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NAS PENSACOLA
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FINAL REMEDIAL INVESTIGATION REPORT
SITE 41 — OPERABLE UNIT 16 — NAS PENSACOLA WETLANDS

NAVAL AIR STATION
PENSACOLA, FLORIDA

SOUTHNAVFACENGCOM
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List of Abbreviations

The following list contains many of the acronyms, initials, abbreviations, and units of measure used in this report.

1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethene
4,4'-DDD	4,4'-Dichlorodiphenyldichloroethane
4,4'-DDE	4,4'-Dichlorodiphenyldichloroethylene
4,4'-DDT	4,4'-Dichlorodiphenyltrichloroethane
ABB	Asea Brown Boveri
ABS_{GI}	Gastrointestinal absorption factor
AL	Action Level
ARARs	Applicable and Relevant and Appropriate Requirements
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
AVGAS	Aviation gas
BEDS	Biological effects dataset
BEHP	Bis(2-ethyhexyl)phthalate
BEQs	Benzo(a)pyrene Equivalents
BCF	bioconcentration factor
bls	below land surface
BNA	Base-neutral/acid extractable
BRA	Baseline Risk Assessment
BSAF	Biota Sediment Accumulation Factor
BTEX	Benzene, toluene, ethylbenzene, xylene
BW	Body Weight (mean body weight of receptor in kg)
C_t	Fish tissue contaminant concentration
CCRREM	Canadian Council of Resource and Environment Ministers
CDF	Chlorinated dibenzofuran
CDI	Chronic Daily Intake
CEC	Cation-Exchange Capacity
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
COC	Chemical of Concern
COPC	Chemical of Potential Concern
cPAH	Polycyclic Aromatic Hydrocarbon
Cr III	Trivalent Chromium
CSAP	Comprehensive Sampling and Analysis Plan
CTL	Cleanup Target Level
%D	Percent Difference
DD	Decision Document
DOC	Dissolved Organic Carbon
DQO	Data Quality Objective

E/A&H	EnSafe/Allen & Hoshall
E&E	Ecology and Environment, Inc.
ECD	Electron Capture Detector
EFDSOUTH	Southern Division, U.S. Navy, Naval Facilities Engineering Command
EnSafe	EnSafe Inc.
EqP	Equilibrium Partitioninq Quotient
ERA	Ecological Risk Assessment
ERED	U.S. Army Corps of Engineers Environmental Residue Effects Database
ERL	Effects Range Low
ERM	Effects Range Mean
f	Fraction of diet composed of fish tissue
FAC	Florida Administrative Code
FCM	Food Chain Multiplier
FDEP	Florida Department of Environmental Protection
FNAI	Florida Natural Areas Inventory
FOTW	Federally Owned Treatment Works
f_{oc}	Organic Carbon Content Fraction
FS	Feasibility Study
g/cm^3	Grams per Cubic Centimeter
g/mole	Grams per Mole
GC/MS	Gas Chromatography/Mass Spectrometry
GFAA	Graphite Furnace Atomic Absorption
GPS	Global Positioning System
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
ICP	Inductively Coupled Plasma
ICS	Interference Check Sample
IDL	Instrument Detection Limit
IR	Installation Restoration/Food ingestion rate of receptor
IRA	Interim Removal Action
IRIS	Integrated Risk Information System
IS	Internal Standard
IWTP	Industrial Wastewater Treatment Plant
K_d	Normalized Partition Coefficient/Distribution Coefficient
K_{oc}	Organic Carbon/Water Partitioning Coefficient
K_{ow}	Octonal/Water Partitioning Coefficient
kg	Kilograms
kg BW/day	Kilograms of body weight per day
kg/day	Kilograms per day
kg/L	Kilograms per liter

LCS	Laboratory Control Sample
LOAEL	Lowest-Observed-Adverse-Effects-Level
LUCIP	Land Use Control Implementation Plan
MATC	Maximum acceptable toxicant concentration
MCAWW	Methods for Chemical Analysis of Water and Wastes
mg/kg	Milligrams per Kilogram
mg/kg/day	Milligrams per Kilogram per Day
mg/kg-day^{-1}	Kilograms per day per milligram
ml	Milliliter
MNA	Monitored Natural Attenuation
MS/cm	Millisiemens per centimeter
MS	Matrix Spike
MSD	Matrix Spike Duplicate
msl	Mean Sea Level
NACIP	Navy Assessment and Control of Installation Pollutants
NAS	Naval Air Station
NATTC	Naval Air Technical Training Center
NCEA	National Center for Environmental Assessment
NEESA	Naval Energy and Environmental Support Activity
NFA	No Further Action
NOAA	National Oceanic and Atmospheric Administration
NRCC	National Research Council of Canada
NSTP	National Status and Trends Program
OERR	Office of Emergency and Remedial Response
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
PBS	Pensacola Bay System
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PEL	Probable Effects Level
PEM	Performance Evaluation Mixture
pH	Hydrogen Ion Concentration
ppm	Parts per million
PQL	Practical Quantitation Limit
PRG	Preliminary Remediation Goal
PWC	Public Works Center
QA	Quality Assurance
QC	Quality Control
RAIS	Risk Assessment Information System
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
Redox	Oxidation/Reduction
RfD	Reference Dose (mg/kg-day)
RGO	Remedial Goal Options

RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable Maximum Exposure
ROD	Record of Decision
RPD	Relative Percent Difference
RRF	Relative Response Factor
%RSD	Percent Relative Standard Deviation
RV	Refinement Value
SAP	Sampling and Analysis Plan
SDG	Sample Delivery Group
SEV	Screening Ecotoxicity Value
SF	Slope Factor
SFF	Site Foraging Factor
SMP	Site Management Plan
SOP/QAM	Standard Operating Procedures and Quality Assurance Manual
SOW	Statement of Work
SPLP	Synthetic Precipitation Leaching Procedure
SQAG	Sediment Quality Assessment Guidelines
SQG	Sediment Quality Guideline
SQT	Sediment Quality Triad
SSL	Sediment Screening Level
SSV	Sediment Screening Value
SV	Screening Value
SVOC	Semivolatile Organic Compound
TAC	Test Acceptability Criteria
TAL	Target Analyte List
TCE	Trichloroethene
TCL	Target Compound List
TEC	Threshold Effects Concentration
TEF	Toxicity Equivalence Factor
TEL	Threshold Effects Level
TOC	Total Organic Carbon
TPAH	Total Polycyclic Aromatic Hydrocarbons
TPH	Total Petroleum Hydrocarbons
TRPH	Total Recoverable Petroleum Hydrocarbon
TTC	Trophic Transfer Coefficient
TtNUS	Tetra Tech NUS, Inc.
g/kg	Micrograms per Kilogram
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WQC	Water Quality Criteria

SITE 41 (OPERABLE UNIT 16) NAS PENSACOLA WETLANDS
EXECUTIVE SUMMARY

A remedial investigation was conducted for Naval Air Station (NAS) Pensacola Site 41, The NAS Pensacola Wetlands, assessing the nature and extent of contaminants resulting from Navy activities and Installation Restoration (IR) program sites discharging to wetlands within the NAS Pensacola boundary and assessing human health and ecological risk. Site 41 encompasses the approximately 81 wetlands or wetland complexes, both tidal and nontidal, that are within the base boundary. These wetlands are either palustrine or estuarine and drain directly into either Pensacola Bay or Bayou Grande. The investigation was conducted in various phases. Phase I was an analysis of existing data to identify those wetlands of greatest concern and identify sample locations for Phase II. Samples collected during Phase II showed metals, pesticides, polychlorinated biphenyls, and semivolatile and volatile organic compounds in particular wetlands. Phase III samples for toxicity, bioaccumulation, and diversity analysis were collected in wetlands thought to pose a risk from toxicological and bioaccumulative effects to estuarine and marine fauna. Phase IV was conducted to confirm surface water exceedances and to collect additional data for mercury in fish and sediment and sediment chemistry and toxicity in Wetland 5B.

As a result of Phase II, wetlands were ranked as either Red, Orange, or Blue based on detected concentrations in sediment. Red-coded wetlands had contamination that appeared directly related to nearby IR sites and had consistent exceedances of SSVs and reference levels. The nine red-coded wetlands identified were Wetlands 64, 5, 3, 4D, 16, 18, 10A, 12, and W1. Contaminants detected in these wetlands were also considered to be possible sources of ecological risk. Orange-coded wetlands had limited contamination above SSVs and reference levels which in some cases did not appear to be related to nearby IR sites. The six orange-coded wetlands identified were Wetlands 1, 15, 6, 63A, 48, and 49. Blue-coded wetlands had contaminants which in most cases were below benchmark values, or which did not appear to be site-related. The 12 blue-coded wetlands included Wetlands 10B, 13, 17, 19, 52, 56, 57, 58, 63B, 72, 79, and W2.

For Phase III of the field investigation, the wetlands were further subdivided according to the nature and extent of sediment contamination and several physical characteristics that could affect contaminant fate and habitat use. By subdividing these wetlands, any risk quantified in one wetland could be extrapolated to determine potential risk in other wetlands in that group. Because Wetland 64 is considered to be unique among the other wetlands, it was grouped by itself in Group A. Group B included Wetlands 3 and 5A. Group C included Wetlands 4D, 15, 16, 18A/B and 63A. Wetlands 16 and 18 were chosen as the representative wetlands for Group C. Group D included Wetlands 10, 6, 5B, W1, and 1, as these wetlands appear as man-made drainage ditches and are in developed areas of the base. Group E included Wetlands 48 and 49, and because of

their intermittent levels of surface water, neither was expected to have a significant ecological concern. Based on HQs and potential receptor species, wetlands in Groups A, B, and C (Wetlands 16 and 18 only in Group C) were selected for sampling priority in Phase III. Groups D and E, along with those wetlands not placed in a group, were not considered for Phase III.

Assessment endpoints studied during Phase III included survival, growth and reproduction of macroinvertebrates associated with the benthic environment (Wetlands 64, 3, 5A, 16, and 18); protection of fish viability using the fathead minnow *(Pimephales promelas)* (Wetlands 3 and 5A); and health of piscivorous birds (great blue heron — Wetland 18 only). Decision making triad analyses were used to round-out the ecological assessment of each wetland studied in Phase IIB/III, to determine if the ecological impacts to sediment and surface water were acceptable or not. At wetlands determined to have chemicals of potential concern (COPCs), a human health risk evaluation was conducted.

As summarized in Table 16-1, the following wetlands are recommended for an FS:

- Wetland 3
- Wetland 5A
- Wetland 64
- Wetland 10 (contingent on confirmatory sampling at location 033M00401)

The following wetlands are being assessed under the FDEP petroleum program, therefore CERCLA has no authority to proceed:

- Wetland 12 (Bilge Water Spill)
- Wetland W1 (UST 18)

All other wetlands are recommended for NFA based on the weight of evidence from the various techniques used to analyze the data and that Navy policy prohibits investigation of wetlands not directly linked to Navy CERCLA/RCRA sites.

1.0 INTRODUCTION

As part of the U.S. Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) program, a Remedial Investigation (RI) was completed at Site 41, the Naval Air Station (NAS) Pensacola wetlands. This site is listed in the Site Management Plan (SMP) of the Installation Restoration (IR) program for NAS Pensacola (Naval Facilities Engineering Command Southeast [NAVFAC Southeast] formerly Southern Division Naval Facilities Engineering Command), U.S. Navy, Naval Facilities Engineering Command, 2003). Site 41 encompasses all of the wetlands potentially impacted by site activities, both tidal and nontidal, within the NAS Pensacola boundary. Field work for the RI took place during multiple events: (1) Phase I was performed during August 1994; (2) Phase II (formerly called IIA) was performed from November 1995 through January 1996; (3) Phase III (formerly called IIB/III) was performed during August and September 1997; (4) additional sediment and whole prey fish tissue sampling was performed at Wetland 64 in August 2001; and (5) confirmation sampling was conducted at Wetlands 5B, 6, 10, 15, 17, 19A, 63A, and 72 in March 2004. This RI Report has been developed by EnSafe Inc. (EnSafe) as contracted by NAVFAC Southeast under Contract Number N62467-89-D-0318/CTO-36.

This investigation was completed in accordance with the primary site documents. These include the *Final Remedial Investigation/Feasibility Study (RI/FS) Work Plan, Site 41, NAS Pensacola Wetlands* (EnSafe/Allen and Hoshall [E/A&H], 1995f); the *Final RI/FS Sampling and Analysis Plan (SAP), Site 41, NAS Pensacola Wetlands* (E/A&H, 1995g); the *Final Comprehensive Sampling and Analysis Plan for Naval Air Station Pensacola (CSAP)* (E/A&H, 1994); and the *Final RI/FS SAP Addendum, Site 41* (E/A&H, 1997d).

EnSafe initiated the investigation to meet the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) program, which administers the investigation and cleanup of former hazardous-waste sites. This RI report summarizes the activities, results, and conclusions of the investigation and provides the basis for a future feasibility study (FS) to be completed at the site.

The RI objectives are outlined as follows:

- To determine the sources, nature, magnitude, and horizontal extent of sediment and surface water contamination associated with the identified IR sites

- To evaluate human health and ecological risk posed by contaminated media onsite through the baseline risk assessment (BRA) process

1.1 Project Organization

The RI was organized into four events. Phase I focused on a qualitative review of each wetland and development of a sampling strategy, including selecting sample locations for Phase II of the investigation.

Event One, Phase I, included:

- Site reconnaissance
- Review of data from previous investigations
- Review of site history, past and present activities, potential sources of contamination, locations of any known surface spills, and historical outfalls or other releases
- Habitat and biota survey
- Review of potential endangered species habitat
- Review of fisheries information
- Review of aerial photographs, topographic maps, and wetland maps

Event Two, Phase II, included:

- Verification of whether suspected contamination identified during Phase I actually existed
- Collection of sediment and surface water samples in wetlands of concern and analysis for chemical and physical parameters
- Selection of sample locations according to those with greatest probability of contamination (i.e., high total organic carbon [TOC], small grain size)
- Tabulated and review of data after sample collection

Event Three, Phase III, included:

- Further analysis of certain wetlands based on contaminant exceedances of sediment screening values and surface water quality criteria
- Linking contamination identified in Phase II to possible toxicological or bioaccumulative effects
- Deciding which wetlands and contaminants appeared to pose an unacceptable ecological or human health risk
- Collecting and analyzing sediment and surface water samples for acute and chronic toxicity, chemical and physical parameters, and benthic diversity
- Collecting and analyzing fish tissue samples for contaminant body burden and contaminant food-chain transfer potential

Event Four, 2001 and 2004 Investigations, included:

- Addressing data gaps identified during data interpretation
- Confirmation sampling based on select Phase II results

1.2 Scope of Report

This RI report summarizes the activities, results, and conclusions of the investigation and provides the basis and justification for an FS if needed and Record of Decision (ROD). The report is divided into sections, which address the major phases of the RI. The actions and results of each phase, how these results affected the actions taken in subsequent phases, and how the results formed the basis for determining risk are detailed. Individual wetlands are separated by operable unit potential impacting them and are presented in Sections 10 through 15. The report also details the data collection and analytical methods used during the investigation.

2.0 ENVIRONMENTAL SETTING

This section describes the physical and ecological setting of the Florida Panhandle and the NAS Pensacola wetlands. This information was incorporated into the Phase I portion of the RI.

2.1 Regional Ecological Setting

According to Wolfe et al. (1988), the Florida Panhandle's wide variety of surface waters and physiographic regions leads to an ecological diversity found in few other areas of the United States. Watersheds of the panhandle support a diverse array of habitats and vegetative communities. Bottomland hardwoods and wetlands predominate in river floodplains. Pines, mixed with a variety of other shrubs, prevail in upland areas. Barrier islands support dune vegetation communities and salt marshes. Bays supporting sea grass meadows and oyster reefs are present in intertidal and subtidal areas.

Seven major rivers in the region discharge into seven estuaries formed at the mouths of the rivers. The Florida Panhandle is a crossroads where animals and plants from the Gulf Coastal Plain reach their eastward distributional limits, and where many northern species reach their southern limits. Many peninsular Florida species are also distributed in this area. Due to the wet temperate climate of the region, the panhandle area may support a higher diversity of species than any other similarly sized territory in the United States (Wolfe et. al, 1988).

The high annual rainfall and low, gently sloping terrain create numerous wetlands in the region. Bogs, swamps, marshes, wet prairies, and wet flatwoods provide a diversity of wetland types that support a wide variety of flora and fauna. Terrestrial vegetation includes mostly second-growth pine forests and encroaching hardwoods (Wolfe et. al, 1988).

The Florida Panhandle's estuaries and near-shore marine habitats are among the greatest natural and economic assets of the region. Important commercial organisms (such as oysters and fish) abound in these areas and contribute to the region's economy. Coastal salt marsh habitats provide critical nursery, feeding, and refuge habitat for these important commercial species. Seagrass beds within estuaries also are vital to the seafood industry (Wolfe et. al, 1988).

2.2 Physical Setting

NAS Pensacola is in the Gulf Coast lowlands physiographic province on a peninsula bound by Pensacola Bay to the south and east and Bayou Grande to the north. The main topographic feature is a bluff that parallels the southern and eastern shorelines of the peninsula. Landward of the bluff is a gently rolling upland with elevations up to 40 feet above mean sea level (msl) (U.S. Geological Survey

[USGS], 1970a,b). In the eastern part of the base, a low and nearly level marine terrace lies east of the bluff with elevations of approximately 5 feet or less above msl, constituting the areas of the former Chevalier Field and Magazine Point.

Site 41 encompasses approximately 81 wetlands and wetland complexes throughout the base. Most wetlands on base are estuarine and drain directly into either Pensacola Bay or Bayou Grande. Less prevalent, exclusively freshwater wetlands on base are not tidally influenced and drain into other wetlands. The wetlands identified at NAS Pensacola are shown on Figure 2-1 (figures are located at the end of each section).

2.3 Ecological Setting at NAS Pensacola

NAS Pensacola, which occupies approximately 5,800 acres, is bound by Bayou Grande to the north and Pensacola Bay to the east and south. To the west, the land changes to less developed swampy lowlands, forests, and beaches. NAS Pensacola's eastern portion is largely developed with military and industrial facilities and historical/cultural sites. Most of the installation's activities are on the eastern side of the base.

NAS Pensacola is the setting for numerous aquatic and terrestrial habitats, from coastal strand and estuarine environments along the bay and bayou to inland pine flatwood communities. Wetland environments include a broad spectrum of both estuarine and palustrine (freshwater) wetlands, many in states of recovery as they undergo reforestation or return to their natural condition.

Vegetation Communities

NAS Pensacola's natural vegetation communities fall into several broad categories (U.S. Fish and Wildlife Service [USFWS], 1987):

1. Coastal dune scrub communities are associated with shorelines and subject to high-energy waves.

2. Pine flatwood communities in coastal lowlands are characterized by trees tolerant to various soil moisture conditions. Tree species in flatwood communities are short, with a wide variety of small shrubs and herbaceous plants in the understory.

3. Hardwood/pine communities are highly diverse and are considered biologically productive ecosystems.

4. Sand pine scrub communities on well-drained sandy soil contain sand pines, oaks, and various shrubs.

5. Bay swamps, which are wetlands with titi and cypress, are known to contain permanent standing water and high accumulations of organic peat.

6. Freshwater marshes occur as grass/sedge/rush/herb communities in areas with high soil saturation or standing water.

7. Estuarine coastal marshes consist of salt-tolerant plants able to establish themselves in shifting sands. Estuarine coastal marshes, including salt marshes, occur along low-energy shorelines and in tidal bayous.

Wildlife

NAS Pensacola habitats provide potential ranges for a wide variety of animal life such as deer, squirrel, opossum, raccoon, fox, beaver, and bobcat. The station's beaches serve as resting, feeding, and nesting areas for various shorebirds. Ospreys have been observed nesting along undeveloped shoreline areas of the Big Lagoon, southeast of the Forrest Sherman Airfield. Numerous small mammals, amphibians, and reptiles also inhabit the base. The coastal marsh, submerged grass bed, and shallow water habitats at NAS Pensacola help support fishery communities within the Pensacola Bay estuarine complex. Approximately 180 species of bony fishes form the basis of the Pensacola Bay fish community (USFWS, 1987).

Threatened and Endangered Species

Appendix A of the *Comprehensive Natural Resources Management Plan for NAS Pensacola and Outlying Field Bronson* (USFWS, 1987) lists the rare, threatened, and endangered species that may be found within NAS Pensacola boundaries. EnSafe investigations of different areas at NAS Pensacola have identified the osprey, great blue heron (as well as other shorebirds), gopher tort, snapping turtle, Godfrey's golden aster, Carolina lilaeopsis, white-top pitcher plant, and narrow-leaved sundew (E/A&H, 1995f). Some of these species are considered candidates for listing as rare, threatened, or endangered by the Florida Natural Areas Inventory (FNAI, 2003). Candidate species are not yet officially listed and thus have no legally protected status.

Wetlands at NAS Pensacola

Wetlands are organized by those found in the western and eastern portion of the base. For risk evaluation, each wetland is considered equally attractive for recreational use. This assumption is important in quantifying human health risk, which is addressed by wetland in Section 10.

Western Portion

The western portion of the base contains heavily forested or marginally altered zones west of Sherman Field. The area contains palustrine forested wetlands, or forested wetlands mixed with scrub-shrub vegetation. Also west of Sherman Field are runway overrun areas, which have been cleared of trees and are dominated by scrub-shrub vegetation. Many of these altered areas appear to be dry but contain common wetland plant species. Portions of the forested and scrub-shrub areas have standing water and saturated soil; these conditions support emergent wetland plant species, some of which are considered threatened. Several drainage ditches that drain surface runoff from the airfield and surrounding areas also support wetland species. These ditches are a part of the NAS Pensacola storm water drainage system for the western portion of the base, and receive surface runoff from numerous outfalls located across a roughly 420-acre area that includes Sherman Field and areas occupied by the NAS Pensacola Public Works Center (PWC). The ditches drain into either Bayou Grande or the Intercoastal Waterway/Pensacola Bay.

Additional palustrine wetlands, as well as estuarine wetlands and aquatic beds, are present in the shoreline areas to the south and southwest of Sherman Field. Estuarine emergent wetlands are present in the inlets off the Intercoastal Waterway/Pensacola Bay, with palustrine emergent species in the more brackish upper-water reaches. Submerged aquatic plant beds can be found in the larger coves and immediate offshore areas. Areas of saturated soil inland from the shoreline accommodate palustrine forested and scrub-shrub wetlands, sometimes mixed with emergent plants. Standing water in the same area supports trees, shrubs, and emergent/floating leaf vegetation. Small inlets to Bayou Grande north of Sherman Field support estuarine emergent wetlands. Many of the estuarine emergent wetlands are fed by palustrine wetlands, especially where the inlet is fed by drainage ditches or intermittent streams.

Eastern Portion

About one-third of the wetlands are in the more developed eastern portion of the NAS Pensacola peninsula, and these are almost exclusively smaller remnant features. These wetlands may have been heavily impacted by base activities (Ecology and Environment Inc. [E&E], 1992). There are isolated palustrine wetlands near Site 1, the Sanitary Landfill, directly west of the NAS Pensacola golf course. Several ponds on the golf course drain into Bayou Grande and support palustrine

wetlands inland from the bayou and estuarine wetlands along the bayou shoreline. Areas near the former Chevalier Field/current Naval Air Technical Training Center (NATTC) and the wastewater treatment plant contain several small wetlands. Many occur as palustrine forested wetlands in small, isolated wooded areas. Emergent wetland plants occur in several drainage ditches that form a part of the NAS Pensacola storm water drainage system for the eastern portion of the base. These ditches receive surface runoff from numerous outfalls located across a roughly 300-acre area that includes the NATTC and developed areas to the south and southwest, the Bachelor Officers' Quarters and Officer housing area, and the Air Traffic Control School and former Naval Aviation Depot (NADEP) Dynamic Components Division complex along Murray Road. The drainage ditches direct surface runoff from these areas into the Yacht Basin, which is west of the Magazine Point Peninsula. There are estuarine and palustrine emergent wetlands at the upper end of the Yacht Basin, which is connected to Bayou Grande. Two isolated emergent wetlands lie on the eastern fringe of the NATTC/former Chevalier Field area, next to the former Dredge Spoil Fill Area (Site 14). These two wetlands also receive surface runoff via storm water outfalls from the eastern and southeastern portions of the NATTC/former Chevalier Field.

2.4 Area Climate

The Pensacola area has a mild, subtropical climate with average annual temperatures ranging from 55°F in the winter to 81°F in the summer. Daily temperatures can be more extreme, ranging from less than 7°F in the winter to more than 102°F in the summer. Convective thunderstorms, which occur on approximately half the summer days, can cause a precipitous drop in temperature of 10°to 20° in a matter of minutes (E&E, 1992).

Rainfall averages approximately 60 inches a year, with the highest amounts in July and August, when thunderstorms occur almost daily. Thunderstorms resulting in 3 to 4 inches of rain in an hour are common. Rainfall is lowest during spring and fall (4 inches average per month). In general, spring and fall rains are less intense, last longer, and produce less surface runoff but higher rates of infiltration and net recharge (E&E, 1992). Based on climatological data, November is the driest month of the year, with an average rainfall of 3.2 inches.

Winds, which prevail from the north during the winter and the south during the summer, are generally moderate in velocity, except during thunderstorms. A difference in the ocean-land temperature produces the sea-breeze effect, a daily clockwise rotation in the surface wind direction near the coast.

In addition, hurricanes and tornadoes can substantially damage the near-shore environment. Hurricanes Erin and Opal made landfall in Pensacola in August and October 1995, respectively.

Hurricane Georges made landfall about 50 miles west of Pensacola near Mobile, Alabama, in September 1998. Hurricane Ivan made landfall west of Pensacola near Gulf Shores, Alabama, in September 2005, and Hurricane Dennis made landfall east of Pensacola near Navarre Beach, Florida in July 2005.

Figure 2-1 NAS Pensacola Wetlands and Associated Sites

FIGURE 2-1
NAS Pensacola Wetlands and Associated Sites

Final Remedial Investigation Report
Site 41
NAS Pensacola, FL

Date: 11/22/04 | Drwn by: CT | File: K:/GIS/Navy-Pensacola/CTO-036/Projects/ri_report/Fig2-1.mxd

0 900 1,800 3,600 5,400 7,200 Feet

NAVFAC Naval Facilities Engineering Command SOUTHERN DIVISION

3.0 PHASE I METHODS AND RESULTS

Phase I focused the Site 41 investigation toward those wetlands considered to be of greatest concern and determined sample locations for Phase II. The Phase I tasks and recommendations are described below.

3.1 Document Review

Before visiting the wetlands to select sample locations, existing information was reviewed to better focus the investigation on those wetlands with the greatest apparent risk potential. This review was performed using the following information:

- Data from terrestrial site investigations associated with the wetlands of concern
- Site history, past and present activities, and potential sources of contamination
- Reported locations of any known surface spills, historical outfalls, or other releases
- Existing habitat and biota surveys that identify vegetation patterns, endangered species habitat, fisheries information, and other special concerns
- Aerial photographs, topographic maps, and wetland maps

This information was used to identify potential wetlands of concern, possible risk from contaminants in those wetlands, likely contaminant pathways, and key potential ecological receptors.

3.2 Site Reconnaissance

The site reconnaissance was performed during August 1994 to physically survey each wetland on base, compare site observations with the data gathered during the document review, and select suitable sample locations in identified wetlands of concern. Sample locations were biased to areas of likely contamination near outfalls and natural drainage features, and to areas of preferential contaminant deposition (i.e., low grain size, high TOC).

The Phase I document review and site reconnaissance identified other important features needed to complete the RI. The identification of potential contaminants of concern (COCs) and potential receptors enabled development of measurement and assessment endpoints, a general conceptual model, and the wetland-specific conceptual models. Measurement endpoints were selected to best represent key exposure and effects pathways in relation to assessment endpoints and the conceptual model. In

turn, these endpoints and models provided the technical basis for choosing toxicity, diversity, and bioaccumulation analyses in a subsequent phase to link contaminant levels with observed effects.

3.3 Phase I Results

Phase I results included the identification of wetlands that required further study and the justification for the Phase II sampling approach. Sediment and surface-water sample locations were also selected for those wetlands. This information is detailed extensively in Section 4 of the *Final RI/FS SAP for Site 41* (E/A&H, 1995g). Table 3-1 (derived from E&E, 1992 — tables are located at the end of each section) summarizes the sites at NAS Pensacola that were initially suspected of impacting particular wetlands. Site locations are shown on Figure 2-1. Based on additional investigations, Sites 25, 27, 43, and 44 were added; these are described in Section 3.4.

Section 2 of the *Final RI/FS SAP for Site 41* (E/A&H, 1995g) describes the general conceptual model and identifies the measurement and assessment endpoints developed based on Phase I activities. Following a review of the data collected during Phase II, assessment and measurement endpoints were re-evaluated and revised. A wetland-specific conceptual model was developed for each wetland selected for further study. The revised endpoints, conceptual models, and the justification for their selection are provided in the *Final RI/FS SAP Addendum, Site 41, Wetlands* (E/A&H, 1997d).

3.4 Additional Sites

Sites 25, 27, 43, and 44 were evaluated after completion of the original Phase I site reconnaissance. Sites 25 and 27 are part of Operable Unit (OU) 2 (EnSafe, 1997b). Field investigations for these sites were conducted between 1993 and 1995. Sampling and analysis to evaluate potential impacts from these sites were incorporated into Phase II. A site investigation has not yet been performed for Site 44. Sites 25, 27, and 43 are discussed below.

Site 25

Site 25, the radium spill area, is a reported radium spill in a concrete-paved area immediately east of the radium decontamination building (Building 780). An unpaved area containing scrapped helicopters is approximately 35 feet east of the building.

The spill reportedly occurred in 1978 on the area when a corroded drum broke open, spilling approximately 25 gallons of radioactive waste. Drainage from this area appears to flow east, toward the unpaved scrap yard.

Soil samples revealed a wide range of primary/secondary metals and semivolatile organic compound (SVOC) contamination, but no radium was found. Groundwater samples collected at the site contained metals, chlorinated solvents, benzene, and xylene (EnSafe, 1997b).

Another location of concern at Site 25 is the storage yard behind Building 225, which was formerly used as a metal prefabricating shop by the NAS PWC. Groundwater from the site contained metals and tetrachloroethylene (PCE). Activities in and around this building are the likely sources of groundwater contamination. Wetland 64, within the Yacht Basin, is potentially impacted by this site (EnSafe, 1997b).

Site 27

Site 27 is a former radium dial shop in Building 709, approximately 150 feet west of Site 25. The building contained a number of operations, including a carburetor repair shop, propeller shop, paint shop, maintenance shop, and various instrument shops (including a radium paint room) and operated from 1940 to 1976. All or most of the chemical wastes appear to have been dumped down building drains, which lead to the sanitary sewer. Building 709 was dismantled in 1976, and the remaining concrete pad is being used as a parking lot. Approximately 1,500 gallons of radioactive waste was reported to be disposed of through drains in the floor of the building each year. These drains led to the sanitary sewer system. A portion of the drainpipe was excavated to 18 inches below ground surface and found to emit radiation at a rate of 1.2 milliroentgen per hour (mR/hr).

Wells previously installed by ABB Inc. to support the removal of underground storage tanks (USTs) at this location were included in the site investigation. Soil contaminants at Site 27 included aluminum, arsenic, cadmium, chromium, iron, mercury, and dieldrin. Groundwater results revealed drinking water standard exceedances for primary/secondary metals, SVOCs, and volatile organic compounds (VOCs). VOC exceedances included chlorinated solvents such as PCE, trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), 1,2-dichloroethane (1,2-DCA), and benzene, toluene, ethylbenzene, and xylene (BTEX). The former USTs are likely contributors of contamination in these wells. Based on site topography, Wetland 5 may have been impacted by Site 27 activities (EnSafe, 1997b).

Site 43

Site 43 is an area of drums and other debris near the corner of Murray and Taylor Roads, across from Site 10. The area was identified and fenced off from the public in January of 1994. The site was investigated in 2001, and an interim removal action (IRA) was performed in 2002 (CH2MHill, 2003b). The IRA included the removal of the upper 6 inches of soil and any exposed metal debris, followed by backfilling with a low-permeability material. However, contaminated soil remained above

leachability criteria; therefore, this screening site has been elevated to an RI status. A human-health risk-assessment and ecological risk-assessment is planned.

Site 44

This site was transferred from the Florida Petroleum Program to the IR program because chlorinated solvents were detected in groundwater. The site, near an active hangar (Building 3221) on Forrest Sherman Field, is currently used by the nearby aviation museum for aircraft storage and restoration. Further investigation has not been performed at this site, which could potentially impact downgradient Wetlands 79, 52, and W2.

3.5 Site Investigation Update

As shown in Table 3-1 and discussed in Section 3.4, many of the sites identified as potential sources of wetland contamination have either been remediated, are pending remediation under the state petroleum program, are pending further investigation, or have been designated as sites requiring no further action (NFA).

Investigations of the NFA sites are considered complete under the IR program, indicating no excess ecological risk was found at these sites. However, historical contamination associated with these sites may have impacted downgradient wetlands. NFA site activities are summarized below and are detailed in their respective RI or preliminary site-characterization reports.

Appendix A contains data tables from the site reports for those terrestrial sites that are adjacent to the wetlands investigated under Site 41.

Site 4

In the 1950s, rubble from the former Fort Barrancas was disposed in this area. The rubble included timber, pipes, mattresses, and other wastes. None of the wastes was documented as being incinerated before disposal. Inorganic constituents exceeding preliminary remediation goals (PRGs) in site soil were similar to those identified at previously investigated sites in the eastern portion of NAS Pensacola (E/A&H, 1997e). The detected PAH contaminants are likely associated with routine activities such as automobile traffic or the asphalt pavement (E/A&H, 1997e). The USEPA Region 4 (USEPA Region 4, 1997b) and FDEP (FDEP, 1997c) approved remedial alternative for Site 4 was no action.

Site 5

Site 5 was a cover material source for Site 1, the Sanitary Landfill. Concentrations detected during the Site 5 investigation were below PRGs (E/A&H, 1995a). A previous UST investigation at Site 3221NE,

adjacent to the northwest corner of Site 5, showed that the contaminants there were not associated with Site 5 (E/A&H, 1995a). Site 3221NE will be addressed under the Florida Petroleum Program. The USEPA (USEPA Region 4, 1995a) and FDEP (FDEP, 1995a) approved remedial alternative for Site 5 was no action.

Site 6

Site 6 is an active construction-rubble-debris landfill subject to State of Florida solid waste regulations. Therefore, the site was not investigated under the IR program. FDEP concurred with the finding in 1997 (FDEP, 1997d).

Operable Unit 6: Sites 9, 29, and 34

Site 9 was the station disposal site for the old Navy Yard. The earliest records show that disposal occurred here from 1917 until sometime during the 1930s. It is unknown what was disposed here besides domestic refuse. Soil and groundwater contamination were delineated during the OU 6 RI (E/A&H, 1997f). Soil contamination at each site was removed. At Sites 9 and 29, soil contamination appeared to be limited to small, isolated constituent concentrations (E/A&H, 1997f). Therefore, a removal action of the metal and PAH-contaminated soils was performed in 1998. Dieldrin-contaminated surface and subsurface soil was removed from Site 9B in 1995.

Elsewhere at Site 9, soil contamination was limited to isolated inorganics, PAHs, and pesticides in surface and subsurface soil. At Sites 29 and 34, dieldrin- contaminated surface and/or subsurface soil was removed in 1995 (E/A&H, 1997f).

Much of the rest of the OU 6 area was covered with fill material, buildings, or asphalt pavement during construction of the NATTC. The selected remedial alternative for the OU 6 sites was NFA, with the ROD (EnSafe, 2000), approved by the USEPA in 1999 (USEPA Region 4, 1999) and FDEP in 2001 (FDEP, 2001).

Site 10

Site 10, Commodore's Pond, was used in the mid-1800s for underwater storage of wooden timbers for shipbuilding. There is no evidence of hazardous-material use, storage, or disposal at this site.

Several detections of dieldrin above its PRG were noted in soil, resulting in the contaminated soil being removed (E/A&H, 1995b). Based on two groundwater sampling events, dieldrin did not appear to be leaching to nor impacting shallow groundwater. Detected concentrations in groundwater were

below federal and state standards for drinking water (E/A&H, 1995b). The USEPA (USEPA Region 4, 1996b) and FDEP (FDEP, 2000) approved remedial alternative for Site 10 was NFA.

Site 13

The site extends along the eastern waterfront of the base, including Magazine Point and the waterfront of the eastern side of Chevalier Field. Wetland 10 may have been impacted by Site 13.

Site 13 is the Magazine Point Rubble Disposal Area consisting of the construction debris piles and fill along the eastern clay road on Pensacola Bay and the recent dredge-spoil dumping ground at the northern tip of Magazine Point. The site was used to dispose of various clean fill materials, including building rubble, bricks, metal, concrete, and wood. There is no evidence of any hazardous-materials disposal. Detected concentrations of some parameters were identified sporadically in soil associated with the dredge-spoil material (E/A&H, 1995h). Low to not-detected concentrations of all contaminants except sodium (naturally occurring) were present in Site 13 monitoring wells (E/A&H, 1995h). Site 13 was approved for "no action" in 1996 by EPA (USEPA Region 4, 1996a) and FDEP (FDEP, 1995h).

Site 14

This site was created between 1975 and 1977 by depositing spoils from dredging operations in Pensacola Bay. Samples of the basin's dredge material, collected during the Site 14 investigation, contained metals and organic compounds, notably PCBs (E/A&H, 1995c). However, soil contamination appeared limited to the site interior and did not appear to have spread outside its boundaries (E/A&H, 1995c). Site-specific groundwater contamination does not appear to be present (E/A&H, 1995c). Therefore, potential contaminant migration into Wetland 63A or Wetland 63B is of minimal concern.

After the berms of the site were collapsed into the sediment basins, eliminating potential exposure pathways, Site 14 was approved by USEPA (USEPA Region 4, 1996c) and FDEP (FDEP, 1996a) for NFA.

Site 16

Site 16 occupies approximately 30 acres of a sparsely vegetated, open field immediately northeast of Sherman Field. It was reportedly used between the late 1960s and 1973 for the disposal of pruning and tree-trimming refuse. However, the area may have been used for garbage incineration and ash disposal. There was no evidence of chemical usage onsite. A visual inspection showed evidence of brush and several pieces of metal onsite (E/A&H, 1997a).

Inorganic constituents exceeding PRGs in site soil were similar to those identified at other sites in the area (E/A&H, 1997a). Elevated soil PAH concentrations likely originated from a source not related to site activities (E/A&H, 1997a). Detected concentrations of aluminum and iron in groundwater were below their respective reference concentrations at all locations but one for each constituent (E/A&H, 1997a). The USEPA (USEPA, 1997c) and FDEP (FDEP, 1997a) approved alternative for Site 16 was "no action."

Site 36

Site 36, the Industrial Wastewater Treatment Plant (IWTP) sewer line, is approximately 1 mile wide by 5.5 miles long in a broad area within the southeastern portion of the activity. The sewer flows towards the IWTP in the northeastern corner of Site 36. Portions of this line traversed near Wetlands 5A/B, 6, 7, 8, 63A, and 64. Resources downgradient of Site 36 are adjacent wetlands and Pensacola Bay. In 1995 the segment of the sewer line extending from Site 38 through OU 6 to the IWTP was flushed. Since much of the site area near wetlands is paved or covered by buildings or fill material, leaching and sediment transport were not considered to be viable pathways for constituent transport (E/A&H 1997b). Groundwater transport, the only viable transport pathway, contained low concentrations of contaminants (E/A&H 1997b). The USEPA (USEPA Region 4, 1997a) and FDEP (FDEP, 1997b) approved remedial alternative for Site 36 was NFA.

Site 39

Site 39, the Oak Grove Campground, is an area of stained soil and debris exhibiting a hydrocarbon odor. It is not known how this stain originated, but it is suspected that campers may have poured used motor-oil onto the ground. Records indicated that a saw mill was once located near this site. Analytical results indicated the stain was petroleum-based (E/A&H, 1995e). A removal action was performed between July 25 and July 29, 2004. Approximately 864 tons of soil were removed from the site and replaced with clean fill. Groundwater was also sampled during the investigation (E/A&H, 1995e). Tetrachloroethene and 1,1-dichloroethane (first round of sampling) and tetrachloroethene (second round of sampling) were the only organic compounds present in groundwater. These VOCs were only in the top of the uppermost aquifer zone; all VOC concentrations were below drinking-water standards. Aluminum and iron exceeded secondary drinking-water standards concentrations were aluminum and iron. In addition, arsenic, barium, calcium, lead, magnesium, and vanadium exceeded their respective NAS Pensacola reference (background) concentrations. In the lower portion of the uppermost aquifer, only iron exceeded a secondary drinking-water standard. Concentrations of aluminum, iron, calcium, and sodium are comparable with NAS Pensacola reference concentrations or those for ambient groundwater quality of the Sand and Gravel aquifer in this area. In addition, calcium, iron, magnesium, and sodium are essential nutrients and are only toxic at extremely high concentrations. Due to the limited contamination

found in the remedial investigation and the removal of the stained soil, the site did not warrant the detailed evaluation of remedial alternatives associated with a feasibility study. The proposed plan (E/A&H, 1995d) and ROD (E/A&H, 1995e) presented a "no-action" alternative that was approved by USEPA (USEPA Region 4, 1995b) and FDEP (FDEP, 1995b).

3.6 Petroleum Sites

In addition to the IR sites, petroleum sites also have the potential to impact NAS Pensacola wetlands. The sites, tanks, contents, and identified groundwater contaminants are summarized in Table 3-2. Petroleum site locations are shown in Figure 2-1. Their potential impact to individual wetlands is discussed in the Section 10.

3.7 Prioritization and Recommendations for Phase II Sampling Locations

Based on the results of the Phase I investigation, the wetlands were prioritized for Phase II sampling as listed in Table 3-3, with those perceived to be the most susceptible to contamination given the highest sampling priority. Generally, wetlands at the eastern side of the base have highest priority. This includes wetlands in the Yacht Basin and Operable Unit (OU) 10. Wetlands 5, 6, and 64, associated with Site 30, and the wetlands associated with Site 1 are also high priority. Table 3-3 shows the order of all wetlands to be sampled and number of samples selected.

In all cases, sample locations were selected based on conditions found during the site reconnaissance. Sample locations were selected in areas thought most likely influenced by surficial contaminant runoff or groundwater contaminant influences. It has been established that groundwater flow mimics topography at NAS Pensacola; by planning sample locations based on topography, likely areas of groundwater and surface water influence can be determined. All sample locations were selected in areas of high sedimentation or topographic depressional areas where contaminants would likely accumulate from immediate and long-term influences. Some sample locations were selected at the wetland area nearest the site to capture any immediate influences. Other locations were selected in areas of ponding or high sedimentation, where it is suspected that long-term groundwater influences would be at their maximum and where organic carbon and fine-grained sediment distribution would most likely retain any contaminants. Final sediment sample locations are shown on the figures presented in Sections 10 through 15 with the wetland investigation findings.

Table 3-1
Sources and Pathways of IR Site-Related Contamination
Potentially Impacting Site 41

Source (Site)	Site Name	Known or Suspected Contaminants	Years of Operation	Potential Pathway(s)	Specific Wetland(s)[a] Potentially Impacted	Selected Remedial Alternative for Source
1 (OU 1)	Sanitary Landfill	Metals, TRPHs, VOCs, PAHs, phenols	30 (1950-1980)	Groundwater, surface runoff	1-4, 15-18, W2b	Land Use Control Implementation Plan (LUCIP) for soil to restrict intrusive activities; MNA with a groundwater interception trench upgradient Wetland 3
3 (UST 18)	Crash Crew Training Area	Metals, TRPHs, VOCs, PAHs, phenols	42 (1955-1997)	Surface runoff into storm water drain	39, 52, 54, 62, 72, W1[b]	Additional Assessment is ongoing.
4	Army Rubble Disposal Area	Unknown	Unknown	Groundwater	52, 56-58	NFA-1997
5	Borrow Pit	Unknown	Unknown	Groundwater, surface runoff	79, 55, W2[b]	NFA-1995
6	Fort Redoubt Rubble Disposal Area	Unknown	Unknown	Groundwater, surface runoff	79,W2[b]	NFA-1997
9 (OU 6)	Navy Yard Disposal Area	Metals, TRPHs, PAHs	13 (1917-1930s)	Groundwater, surface runoff	6-8, 64	NFA-1999
10	Commodore's Pond	Metals, TRPHs, PAHs, phenols	Unknown (1800s)	Groundwater, surface runoff	6-8, 64	NFA-1996
11 (OU 2)	North Chevalier Disposal Area	Metals, TRPHs, VOCs, PAHs, phenols	Unknown (1930s-present)	Groundwater, surface runoff, direct discharge	7-8, 64	Pending
12 (OU 2)	Scrap Bins	Metals, TRPHs, PAHs, phenols, PCBs	60 (early 1930s-present)	Storm water drainage	6-8, 64	Pending
13	Magazine Point Rubble Disposal Area	TRPHs, VOCs, PAHs, phenols[c]	Unknown	Groundwater	10	NFA-1996
14	Dredge Spoil Fill Area	Metals, TRPHs, VOCs, PAHs, phenols	19 (1975-1994)	Groundwater, storm water overflow	63B	NFA-1996
16	Brush Disposal Area	Metals	Unknown (1960s-present)	Groundwater, surface runoff	19,W2[b]	NFA-1997

Table 3-1
Sources and Pathways of IR Site-Related Contamination
Potentially Impacting Site 41

Source (Site)	Site Name	Known or Suspected Contaminants	Years of Operation	Potential Pathway(s)	Specific Wetland(s)[a] Potentially Impacted	Selected Remedial Alternative for Source
19	Fuel Farm Pipeline Leak Area	Metals, TRPHs, PAHs, VOCs	Single incident (1958)	Groundwater, surface runoff	49, 52, 54	Contaminated Soil Excavation and Disposal. Groundwater remediation using nutrient injection treatment technology.
23	Chevalier Field Pipeline Leak Area	Metals, TRPHs, PAHs, phenols	Two incidents (1965, 1970)	Groundwater, surface runoff	6-8	NFA 2001
25	Radium Spill Site	Metals, VOCs	Single incident (1978)	Groundwater	64	Pending
27	Radium Dial Shop Sewer	Metals, VOCs	1940-1976	Groundwater	5	Pending
29 (OU 6)	Soil South of Building 3460	Metals, TRPHs, PAHs, VOCs	Unknown (1970s-1980s)	Groundwater	6-8, 64	NFA-1999
30 (OU 2)	Buildings 649 and 755	Metals, TRPHs, VOCs, PAHs, phenols	30 (1940s-1970s)	Groundwater, surface runoff, direct discharge	5-8, 64	Pending
32,33,35 (OU 10)	Industrial Wastewater Treatment Plant	Metals, VOCs, BNAs	24 (1973-1997)	Groundwater, surface runoff	7-13	Soil NFA; Groundwater recovery system
34 (OU 6)	Solvent North of Building 3557	Metals, TRPHs, PAHs, phenols	Single incident (1984)	Groundwater	6-8, 64	NFA — 1999
36	Industrial Waste Sewer	Metals, TRPHs, VOCs, PAHs, phenols	24 (1973-1997)	Groundwater	5-13, 63	NFA — 1997
37	Sherman Field Area	Metals, TRPHs, VOCs, PAHs	Single Incident (1983)	Groundwater	48, 52, 54	Multi phase extraction for removal of free product and remediation of contaminated soil
39	Oak Grove Campground	TRPHs, VOCs	Unknown	Groundwater	56	NFA — 1994
43	Demolition Debris Disposal Area	Metals	Unknown	Groundwater	5, 6	Pending

Table 3-1
Sources and Pathways of IR Site-Related Contamination
Potentially Impacting Site 41

Source (Site)	Site Name	Known or Suspected Contaminants	Years of Operation	Potential Pathway(s)	Specific Wetland(s)[a] Potentially Impacted	Selected Remedial Alternative for Source
44	Solvent near Bldg 3221	VOCs	Unknown	Groundwater	79,52,W2	Pending

Notes:
a = Wetland number corresponds USEPA wetland inventory (USEPA, 1991a)
b = Wetlands not identified in USEPA wetland inventory (USEPA, 1991a)
c = Suspected source of these contaminants is the former Industrial Wastewater Treatment Plant (Sites 32, 33, and 35). *Source:* Modified from E&E, 1992.

Table 3-2
Petroleum Sites Potentially Impacting NAS Pensacola Wetlands

Map Label	Site Name	Tanks/Size	Contents	Groundwater Contaminants
UST A	3221 SW	1/1,000 Gal	Waste Oil, PD-680	TCE, PCE, Methylene Chloride
UST B	PWC Site 4	Sludge Disposal	Waste Oil, Jet Fuel	Petroleum Hydrocarbons
UST C	PWC Site 1	Pipeline	JP-5	Petroleum Hydrocarbons
UST D	Building 604	Unknown	TCE	Chlorinated Solvents
UST E	DFM Pipeline	Pipeline	Diesel	None
UST F	607NE	2/500 Gal	Waste Oil, Jet Fuel	Lead
UST G	2662W	1,000 Gal	Used Oil, Jp-5	BTEX
UST H	3557	2/500 Gal	Waste Oil	None
UST I	3220	Multiple Tanks/Unknown Size	Diesel, Waste Oil, TCE	Unknown
UST J	3450W	Multiple/1,000 Gal	Gasoline	TCE, 1,1,1-trichloroethane
UST K	PWC Site 3/3810N	1/500 Gal	Fuel Oil	TRPHs, PAHs
UST L	3644	2/8,000 Gal	Diesel	Petroleum Hydrocarbons
UST M	709N,S	3/2,000 Gal	Fuel Oil	Unknown
UST N	647, 648, 649, 692	3/1,000 Gal, 3/500 Gal	Waste Oil, Kerosene	Unknown
UST O	UST 18	Open Pits	Jet Fuel, Waste Oil	BTEX, Lead
UST P	Sites 1 to 13	AVGAS Line and 12 Tanks/500 Gal	Jet Fuel	Lead, Petroleum Hydrocarbons
UST Q	Radar Site 3255	1/300 Gal	Diesel	Petroleum Hydrocarbons
UST R	3221 NE	1/500 Gal	Waste Oil, Water Tainted JP-5	None
UST S	Site 19	Pipeline	Jet Fuel	Petroleum Hydrocarbons
UST T	Site 20	1/1,511,580 Gal, AST	JP-5	Petroleum Hydrocarbons
UST U	Site 26	Unknown	Jet Fuel	Petroleum Hydrocarbons
UST V	Site 23	Unknown	Jet Fuel	Petroleum Hydrocarbons

Table 3-2
Petroleum Sites Potentially Impacting NAS Pensacola Wetlands

Map Label	Site Name	Tanks/Size	Contents	Groundwater Contaminants
UST W	Site 26	Unknown	Jet Fuel	Petroleum Hydrocarbons
UST X	Site 27	Unknown	Jet Fuel	Petroleum Hydrocarbons

Notes:
[a] = Wetland number corresponds to USEPA wetland inventory (USEPA, 1991a)
[b] = Wetlands not identified in USEPA wetland inventory (USEPA, 1991a)
[c] = Suspected source of these contaminants is the former Industrial Wastewater Treatment Plant (Sites 32, 33, and 35)
LUCIP = Land Use Control Implementation Plan
MNA = Monitored Natural Attenuation
NFA = No Further Action
OU = Operable Unit
PAHs = Polycyclic Aromatic Hydrocarbons
PCBs = Polychlorinated Biphenyls
TRPHs = Total Recoverable Petroleum Hydrocarbons
UST = Underground Storage Tank
VOCs = Volatile Organic Compounds

Source: Derived from E&E, 1992.

Table 3-3
Phase II Wetlands Sampling Priority

Wetland	Number of Samples Planned	Justification
Wetlands 7, 8, and 64 (Yacht Basin)	24 Sediment 5 Surface Water	Based on previous investigations, the Yacht Basin may have received contaminants from many sites, including 9 through 13, 29, 30, 36, and OU 10 and from activities within the Yacht Basin itself. Contaminants have likely migrated via surface water or groundwater. Some outfalls present will be sampled, but transects are also required to cover such a large area.
Wetland 5	9 Sediment 5 Surface Water	Wetland 5 has been impacted, probably by Site 30. Previous investigations, including an immediate removal action, have taken place in this wetland. See text describing previous results.
Wetland 6	11 Sediment 3 Surface Water	Wetland 6 has possibly been contaminated from most of the sites that have impacted the Yacht Basin. Sample locations were selected based on surface outfalls.
Wetland 1	4 Sediment 2 Surface Water	Limited sampling of this wetland was performed by USEPA and by E/A&H. Sample locations are selected to characterize the extent of potential contaminants in other areas of the wetland.
Wetland 3	6 Sediment 2 Surface Water	Samples have been collected in this wetland by USEPA and E/A&H. Sample locations are selected to characterize the extent of potential contaminants in other areas of the wetland.
Wetland 4D	5 Sediment 3 Surface Water	Previous data exists for Wetland 4D only. Samples will help characterize the extent of potential contaminants in other areas of the wetland.
Wetland 15	4 Sediment 2 Surface Water	USEPA has collected samples here, but additional data are needed to confirm whether any influences exist from Site 1.
Wetland 16	3 Sediment 2 Surface Water	USEPA and E/A&H have collected samples in this wetland. It appears to be Impacted by Site 1. Additional samples are needed to characterize the extent of contamination.
Wetland 17	3 Sediment 1 Surface Water	USEPA collected samples in this wetland. It does not appear to be impacted by Site 1, but additional samples will be needed to confirm this.
Wetland 18	4 Sediment 2 Surface Water	USEPA and E/A&H have both collected samples. Wetland 18 appears to be impacted by Site 1. Additional data are required to characterize the extent of potential contaminants in other areas.
Wetlands 10A/10B, 11, 12, and 13	6 Sediment 3 Surface Water	This wetland was sampled by E/A&H and is suspected of being impacted by OU 10. Sample locations are selected to characterize the extent of potential contaminants in other areas of this wetland.
Wetland 63A	5 Sediment 2 Surface Water	Potential impacts from Chevalier Field and Building 3380. Little is known about this area.
Wetland 63B	4 Sediment 2 Surface Water	Potential impacts from Chevalier Field. Little is known about this area.

Table 3-3
Phase II Wetlands Sampling Priority

Wetland	Number of Samples Planned	Justification
Wetland W1	3 Surface Water	Three sediment samples were collected in this wetland as part of the Site 3 investigation. Thirteen additional sediment samples were collected from the grated catch basins, but are not considered as part of this investigation, since the pathway to the receptors is not complete. Surface water samples are needed to help characterize the extent of contamination.
Wetland 48	1 Sediment 1 Surface Water	This sample was selected in an area immediately adjacent to a small culvert that drains into Wetland 52. Any contaminants detected here will likely be impacting areas further downgradient.
Wetland 52A (Eastern Portion)	1 Sediment 1 Surface Water	Suspected groundwater and surface water impacts from Site 3 (UST 18). Sample location is in an area of high groundwater recharge into a relatively fast-moving stream.
Wetland 52A (Western Portion)	4 Sediment 2 Surface Water	Potential impacts from Site 4. Little is known about this site.
Wetland 72	2 Sediment 1 Surface Water	Potential surface water impacts from Site 3. Samples will be collected at a large culvert that is the apparent origin of this wetland.
Wetland 57	1 Sediment 1 Surface Water	Potential impacts from Site 4. Little is known about this site.
Wetland 58	1 Sediment 1 Surface Water	Potential impacts from Site 4. Little is known about this site.
Wetland 19	3 Sediment 2 Surface Water	Site 16 has potentially impacted this wetland. Sample locations were selected in areas of ponding and high sediment deposition.
Wetland W2	3 Sediment 1 Surface Water	Potential impacts from Site 16.
Wetland 56A	1 Sediment 1 Surface Water	The Site 39 RI has concluded that contamination is limited to a small area and is not impacting any offsite locations. However, Site 4 may be impacting this wetland.
Wetland 79	3 Sediment 1 Surface Water	Potential impacts from Site 5 and Site 6. Little is known about these sites.
Wetland 49	2 Sediment 1 Surface Water	Possible impacts from Site 19, which is located within wetland boundaries.
Wetland 27	3 Sediment 2 Surface Water	Control wetland used for reference comparison.

Table 3-3
Phase II Wetlands Sampling Priority

Wetland	Number of Samples Planned	Justification
Wetland 32	3 Sediment 2 Surface Water	Control wetland used for reference comparison.
Wetland 33	3 Sediment 2 Surface Water	Control wetland used for reference comparison.

4.0 PHASE II, III, AND IV (CONFIRMATION SAMPLING) METHODS

The phased RI process, which includes investigation of sediment, surface water, and biota for the Site 41 wetlands, is described in the *Final RI/FS Work Plan, Site 41* (E/A&H, 1995f), *Final RI/FS SAP*, S*ite 41* (E/A&H, 1995g), and *Final RI/FS SAP Addendum* (E/A&H, 1997d). Each document and phase of the investigation was approved by the Navy, USEPA, FDEP, and National Oceanic and Atmospheric Administration (NOAA) before sampling was conducted.

4.1 Phase II

Sampling Rationale

As stated in the *Final RI/FS SAP*, Site 41(E/A&H, 1995g) and summarized in Section 3, Phase I identified wetlands requiring further sampling and analysis in Phase II. The prioritization of sediment sampling locations was presented in Table 3-3. The number of samples and analytical methods for sediment chemistry are listed for each wetland in Table 4-1 (tables are located at the end of each section). The number of samples and analytical methods for surface water chemistry are listed for each wetland in Table 4-2.

Sediment Sampling Procedures

Phase II samples for chemical and physical analysis were collected from the wetlands of concern from November 1995 through January 1996. Most sample locations in each wetland were identified using the global positioning system (GPS). However, some sediment samples included in the Phase II data set were collected during previous RIs completed at sites adjacent to Site 41 and were not surveyed with GPS. These samples included 24 sediment samples collected and analyzed from Wetlands 1, 3, 6, 10, 16, and 18 in 1994.

Sampling procedures for Phase II were performed in accordance with the *Final RI/FS SAP, Site 41* (E/A&H, 1995g). Sediment samples for chemical, physical, and toxicological analyses were collected from 0 to 6 inches depth with a stainless-steel hand auger, scoop, or mini-Ponar grab in accordance with Section 4 or Section 7 of the *Final CSAP* (E/A&H, 1994). The only deviation in Phase II from the Site 41 SAP involved field adjustments of sample locations based on site conditions (i.e., lack of accessibility to certain areas of a wetland).

Surface Water Sampling Procedures

Surface water samples for chemical analyses were collected by submerging the sample bottle or using a Kemmerer sampler according to procedures outlined in Section 7.4.1 of the *Final CSAP* (E/A&H, 1994). Eleven surface water samples collected during other site investigations were incorporated into the

Phase II data set. Turbidity, hydrogen ion concentration (pH), conductivity, and salinity measurements collected during the Phase II surface water sampling are presented in Table 4-3.

Analytical Methods

All sediment and surface water samples collected during the Phase II event were submitted for laboratory analysis of VOCs, SVOCs, pesticides/PCBs, and metals. In addition, total organic carbon, and grain size analysis were conducted on sediment samples.

4.2 Phase III

Sampling Rationale

Twenty-six potentially contaminated wetlands were identified based on the Phase II sampling results. These 26 wetlands were assigned to one of three groups: red, orange, or blue. Assigning a wetland color was based on a subjective determination of contaminant distribution and exceedances of reference values and sediment and water-quality benchmarks. The groupings are defined as the following:

Red: Contamination appears related to an IR site with consistent exceedance of reference values and benchmarks. Wetlands assigned the red designation are Wetlands 64, 5A/5B, 3, 4D, 16, 18(A and B), 10, 12, and W1.

Orange: Contamination may be related to an IR site. However, limited contaminants exceed reference values or benchmarks, or the contaminants exceed benchmarks but do not appear to be site-related. Wetlands assigned the orange designation are Wetlands 1 (A and B), 15, 6, 63A, 48, and 49.

Blue: Isolated or no contaminants are detected. Those detected are, in most cases, below reference values and/or benchmarks and do not appear to be related to an IR site. Wetlands assigned the blue designation are Wetlands 13, 17, 19 (A and B), 52, 56, 57, 58, 63B, 72, 79, and W2.

After reviewing Phase II sediment and surface water contaminant distribution and other characteristics in the red- and orange-coded wetlands (as discussed in Section 6.2), the red- and orange-coded wetlands were further subdivided according to their nature and extent of sediment contamination and their similarity of several physical characteristics that could affect contaminant fate and habitat use (including salinity, depth of surface water, TOC, and riparian habitat). Blue-coded wetlands were not considered, as the detected parameters were determined not to be site-related.

Surface water exceedances were evaluated, but they appeared isolated and not IR site related. The surface water samples were not filtered, and many were highly turbid. By subdividing these wetlands, any risk quantified in one wetland could be extrapolated to determine potential risk in other wetlands in that group. The groupings and rationale for selection are summarized below:

Group A, Wetland 64: This estuarine wetland is unique, primarily because it receives runoff from a large area of the base and has high concentrations of several metals, PAHs, and pesticides. The sediment in this wetland has high TOC values.

Group B, Wetlands 3 and 5A: These wetlands have similar physical characteristics and contaminants, although Wetland 3 had relatively little PAH contamination compared to Wetland 5A. These wetlands have similar species that live and feed in them.

Group C, Wetlands 4D, 15, 16, 18A, 18B, and 63A: These wetlands are adjacent to and tidally influenced by either Pensacola Bay or Bayou Grande. The types of receptors present in these wetlands are expected to be similar to each other. Wetlands 16 and 18 were selected to represent Group C because they had the highest levels of contamination in comparison with the other Group C Wetlands.

Group D, Wetlands 1, 5B, 6, 10, and W1: These wetlands appear as man-made drainage ditches, several of which are located in developed areas of the base. Due to their channelized features and/or proximity to developed areas, they have limited ecological receptors. These wetlands are comparable in physical characteristics and types of chemical contamination.

Group E, Wetlands 48 and 49: These freshwater wetlands are on the western side of the base and do not appear to be impacted by any IR sites. Both are palustrine forested wetlands subject to periodic, intermittent flooding.

Table 4-4 shows Wetland Groups A through E and the characteristics used to categorize the red-and orange-coded wetlands included in these groups. Note that red- and orange-coded wetlands may be combined into the same group.

Based on HQs and potential receptor species, Wetland 64 from Group A, Wetlands 3 and 5A from Group B, and Wetlands 16 and 18 from Group C were selected for the highest sampling priority in Phase III. If contamination in Wetlands 16 and 18 was determined to be at levels producing adverse

ecological effects, then techniques can be used to predict the potential for effects in the remaining Group C wetlands (4D, 15, and 63A) such as back-calculation or regression analysis.

Both Group D and E wetlands contained elevated levels of contaminants, mostly pesticides; however, these groups were not considered for Phase III sampling. The Group D wetlands were not considered further primarily because they are channelized drainage ditches within the NAS Pensacola storm water drainage system which receive continual impacts from storm water and are actively maintained by base maintenance personnel. The Group E Wetlands, 48 and 49, were not sampled because both are heavily influenced by seasonal fluctuations in rainfall and appeared dry for much of the year (they do not appear to have prolific aquatic communities). Wetlands 48 and 49 also do not appear to be impacted by any IR sites.

In 1997, the Phase III assessment was conducted at selected locations in Wetlands 3, 5A, 16, 18B, 33, and 64. Sample locations were selected in areas of the wetlands exhibiting relatively high, medium, and low levels of contamination. The gradient sampling was proposed to yield a better idea of relative risk in certain portions of the wetland. Wetland 75, which is not related to an IR site, was also sampled during Phase III as a reference wetland but was subsequently determined not to be suitable and is not included in this document. Phase III was conducted to further characterize risk at the Site 41 wetlands; therefore, sediment chemistry, toxicity, benthic community analysis and bioaccumulation samples were collected for analysis in August and September 1997 as outlined in the approved *Final RI/FS SAP Addendum* (E/A&H, 1997d).

Phase III Sample Locations

Wetland 64 — Sediment samples for toxicity, chemistry, TOC, grain size, and benthic diversity were collected at locations 041M6404, 041M6405, and 041M6406. Fish tissue samples were also collected. Two discrete surface water samples were also collected near sediment locations 041M6401 and 041M6402 and sediment locations 041M6402 and 041M6405.

Wetland 5 — Sediment samples for toxicity, chemistry, TOC, grain size, and benthic diversity were collected at locations 041M5A04, 041M5A05, and 041M5A06. Discrete surface water samples for chemistry and toxicity testing were also collected at those locations.

Wetland 3 — Sediment samples for toxicity, chemistry, TOC, grain size, and benthic diversity were collected at locations 041M0302 and 041M0307. A surface water sample was collected for chemistry and toxicity testing at 041W0301.

Wetland 18B — Sediment was collected at location 041M18B01 for toxicity, chemistry, TOC, grain size, and benthic diversity analysis. In addition, prey fish were collected for whole body tissue analysis.

Wetland 16 — Sediment was collected at location 041M1601 for toxicity, chemistry, TOC, grain size, and benthic diversity analysis.

Sediment, Surface Water, and Biota Sampling Procedures

Sediment and surface water samples were collected for chemistry and toxicity testing following the procedures described for Phase II. Sediment samples for benthic diversity testing were collected as composites of three grab samples within 10 feet of each sample location to account for spatial variability.

Using new fish traps, native foraging fish species from Wetlands 64 and 18 were collected for tissue analysis during Phase III. Control specimens were collected from reference Wetland 33. All traps were baited with commercial dog food and placed on the wetland floor. The traps were checked periodically, and the fish were collected and thermally preserved.

Within Wetland 64, two fish traps were placed near Phase II sediment sample locations 041M6404, 041M6405, and 041M6406. Within Wetland 18, one trap was placed at its mouth in an area likely to be frequented by fish. Two traps were placed in Wetland 33, and one was placed in Wetland 75.

After the 10-day period, the fish species were identified, placed in resealable plastic bags, and labeled with the sample number on the outside of the plastic bag and on an inside tag. The samples were transported on dry ice to the analytical laboratory, where they were processed and analyzed for whole body contaminant levels.

Analytical Methods

All sediment samples collected during Phase III were analyzed for SVOCs, pesticides/PCBs, metals, TOC, and grain size. Surface water samples were collected for VOC, SVOC, pesticide/PCB, and metals analysis. Although Phase III sediment samples were collected at the same locations as Phase II, deviations in sediment chemistry were expected due to changes in site conditions during the time between the sampling events. The number of samples and analytical methods for sediment chemistry are listed for each wetland in Table 4-1. The number of samples and analytical methods for surface water chemistry are listed for each wetland in Table 4-2.

4.3 2001 Confirmation Sampling/Phase IV

Rationale

Because fish were not analyzed for mercury during Phase III, this sampling event was conducted to develop site-specific biota sediment accumulation factor (BSAF) for use in modeling mercury. Although mercury was the primary contaminant of concern, the scope of the investigation was expanded to include pesticides/PCBs, SVOCs and metals. The BSAF is calculated using results from co-located sediment and prey fish samples. Data from the Phase II and III sampling events were evaluated to identify a range of TOC and mercury concentrations. TOC ranges for Wetland 64 are shown below.

TOC Ranges

Range	Wetland 64
Low	< 1%
Medium	1-4%
High	> 4%

Mercury concentrations were also evaluated, and the following criteria were established to represent low, medium, and high TOC concentrations, as shown on the next page.

Mercury Ranges

Range	Wetland 64
Low	ND
Medium	0.3 ppm
High	> 0.3 ppm

A matrix was developed for Wetland 64 that compared TOC and mercury data from each site to find sample locations meeting the above criteria. For Wetland 64, locations were not found for combinations of low TOC and high mercury concentrations or medium TOC and high mercury concentrations. All other combinations for Wetland 64 were found. A total of seven sample locations were selected for Wetland 64 as summarized in Table 4-5.

Sampling Procedures

Seven sediment samples were collected at locations 041M6402, 041M6403, 041M6405, 041M6406, 041M6407, 041M6411, and 041M6424 in Wetland 64 during August 2001. Sediment samples were collected using the appropriate means (Eckman dredge, Ponar dredge, stainless-steel scoop, etc.), depending on water depth and site accessibility. A polygon pattern with three sampling points situated approximately 10 yards apart was established at each sample location. At each of the

three sampling points, three sediment samples (0 to 6 inches in depth) were collected and composited for laboratory analysis. The sampling followed procedures specified in the technical memorandum for this event (EnSafe, 2001).

One bait trap was also deployed at each location for fish collection. Dry dog food was used as bait for the traps (a sample of which will be collected for laboratory analysis). Fish were collected for whole body tissue analysis (for lipid content and mercury). The target fish species for trapping was the Gulf killifish *(Fundulus grandis)*. The fish collected in the trap were examined in the field, with the largest organisms selected for analysis. The collected fish were retained in a tank for at least 24 hours before shipment to the laboratory to allow time for undigested food to pass through their system.

Analysis

The fish samples were submitted to STL Savannah of Savannah, Georgia for analysis of percent lipids, metals, PCBs, pesticides and SVOCs.

4.3.1 Wetland 5B — Confirmation Sampling

Rationale

In 2004, further sampling was conducted at Wetland 5B to fill an identified data gap for the delineation of cadmium in sediment near location 041M5B02. Five locations were sampled in Wetland 5B and one sediment sample collected from Wetland 19A in March 2004. Two sediment samples were collected upstream and two sediment samples were collected downstream at 50-foot and 100-foot intervals. Location 041M5B02 was also resampled. Wetland 19A was also sampled during this event to serve as a reference wetland because of its similar characteristics for Wetland 5B.

Procedures

The sampling followed sampling procedures specified in the technical memorandum for this event (EnSafe, 2004a). Because the surface water was shallow, the sediment samples were collected at each location using a hand auger. Samples were containerized, labeled, and shipped to the appropriate laboratory for analysis.

Analysis

Collected samples were submitted for sediment chemistry analysis at STL Savannah and toxicity testing at TRAC Laboratory. Sediment samples were analyzed for SVOCs, pesticides/PCBs, and metals. Toxicity was assessed using 10-day survival and growth tests using the amphipod, Hyalella azteca (USEPA, 2000a).

4.3.2 Surface Water Resampling

Also in March 2004, surface water samples were collected from Wetlands 6, 10, 17, 19, 63A, and 72 for laboratory analysis specified in the memorandum. The sampling was conducted to confirm previous findings as outlined in Table 4-6. Surface water samples could not be collected from Wetland 13, 15, or 58 because surface water was not present. In addition, Wetland 16 was inadvertently sampled for metals, including mercury.

4.4 Sample Management

All environmental samples were preserved, labeled, packed, and shipped under strict chain-of-custody procedures, in accordance with Section 12 of the *Final CSAP* (E/A&H, 1994). All temperature-sensitive sample shipments not analyzed locally were put on ice and sent via an overnight express courier to the appropriate laboratory. The laboratory was notified the day of shipment. Sample containers and preservatives for each type of analysis are listed in Table 4-7.

Quality Assurance/Quality Control Samples

Quality assurance/quality control (QA/QC) samples for chemical analysis were collected to ensure the quality of field and laboratory procedures by confirming the level of reproducibility attainable in the sampling and analytical process, the quality of equipment decontamination, the quality of source waters and materials, sample exposure to ambient contamination during handling, and the level of laboratory precision. All field QA/QC samples were collected in accordance with Section 15 of the *Final CSAP* (E/A&H, 1994).

QA/QC samples for the toxicity, bioaccumulation, and diversity analyses were not collected because the laboratories performing these analyses followed their own internal quality procedures to ensure data usability.

Ancillary Data

Ancillary data pertinent to sampling activities were collected for each sampling event. Field information included personnel identification, sampling time, location, weather conditions, test equipment and sample containers used, sampling methods, physical/chemical parameters measured, problems encountered, and procedural deviations. The data were recorded in bound field logbooks.

Decontamination

All sampling equipment used to collect chemical and toxicity data was decontaminated following procedures outlined in Section 11 of the *Final CSAP* (E/A&H, 1994).

Sample Identification

Due to the need to distinguish multiple wetlands within a single site designation, sample identification procedures were modified from those presented in the *Final CSAP* (E/A&H, 1994). The new sample identification scheme was used only for sediment and surface water samples and affected the fifth through eighth characters. The fifth and sixth characters referred to the wetland number, and the seventh and eighth characters referred to the sample number within that wetland. Because all sediment samples were collected from 0 to 6 inches deep, the last two characters were "-01." For example, sediment sample location 2 within Wetland 3 during the Site 41 investigation was designated "041M030201." For wetland numbers three characters long (18A, 18B, etc.), the wetland number was given in the fifth, sixth, and seventh characters. For example, sediment sample location 3 in Wetland 18A was designated "041M18A301."

All QC samples followed the identification procedure described above. The matrix identification numbers were consistent with the *Final CSAP* (E/A&H, 1994).

Sample Containers and Preservation

All laboratory-provided containers were precleaned and certified, as specified in Chapter 12 of the *Final CSAP* (E/A&H, 1994). All samples were preserved with ice to 4°±2°C before shipment in accordance with the *Final CSAP* (E/A&H, 1994) except the samples for toxicity analysis and benthic diversity. The samples for toxicological studies were couriered on ice directly to the local laboratory twice a day during sample collection, where they were stored at 4°C before analysis. The samples for benthic diversity were preserved in 10% formalin and did not require temperature preservation to ensure sample integrity.

4.5 Analytical Parameters

Site 41 samples were collected for chemical, physical, toxicity, and/or diversity analysis. Chemical analyses provided a basis for determining the nature and extent of site contamination and contaminant bioaccumulation potential. Physical analyses helped assess the potential bioavailability of contaminants within the source media by evaluating the amount of total organic carbon and grain size of the sediment. Toxicity and diversity tests helped quantify effects to endpoint species.

The number of Site 41 samples collected and the analytical requirements for Phases II and III are summarized in Table 4-8. Phase II sediment and surface water analytical results are presented in Appendix B. Phase III sediment, surface water, and biota analytical results are presented in Appendix C. Sample results from 2001 and 2004 are presented in Appendix D. TAI Environmental Sciences Inc., of Mobile, Alabama, followed an internal laboratory procedure for species enumeration

using standard dissection microscope techniques. This procedure is included in Appendix E, and the results of their findings are included in Appendix F. Procedures for toxicity analysis are included in Appendix G.

In addition to the CLP method analyses during Phase II, a duplicate group of sediment samples was analyzed for metals by a modified method that used hydrofluoric acid for metals digestion instead of nitric acid, which is used in the CLP method. This modified method is cited in Section 5, Data Validation. The hydrofluoric acid digestion was performed at FDEP's request as a test case to compare the two digestion techniques. The results from the two methods were very comparable; therefore, only the CLP method data have been presented for evaluation in this report. These two methods are compared in Appendix H.

Sediments were also analyzed for physical parameters. Sediment samples were analyzed for TOC according to USEPA Method SW 846-9060, and grain size according to American Society for Testing and Materials (ASTM) Method D422 (ASTM, 1990). These analyses were conducted by Ceimic Laboratories of Narragansett, Rhode Island, during Phase II and STL Savannah Laboratories of Savannah, Georgia, during Phase III and confirmation sampling phases.

4.6 Global Positioning System

GPS was used to identify sample locations at Site 41. At NAS Pensacola, the GPS unit required a stationary reference receiver that was placed at a surveyed location and continually recorded signals from satellites. Before field sampling, a rover unit was initialized. A stop-and-go survey was performed by pausing for a few seconds at each sampling location (identified by stakes labeled with the sample identification number). Using the hand-held controller, the user recorded and appropriately described each point. This process of initialization and subsequent recording is termed a "chain." At each day's end, the memory cards were downloaded.

One advantage of using GPS for mapping water-based sampling locations is that resampling at the same location (+ 0.1 meter) is possible.

4.7 Deviations

Additional research into laboratory techniques was performed after the SAP addendum was finalized and distributed. Initially, the 10-day *Hyalella azteca* test for survival, growth, and reproduction was planned to be performed on sediment samples collected from Wetlands 5A and 3 during Phase III. However, based on the recommendation of the contract laboratory, the 28-day *Chironomus tentans* test (ASTM Method E1706-95B) for survival and emergence was performed instead. USEPA and

FDEP concurred with this analysis change. The 10-day Hyalella test was discontinued because 10 days was considered insufficient to obtain adequate growth and reproduction response, both key measurement endpoints for this test. The longer test enabled the chronic endpoints to be measured more effectively.

In addition, full TCL/TAL analysis was originally proposed for the analysis of prey fish in Phase III. Due to a sampling error, the fish tissue was analyzed for pesticides/PCBs, SVOCs, and Appendix IX metals. This analysis did not include mercury, a parameter that has a potential to bioaccumulate. To address this data gap, sediment and prey fish samples were collected from Wetland 64 in 2000.

Several surface water samples collected during the Phase II sampling effort exceeded water-quality criteria for metals, which may have been attributable to high turbidity of the surface water collected. To determine if turbidity was the cause of the metal exceedances, surface water from several wetlands was resampled in 2004 (Wetlands 6, 10, 15, 17, 19A, 63A, and 72). Both total and dissolved metals analysis was performed. Wetlands 13, 15, and 58 had no surface water; therefore, no samples were collected. Though the technical memorandum for the surface water resampling (EnSafe, 2004b) specified that water quality parameters (i.e., turbidity, specific conductance, pH, and temperature) were to be collected during the sampling, this was not accomplished due to sampler error.

Sample location 041M5A01 could not be resampled during Phase III because the area no longer contained surface water. In addition, confirmation samples of surface water in 2004 could not be collected at location 041M1501 and 041M7201 because of the lack of surface water.

Table 4-1
Summary of Sediment Samples and Analysis by Wetland

Wetland	Fresh/Estuarine?	Metals	PAHs	PCBs	Pesticides	SVOC	TOC	TPH	VOC	Grain Size	HF Metals	AVS/SEM
Phase II												
10	F	7	7	7	7	7	3	N/A	7	3	1	N/A
12	F	2	2	2	2	2	2	N/A	2	2	N/A	N/A
13	F	1	1	1	1	1	1	N/A	1	1	N/A	N/A
15	E	4	4	4	4	4	4	N/A	3	4	N/A	N/A
16	E	4	4	4	4	4	3	N/A	4	3	1	N/A
17	E	3	3	3	3	3	3	N/A	3	3	N/A	N/A
18A	F	4	4	4	4	4	3	N/A	3	3	N/A	N/A
18B	E	1	1	1	1	1	1	N/A	1	1	N/A	N/A
19A	F	2	2	2	2	2	2	N/A	2	2	N/A	N/A
19B	E	1	1	1	1	1	1	N/A	1	1	N/A	N/A
1A	F	3	3	3	3	3	2	N/A	3	2	N/A	N/A
1B	F	2	2	2	2	2	2	N/A	2	2	N/A	N/A
3	F	10	10	10	10	10	7	N/A	10	7	1	N/A
48	F	1	1	1	1	1	1	N/A	1	1	N/A	N/A
49	F	3	3	3	3	3	3	N/A	3	3	N/A	N/A
4D	E	5	5	5	5	5	5	N/A	5	5	1	N/A
52	F	5	5	5	5	5	5	N/A	5	5	N/A	N/A
56	F	1	1	1	1	1	1	N/A	1	1	N/A	N/A
57	F	1	1	1	1	1	1	N/A	1	1	N/A	N/A
58	F	1	1	1	1	1	1	N/A	1	1	N/A	N/A
5A	F	7	7	7	7	7	7	N/A	7	7	N/A	N/A
5B	F	2	2	2	2	2	2	N/A	2	2	N/A	N/A
6	F	12	11	12	12	11	11	N/A	12	11	N/A	N/A
63A	E	5	5	5	5	5	5	N/A	5	5	1	N/A
63B	E	4	4	4	4	4	4	N/A	4	4	N/A	N/A
64	E	24	24	24	24	24	24	N/A	24	24	1	N/A
72	F	2	2	2	2	2	2	N/A	2	2	N/A	N/A
W1	F	3	3	3	3	3	3	3	3	3	N/A	N/A
W2	E	3	3	3	3	3	3	N/A	3	3	N/A	N/A
25	F	3	3	3	3	3	3	N/A	3	3	N/A	N/A
27	E	2	2	2	2	2	2	N/A	2	2	N/A	N/A
32	F	3	3	3	3	3	3	N/A	3	3	N/A	N/A
33	E	3	3	3	3	3	3	N/A	3	3	N/A	N/A
Phase III												
16	E	1	1	1	1	1	1	N/A	1	1	N/A	N/A
18B	E	1	1	1	1	1	1	N/A	1	1	N/A	N/A
3	F	2	2	2	2	2	2	N/A	2	2	N/A	N/A
5A	F	3	3	3	3	3	3	N/A	3	3	N/A	N/A
64	E	3	3	3	3	3	3	N/A	3	3	N/A	N/A
75	F	1	1	1	1	1	1	N/A	1	1	N/A	N/A
33	E	2	2	2	2	2	2	N/A	2	2	N/A	N/A
2001 Sampling												
64	E	7	7	7	7	7	7	N/A	N/A	N/A	N/A	7
Phase IV/2004 Sampling												
19A	F	1	1	1	1	1	1	N/A	1	1	N/A	N/A
5B	F	5	5	5	5	5	5	N/A	5	5	N/A	N/A

Notes:
The number under each analytical method indicated the number of samples analyzed for that wetland.
N/A = Not Analyzed
E = Estuarine
F = Freshwater

Table 4-2
Summary of Surface Water Samples and Analysis by Wetland

Wetland	Fresh/Estuarine?	Metals	Pesticides/PCBs	SVOCs	TPH	VOC
Phase II						
10	F	4	4	4	N/A	4
12	F	1	1	1	N/A	1
13	F	1	R	1	N/A	1
15	E	2	2	2	N/A	2
16	E	3	3	3	N/A	3
17	E	1	1	1	N/A	1
18A	F	2	2	2	N/A	2
18B	E	1	1	1	N/A	1
19A	F	1	1	1	N/A	1
19B	E	1	1	1	N/A	1
1A	F	1	1	1	N/A	1
1B	F	1	1	1	N/A	1
3	F	7	7	7	N/A	7
48	F	1	1	1	N/A	1
49	F	2	2	2	N/A	2
4D	E	2	2	2	N/A	2
52	F	2	2	2	N/A	2
56	F	1	1	1	N/A	1
57	F	1	1	1	N/A	1
58	F	1	1	1	N/A	1
5A	F	6	6	6	N/A	6
5B	F	1	1	1	N/A	1
6	F	3	3	3	N/A	3
63A	E	1	1	1	N/A	1
63B	E	2	2	2	N/A	2
72	F	1	1	1	N/A	1
W1	F	6	6	6	3	6
W2	E	1	1	1	N/A	1
25	F	2	2	2	N/A	2
27	E	1	1	1	N/A	1
32	F	2	2	2	N/A	2
33	E	2	2	2	N/A	2
Phase III						
3	F	1	1	1	N/A	1
5A	F	3	3	3	N/A	3
64	E	2	2	2	N/A	2
75	F	1	1	1	N/A	1
33	E	1	1	1	N/A	1
Phase IV/2004 Confirmation Sampling						
10	F	1	N/A	N/A	N/A	N/A
16	E	1	N/A	N/A	N/A	N/A
17	E	1	N/A	N/A	N/A	N/A
19A	F	1	N/A	N/A	N/A	N/A
6	F	1	N/A	N/A	N/A	1
63A	E	1	N/A	N/A	N/A	N/A
72	F	1	N/A	N/A	N/A	N/A

Notes:
The number under each analytical method indicated the number of samples analyzed for that wetland.
N/A = Not Analyzed
R = Rejected
F = Freshwater
E = Estuarine

Table 4-3
Site 41 Phase II Surface Water Sample pH, Turbidity, Specific Conductance, and Salinity Measurements

Wetland	Sample Location	pH	Turbidity	Specific Conductance	Salinity
1	041W00101	6.70	2	0.231	0.00
3	041W030101	6.41	12	0.257	0.00
	041W030201	5.78	470	0.44	0.01
	041W030301	5.99	690	0.404	0.01
	041W030401	5.96	3	0.261	0.01
4D	041W4D101	6.55	0	3.31	0.15
	041W4D401	6.02	0	12.6	0.76
5A	041W5A101	6.30	21	0.169	0.00
	041W5A201	6.10	38	0.146	0.00
	041W5A401	6.31	12	0.166	0.00
	041W5A501	6.03	144	0.21	0.00
12	041W120101	6.21	1	3.94	0.20
13	041W130101	6.13	>1,000	1.31	0.06
15	041W150101	6.01	>1,000	1.20	0.05
	041W150201	6.98	0	1.74	0.08
16	041W160101	6.86	10	19.6	1.17
	041W160201	7.01	17	20.0	1.26
17	041W170101	6.78	0	24.7	1.49
18	041W18A201	5.47	188	0.231	0.0
	041W18B101	5.02	9	0.55	0.02
19	041W19A201	6.20	41	0.103	0.0
	041W19B101	5.57	19	0.676	0.35
25	041W250101	6.24	2	0.931	0.04
	041W250301	5.76	0	1.4	0.06
27	041W270101	6.35	282	18.8	1.11
32	041W320101	4.02	1	0.256	0.00
	041W320301	4.06	2	0.367	0.10
33	041W330101	5.11	1	2.48	0.12
	041W330301	4.91	1	4.20	0.21
48	041W480101	3.96	3	0.078	0.00
49	041W490101	5.21	25	0.054	0.00
	041W490301	4.95	25	0.079	0.00
52	041W52A101	4.63	65	0.052	0.00
	041W53E301	5.86	27	0.063	0.00
56	041W56A101	5.48	6	0.124	0.00
57	041W570101	6.44	280	0.455	0.01
58	041W580101	6.73	0	0.135	0.00
63A	041W63A201	6.79	10	24.2	14.5

Table 4-3
Site 41 Phase II Surface Water Sample pH, Turbidity, Specific Conductance, and Salinity Measurements

Wetland	Sample Location	pH	Turbidity	Specific Conductance	Salinity
63B	041W63B201	6.35	5	0.638	0.02
	041W63B401	6.13	13	0.011	0.00
64	041W640501	6.81	10	2.72	0.07
	041W640601	7.69	10	17.0	10.9
	041W640701	7.73	10	4.61	0.51
	041W640901	7.82	10	21.4	12.9
	041W641001	7.73	4	22.2	13.3
	041W641101	7.99	3	22.7	13.7
	041W641201	8.24	10	22.1	12.9
	041W641301	8.06	13	22.1	13.2
	041W641401	7.54	5	22.4	13.5
	041W641501	8.29	10	21.9	13.1
	041W641601	8.04	22	22.2	13.3
	041W641701	8.12	26	22.3	13.5
	041W642001	8.22	24	22.6	13.7
	041W642101	7.95	9	21.8	13.1
	041W642201	7.27	3	22.6	13.6
	041W642301	8.00	3	22.8	13.7
	041W642401	8.04	4	22.8	13.7
72	041W720101	6.21	9	0.476	0.01
W1	041WW10101	5.43	10	0.61	0.00
	041WW10201	5.22	102	0.042	0.00
	041WW10301	6.09	5	0.035	0.00
W2	041WW20201	6.22	6	0.35	0.04

Note:
Turbidity, conductivity, pH, and salinity measurements were not recorded for Wetlands 6 or 10 during the Phase II sampling

Table 4-4
Wetland Groupings
Red- and Orange-Coded Wetlands

Wetland Characteristic	64	5A	3	4D	15	16	18A	18B	63A	10	6	5B	1	W1	48	49
Estuarine	A			C	C	C		C	C							
Fresh		B	B				C			D	D	D	D	D	E	E
TOC > 1%	A	B	B	C	C	C	C	C				D	D	D		
TOC < 1%									C	D	D				E	E
Metals	A	B	B	C	C	C	C	C	C	D	D	D	D	D		
SVOC	A	B		C									D			
Pest/PCB	A	B	B	C	C	C	C	C	C	D	D		D	D	E	E
Shallow (<3')	A	B	B	C	C		C	C	C	D	D	D	D	D	E	E
Deep (>3')						C										
Predominant Silt	A		B		C		C	C								
Predominant Sand		B		C		C			C	D	D	D	D	D	E	E
Juncus sp.	A				C			C								
Cattails		B	B						C							
Hardwoods		B	B			C	C	C					D			
Mowed Grass				C						D	D			D	E	E
Disturbed Vegetation	A			C	C	C			C	D	D	D		D		
Viable Benthos	A															

Note:
The letter on the table refers to the designated wetland grouping and whether that characteristic was present for a particular wetland.

Table 4-5
Mercury and TOC Matrix
For Additional Sampling at Wetland 64

Site 40

Matrix Combinations		TOC Concentrations		
		Low	**Medium**	**High**
Mercury Concentrations	**Low**	040MZ237 TOC C 0.15% Hg C 0.8 ppm	N/A	040MZ401 TOC C 5.6% Hg C ND
	Medium	040MZ316 TOC C 0.09 Hg C 0.14	040MZ216 TOC C 7.2% Hg C 0.28 ppm	040MZ247 TOC C 4.0% Hg C 0.28 ppm
	High	N/A	040MZ244 TOC C 3.9% Hg C 0.64 ppm	040MZ130 TOC C 3.9% Hg C 2.2 ppm

Wetland 64

Matrix Combinations		TOC Concentrations		
		Low	**Medium**	**High**
Mercury Concentrations	**Low**	041M6407 TOC C 0.48% Hg C 0.1 ppm	041M6406 TOC C 2.81% Hg C 0.12 ppm	041M6402 TOC C 4.42% Hg C 0.17 ppm
	Medium	041M6424 TOC C 0.74% Hg C 0.3 ppm	041M6411 TOC C 4.01% Hg C 0.3 ppm	041M6405 TOC C 8.35% Hg C 0.27 ppm
	High	N/A	N/A	041M6403 TOC C 19.4% Hg C 0.88 ppm

Notes:
N/A = Not Applicable
ppm = Parts per million (ppm) or milligrams per kilogram (mg/kg)

Table 4-6
Phase II Sample Locations, Exceedances and Sampling Rationale for Surface Water
NAS Pensacola Site 41

Wetland	Sample Location	Original Turbidity Reading (NTU)	Parameters Exceeded	HQs	Rationale
6	041W0610	No data	Mercury	HQ 73.33	Resample surface water at 041W0610 for VOCs and metals
	041W0610		1,1-DCE	HQ 2.5	
10	033W0001	No data	Cadmium	HQ 6.71	Resample surface water for metals at 033W0001
13	041W1301	>1000	Metals	Several ≥ 1	Resample surface water at 041W1301 for metals
15	041W1501	>1000	Mercury	HQ 78.33	Resample surface water for metals at 041W1501
	041W1501		Metals	Several ≥ 1	
17	041W1701	0	Thallium	HQ 2.59	Resample surface water at 041W1701 for thallium only
19	041W19A1	41	Metals	Several ≥ 1	Resample surface water at 041W19A1 for metals
58	041W5801	0	Aluminum	HQ 83.85	Resample 041W5801 for metals
	041W5801		Lead	HQ 4.33	
63A	041W63A2	10	Lead	HQ 53.39	Resample 041W63A2 for metals
72	041W7201	9	Silver	HQ 62.86	Resample 041W7201 for metals

Note:
NTU = Nephelometric Turbidity Unit

Table 4-7
Phase II/III Sample Containers and Preservation by Medium and Analysis

Medium	Analysis	Sample Container	Preservative
Phase II/III			
Surface Water	CLP TCL VOCs	40-ml glass vial	4° C — HCL, pH<2
Surface Water	CLP TCL SVOCs, CLP TCL Pesticides/PCBs	1-liter amber bottle	4° C
Surface Water	CLP TAL Metals	1-liter Nalgene bottle	4° C — HNO_3, pH<2
Surface Water	Cyanide	1-liter Nalgene bottle	4° C — NaOH, pH>10
Surface Water	Hardness	120-ml polyethylene bottle	4° C — HNO_3, pH<2
Sediment	CLP TCL VOCs	60-ml glass jar	4° C
Sediment	CLP TCL Pesticides/PCBs	250 ml amber bottle	4° C
Sediment	CLP TCL SVOCs	250 ml amber bottle	4° C
Sediment	CLP TAL metals/cyanide	120-ml glass jar	4° C
Sediment	Grain Size	500-ml plastic jar	4° C
Sediment	TOC	120-ml sterile polyethylene bottle	4° C
Sediment	Species enumeration to genus level for sediment macroinvertebrates	1-liter plastic bottles	10% formalin
Sediment	Midge larvae *Chironomus tentans* 28-day survival/growth	200-ml plastic jar	4° C
Sediment	Marine amphipod *Leptocheirus plumulosus* 10-day acute toxicity	1-gallon plastic container	4° C
Sediment	Marine polychaete *Neanthes arenacoedentata* 20-day chronic growth and fecundity	1-gallon plastic container	4° C
Surface Water	Fathead minnow *Pimephales promelas* 28-day survival and growth	2.5-gallon plastic container	4° C
Fish Tissue	Contaminant residues in whole body prey fish tissue (PAHs, pesticides/PCBs, and lead)	Aluminum foil/plastic bags	4° C

Table 4-7
Phase II/III Sample Containers and Preservation by Medium and Analysis

Medium	Analysis	Sample Container	Preservative
2001 Wetland 64			
Sediment	Acid Volatile Sulfide/Simultaneously Extractable Metals	250-ml plastic	4° C
Sediment	Total Organic Carbon	125-ml glass	4° C
Sediment	Metals	250-ml plastic	4° C
Sediment	Pesticides/PCBs	500-ml glass	4° C
Fish	Contaminant residues in whole body prey fish tissue (SVOCs, Metals, and pesticides/PCBs)	Aluminum foil/plastic bags	4° C
Fish	% Lipid	Aluminum foil/plastic bags	4° C
Wetland 5B 2004			
Sediment	Metals	250-ml plastic jar	4° C
Sediment	SVOCs, Pesticides/PCBs	9-oz glass jar	4° C
Sediment	VOCs	125-ml glass jar/septa	4° C
Sediment	Marine amphipod *Hyallela azteca* 10-day acute toxicity	Two 1-liter plastic cont.	4° C
Wetlands 6, 10, 13, 15, 17, 19, 58, 63A, and 72 Surface Water Confirmation Sampling			
Wetland 6	VOCs	40-ml glass vial	4° C — HCL, pH<2
Wetland 6 and all other samples	Total Metals	1-liter Nalgene bottle	4° C — HNO_3, pH<2
Wetland 6 and all other samples	Dissolved Metals	1-liter Nalgene bottle	4° C — HNO_3, pH<2

Notes:
CLP = Contract Laboratory Program
ml = Milliliter
PAH = Polycyclic Aromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
SVOC = Semivolatile Organic Compound
TAL = Target Analyte List
TCL = Target Compound List
TOC = Total Organic Carbon
VOC = Volatile Organic Compound

Table 4-8
Analytical Parameters and Number of Samples

Medium	Number of Stations	Analysis	Method
Phase II			
Sediment	122	VOCs, SVOCs, pesticides/PCBs, metals including cyanide	TCL/TAL
Surface Water	51	VOCs, SVOCs, pesticides/PCBs, metals including cyanide	TCL/TAL
Phase III			
Sediment	13	VOCs, SVOCs, pesticides/PCBs, metals including cyanide	TCL/TAL
Surface Water	9	VOCs, SVOCs, pesticides/PCBs, metals including cyanide	TCL/TAL
Sediment	6	Midge larvae *Chironomus tentans* survival and emergence (10/28 days)	ASTM E 1706-95B
Sediment	7	Marine amphipod *Leptocheirus plumulosus* mean survival (10 days)	ASTM E 1367-92
Sediment	7	Marine polychaete *Neanthes arenaceodentata* survival and growth (20 days)	PSEP, 1991
Surface Water	5	Fathead minnow *Pimephalespromelas* survival and growth (7 days)	EPA/600/4-89/001
Sediment	11	Species Richness/Diversity	See Appendix E
Fish	6	Whole body contaminant residue	SVOCs, Pesticide/PCBs and Appendix IX metals
2000 Wetland 64			
Sediment	7	VOCs, SVOCs, pesticides/PCBs, metals	Low Concentration SOW CLP
Sediment	7	TOC	Walkley Black
Fish	7	Lipid Content	
Fish	7	Mercury	Low Concentration SOW CLP
2004 Wetland 5B			
Sediment	5	VOCs, SVOCs, pesticides/PCBs, metals	Low Concentration SOW CLP
Sediment	5	Amphipod *Hyallaela azteca* mean survival (10 days)	EPA-600/R-99/064
2004 Surface Water Confirmation Sampling			
Surface Water	1	VOCs	SW-846 8260B
Surface Water	6	Metals	SW-846 Methods 6010B/7470a/7471A

Notes:
TCL = Target Compound List Organic
TAL = Target Analyte List Metals
ASTM = American Society for Testing and Materials
PSEP = Puget Sound Estuary Program

5.0 DATA VALIDATION

5.1 Phase II and III Data

Site 41 data were validated by EnSafe personnel and Heartland Environmental Services Inc. of St. Charles, Missouri. The analytical work was conducted by Ceimic Laboratories, Narragansett, Rhode Island, and STL Savannah Inc., Savannah, Georgia. Sample analyses were performed in accordance with the following guidance documents:

- Naval Energy and Environmental Support Activity (NEESA) Level D QA/QC guidelines as stated in *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation and Restoration Program (NEESA 02.2-047B),* June 1988 (NEESA, 1988).

- *USEPA Contract Laboratory Program CLP, Statement of Work (SOW) for Organic Analysis*, Multi-Media, Multi-Concentration, USEPA Office of Solid Waste and Emergency Response (OSWER) (CLP Organic SOW), OLM02.1, 1994 (USEPA, 1994d).

- *USEPA CLP, SOW for Inorganic Analysis,* Multi-Media, Multi-Concentration (CLP Inorganic SOW), USEPA OSWER, ILM03.0, 1993 (USEPA, 1993a).

- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) (3rd ed.) USEPA OSWER, revised July 1992 (USEPA, 1992).

- *Methods for Chemical Analysis of Water and Wastes* (MCAWW), USEPA Environmental Monitoring and Support Laboratory, EPA-600/4-79-020, March 1983 (USEPA, 1983).

Data were validated using the following documents:

- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, Office of Emergency and Remedial Response (OERR) 9240.1-05, EPA 540/R-94/012 (USEPA, 1994a).

- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, OERR 9240.1-05-01, EPA540/R-94/013 (USEPA, 1994b).

The end of this section includes a list of data validation qualifiers. Appendix I provides detailed validation reports completed by EnSafe and Heartland Environmental Services.

Samples for Phase II and Phase III were collected at Site 41 from November 1995 through August 1997. All samples were received by the laboratory in good condition and with proper custody documentation. Samples were analyzed for VOCs, SVOCs, PCBs, and inorganic parameters. Phase II samples submitted to Ceimic Laboratories were analyzed using the CLP organic and inorganic SOWs (USEPA 1993a and 1994d) Phase III samples submitted to STL Savannah Laboratory were analyzed using the CLP Inorganic SOW (USEPA 1993a) and SW-846 methodology. Selected samples were also analyzed for TOC using SW-846 method 9060; grain size using ASTM method D422; and hardness using MCAWW method 130.1. Four fish-tissue samples were submitted to Savannah Laboratory and analyzed for SVOCs, pesticides/PCBs, and Appendix IX metals (aluminum, antimony, arsenic, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, silver, thallium, vanadium, and zinc).

Organic and inorganic results were reported by the laboratory in 28 sample delivery groups (SDGs): 030301, 041M10, 5A0101, 63A401, 640801, EA0101, EAH030, EAH031, EAH032, EAH033, EM0040, EM005, EM0050, EM0060, EMD0060, EW0010, M00901, M06010, M06070, M52A10, Z30301, Z42101, Z53301, PEN11, PEN12, PEN13, PEN14, and PEN15. SDGs Z13601 and Z30201 are not included because these two SDGs were analyzed for metals using a modified hydrofluoric acid digestion. Although samples prepared by the modified method were not used to quantify specific analyte concentrations, the validation results are presented in this section. TOC results were not validated because the data were used for qualitative purposes only.

5.2 Organic Analysis

5.2.1 Holding Times

All technical and contractual holding times were within QC requirements for the VOC fraction. No SDGs were outside holding times for the VOC fraction. Several samples were analyzed outside holding times in the SVOC and pesticide/PCB fractions. When a sample was analyzed or extracted outside holding times, positive and undetected results were flagged as specified in CLP Organic SOW. Undetected values for samples that greatly exceeded holding times were rejected as "UR," based on professional judgment. Samples exceeding holding times and the corresponding flags are summarized below:

Fraction/SDG	Sample IDs	Days Exceeded	Flag(s)
SVOC / 041M10	041W130101	10	J, UJ
SVOC / M06070	041W250101, 041R250301, 041W270201	22	J, UR
PEST / EM0040	041M030101, 041N030101, 041M030101DL, 041N030101DL, 041M030201, 041W030201, 041M030201DL	1-4	J, UJ

Fraction/SDG	Sample IDs	Days Exceeded	Flag(s)
PEST / EM0050	041M150101, 041W150101, 041M150101DL, 041M150201, 041M150201DL, 041M150301, 041M150301DL, 041M150401	3-4	J
PEST / M06010	041M250201	14	J, UJ
PEST / M06070	041M060701	8	J, UJ
PEST / Z53301	041M10A101, 041M10A201, 041M120101, 041M120101DL	2-3	J, UJ

5.2.2 Matrix Spike/Matrix Spike Duplicates

A matrix spike (MS) is used to determine the accuracy of the analysis for a given matrix. A matrix spike duplicate (MSD) is used to determine the precision and accuracy of an analysis for a given matrix. The MS and MSD are used to detect matrix effects caused by contaminants that may interfere with the compounds of interest and may also be present within the sample. Both the MS and MSD consist of a known quantity of stock solution added to the sample before its preparation and analysis.

MS/MSD data evaluation involves two calculations to measure accuracy and precision. Accuracy is measured using an estimate of the percent recovery, which is calculated by comparing the amount of the compound recovered by analysis to the amount added to the sample. Precision is measured with an estimate of relative percent difference (RPD), which is calculated using the recoveries for both the MS and MSD. No specific requirements have been established for qualifying MS/MSD data. However, guidelines in applying professional judgment are discussed in Organic Functional Guidelines.

All reported MS/MSD results were satisfactory for the Site 41 investigation.

5.2.3 Calibrations

Initial and continuing calibrations with standard solutions are used to check an instrument's ability to produce acceptable quantitative data for the compounds.

VOC and SVOC Initial Calibration — A five-point initial calibration is done to check the instrument's performance at the beginning of the analytical run and to establish a linear calibration curve. The initial calibration is verified by calculating the relative response factor (RRF) and the percent relative standard deviation (%RSD) for each compound. An RRF less than 0.05 or a %RSD greater than 30% is outside the quality control limits for the initial calibration.

Instruments were calibrated initially and continually with standard solutions to verify their capability of producing acceptable quantitative data for the analyzed compounds. All compound quantitation was

analyzed against gas chromatograph/mass spectrometer (GC/MS) tunes within QC requirements for the VOC and SVOC fractions.

VOC and SVOC Continuing Calibration — Calibration standard solutions are run periodically to check the daily performance of the instrument and to establish the 12-hour RRF on which the sample quantitations are based. The initial calibration is verified by calculating the RRF and the percent difference (%D) for each compound. An RRF less than 0.05 or a %D greater than 25% is outside the quality control limits for the continuing calibration.

QC outliers were found for VOC continuing calibration RRFs for SDGs 030301, 5A0101, 63A401, 041M10, EM0040, EW0010, and Z53301. Details of the SDGs that had RRFs less than 0.050 are summarized below. For the following samples and noncompliant compounds, all positive results were estimated "J" and not-detected values were rejected and flagged "UR."

SDG	Sample	Analytes
030301	041W030401 041W030301	2-butanone, 2-hexanone acetone
041M10	041W130101, 041W5A0501, 041TM00401	acetone, 2-butanone
5A0101	041W5A0101, 041W5A0201, 041W5A0401, 041W5A0701, 041W061001	acetone, 2-butanone
63A401	041M63A401	acetone
EM0040	041R030101	acetone, 2-butanone
EW0010	041W160101, 041W160201	acetone, 2-butanone, 2-hexanone
Z53301	041W120101	acetone, 2-butanone

QC outliers were found for SVOC continuing calibration RRFs for SDG EM0050. No other RRF exceedances were identified. The target compound 4-chloroaniline for samples 041M150201 and 041M150401 in SDG EM0050 was qualified as estimated "J," for positive results. Values not detected were rejected and flagged "UR."

Both the VOC and SVOC fractions contained several compounds with %RSDs and %Ds outside the continuing calibration QC criteria. These QC deficiencies are within the normal fluctuations of laboratory function. All affected sample results were qualified for %RSD and %D outliers per the Organic Functional Guidelines.

Pesticide/PCB Initial Calibration — Using two separate standard mixes, three-point calibrations are analyzed for single-component pesticide compounds, and calibration factors (CF) are established. The

CF for single-component pesticides must be less than or equal to 20%. Multicomponent pesticide toxaphene and all PCBs (or Aroclors) are analyzed separately. Retention times and CFs are determined for three to five peaks. The only review criterion for multicomponent compounds is to verify that these steps were taken.

All initial calibration criteria were met for the pesticide/PCB analyses except for SDGs 030301, 640801, EM0040, EM005, EM0050, EMD060, M06010, and M06070. Details of the SDGs that were outside pesticide/PCB initial calibration QC criteria are summarized below. For the following samples and noncompliant compounds, all positive results were estimated "J," and not detected values were rejected and flagged "UR."

SDG	Sample	Analytes
030301	All samples	alpha-BHC and delta-BHC
640801	All samples	endosulfan II
EM0040	All samples	alpha-BHC and delta-BHC
EM005	All samples	alpha-BHC
EM0050	All samples	alpha-BHC
EM0060	041M18A201, 041M18B101, 041M18A101DL, 041M18A201DL, 041M18A101, 041M18B101DL	alpha-BHC
M06010	041M250101, 041M270101, 041M270201, 041M641501, 041M640501DL, 041M060101DL	alpha-BHC
M06070	041W060701, 041W320101, 041W320301, 041EM0010, 041FM00101, 041W330101, 041W330301, 041R250301, 041W060301, 041W250301, 041M060901, 041M320101, 041M320301, 041M330101,	alpha-BHC and delta-BHC
M06070	041W250101, 041W270201, 041M330201, 041M330301, 041M060801, 041M060801DL	alpha-BHC and delta-BHC
M06070	041M060701	alpha-BHC and 4,4'-DDT

Pesticide/PCB Continuing Calibration — To confirm the calibration and evaluate instrument performance, calibration is verified by analyzing instrument blanks, the performance evaluation mixture (PEM), and the midpoint concentration of the two standard mixes. The %D between the calculated amount and the true amount must not exceed 25%. Multicomponent compounds (e.g., PCBs) do not require continuing calibration verification.

No continuing calibration QC outliers were found for the SDGs analyzed for pesticides/PCBs.

5.2.4 Blanks

Laboratory method blanks are used to assess the existence and magnitude of potential contamination introduced during analysis. Additionally, field-derived *field blanks* and *trip blanks* are submitted to the laboratories. The field blank is a sample of water used during decontamination activities. The trip blank is a 40-milliliter (ml) volatile organic analysis vial filled with certifiable water used to assess cross-contamination during VOC sample shipment. When compounds are found in both samples and laboratory blanks analyzed within the same 12-hour period *and/or* field-derived blanks, the usability of the data depends on the reviewer's judgment and the origin of the blank. According to the Organic Functional Guidelines, a sample result should not be considered positive unless the concentration of the compound in the sample exceeds 10 times the amount in *any* blank for common laboratory compounds (i.e., methylene chloride, acetone, and 2-butanone), or five times the amount for other compounds. These concentrations are referred to as *action levels* (ALs). Because blank samples may not be prepared using the same weight of the sample, volume of sample, or dilution, these variables should be considered when using blank criteria. The specific actions to be taken are as follows:

- If a compound is found in the blank but not in the sample, no action is taken.
- If the sample concentration is greater than the AL, the concentration may be used unqualified.
- If the sample concentration is less than the practical quantitation limit (PQL) and less than the AL, the sample is reported as not detected "U" at the PQL.

Example (using "10×" rule):

Water Sample			**Diluted Water Sample**		
Blank result	=	1	Blank Result	=	1
Blank AL	=	10	Dilution Factor	=	5
PQL	=	5	Blank AL	=	50
Sample result	=	4J	Diluted PQL	=	25
Final result	=	5U	Sample result	=	4J
			Final result	=	25U

In this example, note that data are not reported as 4U because it is less than the PQL. Also note that the dilution factor is used to calculate an AL of 50 ($1 \times 5 \times 10$).

- If the sample concentration is greater than the PQL but less than the AL, the concentration is reported as not detected "U."

Example (using "10×" rule):

Water Sample			**Soil Sample**			**Diluted Soil Sample**			
Blank result	=	6	Blank result	=	6	Blank Result	=	6	
Blank AL	=	60	% Solids	=	80	% Solids	=	80	
PQL	=	5	Blank AL	=	75	Dilution Factor	=	5	
Sample result	=	50	PQL	=	5	Blank AL	=	375	
Final result	=	50U	Sample result		=	50 PQL	=		25
			Final result	=	50U	Sample result		=	250
						Final result	=	250U	

In this example, water sample results less than 60 (or 10 × 6) would be qualified as not detected. Soil results of less than 75 would be qualified as not detected because percent solids are used to calculate the AL: [(6 ÷ 0.8)× 10]. Results less than 375 would be qualified as not detected in the diluted soil sample because dilution factors and percent solids are used to calculate the AL:
[(6 ÷ 0.8)× 10 × 5].

Several compounds were detected in the blanks associated with the investigation of Site 41. Most compounds were considered to be common laboratory compounds: acetone, methylene chloride, and phthalate esters. Target analytes detected in investigative samples were qualified as recommended by the Organic Functional Guidelines. ALs were based on the highest concentration of any laboratory compound found in associated method blank(s) or QC sample(s). No positive sample result for a common laboratory compound was reported unless that compound's concentration exceeded the ALs. All results believed to be attributed to blank contamination were flagged as undetected "U."

5.2.5 Surrogates

Accuracy is the degree to which a given result agrees with the true value. To check the accuracy in VOC, SVOC, and pesticide/PCB analyses, the methods require the addition of known amounts of surrogate compounds. If the surrogate percent recoveries are close to the known concentrations, as defined by the limits set by the method, the reported target compound concentrations are assumed to be accurate.

All volatile and semivolatile fraction surrogate recoveries were within QC limits for the Site 41 investigation.

Pesticide/PCB SDGs had surrogate recoveries within QC criteria except for 030301, 041M10, 5A0101, 63A401, 640801, EM0040, EM0050, EMD060, EW0010, M00901, M06010, M06070, M52A10, Z30301, Z42101, and Z53301. Pesticide/PCB surrogates outside QC criteria indicated that the sample results may have been influenced by matrix interference. Samples that had at least one surrogate recovery outside QC criteria are summarized below. When surrogate recoveries were above the QC limit, only positive results were estimated and qualified as estimated "J." When surrogate recoveries were less than the QC limit, all positive and undetected results were estimated and qualified "J" and "UJ," respectively.

5.2.6 Internal Standards

Internal standards (IS) are added to VOC and SVOC samples and used to calculate the concentrations of target compounds. Two IS QC criteria must be met when a sample is analyzed. The retention time of the IS must not vary by more than 30 seconds, and the IS area counts must not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. For Site 41 samples, all VOC and SVOC internal standard retention times were within QC limits.

The following SDGs had internal standard area recoveries outside QC criteria: 63A401, 640801, EM0040, EM005, EM0050, EMD060, M06010, M06070, M52A10, and Z30301. Details of these SDGs are summarized below. All associated positive results were flagged "J" and all not-detected results as "UJ."

SDG	Sample	Noncompliant Internal Standard
VOC Fraction		
63A401	041M010201RE 041M010301, 041M010101RE	1, 4-difluorobenzene, chlorobenzene-d_5 chlorobenzene-d_5
EM005	041M63A301	chlorobenzene-d_5
EM0050	041M150101RE	1, 4-difluorobenzene, chlorobenzene-d_5
EMD060	041M18A301, 041M18A101RE	chlorobenzene-d_5
EMD060	041M18A301RE	ALL
M06010	041M250201, 041M640301	chlorobenzene-d_5
M06010	041M250201RE, 041M270101RE, 041M270101, 041M640301	1, 4-difluorobenzene, chlorobenzene-d_5
M06070	041M320201	1, 4-difluorobenzene, chlorobenzene-d_5
M06070	041M320201RE	1, 4-difluorobenzene, chlorobenzene-d_5, bromochloromethane
M52A10	041M52A101RE, 041M52A201	chlorobenzene-d_5
640801	041M641901RE 041M641901	chlorobenzene 1,4-difluorobenzene, chlorobenzene-d_5

SDG	Sample	Noncompliant Internal Standard
EM0040	041M030201	chlorobenzene-d_5
SVOC Fraction		
EMD060	041M18A201	perylene-d_{12}
PEN13	041M640501, 041M640401	perylene-d_{12}
PEN15	041J750101	chrysene-d_{12}, perylene-d_{12}
PEN15	041J18B101, 041J330201, 041J640101	perylene-d_{12}

5.2.7 Field Duplicates

The duplicate samples assist in indicating overall field and laboratory precision. A greater variance should be expected for soil sample duplicates than for water sample duplicates, due to the differences in matrix. All Site 41 samples demonstrated good field duplicate correlation except for the pesticide fraction of SDGs 041M10, EM0040, EM005, and M00901.

5.2.8 Compound Quantitation

For organic analyses, the data evaluator must assess the usability of values when multiple sample results are reported by the laboratory. The following paragraphs describe actions taken by the validator in these cases.

Reanalyzed Samples

Occasionally, organic samples may require reanalysis because of method requirements or QC results outside method criteria. Reasons for sample reanalysis include samples analyzed outside 12-hour tuning periods, extremely low surrogate %RSDs and IS retention times, and/or area counts outside QC limits. In these instances, the laboratory may report results for the original and reanalyzed samples. During validation, the reviewer evaluates QC associated with the original and reanalyzed samples and assesses which sample represents the preferable quality. The sample with the preferable QC should be used for interpretation. The preferred analysis is reported as a primary sample in the EnSafe database and analytical tables.

The following samples were reanalyzed. The laboratory reported two sample results, and the preferred analyses were used for interpretation.

SDG	Preferred Samples	Reason
VOC Fraction		
041M10	041M5A0501RE	IS areas improved with reanalyses.
63A401	041M010101RE, 041M010201RE, 041M010301	IS areas improved with reanalyses.
640801	041M64901RE	IS areas improved with reanalyses.
EM0040	041M030201	Surrogate recoveries did not improve with reanalysis.
EM005	041M63A301	IS areas did not improve with reanalysis.
EM0050	041M150101RE	Surrogate recoveries improved with reanalysis.
EMD060	041M18A301	IS areas improved with reanalysis.
EMD060	041M18A101RE	IS areas improved with reanalysis.
M06010	041M250201, 041M270101, 041M640301RE	IS areas did not improve with reanalysis.
M52A10	041M52A101RE 041M52E201	Surrogate recoveries improved with reanalysis. Surrogate recoveries did not improve with reanalysis.
PEN12	041M5A0601, 041M640601, 041N750101	IS areas did not improve with reanalysis.
SVOC Fraction		
EMD060	041M18A201	IS areas did not improve with reanalysis.
PEN13	041M640401, 041M640501	IS areas did not improve with reanalysis.

Diluted Samples

When an analyte response exceeds the linear calibration range of the instrument or is off-scale, the laboratory dilutes the sample. If one or more compounds are outside the calibration range during an initial analysis, the laboratory flags the analyte "E." When diluted, the sample results are qualified "D." Generally, values from the initial analysis will be used except where they exceeded the calibration range. In this case, the initial analysis value will be substituted by the diluted value to ensure the most representative data. The "D" qualifier will remain on the value to alert the data user that the value from a secondary dilution was used.

The SDGs, samples, and compound used from the secondary dilution, and the corresponding samples are listed below.

SDG	Diluted Samples	Compounds Used from Secondary Dilution
5A0101	041M5A0101, 041M061101	acetone
EM005	041W170101, 041W04D401	methylene chloride
M00901	041WW10201	xylene
M06070	041M060901	acetone
	041R250301, 041W250301	methylene chloride
Z42101	041W5B0201	cis-1,2-dichloroethene

SDG	Diluted Samples	Compounds Used from Secondary Dilution
Z30301	041W570101	methylene chloride
030301	041M04D101	delta-BHC, 4,4'-DDE, 4,4'-DDD
	041M04D201	4,4'-DDE, 4,4'-DDD
041M10	041M5A0501	4,4'-DDE
5A0101	041M060601	4,4'-DDE, 4,4'-DDD
63A401	041M010301	4,4'-DDD, gamma-chlordane, Aroclor-1260
640801	041M010401	endrin, 4,4'-DDD, 4,4'-DDT
EM0040	041M030101,041N030101	4,4'-DDE. 4.4'-DDD. 4.4'-DDT
	041M030201	4,4'-DDD, Aroclor-1260
EM005	041M19A101	heptachlor epoxide
	041C490101, 041M490101, 041M490201	4,4'-DDD
	041M63A301	4,4'-DDD, Aroclor-1260
EM0050	041M150101, 041M150201, 041M150301	4,4'-DDE, 4,4'-DDD
EM0060	041M790101	4,4'-DDD, alpha-chlordane
EMD060	041M18A101, 041M18A201	4,4'-DDE, 4,4'-DDD, 4,4'-DDT
	041M18B101	4,4'-DDE, 4,4'-DDT
M00901	041M480101, 041N480101	4,4'-DDE, 4,4'-DDD
M06010	041M060301	4,4'-DDE, 4,4'-DDD, 4,4'-DDT
	041M640201, 041M640501	4,4'-DDE, 4,4'-DDD
	041M060101	4,4'-DDE, 4,4'-DDT
M06070	041M060801	4,4'-DDE, 4,4'-DDD
M52A10	041M52E101, 041M56A101	4,4'-DDE, 4,4'-DDD
	041MW20101	4,4'-DDD
Z53301	041M120101	endrin ketone
PEN12	041M5A401	4,4'-DDE, 4,4'-DDD

Pesticide/PCB Quantitation

Pesticide analysis employs an electron capture detector (ECD) for quantitation; however, ECD detection is not a definitive means of discerning between different components. Pesticides are routinely analyzed using two dissimilar columns with retention time windows as the qualitative indicator. If a peak falls within the retention time windows on both columns, then it is reported as a positive hit for the appropriate target analyte. Target analytes and surrogates are generally quantitated and reported on both columns; however, only the lower of the two concentrations is reported because, if present, co-eluting interferences are likely to increase the calculated concentration of any target analyte.

For detected analytes, the %D between the two columns is calculated. If the %D is greater than 25%, the laboratory flags the value with a "P" qualifier. This flag alerts the data user of the

potential problems in quantitating the analyte. If a significant difference exists in the quantitated values on the two columns, an interference likely exists, suggesting that the detected concentration may be a false positive. This is particularly true at lower concentrations where uncertainty may increase because of instrument noise.

During the validation process, the laboratory's "P" flags are assessed. General guidelines are used to assess result %Ds. For data in SDGs other than PEN11, PEN12, PEN13, PEN14, and PEN15, %Ds greater than 25% were qualified as estimated. For SDGs PEN11, PEN12, PEN13, PEN14, and PEN15, the guidelines below were used in conjunction with examination of the data provided to ascertain the validity of single-component pesticide results:

Result %D	**Validation Flag**
≤ 40%	Result is accepted unqualified.
40%>%D < 100%	Analyte is estimated and flagged "J."
>100%	Analyte is flagged as undetected "U" if it is less than 10× the PQL and data review indicates the result may be a false positive. OR Analyte is flagged "NJ" if the result is greater than 10× the PQL. "NJ" flag indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification at an estimated concentration.

5.3 Inorganic Analysis

5.3.1 Holding Times

All samples were received by the laboratory in good condition with proper custody documentation. From the date of collection to the date of sample analysis, holding times were within method and contractual requirements. The only exceptions were SDGs Z13601 and Z30201, which were prepared using a modified acid digestion. Because the analytical data for SDGs Z13601 and Z30201 were not used to quantify specific analyte concentrations, the holding time exceedances do not affect data quality or usability.

5.3.2 Calibrations

Initial and continuing calibrations are conducted to ensure that the instrument can produce acceptable and quantitative data throughout each analytical run. For the analysis of Site 41 inorganics, no initial or continuing calibrations exceeded method QC limits for the inorganic parameters.

5.3.3 Blanks

As described previously, laboratory method blanks are used to assess the existence and magnitude of potential contamination introduced during analysis. Additionally, field blanks may be collected to assess the potential contamination introduced during sample collection. When chemicals are found in both samples and laboratory blanks, the usability of the data depends on the reviewer's judgment and the origin of the blank. According to Inorganic Functional Guidelines, a sample result should not be considered positive unless the concentration of the analyte in the sample exceeds five times the amount in *any* blank. These concentrations are referred to as ALs. Because blank samples may not be prepared using the same weight of sample, volume of sample, or dilution, these factors should be considered when using blank criteria. The specific actions to be taken are as follows:

- If an analyte is found in the blank but not in the sample, no action is taken.
- If the sample concentration is between the instrument detection limit (IDL) and the AL, the concentration is reported as "U."
- If the sample concentration is greater than the AL, the concentration may be used unqualified.

When the blank concentration is less than the IDL (negative value), but had an absolute value greater than the IDL, the AL is 10 times the absolute value of the blank concentration. The specific actions are as follows:

- If the sample concentration is greater than the AL, the concentration may be used unqualified.
- If the concentration of any detected analyte is less than the AL, it is qualified as estimated "J" for positive results.
- If the result is not detected, then it is qualified as estimated "UJ."

Contamination was identified in blanks of all SDGs. Action levels were set for each affected analyte based on the highest concentration in any associated blank. Analytes attributed to blank contamination

were flagged undetected "U." No positive sample result was reported for an analyte detected in any blank unless that artifact's concentration exceeded the action level of five times the amount found in any blank, per the Inorganic Functional Guidelines (USEPA, 1994b).

5.3.4 Inductive Coupled Plasma Interference Check Sample Analysis

The inductive coupled plasma (ICP) Interference Check Sample (ICS) analysis is performed to check the laboratory's instrument and background correction factors. All percent recovery criteria for the Site 41 samples were within the established criteria.

5.3.5 ICP Serial Dilutions

ICP serial dilutions assess matrix interference. One sample from each set of similar matrix types is diluted by a factor of five. For an analyte concentration that is at least 50 times above the IDL for CLP analyses and 10 times above the IDL for SW-846, the measured concentrations of the undiluted and diluted sample should agree within 10%. SDGs 030301, 5A0101, EM0040, M00901, Z30201, PEN13, and PEN14 had %Ds outside acceptable QC criteria. Elements that exceeded QC criteria are summarized below. When an element exceeded QC criteria, that analyte was qualified as estimated "J" for all positive sample values in the SDG, as specified in Inorganic Functional Guidelines. Nondetect results were accepted without qualification.

SDG	Affected Samples	Analyte(s)
030301	041M030301, 041M030401, 041M030501, 041M030601, 041M030701, 041M04D101, 041M04D201, 041M04D301, 041M04D401, 041M04D501	manganese
5A0101	041W061001, 041W5A0101, 041W5A0201, 041W5A0401, 041W5A0701	iron, magnesium
EM0040	041M030101, 041N030101, 041M030201	lead, calcium
M00901	041W480101, 041R480101, 041W490301, 041WW10101, 041WW10201, 041WW10301, 041W490101	calcium, magnesium
Z30201	041M10A101, 041M320301, 041M330201, 041M641401	iron, lead
PEN13	041M160301, 041M640401, 041M640501, 041M640601	aluminum
PEN14	041W640101, 041W640501, 041R640501	potassium
PEN15	041J400601, 041J18B101, 041J330201, 041J640101, 041J640601, 041J750101	copper, iron, manganese

5.3.6 Laboratory Control Samples

Laboratory control samples (LCS) are used to monitor the overall performance or accuracy of all steps in the analysis, including the sample preparation. All LCS criteria were met for all SDGs except for SDG Z30201. Samples in this SDG were prepared using a hydrofluoric acid digestion method. Because

the analytical data were not used to quantify specific analyte concentrations at Site 41, QC exceedances for this SDG do not affect data quality or usability.

5.3.7 Laboratory Matrix Spikes

Laboratory spiked samples are designed to provide information about the effects of the sample matrix on the digestion and measurement method. Many MS recoveries exceeded QC criteria for the Site 41 data. As specified by the CLP Inorganic SOW and SW-846 methods, the MS QC limits are 75% to 125%. When an element was outside MS QC limits, positive and undetected results for that analyte were qualified for all samples in the SDG, as specified in Inorganic Functional Guidelines. Spike results and the qualifiers applied to QC outliers are summarized below.

SDG	Affected Samples	Spike Results	Flag(s)
Antimony	EM0040, EMD060, 5A0101, 63A401 EM005, M52A10, Z53301, PEN12	>30% <75%	J, UJ
Antimony	030301, 041M10, Z30301, Z42101 (soils), 63A401, 640801, EM005 EM0050, EW0010, M06010, Z30301, Z42101, Z53301, PEN12	<30%	J, UR
Cadmium	EM0040	>30% <75%	J, UJ
Chromium	Z30301	>125%	J
Copper	M06010	>30% <75%	J, UJ
Cyanide	PEN12	>30% <75%	J, UJ
Lead	5A0101, Z42101	>125%	J
Lead	Z42101 (soils)	>30% <75%	J, UJ
Mercury	EMD060	>125%	J
Mercury	PEN14	>30% <75%	J, UJ
Selenium	041M10, EM0040 (soils), EM005 M52A10	>30% <75%	J, UJ
Selenium	Z42101 (soils), 030301, M06010	>125%	J
Silver	041M10, EM0040 (soils), 030301, Z53301, Z22401 (soils), M06010, Z42101, PEN14	>30% <75%	J, UJ
Thallium	041M10, EM0040 (soils), 640801, Z30301 (soils)	>30% <75%	J, UJ
Zinc	PEN14	>125%	J
Cyanide	PEN12	>30%, <75%	J, UJ

For SDGs Z13601 and Z30201, several elements exceeded the MS control limits. Because the data from these SDGs were not used to assess contamination at Site 41, the QC exceedances do not affect data quality and usability.

5.3.8 Laboratory Duplicates

Laboratory duplicate samples are used to determine the precision of analytical process for each parameter. The duplicate RPD analysis criteria were not met for SDGs 041M10, 63A401, M00901, EM0050, M06010, Z42101, and Z53301. A summary of the SDGs outside QC criteria and elements affected is provided below. When an element was outside QC criteria, that analyte was qualified as estimated "J" for all positive sample values in the SDG, as specified in Inorganic Functional Guidelines.

SDG	Analyte	Flag
041M10	calcium, lead	J
63A401	aluminum, calcium	J
M00901	aluminum	J
EM0050	calcium, chromium	J
M06010	calcium, lead, zinc	J
Z42101	antimony, lead, silver	J
Z53301	calcium	J

For SDGs Z13601 and Z30201, several elements exceeded the RPD control limits. Because the data from these SDGs were not used to assess contamination at Site 41, the QC exceedances do not affect data quality and usability.

5.3.9 Field Duplicates

Representativeness expresses the degree to which sample data represent the characteristic of a population, parameter variations at a sampling point, or an environmental condition. The duplicate samples assist in indicating overall field and laboratory precision. A greater variance should be expected for soil sample duplicates than for water duplicates due to matrix differences. RPDs for field duplicates were outside QC criteria for SDGs 041M10 (calcium), EM0040 (aluminum, iron, magnesium, manganese, vanadium, and zinc), EM0050 (calcium), M06010 (aluminum, calcium, iron, and sodium), and Z42101 (calcium).

5.3.10 Atomic Absorption Spike Recoveries

Antimony, arsenic, lead, silver, thallium, and selenium were analyzed by graphite furnace atomic absorption (GFAA). For elements analyzed by GFAA, every sample is spiked by the analyst to assess matrix interference. For the Site 41 samples, GFAA analytical spike recoveries met the control limits of 85 to 115% for all elements except antimony, silver, and thallium. QC criteria exceedances affected the following SDGs: 030301, 041M10, 5A0101, 63A401, 640801, EM0040, EM005, EM0050, EM0060, EMD060, EW0010, M00901, M06010, M06070, M52A10, Z30301, Z42101, Z53301, PEN11, and PEN14. Detections of antimony, silver, and thallium were flagged as estimated "J". Undetected

antimony, silver, and thallium results were estimated "UJ" unless they were previously rejected and flagged "UR" for poor MS results.

5.4 Site 41 Phase II and III Data Summary

5.4.1 Completeness

Completeness is defined as the percentage of acceptable data points. Except for the results flagged "UR", all of the samples analyzed for the investigation of Site 41 were determined to be valid with some qualification. Table 5-1 (tables are located at the end of each section) presents the analytical completeness for Site 41 data by parameter.

With the exception of Wetlands 13 and 25, all wetlands were within the analytical completeness criterion of 95% for each parameter. The low completeness percentages obtained for these two wetlands is due to the number of samples analyzed and the nature of the QC criteria that were not met. There were less than five samples collected at each wetland. Hence, if one sample was rejected because of noncompliant QC, the completeness was more impacted than if there were a larger number of samples. Pesticide/PCB sample 041W130101 was rejected because the surrogate recoveries were extremely low, indicating the possibility of matrix interference. SVOC sample 041W250101 was rejected because of missed holding times. In both instances, the rejected data indicate that any analytes detected may be biased low and the reported quantitation limits may not be representative.

5.4.2 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Comparability is assured through the use of established field sampling methods by experienced field personnel and performance of laboratory analyses as specified by USEPA protocols. All samples for Site 41 were collected in accordance with the USEPA Region IV Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) and analyzed according to specified analytical protocols.

5.5 Conclusion

With the exception of the unusable data identified in Section 5.3, the data are considered complete and satisfactory for the investigation of Site 41. Antimony completeness was 83.8% because of low matrix spike recovery, a result of the acid used during the digestion process. The acid digestion procedure prescribed by the CLP analytical method tends to precipitate antimony from the sample, and problems with antimony matrix recovery are inherent in the CLP sample preparation method. USEPA has acknowledged that this is a problem; in SW-846, it recommends a specific digestion process to reduce the amount of precipitation.

5.6 2001 Analytical Data

Site 41 data were validated by Heartland Environmental Services Inc. of St. Charles, Missouri. The analytical work was conducted by STL Savannah Inc., Savannah, Georgia. Sample analyses and data validation were performed in accordance with the guidance documents listed in Section 5.1.

Samples from Wetland 64 were collected in August 2001. All samples were received by the laboratory in good condition and with proper custody documentation. Samples were analyzed for SVOCs, pesticides, PCBs, and metals, SEM metals, acid volatile sulfide, mercury and total organic carbon. Seven fish-tissue samples were submitted to Savannah Laboratory and analyzed for SVOCs, pesticides/PCBs, and metals.

Organic and inorganic results were reported by the laboratory in two SDGs: NASP14 and NASP15. Data assessment narratives and summary reports are provided in Appendix I.

5.7 Confirmation Sampling 2004/Phase IV Analytical Data

Site 41 data from the 2004 sampling events were validated by EnSafe chemists. Laboratory analysis was performed by STL Savannah of Savannah, Georgia. Sample analyses and data validation were performed in accordance with the guidance documents listed in Section 5.1 except for PAHs, which were analyzed using a low concentration SOW.

Samples from selected wetlands were collected in April 2004. All samples were received by the laboratory in good condition and with proper custody documentation. Sediment samples were analyzed for VOCs, low PAHs, SVOCs, pesticides, PCBs, metals, and total organic carbon. Surface water samples were analyzed for VOCs, low PAHs, SVOCs, pesticides, PCBs, total metals, dissolved metals, and total organic carbon.

Organic and inorganic results were reported by the laboratory in two SDGs: PEN16 and PEN17. Data assessment narratives and summary reports are provided in Appendix I.

Validation Qualifiers

U **Undetected** — The analyte was analyzed for but not detected or was also found in an associated blank at a concentration less than 10 times the blank concentration for common organic laboratory contaminants or five times the blank concentration for other target analytes or elements. The associated value shown is the quantitative limit.

J **Estimated Value** — At least one QC parameter was outside control limits.

NJ **Presumptive Identification** — NJ is used for pesticide/PCB analysis when the percent difference exceeds the QC limits by 100% or more. It indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification at an estimated concentration. This qualifier is used for pesticide/PCB validation only.

UJ **Undetected and Estimated** — The analyte was analyzed for, but not detected above, the listed estimated quantitation limit; the quantitation limit is estimated because one or more QC parameters were outside control limits.

D **Diluted Result** — The compound was reanalyzed at a secondary dilution factor. If one or more compounds are outside the calibration range during an initial analysis, the laboratory flags the analyte "**E**." When diluted, the sample results are flagged "**D**." Generally, values from the initial analysis will be used except where the value exceeded the calibration range. In this case, the initial analysis value will be substituted by the diluted value to ensure the most representative data. The "**D**" flag will remain on the value to alert the data user that a secondary dilution value was used.

R/UR **Unusable Data** — One or more QC parameters grossly exceeded control limits.

I The reported value is between the laboratory minimum detection limit and the laboratory PQL. This qualifier applies to data collected in the 2004 investigations only.

Table 5-1
Phase II and III Analytical Completeness by Parameter

Fraction	Total Unusable Results	Total Results	Percent Completeness
Metal	33	8,990	99.6
Pesticides/PCBs	128	10,541	98.8
SVOC	86	23,412	99.6
VOC	165	12,957	98.7
TOTAL	**412**	**56,176**	**99.2**

Note:
Analytical completeness was greater than 95% for each parameter analyzed for Site 41 sediment and surface water samples; therefore, the analytical completeness criterion of 95% was met for each fraction analyzed for this data set.

6.0 NATURE AND EXTENT EVALUATION METHODS

This section presents the methods used to evaluate the nature and extent of contamination. Wetland specific evaluations are presented in Sections 10 through 15 of this report.

The nature and extent evaluation for each Site 41 wetland will include an overview of each wetland's data to examine the nature and extent of the sediment and surface water detections and where the detections occurred relative to the sample locations, onsite features, adjacent sites, and offsite features. The nature and extent discussion will also include a reference concentration comparison. Site 41 inorganic freshwater and estuarine reference concentrations for sediment and surface water is discussed in Section 6.1. Development of basewide DDT concentrations is described in Section 6.2.

6.1 Inorganic Sediment and Surface Water Reference Criteria

Reference wetlands were identified from the wetlands list developed by Parsons and Pruitt (USEPA, 1991a) for comparison to the potentially impacted wetlands. These wetlands were selected because they had similar vegetation, topography, geology, and hydrology in contrast to the wetlands potentially impacted by an IR site. The reference wetlands were also distant from any IR site or other potential sources of contamination based on field observations and a historical study of adjacent areas. The four reference wetlands sampled were Wetlands 25, 27, 32, and 33. Wetlands 25 and 32 are freshwater reference wetlands, while Wetlands 27 and 33 are estuarine reference wetlands.

In determining reference criteria, the sediment and surface water results from Wetlands 25 and 32 were used to develop freshwater reference concentrations for the Site 41 freshwater wetlands. Likewise, sediment and surface water results from Wetlands 27 and 33 were used to develop estuarine reference concentrations for the Site 41 saltwater wetlands.

Reference criteria for both sediment and surface water were calculated by summing valid detections with one-half of each nondetect ("U" or "UJ" validation qualifier). The mean detection was calculated, then multiplied by two, with the resulting multiplier then used as the reference concentration. Tables 6-1 and 6-2 (tables are located at the end of each section) detail how the freshwater and estuarine inorganic sediment and surface water reference concentrations were developed, respectively.

6.2 Basewide Total-DDT Concentrations

Although its use has been banned in the United States since 1972, 4,4'-DDT and its metabolites (4,4'-DDD, and 4,4'-dichlorodiphenyldichloroethylene 4,4'-DDE) are still detected in the Florida coastal sediments (Delfino, J.J. *et al.*, 1991). Although 4,4'-DDT is not naturally occurring, it appears to be

ubiquitous in the environment, i.e., in surface water, sediment, and biological tissues. 4,4'-DDT and its metabolites are generally highly lipophilic, resistant to biodegradation, and bioconcentrate in biota. 4,4'-DDT can be transferred to humans through the food chain. Atmospheric transport from Central America continues to contribute to the 4,4'-DDT concentrations in the Florida coastal sediment. Therefore, studies of the Pensacola Bay system (PBS) (National Status and Trends Program [NSTP]) and NAS Pensacola (Sites 40 and 41) were reviewed to establish a basewide concentration for 4,4'-DDT and its metabolites for NAS Pensacola coastal sediments. The NSTP results are detailed in *Magnitude and Extent of Sediment Toxicity in Four Bays of the Florida Panhandle: Pensacola, Choctawhatchee, St. Andrew, and Apalachicola* (Long, E.R. e*t al.*, 1997).

The NAS Pensacola results are detailed in this report for Site 41 and in the *Final Remedial Investigation Report, Site 40, Naval Air Station Pensacola* (EnSafe, 1999). The summary table from the NSTP study and a table presenting all the results from the Sites 40 and 41 investigations are presented in Appendix J.

The NSTP study analyzed 24 sediment samples from the Pensacola Bay system for pesticides/PCBs. During the field investigations for Sites 40 and 41, 265 sediment samples were analyzed for pesticides/PCBs. The Site 41 samples were further evaluated based on the color coding established for the wetlands earlier in the investigation. That data were evaluated for concentration populations indicative of widespread use versus elevated concentrations. The maximum concentration of widespread use population was established as the basewide level.

4,4'-DDD

4,4'-DDD was detected in 50% of the NSTP study locations at concentrations ranging from 2.58 g/kg to 53.84 g/kg. 4,4'-DDD was detected in 29.7% of the 265 sediment samples collected from Sites 40 and 41, with detections ranging from 0.2 g/kg (Wetlands 64 and 72) to 2,600 g/kg (Wetland 48). In non-IR-related wetlands and reference wetlands, the concentrations ranged from 0.2 g/kg in Wetland 72 to 24 g/kg in Wetland 32. Based on the concentrations in the NSTP study, and the PNAS wetlands, the basewide concentration for 4,4'-DDD is established at 50 g/kg.

4,4'-DDE

4,4'-DDE was not analyzed for in the NSTP study. Of the 265 samples analyzed from the Sites 40 and 41 investigations, 4,4'-DDE concentrations ranged from 0.21 g/kg (Site 40 Assessment Zone 3 sample) to 620 g/kg (Wetland 48). The concentration of 4,4'-DDE in the non-IR-related wetlands and reference wetlands ranged from 0.24 g/kg (Wetland 72) to 37 g/kg (Wetland 32). Based on the

concentrations in the NSTP study and PNAS wetlands, the basewide concentration for 4,4′-DDE was established at 40 g/kg.

4,4'-DDT

4,4'-DDT was detected in 41.7% of the NSTP study samples. The concentrations ranged from 2.02 g/kg to 37.06 g/kg in that study. 4,4-DDT was detected in 23.6% of the 265 Sites 40 and 41 sediment samples, with detections ranging from 0.21 g/kg (Site 40 Assessment Zone 2 sample) to 1,800 g/kg (Wetland 18B).

The reference wetland concentrations ranged from 0.26 g/kg (Wetland 72) to 13 g/kg (Wetland 32). Based on the results of the NSTP study and the PNAS wetlands, a basewide concentration of 20 g/kg was established for 4,4′-DDT.

Total DDT

The basewide level for total DDT is 110 g/kg, and was derived from adding the basewide levels of 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT.

Table 6-1
Development of Freshwater Sediment and Surface Water Inorganic Reference Concentrations
Site 41

Sediment Reference Concentrations (n=6)						Surface Water Reference Concentrations (n=4)					
Sample ID	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**	**Sample ID**	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**
Aluminum (mg/kg)						**Aluminum (µg/L)**					
041M250101	4,180	J	4,180	6,805	**13,610**	041W250101	1,820		1,820	545.13	**1,090.25**
041M250201	8,780	J	8,780			041W250301	221		221		
041M250301	12,500	J	12,500			041W320101	141	U	70.5		
041M320101	3,670		3,670			041W320301	138	U	69		
041M320201	3,920		3,920								
041M320301	7,780		7,780								
Antimony (mg/kg)						**Antimony (µg/L)**					
041M320101	1.6	UJ	0.8	2.217	**4.43**	041W250101	2	UJ	1	2	**4**
041M320201	6.7	UJ	3.35			041W250301	2	U	1		
041M320301	5	U	2.5			041W320101	2	UJ	1		
						041W320301	10	U	5		
Arsenic (mg/kg)						**Arsenic (µg/L)**					
041M250101	1.1	J	1.1	3.31	**6.62**	041W250101	2.4	J	2.4	1.35	**2.7**
041M250201	8		8			041W250301	2	U	1		
041M250301	8.8		8.8			041W320101	2	U	1		
041M320101	1.6	U	0.8			041W320301	2	U	1		
041M320201	1.3	U	0.65								
041M320301	1	U	0.5								
Barium (mg/kg)						**Barium (µg/L)**					
041M250101	2.3	J	2.3	7	**14**	041W250101	2.2	U	1.1	1.84	**3.68**
041M250201	5.6	J	5.6			041W250301	1.9	U	0.95		
041M250301	8.6	J	8.6			041W320101	5.4	U	2.7		
041M320101	9.1	J	9.1			041W320301	5.2	U	2.6		
041M320201	6.7	J	6.7								
041M320301	9.7	J	9.7								

Table 6-1
Development of Freshwater Sediment and Surface Water Inorganic Reference Concentrations
Site 41

Sediment Reference Concentrations (n=6)						Surface Water Reference Concentrations (n=4)					
Sample ID	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**	**Sample ID**	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**
Beryllium (mg/kg)						**Beryllium (µg/L)**					
041M250101	0.46	U	0.23	0.42	**0.84**	041W250101	1	U	0.5	0.5	**1**
041M250201	0.47	J	0.47			041W250301	1	U	0.5		
041M250301	0.59	J	0.59			041W320101	1	U	0.5		
041M320101	0.78	U	0.39			041W320301	1	U	0.5		
041M320201	0.67	U	0.335								
041M320301	0.51	J	0.51								
Cadmium (mg/kg)						**Cadmium (µg/L)**					
041M250101	1.4	U	0.7	0.9	**1.8**	041W250101	3	U	1.5	1.5	**3**
041M250201	1	U	0.5			041W250301	3	U	1.5		
041M250301	1.3	J	1.3			041W320101	3	U	1.5		
041M320101	2.3	U	1.15			041W320301	3	U	1.5		
041M320201	2	U	1								
041M320301	1.5	U	0.75								
Calcium (mg/kg)						**Calcium (µg/L)**					
041M250101	1,770	J	1,770	5,378.33	**10,756.67**	041W250101	4,620	J	4,620	3,837.5	**7,675**
041M250201	3,700	J	3,700			041W250301	6,720		6,720		
041M250301	17,900	J	17,900			041W320101	1,750	J	1,750		
041M320101	2,150	J	2,150			041W320301	2,260	J	2,260		
041M320201	2,430	J	2,430								
041M320301	4,320		4,320								
Chromium (mg/kg)						**Chromium (µg/L)**					
041M250101	7.1		7.1	19.68	**39.37**	041W250101	8	U	4	4	**8**
041M250201	33		33			041W250301	8	U	4		
041M250301	59.1		59.1			041W320101	8	U	4		
041M320101	7.2	J	7.2			041W320301	8	U	4		
041M320201	5.7	J	5.7								
041M320301	6		6								

Table 6-1
Development of Freshwater Sediment and Surface Water Inorganic Reference Concentrations
Site 41

Sediment Reference Concentrations (n=6)						Surface Water Reference Concentrations (n=4)					
Sample ID	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**	**Sample ID**	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**
Cobalt (mg/kg)						**Cobalt (µg/L)**					
041M250101	1.6	J	1.6	1.4	**2.8**	041W250101	3	U	1.5	1.5	**3**
041M250201	1.9	J	1.9			041W250301	3	U	1.5		
041M250301	2	J	2			041W320101	3	U	1.5		
041M320101	2.3	U	1.15			041W320301	3	U	1.5		
041M320201	2	U	1								
041M320301	1.5	U	0.75								
Copper (mg/kg)						**Copper (µg/L)**					
041M250101	6.1	J	6.1	9.75	**19.5**	041W250101	4	U	2	2	**4**
041M250201	12.2	J	12.2			041W250301	4	U	2		
041M250301	19.6	J	19.6			041W320101	4	U	2		
041M320101	5.7	J	5.7			041W320301	4	U	2		
041M320201	5.7	J	5.7								
041M320301	9.2	J	9.2								
Cyanide (CN) (mg/kg)						**Cyanide (CN) (µg/L)**					
041M250101	4.8	U	2.4	2.61	**5.22**	041W250101	5	U	2.5	2.5	**5**
041M250201	3.5	U	1.75			041W250301	5	U	2.5		
041M250301	3.8	U	1.9			041W320101	5	U	2.5		
041M320101	7.5	U	3.75			041W320301	5	U	2.5		
041M320201	6.4	U	3.2								
041M320301	5.3	U	2.65								
Iron (mg/kg)						**Iron (µg/L)**					
041M250101	1,780	J	1,780	5,955.83	**11,911.67**	041W250101	4,030		4,030	1,180	**2,360**
041M250201	13,500	J	13,500			041W250301	317		317		
041M250301	18,500	J	18,500			041W320101	182		182		
041M320101	652		652			041W320301	191		191		
041M320201	471		471								
041M320301	832		832								

Table 6-1
Development of Freshwater Sediment and Surface Water Inorganic Reference Concentrations
Site 41

Sediment Reference Concentrations (n=6)						Surface Water Reference Concentrations (n=4)					
Sample ID	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**	**Sample ID**	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**
Lead (mg/kg)						**Lead (µg/L)**					
041M250101	21.4	J	21.4	41.23	**82.47**	041W250101	4.9		4.9	1.6	**3.2**
041M250201	32.1	J	32.1			041W250301	1	U	0.5		
041M250301	58.7	J	58.7			041W320101	1	U	0.5		
041M320101	41.3		41.3			041W320301	1	U	0.5		
041M320201	41.6		41.6								
041M320301	52.3		52.3								
Magnesium (mg/kg)						**Magnesium (µg/L)**					
041M250101	1,420	J	1,420	3,756.67	**7,513.33**	041W250101	12,500		12,500	10,130	**20,260**
041M250201	5,490		5,490			041W250301	20,400		20,400		
041M250301	6,660		6,660			041W320101	3,050	J	3,050		
041M320101	2,230	J	2,230			041W320301	4,570	J	4,570		
041M320201	2,460	J	2,460								
041M320301	4,280		4,280								
Manganese (mg/kg)						**Manganese (µg/L)**					
041M250101	2.6	J	2.6	18.98	**37.97**	041W250101	4.2	J	4.2	6.6	**13.2**
041M250201	30.7		30.7			041W250301	2.9	J	2.9		
041M250301	66		66			041W320101	10	J	10		
041M320101	5.5	J	5.5			041W320301	9.3	J	9.3		
041M320201	3.5	J	3.5								
041M320301	5.6	J	5.6								
Mercury (mg/kg)						**Mercury (µg/L)**					
041M250101	0.44	U	0.22	0.27	**0.55**	041W250101	0.13	U	0.065	0.07	**0.13**
041M250201	0.31	U	0.155			041W250301	0.13	U	0.065		
041M250301	0.4	U	0.2			041W320101	0.13	U	0.065		
041M320101	0.61	U	0.305			041W320301	0.13	U	0.065		
041M320201	0.49	U	0.245								
041M320301	0.51	J	0.51								

Table 6-1
Development of Freshwater Sediment and Surface Water Inorganic Reference Concentrations
Site 41

Sediment Reference Concentrations (n=6)						Surface Water Reference Concentrations (n=4)					
Sample ID	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**	**Sample ID**	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**
Nickel (mg/kg)						**Nickel (µg/L)**					
041M250101	5.5	U	2.75	4.64	**9.28**	041W250101	12	U	6	6	**12**
041M250201	6.9	J	6.9			041W250301	12	U	6		
041M250301	6.5	J	6.5			041W320101	12	U	6		
041M320101	9.3	U	4.65			041W320301	12	U	6		
041M320201	8.1	U	4.05								
041M320301	6	U	3								
Potassium (mg/kg)						**Potassium (µg/L)**					
041M250101	172	J	172	814.33	**1,628.67**	041W250101	3,980	J	3,980	3,497.5	**6,995**
041M250201	1,430	J	1,430			041W250301	7,060		7,060		
041M250301	2,060		2,060			041W320101	1,170	J	1,170		
041M320101	433	J	433			041W320301	1,780	J	1,780		
041M320201	306	J	306								
041M320301	485	J	485								
Selenium (mg/kg)						**Selenium (µg/L)**					
041M250101	1.4	U	0.7	1.73	**3.45**	041W250101	3	U	1.5	1.5	**3**
041M250201	1.9	J	1.9			041W250301	3	U	1.5		
041M250301	1.2	U	0.6			041W320101	3	U	1.5		
041M320101	2.3	U	1.15			041W320301	3	U	1.5		
041M320201	2.4	J	2.4								
041M320301	3.6		3.6								
Silver (mg/kg)						**Silver (µg/L)**					
041M250101	1.8	UJ	0.9	1.05	**2.1**	041W250101	4	U	2	2	**4**
041M250201	1.4	UJ	0.7			041W250301	4	U	2		
041M250301	1.6	UJ	0.8			041W320101	4	U	2		
041M320101	3.1	U	1.55			041W320301	4	U	2		
041M320201	2.7	U	1.35								
041M320301	2	U	1								

Table 6-1
Development of Freshwater Sediment and Surface Water Inorganic Reference Concentrations
Site 41

Sediment Reference Concentrations (n=6)						Surface Water Reference Concentrations (n=4)					
Sample ID	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**	**Sample ID**	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**
Sodium (mg/kg)						**Sodium (µg/L)**					
041M250101	640	J	640	9,496.67	**18,993.33**	041W250101	105,000		105,000	91,100	**182,200**
041M250201	22,400	J	22,400			041W250301	185,000		185,000		
041M250301	24,700	J	24,700			041W320101	30,000		30,000		
041M320101	3,680	J	3,680			041W320301	44,400		44,400		
041M320201	2,980	J	2,980								
041M320301	2,580		2,580								
Thallium (mg/kg)						**Thallium (µg/L)**					
041M250101	1.4	U	0.7	0.78	**1.57**	041W250101	3.9	J	3.9	2.1	**4.2**
041M250201	1	U	0.5			041W250301	3	U	1.5		
041M250301	1.2	U	0.6			041W320101	3	U	1.5		
041M320101	2.3	U	1.15			041W320301	3	U	1.5		
041M320201	2	U	1								
041M320301	1.5	U	0.75								
Vanadium (mg/kg)						**Vanadium (µg/L)**					
041M250101	10.1	J	10.1	14.33	**28.67**	041W250101	6.4	J	6.4	2.35	**4.7**
041M250201	22.8		22.8			041W250301	2	U	1		
041M250301	33.7		33.7			041W320101	2	U	1		
041M320101	6.6	J	6.6			041W320301	2	U	1		
041M320201	5.2	J	5.2								
041M320301	7.6	J	7.6								

Table 6-1
Development of Freshwater Sediment and Surface Water Inorganic Reference Concentrations
Site 41

Sediment Reference Concentrations (n=6)						Surface Water Reference Concentrations (n=4)					
Sample ID	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**	**Sample ID**	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**
Zinc (mg/kg)						**Zinc (µg/L)**					
041M250101	7.3	J	7.3	18.365	**36.73**	041W250101	7.4	U	3.7	2.76	**5.53**
041M250201	21.7	J	21.7			041W250301	5.4	U	2.7		
041M250301	57.1	J	57.1			041W320101	3.9	U	1.95		
041M320101	6.8	J	6.8			041W320301	5.4	U	2.7		
041M320201	7.9	J	7.9								
041M320301	9.4	J	9.4								

Notes:
g/kg = Micrograms per kilogram
mg/kg = Milligrams per kilogram
g/l = Micrograms per liter
U = Not Detected
J = Estimated value: concentration is below limit of quantitation
Sample frequency adjusted for rejected data.

Table 6-2
Development of Estuarine Sediment and Surface Water Inorganic Reference Concentrations
Site 41

Sediment Reference Concentrations (n=5)						Surface Water Reference Concentrations (n=4)					
Sample ID	Sample Result	Valid. Qual.	Adjusted 0.5 X "U" or "UJ" Value	Mean Value	Reference Concentration (2 X Mean)	Sample ID	Sample Result	Valid. Qual.	Adjusted 0.5 X "U" or "UJ" Value	Mean Value	Reference Concentration (2 X Mean)
Aluminum (mg/kg)						**Aluminum (µg/L)**					
041M270101	2,900	J	2,900	2,137	**4,274**	041W270201	5,550		5,550	1,463.75	**2,927.5**
041M270201	3,670	J	3,670			041W330101	151	U	75.5		
041M330101	2,460		2,460			041W330201	162		162		
041M330201	1,520		1,520			041W330301	135	U	67.5		
041M330301	135		135								
Antimony (mg/kg)						**Antimony (µg/L)**					
041M330101	0.36	UJ	0.18	0.13	**0.26**	041W270201	2	UJ	1	2.08	**4.15**
041M330201	0.28	UJ	0.14			041W330101	10	UJ	5		
041M330301	0.13	UJ	0.065			041W330201	2.6	U	1.3		
Arsenic (mg/kg)						**Arsenic (µg/L)**					
041M270101	1.1		1.1	1.07	**2.14**	041W270201	4.1	J	4.1	1.8	**3.6**
041M270201	0.98	J	0.98			041W330101	2	U	1		
041M330101	1.8		1.8			041W330201	2.2	UJ	1.1		
041M330201	1.4	J	1.4			041W330301	2	U	1		
041M330301	0.13	U	0.065								
Barium (mg/kg)						**Barium (µg/L)**					
041M270101	2.3	J	2.3	1.92	**3.84**	041W270201	11.6	U	5.8	4.71	**9.43**
041M270201	3.1	J	3.1			041W330101	6.7	U	3.35		
041M330101	2.6	J	2.6			041W330201	7.2	J	7.2		
041M330201	1.3	J	1.3			041W330301	5	U	2.5		
041M330301	0.3	J	0.3								
Beryllium (mg/kg)						**Beryllium (µg/L)**					
041M270101	0.11	U	0.055	0.07	**0.13**	041W270201	1	U	0.5	0.41	**0.82**
041M270201	0.16	U	0.08			041W330101	1	U	0.5		
041M330101	0.18	U	0.09			041W330201	0.28	U	0.14		
041M330201	0.14	U	0.07			041W330301	1	U	0.5		
041M330301	0.06	U	0.03								

Table 6-2
Development of Estuarine Sediment and Surface Water Inorganic Reference Concentrations
Site 41

Sediment Reference Concentrations (n=5)						Surface Water Reference Concentrations (n=4)					
Sample ID	Sample Result	Valid. Qual.	Adjusted 0.5 X "U" or "UJ" Value	Mean Value	Reference Concentration (2 X Mean)	Sample ID	Sample Result	Valid. Qual.	Adjusted 0.5 X "U" or "UJ" Value	Mean Value	Reference Concentration (2 X Mean)
Cadmium (mg/kg)						**Cadmium (µg/L)**					
041M270101	0.33	U	0.165	0.2	**0.39**	041W270201	3	U	1.5	1.2	**2.4**
041M270201	0.47	U	0.235			041W330101	3	U	1.5		
041M330101	0.54	U	0.27			041W330201	0.58	U	0.29		
041M330201	0.42	U	0.21			041W330301	3	U	1.5		
041M330301	0.19	U	0.095								
Calcium (mg/kg)						**Calcium (µg/L)**					
041M270101	941	J	941	989.4	**1,978.8**	041W270201	99,000		99,000	38,400	**76,800**
041M270201	1,260	J	1,260			041W330101	14,100		14,100		
041M330101	1,470		1,470			041W330201	18,800		18,800		
041M330201	1,160		1,160			041W330301	21,700		21,700		
041M330301	116	J	116								
Chromium (mg/kg)						**Chromium (µg/L)**					
041M270101	11.1		11.1	6.55	**13.1**	041W270201	13.3		13.3	5.44	**10.87**
041M270201	12.4		12.4			041W330101	8	U	4		
041M330101	5.5		5.5			041W330201	0.88	UJ	0.44		
041M330201	3.5		3.5			041W330301	8	U	4		
041M330301	0.51	U	0.255								
Cobalt (mg/kg)						**Cobalt (µg/L)**					
041M270101	0.46	J	0.46	0.45	**0.91**	041W270201	3	U	1.5	1.19	**2.38**
041M270201	0.51	J	0.51			041W330101	3	U	1.5		
041M330101	0.99	J	0.99			041W330201	0.53	UJ	0.265		
041M330201	0.42	U	0.21			041W330301	3	U	1.5		
041M330301	0.19	U	0.095								
Copper (mg/kg)						**Copper (µg/L)**					
041M270101	4.2	J	4.2	4.22	**8.44**	041W270201	9.2	J	9.2	3.51	**7.03**
041M270201	3.4	J	3.4			041W330101	4	U	2		
041M330101	8.1		8.1			041W330201	1.7	U	0.85		
041M330201	4.9		4.9			041W330301	4	U	2		
041M330301	0.49	J	0.49								

Table 6-2
Development of Estuarine Sediment and Surface Water Inorganic Reference Concentrations
Site 41

Sediment Reference Concentrations (n=5)						Surface Water Reference Concentrations (n=4)					
Sample ID	Sample Result	Valid. Qual.	Adjusted 0.5 X "U" or "UJ" Value	Mean Value	Reference Concentration (2 X Mean)	Sample ID	Sample Result	Valid. Qual.	Adjusted 0.5 X "U" or "UJ" Value	Mean Value	Reference Concentration (2 X Mean)
Cyanide (CN) (mg/kg)						**Cyanide (CN) (µg/L)**					
041M270101	1.1	U	0.55	0.64	**1.29**	041W270201	5	U	2.5	2.05	**4.1**
041M270201	1.6	U	0.8			041W330101	5	U	2.5		
041M330101	1.7	U	0.85			041W330201	1.4	UJ	0.7		
041M330201	1.4	U	0.7			041W330301	5	U	2.5		
041M330301	0.63	U	0.315								
Iron (mg/kg)						**Iron (µg/L)**					
041M270101	1,440	J	1,440	1,342.2	**2,684.4**	041W270201	2,230		2,230	676	**1,352**
041M270201	1,380	J	1,380			041W330101	189		189		
041M330101	2,120		2,120			041W330201	102	J	102		
041M330201	1,620		1,620			041W330301	183		183		
041M330301	151		151								
Lead (mg/kg)						**Lead (µg/L)**					
041M270101	13.5	J	13.5	10.52	**21.04**	041W270201	25.9		25.9	6.88	**13.75**
041M270201	13.2	J	13.2			041W330101	1	U	0.5		
041M330101	13.3		13.3			041W330201	1.2	U	0.6		
041M330201	11.9		11.9			041W330301	1	U	0.5		
041M330301	0.69		0.69								
Magnesium (mg/kg)						**Magnesium (µg/L)**					
041M270101	1,200		1,200	1,471.8	**2,943.60**	041W270201	327,000		327,000	121,825	**243,650**
041M270201	2,070		2,070			041W330101	40,100		40,100		
041M330101	2,420		2,420			041W330201	55,600		55,600		
041M330201	1,480		1,480			041W330301	64,600		64,600		
041M330301	189	J	189								
Manganese (mg/kg)						**Manganese (µg/L)**					
041M270101	5.1		5.1	4.9	**9.81**	041W270201	1	U	0.5	6.08	**12.15**
041M270201	5.1		5.1			041W330101	8.2	J	8.2		
041M330101	8.2		8.2			041W330201	9.3	J	9.3		
041M330201	5.5		5.5			041W330301	6.3	J	6.3		
041M330301	0.62	J	0.62								

Table 6-2
Development of Estuarine Sediment and Surface Water Inorganic Reference Concentrations
Site 41

Sediment Reference Concentrations (n=5)						Surface Water Reference Concentrations (n=4)					
Sample ID	Sample Result	Valid. Qual.	Adjusted 0.5 X "U" or "UJ" Value	Mean Value	Reference Concentration (2 X Mean)	Sample ID	Sample Result	Valid. Qual.	Adjusted 0.5 X "U" or "UJ" Value	Mean Value	Reference Concentration (2 X Mean)
Mercury (mg/kg)						**Mercury (µg/L)**					
041M270101	0.09	U	0.045	0.05	**0.11**	041W270201	0.17	J	0.17	0.11	**0.21**
041M270201	0.12	U	0.06			041W330101	0.13	U	0.065		
041M330101	0.14	U	0.07			041W330201	0.05	U	0.025		
041M330201	0.12	U	0.06			041W330301	0.16	J	0.16		
041M330301	0.06	U	0.03								
Nickel (mg/kg)						**Nickel (µg/L)**					
041M270101	2	J	2	1.85	**3.69**	041W270201	12	U	6	4.65	**9.3**
041M270201	3	J	3			041W330101	12	U	6		
041M330101	3	J	3			041W330201	1.2	U	0.6		
041M330201	1.7	U	0.85			041W330301	12	U	6		
041M330301	0.76	U	0.38								
Potassium (mg/kg)						**Potassium (µg/L)**					
041M270101	406	J	406	449.86	**899.72**	041W270201	106,000		106,000	40,625	**81,250**
041M270201	689	J	689			041W330101	12,300		12,300		
041M330101	698	J	698			041W330201	23,300		23,300		
041M330201	386	J	386			041W330301	20,900		20,900		
041M330301	70.3	J	70.3								
Selenium (mg/kg)						**Selenium (µg/L)**					
041M270101	0.39	J	0.39	0.33	**0.66**	041W270201	3	U	1.5	1.45	**2.9**
041M270201	0.47	U	0.235			041W330101	3	U	1.5		
041M330101	0.54	U	0.27			041W330201	2.6	U	1.3		
041M330201	0.66	J	0.66			041W330301	3	U	1.5		
041M330301	0.19	U	0.095								
Silver (mg/kg)						**Silver (µg/L)**					
041M270101	0.43	UJ	0.215	0.26	**0.52**	041W270201	4	U	2	1.5	**3.01**
041M270201	0.63	UJ	0.315			041W330101	4	U	2		
041M330101	0.72	U	0.36			041W330201	0.03	U	0.015		
041M330201	0.56	U	0.28			041W330301	4	U	2		
041M330301	0.25	U	0.125								

Table 6-2
Development of Estuarine Sediment and Surface Water Inorganic Reference Concentrations
Site 41

Sediment Reference Concentrations (n=5)						Surface Water Reference Concentrations (n=4)					
Sample ID	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**	**Sample ID**	**Sample Result**	**Valid. Qual.**	**Adjusted 0.5 X "U" or "UJ" Value**	**Mean Value**	**Reference Concentration (2 X Mean)**
Sodium (mg/kg)						**Sodium (µg/L)**					
041M270101	3,170	J	3,170	5,719.8	**11,439.60**	041W270201	2,580,000		2,580,000	976,000	**1,952,000**
041M270201	8,610	J	8,610			041W330101	315,000		315,000		
041M330101	10,100		10,100			041W330201	462,000		462,000		
041M330201	5,740		5,740			041W330301	547,000		547,000		
041M330301	979		979								
Thallium (mg/kg)						**Thallium (µg/L)**					
041M270101	0.33	U	0.165	0.2	**0.39**	041W270201	3	U	1.5	1.28	**2.55**
041M270201	0.47	U	0.235			041W330101	3	U	1.5		
041M330101	0.54	U	0.27		***Note:*** *= Sample frequency adjusted for rejected data.	041W330201	1.2	U	0.6		
041M330201	0.42	U	0.21			041W330301	3	U	1.5		
041M330301	0.19	U	0.095								
Vanadium (mg/kg)						**Vanadium (µg/L)**					
041M270101	5.2	J	5.2	4.3	**8.59**	041W270201	11	J	11	3.35	**6.69**
041M270201	6.9	J	6.9			041W330101	2	U	1		
041M330101	4.7	J	4.7			041W330201	0.77	UJ	0.385		
041M330201	4.3	J	4.3			041W330301	2	U	1		
041M330301	0.38	J	0.38								
Zinc (mg/kg)						**Zinc (µg/L)**					
041M270101	8.2	J	8.2	7.18	**14.36**	041W270201	19.6	J	19.6	6.44	**12.88**
041M270201	4.7	J	4.7			041W330101	4.2	U	2.1		
041M330101	14		14			041W330201	3.7	U	1.85		
041M330201	8.3		8.3			041W330301	4.4	U	2.2		
041M330301	1.4	U	0.7								

Notes:
g/kg = Micrograms per kilogram
mg/kg = Milligrams per kilogram
g/l = Micrograms per liter
U = Not Detected
J = Estimated value: concentration is below limit of quantitation
Sample frequency adjusted for rejected data.

7.0 FATE AND TRANSPORT ANALYSIS METHODS

This section presents the methods used to evaluate fate and transport of contaminants. Wetland-specific evaluations are presented in Sections 10 through 15.

The fate and transport assessment evaluates the ability of chemical constituents to become mobile or change in the environment, based on their chemical and physical properties, and also evaluates processes that govern their interaction with environmental media. This evaluation helps identify receptors that may be impacted by constituent movement in the environment.

This section describes media and contaminant properties that affect fate and transport, and concludes with a discussion of the potential pathways and sources presumed to affect the NAS Pensacola wetlands. Sections 10 through 15 present the wetland-specific evaluations and validation of migration pathways.

7.1 Contamination Summary

Chemical and physical analyses were performed on Site 41 sediment and surface water samples. A wide range of metals, pesticides/PCBs, and SVOCs were detected. Sections 10 through 15 evaluate the nature and extent of sediment and surface water contamination.

7.2 Contaminant Migration

7.2.1 Properties Affecting Fate and Transport

Numerous chemical and physical properties of both the chemical constituents and the surrounding media are used to evaluate fate-transport mechanisms. The primary mechanisms in estuarine and freshwater environments are sediment transport and aqueous solubility of an analyte. Chemical and physical properties of constituents used to evaluate fate and transport are vapor pressure, density, solubility, Henry's law constant, half-life, organic carbon-water partitioning coefficient (K_{oc}), and molecular weight (see Table 7-1). Compounds with similar chemical and physical properties display similar fate-transport behavior. These characteristics facilitate the general grouping of contaminants into the following categories: VOCs, SVOCs, pesticides/PCBs, and metals.

7.2.2 Media Properties Affecting Fate and Transport

The properties of environmental media used to evaluate fate and transport are TOC, normalized partition coefficient (K_d), cation-exchange capacity (CEC), redox conditions, pH, and sediment type. The following paragraphs briefly discuss these properties.

Total Organic Carbon

TOC indicates the sediment's adsorption capabilities. With an elevated TOC, there is a greater potential for a chemical to adsorb sediment particles and become less bio-available, particularly an organic compound. For example, it is possible for a sediment sample to have a very high concentration of a particular organic constituent, but show no observable toxic effect typically associated with that constituent. If the TOC for that sample was elevated, then the contaminant would likely be bound to the sediment and not be bio-available, reducing the net toxic effect.

Normalized Partition Coefficient

K_d is used to predict the capacity for a constituent to partition between sediment and water; it is a function of both the constituent and the sediment. To estimate K_d, the constituent's constant K_{oc} is adjusted by the sediment's TOC: $K_d=K_{oc}$ x fraction of organic carbon (f_{oc}), where f_{oc} is a function of the organic carbon content fraction of the sediment. Sediments with a higher K_d have a higher potential to adsorb organic compounds.

Most wetlands at NAS Pensacola have depositional areas of high TOC, and these areas tended to have the highest detected contaminant concentrations. These areas were purposely targeted for sampling during Phase IIA to locate areas of maximum contaminant concentrations.

Cation-Exchange Capacity

CEC reflects the sediment's capacity to adsorb ions, neutralizing ionic deficiencies on the surfaces of its particles. Generally, trivalent ions are preferentially adsorbed to sediment over divalent ions, and divalent ions are preferentially adsorbed over monovalent ions. Although this relationship generally holds true, the process also depends on sediment pH.

Sediments with high CEC values have the potential to adsorb inorganic ions, although dipolar organic compounds also have an affinity for adsorption.

However, in estuarine environments, the presence of brackish water can result in an excess of alkali metals, which in turn can out-compete other metals for these cationic binding sites. Therefore, the estuarine wetlands at NAS Pensacola may have lower concentrations of some metals due to alkali metals competing for binding sites within the sediment. Other factors such as TOC can improve the effects of CEC in sediment in estuarine wetlands.

Oxidation/Reduction Conditions

Redox is the process that includes oxidation (the loss of electrons) and reduction (the gain of electrons). The resultant change in valence generates products that are different from the parent

reactants in solubility, toxicity, reactivity, and mobility. Extreme redox conditions tend to mobilize chemicals, especially transition metals. However, in an estuarine environment, the excess of alkali metals in seawater can reduce the effect of redox conditions on nonalkaline metals.

pH

pH is a measure of the negative logarithm of the hydrogen ion concentration in water, indicating the medium's acidity or alkalinity. Chemicals react differently as pH changes. Low pH conditions tend to mobilize most metals and facilitate substitution in organic compounds. High pH conditions may cause metals to precipitate and organic molecules to degrade. In general, pH conditions are uniform in the estuarine environment. Within the freshwater environment, pH conditions generally appeared in the 7.0 to 7.5 range, reflecting relatively neutral conditions.

Sediment Type

Sediment mineral composition, particle-size distribution, and organic content affect chemical fate and transport. Sediment characteristics influence or determine hydraulic conductivity, effective porosity, and hydraulic gradient, which in turn dictate groundwater flow. In wetland environments, smaller particle sizes (i.e., clays) are observed in areas of deposition where currents are low-energy. Because clays and silts have larger surface areas than sands relative to total particle size, they tend to absorb more contaminants than larger sediment types. Each wetland at NAS Pensacola had a wide range of sediment particle sizes, but sampling was biased toward areas of lowest particle size, as these areas were likely to have the highest concentrations of contaminants.

7.3 Contaminant Properties

This section describes the properties of the major contaminant classes (VOCs, SVOCs, pesticides/PCBs, and metals) and how these properties relate to interactions in the environment.

7.3.1 VOCs

The chemical and physical properties that most influence fate and transport of VOCs are solubility, Henry's law constant, and vapor pressure. The mechanisms for transportation of VOCs include the following:

- sorption to sediment from groundwater or surface water
- escape via volatilization from both sediment and water
- dissipation via diffusion

VOCs have low molecular weights, high solubilities, and high vapor pressures. Because of these properties, VOCs are expected to be highly mobile in the environment and, therefore, quick to migrate from sediment and groundwater.

7.3.2 Metals

The adsorption potential for metals in sediment is related to grain size, the presence of various metallic hydroxides, and organic carbon. Fine-grained particles, particularly aluminosilicate clays and amorphous hydroxides of iron, provide a greater surface area relative to total particle size (ferrous hydroxide can contain as much as 600 square meters of surface area per gram of mass), and the crystalline microstructure is conducive to the adsorption of inorganic contaminants.

The primary transport mechanism for metals bound to sediment is through physical movement of the sediment itself. When metals are tightly bound within the mineral structure, currents are the predominant transport mechanism. Over time, sediments will be transported into natural depositional locations.

The fate of metals in sediments involves both chemical and biological transformation. Chemical transformation may involve formation of organo-metallics and sulfide complexes, or methylation from microbial processes. Transfer of metals through biological uptake by benthic infauna is also a possibility. Biomagnification of metals is not considered a critical pathway in estuarine wetlands, but may occur in acidic freshwater wetlands. Bioaccumulation and biomagnification of contaminants are discussed in the ecological risk assessments, Sections 10 through 15.

7.3.3 Organics

Organic contaminants, particularly hydrophobic compounds (those less-inclined to enter a dissolved state in natural waters), tend to sorb to water-borne particulates (clays, colloids, and humic substances) that eventually end up as bottom deposits. From there, they may be transformed into more or less toxic forms, migrate from the sediment into benthic organisms via ingestion/respiration, or reach overlying waters as physicochemical conditions change. Sediment organic carbon, in the form of humic substances (measured by TOC), is the primary storage site for organic chemicals in sediments. Also, particle size and chemical hydrophobicity are important environmental influences affecting adsorption rates. As particle size decreases and hydrophobicity increases, there is increased binding of organic contaminants to sediment organic carbon. Increased surface area, resulting from decreased particle size, provides more adsorption sites for neutral and/or hydrophobic organic chemicals.

For PAHs in sediments, photolytic degradation rates are a function of the available penetrating sunlight and oxygen. PAHs may persist indefinitely in the low light/low oxygen environments common in many wetlands on base. PAHs may also persist when they are tightly bound to organic substances.

Fate of organic constituents in sediments is also influenced by biotransformation and biodegradation by benthic organisms. Neutral organics that are more hydrophobic tend to be more persistent in the food chain due to their accessibility when they bind with organic substances. Some organic compounds, particularly pesticides (such as 4,4'-DDT), are inherently stable due to their chemical structure and are very slow to undergo any type of degradation. For example, their persistence of 4,4'-DDT is demonstrated by it's detection throughout the base and the country long after its use was banned in the United States.

As with metals, organics have been detected throughout the NAS Pensacola wetlands in many forms. The highest concentrations of organics detected tended to be in depositional areas with high TOC values.

7.4 Water Transport Characteristics

In water, the likelihood that a dissolved contaminant will be retained within the medium is dependent on that chemical's fugacity, or escaping tendency. The fugacity potential is based on both the chemical-specific traits and medium thermodynamic influences. The partitioning coefficient of a chemical indicates its affinity for water or another medium (sediment, tissue, or suspended particles). Under ideal conditions the partitioning coefficient for a chemical is constant, but the environmental parameters that can influence partitioning vary with site conditions.

Environmental variables include suspended and dissolved materials, light attenuation, pH, and redox. Redox and pH have a strong influence on metals but little effect on neutral organic chemicals. In freshwater wetlands, acidic water will result in a greater abundance of free metal ions which, under oxidizing conditions, are more bioavailable. Under reducing conditions, these metals tend to form insoluble sulfides and are less bioavailable. Generally, higher pH environments have more particulate matter and metals can be precipitated out. In saltwater, the presence of divalent cations of magnesium (Mg^{++}) and calcium (Ca^{++}) can cause suspended fine-grained sediments, colloids, and dissolved organic matter to flocculate and settle from the water column. Organic contaminants may co-precipitate with metal complexes on these flocculated materials. Dissolved organic carbon (DOC) in water, composed primarily of humic substances produced by the degradation of dead plant material, can also provide binding sites for metal ions and neutral organics. DOC concentrations also affect bioavailability and bio-concentration of chemicals by aquatic organisms like that of suspended sediment (Carlberg, G.E. *et al.,* 1986).

7.5 Pathways and Sources

The factors influencing fate and transport of contaminants into, within, and out of wetlands at NAS Pensacola are complex. This section describes the pathways and sources other than chemical factors that influence contaminant distribution. Sections 10 through 15 present the validation of these pathways with respect to the individual wetlands.

7.5.1 Pathways

Three primary migratory routes for transport are immediately evident for the NAS Pensacola wetlands:

- *Surface water:* surface water runoff from adjacent terrestrial areas, natural surface water drainage into and out of wetlands

- *Sediment:* physical sediment movement via entrainment in surface water flow into, within, and out of wetlands

- *Groundwater:* discharge to wetlands from adjacent upgradient areas and wetland surface water to groundwater recharge to downgradient areas where no surface water outlet is observed

Surface Water Migration

Surface water migration into the wetlands can be evaluated by considering the physical properties of the area. Many wetlands receive surface water discharge from storm water outfalls or nearby paved areas. Heavy rainfall will cause surface runoff (or rejected recharge) to enter the wetlands. For wetlands that are not adjacent to impervious surfaces or outfalls, the high permeability of the surficial sand deposits precludes direct runoff. Precipitation will evaporate or enter the surficial aquifer as recharge, and may eventually discharge to the wetlands as groundwater. Figure 7-1 illustrates the surface topography at NAS Pensacola; with the wetland areas occupying the lowest elevations, the general patterns of surface drainage is toward them; surface water flow then moves toward the larger water bodies of Pensacola Bay and Bayou Grande.

In addition to surface runoff, some wetlands at NAS Pensacola receive surface water influx directly as a result of natural drainage patterns. In these cases, upgradient wetlands receive discharge from nearby groundwater, and this discharge then follows in the natural direction to the receiving wetland. A special circumstance involves those wetlands that are connected directly to Bayou Grande or Pensacola Bay through tidal channels. In these cases, tidal flux will allow a backflow of brackish bay water to enter the wetland. Flow into and out of the wetlands is considered to be consistent with the direction of base flow or topography. None of the wetlands is sufficiently large to expect a complex flow configuration.

In cases where no surface water outlet is observed for a wetland, surface water is assumed to infiltrate into the aquifer on the downgradient side of the wetland (in essence, the wetland is a "window" into the aquifer). The surface water transport pathway is evaluated in Sections 10 through 15 for each wetland with respect to its location and hydrologic and topographic configuration.

Sediment Transport

Sediment transport is expected to be coincident with and as a consequence of surface water transport. Sediment will become entrained in the surface water runoff stream and enter the wetland. Sediment entrainment is expected to be a mechanism for contaminant transport into, within, and out of the wetlands as natural drainage moves through the system. With natural drainage, sediment movement is expected to be governed more through bottom transport, whereby sediment load is redistributed en mass by current movement along the bottom and sides of the drainage watercourses and wetlands. Data regarding the rate and mass of sediment movement into and through the wetland systems are not available. Therefore, this mechanism of transport is treated qualitatively in Sections 10 through 15 by considering the physical configuration of the wetland system, and any trends in sediment concentrations.

Leaching of constituents from sediment to surface water is a distinct possibility when environmental conditions are highly variable. Otherwise, these two media tend to reach a metastable balance between chemical supply and demand. Given the relatively unchanging conditions of groundwater and surface water contributing to the conditions within NAS Pensacola wetlands (source activities have ceased except for storm water runoff from currently active areas such as Sherman Field), it is expected that water quality will not exhibit remarkable variation. However, storm water runoff containing entrained sediment could alter the metastable balance, and cause a partitioning from sediment to surface water. Without significantly detailed chemical data, it is virtually impossible to define the direction of imbalance between sediment and its paired surface water — whether the sediment is <u>portioning</u> to surface water, or whether the surface water is <u>partitioning</u> to the sediment.

Therefore, for the purpose of this fate and transport analysis, the presence of a COPC in both will be cited simply as a matter of evidence that a metastable balance exists.

If there is a marked difference in the concentrations of a COPC between sediment and surface water, it is likely that the direction of partitioning is to the media with the lower concentration, but this is not a given, as the balance is dependent on particular chemical constraints (for example, high CEC in the sediment can alter the sorptive capacity of the sediment, or a change in pH can alter the dissolution capacity of the surface water).

Groundwater Discharge

Throughout the investigative phases for terrestrial sites at NAS Pensacola, groundwater heads have consistently been higher than those of the adjoining wetlands. Therefore, the predominant flow cycle is expected to be from the groundwater regime to the NAS Pensacola wetlands. Therefore, this pathway has been evaluated extensively as a matter of course during this analysis. Under these conditions, the flow of wetland water to shallow groundwater is expected to be a relatively minor process and is not specifically evaluated as part of the wetlands evaluation. Instead, groundwater is being extensively assessed as part of numerous other NAS Pensacola site investigations.

7.5.2 Sources

There are many sources of influx to the NAS Pensacola wetlands, including adjacent sites of environmental concern and adjacent areas of the base contributing runoff. Table 7-1 provides a compilation of known or suspected sources for each wetland, accompanied by the presumed pathways for transport and pertinent remarks. Figure 2-1 shows the locations of wetlands and environmental sites.

7.6 Wetland-Specific Fate and Transport

The wetland-specific fate and transport evaluations will deal solely with the physical and chemical aspects of contaminant transport, and will be integrated with the data presented in Section 10. Figure 7-2 presents a conceptual model of the pathways that will be evaluated for each wetland. The major pathways for contaminants to reach the receptor wetlands include:

- Surface water/sediment transport into the receptor wetland from both upgradient IR sites and upgradient nonpoint sources; prime mechanism is natural drainage and storm water runoff.

- Groundwater discharge into the receptor wetland from upgradient IR sites.

Again, in general, the above pathways have some degree of empirical data available to validate the pathway. Sediment to surface water partitioning (and vice versa) can be an important pathway as well, but without more detailed chemical data, it can only be treated conceptually in this evaluation.

For this fate and transport analysis, sediment and surface water within the wetland are viewed as the ultimate receptors. Enrichment of a given parameter over time can occur in either of these media if the physical/chemical conditions have reached a metastable balance, and if the source to the receptors remains active.

7.7 Pathway Evaluation (Validation and Significance)

The ecological assessment process conducted a thorough screening to evaluate all parameters detected in soil and sediment. Because of the exhaustive nature of the ERA screening process, which incorporates a number of procedures and benchmark comparisons, only those detected parameters retained for the ERA are evaluated as part of the fate and transport analysis.

The fate and transport analysis is qualitative in nature, and relies on "matched" comparisons. For example, this type of analysis requires tracing the detections of a parameter through the various sampled media to link the noted detections of interest. The data to be used include sediment and surface water samples from within the evaluated wetland and from those wetlands upstream from it; and soil and groundwater samples in proximity to the evaluated wetland.

The fate and transport analysis will be conducted for each of the pathways noted in the introduction to Section 7.6 above, namely:

- Surface water/sediment transport into the receptor wetland from both upgradient IR sites and upgradient nonpoint sources; prime mechanism is natural drainage and storm water runoff.

- Groundwater discharge into the receptor wetland from upgradient IR sites.

Where sufficient data are available, the following pathways will also be addressed:

- Surface water/sediment transport within the wetland.

For the qualitative analysis, two levels of evaluation are of note. First, a pathway is deemed to be "valid" if COPC is detected in both the source and receptor media. Secondly, a pathway is deemed "significant" only if that parameter has been validated, and if the receptor media concentration is at concentrations above appropriate screening levels (the screening levels will be those used to retain parameters for refinement as part of the ERA).

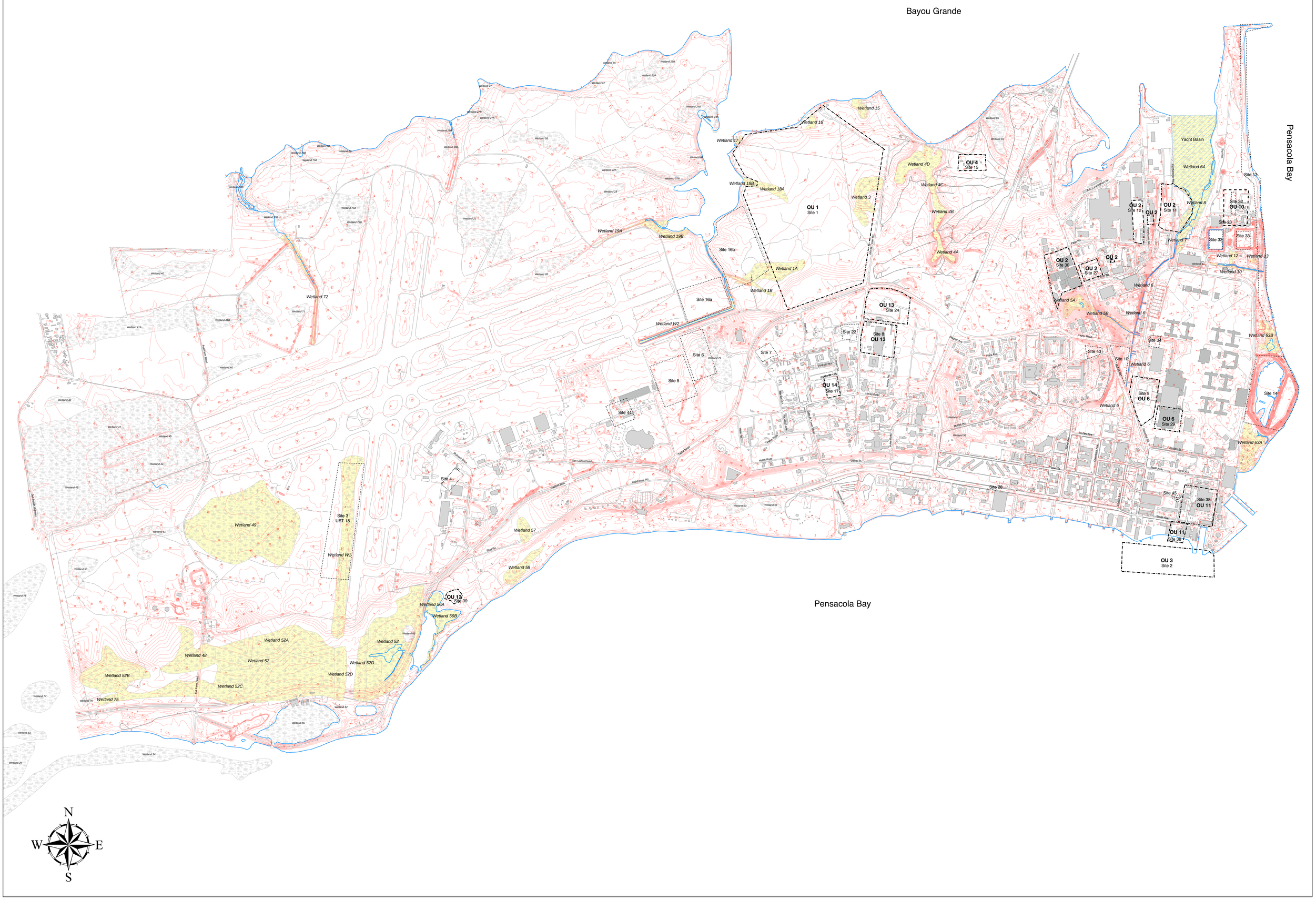

FIGURE 7-1
Sitewide Study Area Topography

Final Remedial Investigation Report
Site 41
NAS Pensacola, FL

Date: 9/20/04	Drwn by: CT	File: K:/GIS/Navy-Pensacola/CTO-036/Projects/ri_report/Fig7-1.mxd

Legend

- Site
- Operable Unit (OU)
- Building
- Site 41 RI Wetland- Approximate
- Wetland- Approximate
- Consolidated Wetland 64
- Road
- Shoreline
- Topographic Contour(ft)

0 750 1,500 3,000 4,500 6,000 Feet

NAVFAC
Naval Facilities Engineering Command
SOUTHERN DIVISION

FIGURE 7-2
CONCEPTUAL MODEL OF FATE AND TRANSPORT SOURCES AND PATHWAYS TO RECEPTOR WETLAND SEDIMENT AND SURFACE WATER — SITE 41.

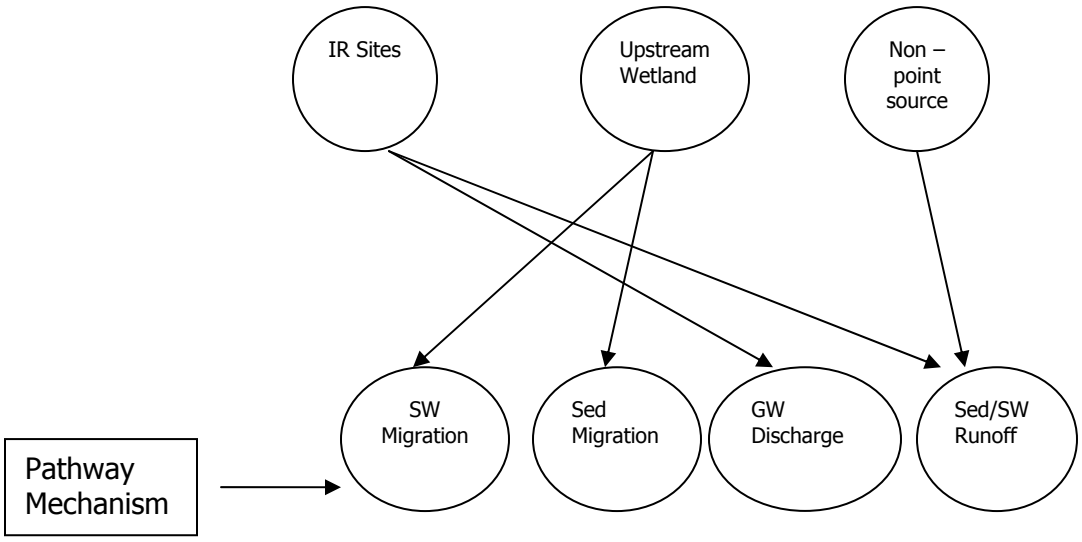

Table 7-1
Known or Suspected Sources for Each Wetland's Transport Pathways

Wetland	Associated Site(s) and/or Concerns	Transport Pathways	Remarks
64	OU 2, OU 6, OU 10, Yacht Basin activities	SW, ST, GW, SL	Drainage from OU 2; storm water runoff from OU 2, OU 6 and Yacht Basin; groundwater discharge from OU 2, OU 6, and OU 10; sediment leaching from Yacht Basin; tidal flux from Site 40.
5	OU 2	SW, ST, GW	Storm water runoff and groundwater discharge from OU 2.
3	Site 1	SW, ST, GW	Intermittent drainage from Site 1; GW discharge from Site 1.
4D	Site 15, Site 1, Site 40, Wetland 3	SW, ST, GW, SL	Runoff from Site 1 and Wetland 3; sediment leaching and tidal flux from Site 40; groundwater discharge from Sites 1 and 15.
16 and 18	Site 1, Site 40	SW, ST, GW, SL	Runoff and groundwater discharge from Site 1; sediment leaching and tidal flux from Site 40.
10 and 12	OU 10, OU 6	SW, ST	Runoff from southern portion of former IWTP, Bilge water Plant, and former Chevalier Field area.
W1	Site 3 (UST 18), Sherman Field	SW, ST, GW	Runoff from site and airfield; groundwater discharge from Site 3 (UST 18).
1	Site 16, Site 1, Site 40, Site 7, Site 5, Site 22 (UST 26), OU 13	SW, ST, GW	Runoff and drainage from Site 16 and airfield; groundwater discharge from Sites 1, 7, 5, 22, OU 13.
15	Site 1, Site 40, Golf Course	SW, ST, GW	Runoff from Golf Course; groundwater discharge from Site 1 and tidal flux from Site 40.
6	OU 2, OU 6, Site 10, Chevalier Field	SW, ST, GW	Runoff from OU 2, OU 6, Site 10, and former Chevalier Field area; groundwater discharge from OU 2 and OU 6.
63A and 63B	Site 13, Site 14, Site 42, Chevalier Field	SW, ST, GW	Runoff from former Chevalier Field area, Site 13, and Site 14; groundwater discharge from Site 14; tidal flux from Site 42.
48, 49, 52	USTs S, O, X, Sherman Field	SW, ST, GW	Runoff from Sherman Field; groundwater discharge from UST sites.
13	OU 10, Chevalier Field	SW, ST	Runoff from southern portion of former IWTP and former Chevalier Field area.
17	Site 1, Site 40	GW	Groundwater discharge from Site 1; tidal flux from Site 40.
19	Sherman Field	SW, ST	Runoff from Sherman Field; tidal flux from Site 40.
56	Site 39, Site 42	GW	Groundwater discharge from Site 39; tidal flux from Site 42.
57 and 58	Site 4	GW	Groundwater discharge from Site 4.
72	Sherman Field	SW	Runoff from Sherman Field.

Table 7-1
Known or Suspected Sources for Each Wetland's Transport Pathways

Wetland	Associated Site(s) and/or Concerns	Transport Pathways	Remarks
W2	Site 5, Site 6, Site 16, Sherman Field	SW, ST, GW	Runoff from Sherman Field; groundwater discharge from Sites 5, 6, and 16.

Notes:
SW = Surface Water
ST = Sediment Transport
GW = Groundwater Discharge
SL = Sediment Leaching

8.0 ECOLOGICAL RISK ASSESSMENT METHODS

This section presents the methods and steps used during the ERA process for Site 41. Wetland-specific risk evaluations are presented in Section 10 (Site-Specific Evaluations).

8.1 Introduction

The ERA evaluates potential ecological risks from hazardous substances at the Site 41 wetlands under current and future conditions. The ERA examines wetland chemical contamination and exposure pathways that could result in unacceptable levels of exposure to flora and fauna. For Site 41, the remedial investigation has been ongoing since 1994, and has been conducted in several phases. The ERA for each wetland included in Site 41 uses all data that has been collected during each phase to attempt to accurately portray the potential for risk at each wetland. The ERAs presented in this RI will summarize the data collected to date and provide the necessary analysis to determine if remedial actions are necessary to address risk to ecological receptors at Site 41. For clarity, the wetlands have been grouped by operable units identified during the investigations conducted at NAS Pensacola, or by area. Grouping wetlands in this way allows clearer conclusions to be drawn on potential contaminant migration pathways from known sources at NAS Pensacola. The Site 41 ERAs have followed the process for conducting risk assessments at Superfund sites as laid out by USEPA in 1997 and the methods provided in the Site 41 work plans as approved by USEPA and FDEP with input from natural resource trustees.

8.2 Wetland-Specific ERAs

The general outline for each wetland will be as follows:

- General physical description of wetland
- Description of nearby sites that may impact wetlands
- Conceptual Site Model
- Evaluation of contaminant migration pathways
- Evaluation of exposure pathways
- Screening HQ tables
- Listing of screening COPCs
- Problem formulation
- Refinement of COPCs
- Re-evaluation of conceptual site model
- Characterization of potential ecological effects

- List of final COPCs
- Presentation of site-specific biotic data (where available)
- Uncertainties
- Conclusions/Recommendations

8.2.1 Data Preparation

Section 5 explains the data validation process for the Site 41 sediment and surface water sample results. The validated sample data for each wetland were prepared in the following ways:

- Detected constituents for both sediment and surface water with the appropriate validation qualifier (no qualifier, J, D, B, E, etc.), were compared to screening and refinement criteria.

- Sediment and surface water constituents that were not detected (U or UJ validation qualifier) were compared to screening and refinement criteria using one-half the detection limit.

- Sediment constituent totals were calculated for total BHCs, total chlordanes, total endrins, total PCBs, total dichlorodiphenyltrichloroethane (DDT), and total PAHs. Constituent totals were derived by summing valid detections with one-half the detection limit for not detected parameters. Total PAHs for sediment were calculated by combining the values for the 13 low and high molecular weight PAHs outlined in *Approach to the Assessment of Sediment Quality in Florida Coastal Waters; Volume 1 — Development and Evaluation of Sediment Quality Assessment Guidelines* (MacDonald, D.D., 1994).

- Surface water constituent totals were calculated for total chlordanes, total endosulfans, total endrins, total PCBs, total 1,3-dichloropropene, and total PAHs. The same logic used for sediment, summing valid detections with one-half the detection limit for not detected parameters, was used for surface water. Surface water total PAHs were calculated using the 10 PAHs outlined in *Contaminant Target Cleanup Levels, Groundwater and Surface Water Cleanup Target Levels (CTLs)*, Table 1, Chapter 62-777, Florida Administrative Code (FAC) (2003b), and *Criteria for Surface Water Quality Classifications*, Rule 62-302.503, (FAC, 2003a).

8.3 Screening and COPC Refinement Criteria for Sediment

The sediment samples will initially be screened by comparing sediment results to applicable regulatory criteria, as follows:

- USEPA Region IV Sediment Screening Values (SSVs) (USEPA Region 4, 2001b)

- Sediment Quality Assessment Guidelines (SQAGs), Threshold Effects Levels (TELs) (MacDonald, D.D., 1994)

The lower of the SSV or TEL is used to derive a screening value (SV) for sediment, which is then used to screen detected values, one-half the not detected concentrations, or constituent totals as appropriate.

After screening constituents using the sediment SVs described above, constituents retained for further refinement are then compared to refinement values (RVs). The refinement values used are the Probable Effects Levels (PELs) from MacDonald, D.D. (1994), or if no PEL is available, surrogates were used as outlined below. The Site 41 SVs, RVs, and the freshwater and estuarine sediment reference concentrations are presented in Table 8-1 (tables are located at the end of each section).

Additionally, during the July 15-16, 2002, Eco Subgroup Meeting, it was decided to use surrogates for the following constituents (also detailed in the footnotes for Table 8-1):

- Phthalate Esters (diethylphthalate, dimethylphthalate, di-n-butylphthalate, and di-n-octylphthalate) — The 182 micrograms per kilogram (g/kg) SV and the 2,647 g/kg RV (FDEP TEL and PEL, respectively) for bis(2-ethylhexyl)phthalate (BEHP) will be used as surrogates for all phthalate esters.

- Alpha, beta, delta, and total-BHC — The 0.32 g/kg SV and the 0.99 g/kg RV (FDEP TEL and PEL, respectively) for gamma-BHC (Lindane) are used as surrogates for all BHCs.

- Alpha, gamma, and total-Chlordane — The 1.7 g/kg SV and 4.79 g/kg RV (USEPA SSV and FDEP PEL, respectively) for chlordane will be used as surrogates for all chlordanes.

- PCBs — The 21.6 g/kg SV and 189 g/kg RV (FDEP TEL and PEL, respectively) for total-PCBs are used as surrogates for all PCBs except for aroclor-1221, which uses the USEPA SSV (67 g/kg) for a SV.

- Phenol — The 50 g/kg no-effects surrogate value is used as the SV for phenol.

- TOC-normalized total PAHs — The Threshold Effects Concentration (TEC) of 290 milligrams per kilogram of organic carbon (mg/kg-oc), and the Median Effects Concentration (MEC) of 1,800 mg/kg oc found in *Consensus Sediment Quality Guidelines for Polycyclic Aromatic Hydrocarbon Mixtures* (Swartz, R.C., 1999) are used as the SV and RV, respectively, for TOC-normalized total PAHs.

8.3.1 Development of Sediment-Screening-Level COPCs

Screening-level COPCs for sediment are determined by one or more of the following ways:

- Comparison of maximum detections to the appropriate SVs

- Comparison of one-half the detection limit of "U" or "UJ" flagged constituents (not detected parameters) to their appropriate SVs

- Comparison of constituent totals to their appropriate SVs

Sediment constituents are summarized in tables showing their frequency of detection, the maximum detection and its validation qualifier (if any), the location of the maximum detection, the SV and its source, the maximum SV HQ, the number of detections exceeding the SV, and whether or not the constituent is retained for refinement, along with the rationale driving the decision.

During the screening process, any detected sediment constituent with an HQ > 1 is retained for later refinement using the appropriate RV. Constituents detected for which no SV is available are conservatively included as screening COPCs and are retained for further refinement.

For constituent totals, if the total concentration is found to have an HQ < 1, then all of the parameters making up the total concentration are removed from further refinement in the ERA process.

Many sediment constituents are not detected above detection limits at any sediment sample location. Since no conclusive statement can be made about the potential for adverse effects from exposure below the identified limits, sample quantitation limits for the not detected parameters are taken through the same process as real detections. This is done by conservatively appraising one-half the detection limit to the SVs and calculating HQs. Parameters quantitation limit HQs > 1 are retained as screening

COPCs, since the potential for risk from those constituents can not be ruled out. Not detected parameters, for which no SVs are available, are also retained for further comparison to the RVs.

8.3.2 Refinement of Sediment Screening Level COPCs

Sediment detections, not detected parameters, and constituent totals that were retained in the screening process are carried through the refinement process. The refinement process uses several lines of evidence to address these constituents that were retained through the screening process, including:

- Comparison of maximum detections and average concentrations, not detected concentrations, and constituent totals to the appropriate RVs
- Comparison of average concentration to appropriate SVs
- Comparison of maximum inorganic detections and not detected concentrations to the appropriate reference concentrations
- Comparison of maximum 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and total DDT detections and not detected parameters to the appropriate basewide levels
- Further comparison of inorganic constituents using the appropriate freshwater or estuarine interpretive method for Florida sediments

8.3.2.1 Comparison of Concentrations in Refinement

During refinement, a series of HQs is generated to help clarify the potential for risk posed by each of the screening COPCs. This is presented in the tables by comparing the average concentration to the SV, the maximum concentration to the RV, and the average concentration to the RV. The tables for each wetland indicate how many of the sample collected in each wetland exceeds the SV and the RV. This evaluation helps evaluate the magnitude of potential risk as well as distribution of risk at each wetland.

8.3.2.2 Inorganic Sediment and Surface Water Reference Criteria

Reference wetlands are identified from the wetlands list developed by Parsons and Pruitt (USEPA, 1991a) for comparison to the potentially impacted wetlands. These wetlands are selected because they had similar vegetation, topography, geology, and hydrology in contrast to the wetlands potentially impacted by an IR site. The reference wetlands are also distant from any IR site or

other potential sources of contamination based on field observations and a historical study of adjacent areas. The four reference wetlands sampled are Wetlands 25, 27, 32, and 33. Based on field auxiliary data, Wetlands 25 and 32 are selected as freshwater reference wetlands, while Wetlands 27 and 33 are used as estuarine reference wetlands. In determining reference criteria, the sediment and surface water results from the two freshwater and two estuarine reference wetlands are used to develop freshwater and estuarine sediment and surface water reference concentrations.

Reference criteria for both sediment and surface water are calculated by summing valid detections with one-half of the quantitation limit for each not detected parameter ("U" or "UJ" validation qualifier). The mean detection is calculated, then multiplied by two, with the resulting product then used as the reference concentration. Tables 6-1 and 6-2 show how the freshwater and estuarine inorganic sediment and surface water reference concentrations are developed, respectively.

8.3.2.3 Basewide Total DDT Concentrations

A summary for the basewide total DDT concentrations for NAS Pensacola are listed below:

- 4,4'-DDD — 50 g/kg
- 4,4'-DDE — 40 g/kg
- 4,4'-DDT — 20 g/kg
- Total DDT — 110 g/kg

The approach used in their development is explained in Section 6.1.2.

8.3.2.4 Regression Analysis for Metals

The FDEP developed an interpretive tool for identifying metals outside of background range for both freshwater and estuarine sediments. This interpretive tool can determine whether metals in freshwater or estuarine sediments in Florida exceed expected natural concentrations, providing a way to determine whether sediments at a specific location are metal enriched. The freshwater interpretive tool (Carvalho, A., *et al.,* 2002) uses iron and aluminum as normalizers for plotting regressions for arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc.

A statistical process similar to FDEP's interpretive tool was used to assess metals concentrations in estuarine sediments. The methods used and the results of the analysis are presented in Appendix L.

8.3.2.5 DiToro Sediment VOCs Compared to SQGs

Since VOCs have no SVs or RVs, these are carried forward in the ERA as a class of contaminants. This conservative approach was taken because many of the IR sites adjacent or nearby the Site 41 wetlands are known to have VOC contamination in soil and/or groundwater. However, the likelihood of risk to the wetlands from VOCs is limited, since VOCs are known to have a short half-life, are not persistent, and readily volatilize.

The article *Technical Basis for Narcotic Chemicals and Polycyclic Aromatic Hydrocarbon Criteria. II. Mixtures and Sediments* (Di Toro, J. M. and J. A. McGrath, 2000b) explains how TOC-normalized VOC concentrations in sediment can be compared to EqP SQGs to develop HQs for evaluation of potential sediment toxicity. Since wetland-specific TOC is available for this site, each Di Toro SQG is normalized based on the amount of organic carbon present at each location (rather than 1% as in the original methodology). At wetlands where TOC is not available for each sample location, the lowest TOC measured in that wetland is used as a conservative surrogate. The data evaluation using the Di Toro SQG is provided in Appendix K.

8.3.2.6 Mean ERM Quotients

Mean ERL and ERM analyses is used in the refinement process for the Site 41 sediments. These methods are characterized in *Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments* (Long, E.R. *et al.,* 1995). ERL and ERM delineate three concentration ranges for a particular chemical. The concentrations below ERL values represent a minimal-effects range, which is intended to estimate conditions where biological effects would be rarely observed. Concentrations equal to or greater than ERL, but below ERM, represent a range within which biological effects occur occasionally. Concentrations at or above ERM values represent a probable-effects range, within which adverse biological effects frequently occur. To estimate the adverse effects of mixtures of chemicals, mean ERM quotients are determined by normalizing the concentration of each substance to its ERM value, summing the quotient for each substance, and dividing the resultant sum by the total number of contaminants for which guidelines are available.

This study developed mean ERM quotients as a useful way to evaluate mixtures of the following 25 constituents include (nine metals, three pesticides/PCBs, and 13 PAHs), as shown below:

- Arsenic
- Cadmium
- Chromium
- Copper
- Lead
- Mercury
- Nickel
- Pyrene
- 4,4'-DDE
- Silver
- Zinc
- Acenaphthene
- Acenaphthalene
- Anthracene
- Fluorine
- 2-Methylnaphthalene
- Total DDT
- Total PCBs
- Napthalene
- Phenanthrene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Chrysene
- Dibenzo(a,h)anthracene
- Fluoranthene

The results of the study yielded indices which were derived by dividing the individual chemical constituents by their respective ERM values, yielding quotients for each of the 25 constituents listed above. The mean ERM quotient is the average of the 25 quotients obtained. The ERM quotients represent the likelihood of adverse effects due to direct toxicity and are sorted according to the following categories:

- **Category 1:** Sediments have no ERL exceedances or a mean ERM quotient of less than 0.1. These sediments are considered least likely to be toxic.

- **Category 2:** Sediments with the greatest uncertainty due to the average survival approximates the critical threshold of 80%; whereas other categories are clearly greater or less than 80%. Mean ERM quotients are 0.11 — 0.5, with 1-5 ERLs exceeded.

- **Category 3:** Sediment is likely to cause adverse effects. Mean ERM quotients are 0.5 — 1.5, with 6-10 ERLs exceeded.

- **Category 4:** Sediments have high probability to cause adverse effects. Mean ERM quotients are >1.5, with >10 ERLs exceeded.

To assist in evaluating the Site 41 sediment data, mean ERM quotients for the 25 ERM constituents will be developed for each Site 41 sample location. For not detected parameters, one-half the detection limit is used in the ERM calculations. Mean ERM quotients derived from the data are then graphed to show one of three conditions for each of the 25 ERM constituents, including: (1) the constituent exceeds the mean ERL; (2) the constituent exceeds the mean ERM; (3) the mean ERM quotient is driven by one-half the detection limit for the not detected parameters.

8.4 Evaluating Surface Water Constituents

8.4.1 Development of Surface Water Screening — Level COPCs

Screening level COPCs for surface water conditions are developed similarly to the sediment method and includes:

- Comparison of maximum detections to SVs
- Comparison of detection limits for not detected parameters to SVs
- Comparison of constituent totals to SVs

The surface water screening values and reference concentrations are summarized in Table 8-2. As with sediment, surface water constituents are summarized in tables showing their frequency of detection, the maximum detection and its validation qualifier (if any), the location of the maximum detection, the SV (including its source), the maximum SV HQ, the number of detections exceeding the SV, and whether or not the constituent is retained for further refinement.

Constituents with HQs $\geq$1 are retained for refinement, along with constituents detected for which no SV is available. As with sediment, if a total constituent concentration is found to have an HQ <1, then all of the parameters making up the total concentration are removed from further refinement (regardless of HQs for individual constituents). Not detected parameters with HQs $\geq$1 are also retained as screening COPCs, as are not detected parameters for which no SV was available.

8.4.2 Refinement of Surface Water Screening Level COPCs

Retained surface water detections, not detected parameters, and constituent totals were further evaluated in the refinement process by performing the following comparisons:

- Comparison of average concentration HQs to SVs
- Comparison of surface water inorganic concentrations to their reference concentrations

Surface water constituents that were retained after the refinement process are listed as COPCs for their specific wetland.

8.5 Baseline Problem Formulation and Sampling Plan

Based on the results of the screening and COPC refinement conducted on the Phase II sampling, all the wetlands are grouped based on the HQs generated and the potential receptor species from each wetland. Once they are grouped, representative wetlands were selected from each group to be resampled during Phase III. The grouping of the wetlands is summarized in the paragraphs below.

8.5.1 Wetlands Selected for Study in Phase III

Based on HQs and potential receptor species, Wetland 64 from Group A, Wetlands 3 and 5A from Group B, and Wetlands 16 and 18 from Group C were selected for the highest sampling priority in Phase III. If contamination in Wetlands 16 and 18 was determined to be at levels producing adverse ecological effects, then the potential for effects in the remaining Group C wetlands (4D, 15, 63A) can also be determined by back-calculation or regression analysis.

Wetlands in Groups D and E were not considered for Phase III sampling. Both groups contain elevated levels of contaminants, mostly pesticides. The primary reason the Group D wetlands were not considered for further sampling is that these are channelized drainage ditches that are a part of the NAS Pensacola storm water drainage system. They receive continual impacts from storm water and are actively maintained by base maintenance personnel; however, in 2004 Wetland 5B is included in Phase III evaluations to fill data gaps identified for cadmium in sediment detected during the Phase II investigation for this wetland. The Group E Wetlands 48 and 49 were not sampled because both are heavily influenced by seasonal fluctuations in rainfall, appear dry for much of the year, and do not appear to be impacted by any IR sites.

In 1997, the Phase III assessment was conducted at Wetlands 3, 5A, 16, 18B, 33, and 64. Wetland 75 was also sampled during Phase III as a reference weland but was later dropped from consideration. Phase III was conducted to further characterize risk at the Site 41 wetlands. In 2001 and 2004, further Phase III sampling was conducted at Wetlands 64 and 5B, respectively, to fill data gaps at these wetlands. Select sediment sample locations from wetlands that exhibited Phase II contamination above the SVs were resampled. At each Phase III location, a sediment sample was collected for full-scan analyses, TOC, and grain-size analysis to better correlate the sediment contaminants with the toxicity results. In collecting Phase III samples from the Phase II locations, deviations in sediment chemistry were expected due to changes in site conditions during the time between the sampling events. Toxicity testing, biota sampling, and modeling were conducted to determine the extent of ecological risk at these wetlands.

The Phase II data analysis indicated contamination may pose a risk to receptors in Wetland Groups A, B, and C. The objective of the problem formulation phase was to help establish a link between contamination and effects. The conceptual model developed for each of these wetlands identifies exposure pathways and uses assessment and measurement endpoints to evaluate potential impacts through those pathways.

The *Final RI/FS SAP Addendum* (E/A&H, 1997d) describes the technical basis for the following factors selected for further study: (1) the specific functional uses and conceptual models for each wetland; (2) the selected assessment endpoints; (3) the measurement endpoints (including site-specific benthic community studies, toxicity tests, and food chain models); and (4) the scientific/management decision points.

8.5.2 Phase III Wetland-Specific Functional Uses and Conceptual Models

The conceptual models represent all possible exposure routes to particular receptor species from each wetland of concern. However, several assessment endpoints were selected based on their sensitivity to the contaminants and likelihood of exposure. For example, due to the prevalence of the wading birds throughout the area, health of piscivorous bird populations was selected as an assessment endpoint to represent impacts on wading bird species.

The conceptual models were developed according to site contaminants, the receptors identified within the NAS Pensacola estuarine system, and the complete predicted contaminant exposure pathways. Specific conceptual models were based on a functional use assessment of the red- and orange-coded wetlands and their prevalent contaminants. The functional uses of the red- and orange-coded wetlands selected for further study are summarized in Table 8-3. Conceptual models are provided in the site-specific evaluations in Sections 10 through 15.

8.5.3 Phase III Sample Locations

The Phase III sample locations were selected in wetland areas where Phase II data showed relatively high, medium, and low levels of contamination. Contaminant-level gradient sampling was selected to show the risk gradients in wetlands selected for further sampling. In wetlands where only one Phase III sediment sample was collected, the most contaminated Phase II location that corresponded to the conceptual model was sampled.

Sediment samples were collected in Wetlands 3, 5A, 16, 18B, 33, and 64. Surface water samples were collected (concurrent with sediment samples) in Wetlands 3, 5A, 33, and 64. Wetland 75 was also sampled for sediment and surface water during Phase III but was later dropped from consideration. GPS coordinates of the Phase II sample locations were used to locate the Phase III sample locations. As expected, the sediment and surface water chemistry results varied between Phases II and III due to changes in conditions between the respective phases. These variations meant that the contaminant gradients detected in Phase II sediments were not evident in Phase III.

8.6 Assessment Endpoint and Measurement Endpoints

For Phase III, several assessment and measurement endpoints were identified and presented in the *Final RI/FS SAP*, Site 41(E/A&H, 1995g) for Phase III. Those endpoints are summarized in Table 8-4.

8.6.1 Assessment Endpoint: Piscivorous Bird Health

The green heron was selected for several factors relevant to assessing risk in Site 41 wetlands. The green heron is common throughout NAS Pensacola, and data are readily available on its habitat use and feeding characteristics. The heron is considered an ideal assessment endpoint species for assessment of aquatic food-chain contaminant transfer based on diet, feeding characteristics, and limited home range.

For example, the heron feeds on some of the measurement endpoint species selected for the study. Any effects to these measurement endpoint species, either through toxicity or body burden effects, may help establish a correlation between: (1) effects to the measurement endpoint and (2) potential effects in the heron.

Specific factors making the heron an attractive assessment endpoint species include:

- *Diet* — The green heron feeds primarily on fish, but it also eats amphibians, reptiles, and other organisms. Fish consumed by the heron are generally less than 20 centimeters in length with small home ranges. The limited home range of the fish prey species simplifies the prediction of sediment impacts from these fish species. The limited migration increases the certainty in predicting impacts to species consuming fish in their diet from specific portions of the bayou and the adjacent wetlands. Food, body weight, and water ingestion rates for the heron are also readily available.

- *Limited Home Range* — The green heron is widely distributed in both saltwater and freshwater environments, making the bayou and adjacent wetlands a suitable, attractive habitat. Herons have a limited home range and do not venture far from their nesting sites; thus, it is assumed that they spend a significant amount of time in portions of the bayou and the adjacent wetlands where they have been observed. Also, herons do not appear to be sensitive to human presence, feeding in portions of the bayou and wetlands near the more developed parts of the base.

- *Correlation with Accepted Measurement Endpoints* — Based on their diet, feeding habits, and feeding range, effects to the heron may be correlated with impacts caused by contaminants present in Site 41 wetlands. For example, body burdens in particular prey fish species may be used to predict reproductive impacts to herons.

8.6.2 Assessment Endpoint: Piscivorous Mammal Health

The mammalian piscivore community health assessment endpoint was added after the work plan was approved as a result of meetings with regulators and trustees. This assessment endpoint is aimed at ecologically viable mammalian piscivore community or organism sustainability. The piscivorous mammal to be used as a surrogate for this assessment endpoint is the mink (*Mustella vision*). Piscivorous mammals are selected as an important endpoint for Site 41 based on the prey preferences, their known sensitivity to environmental contaminants, and their position as a predator in the food chain. All these factors collectively make piscivorous mammals a good sentinel endpoint for community health. Risk to this community is evaluated using a food-chain model described in Section 8.7.1.

8.6.3 Assessment Endpoint: Survival, Growth, and Reproduction of Macroinvertebrates Associated with the Benthic Environment

Benthic macroinvertebrate communities are selected as an assessment endpoint because this endpoint is relatively sessile and may significantly affect higher trophic level organisms. Benthic macroinvertebrates are an important biomonitoring tool because they are relatively sessile, generally have short life cycles, and represent a range of ecological niches. In addition to showing acute and chronic toxicological effects, benthic organisms also have the potential to accumulate metals and other contaminants at several orders of magnitude above ambient concentrations in the sediment or surface water. Benthic macroinvertebrates are localized in their habitat, meaning effects to benthic organisms can often be directly related to conditions in the immediate vicinity. The ability to focus on effects in particular areas may help focus remedial decisions.

8.6.4 Assessment Endpoint: Protection of Fish Viability

Predatory and prey fish communities are selected as an assessment endpoint based on their potential for exposure through diet and/or absorption. Fish occupy a significant niche in an estuarine community, and effects to populations can alter the overall community structure.

Body burden and toxicity data from fish species will be important for the following reasons:

- *Higher Food-Chain Impacts* — Fish are prey for a variety of other species, emphasizing the importance of the piscivorous assessment endpoints.

- *Biotransfer* — Fish may ingest sediment during feeding, becoming a direct transfer pathway to higher trophic level species for contaminants present in the sediment.

- *Toxicity from Direct Exposure* — Toxicity to fish species may be correlated with contaminant concentrations in sediment.

8.7 Measurement Endpoints

Ecological risk in each wetland is evaluated through impacts on its assessment endpoints. The methods used to quantify risk to each of these assessment endpoints are described below. The data evaluation is provided in Section 10 through 15.

Decision points are toxicological or bioaccumulative effects that indicate ecological risk meaning a decision is required concerning whether risk is assumed or additional analysis is needed. A decision point is selected for each Phase III measurement endpoint test. For all toxicity tests, the decision point is defined as statistically significant differences in mortality, growth, or fecundity when compared to a control. After these differences are established, they are also compared to effects seen in the reference wetlands. For the bioaccumulation analysis, the decision point is whole-body contaminant levels associated with an adverse effect. These are defined as tissue concentrations that exceed a defined threshold effects level in the assessment endpoint species.

8.7.1 Food-Chain Model

Some constituents are known to bioaccumulate or biomagnify within the food web. The potential for constituent movement from the environmental media into upper trophic level predators requires additional analysis for these constituents. To evaluate this exposure route, a food web model is developed using Site 41 sediment, surface water, and fish tissue concentrations to develop a dietary exposure estimate. The dietary exposure estimate is then compared to literature-based values related to no observed effects levels and lowest observed effects levels to determine the potential for unacceptable risk based on this exposure route.

While numerous receptors may be exposed to constituents in sediments and prey items within Site 41, three assessment endpoints have been selected to represent a conservative estimate for all potential exposures. The three assessment endpoints identified are:

- Health and survival of the piscivorous bird community
- Health and survival of the piscivorous mammal community
- Health and survival of the predatory fish community

The general list of constituents to be evaluated includes the following bioaccumulative constituents:

- Mercury
- Total PCBs
- Pesticides

8.7.1.1 Food-Chain Model Methodology

Two separate uptake models were used to estimate uptake of sediment COPCs at the Site 41 wetlands. For exposure to piscivorous birds and carnivorous mammals, a simple exposure model was used based on the site specific data gathered during the RI. A model developed by Evans and Engel (Evans and Engel, 1994) was used to estimate the exposure of predatory fish to mercury at Site 41. Each of these food-chain models is described below.

8.7.1.2 General Food-Chain Model Equation

The simple food web model estimated dietary exposure as a body-weight normalized total daily dose for each receptor species. The general structure of the food web exposure model is described by the following calculation:

$$Estimated\ \exp osure = \frac{\sum_{i}\left(C_{i} \times M_{i} \times A_{i} \times F_{i}\right)}{W}$$

where:

Estimated exposure	=	total ingestion rate of chemical from all dietary components (mg/kg body weight/day)
C	=	concentration of the chemical in a given dietary component and medium (mg/kg dry weight)
M_i	=	rate of ingestion of an abiotic medium (kg/day dry weight)

A_i	=	relative gastrointestinal absorption efficiency for the chemical in a given dietary component or medium (fraction, assumed 1 for this risk assessment)
F	=	fraction of the daily intake of a given dietary component or medium derived from the study area (unitless, assumed to be 1 for this risk assessment)
W	=	body weight of receptor species (kg)

For this assessment, A has been set to 1.0 (100 percent absorption) and F, has been set to 1.0 (dietary component is assumed to be 100% fish) scenarios evaluated.

The estimated exposure term can be expanded to specify each ingestion medium, which includes one or more primary food items, drinking water, and incidentally ingested sediment (or soil):

$IR_{chemical} = [(\Sigma\ (C_{food} \times M_{food} \times F_{food}) + (C_{water} \times M_{water} \times F_{water}) + (C_{sediment} \times M_{sediment} \times F_{sediment})]/W$

8.7.1.3 Red Drum Mercury Model

A model was performed that predicts mercury tissue concentration in the red drum based on concentrations of mercury in the sediment of Site 41. This model is based on the red drum mercury bioaccumulation model developed by Evans and Engel. The model assumes that mercury uptake into the red drum occurs via prey ingestion exclusively. The three prey sources are forage fish, crustaceans, and infaunal invertebrates. The *Final RI Report, Site 40* (EnSafe, 1999) and Evans and Engel (1994) explain this model in detail.

The equation used in the model is briefly explained below:

$$= \left(\frac{a * R}{g + K}\right) * [(Cf)(\%Cf)) + (Ccr)(\%Ccr) + (Cinv)(\%Cinv)]$$

where:

a	=	Assimilation efficiency of mercury from food, or 0.8
R	=	Feeding rate of the red drum, or 0.02/day
g	=	growth rate coefficient, or 0.003/day

K	=	Methyl mercury excretion rate from the red drum, or 0.00035/day
Cf	=	Methyl mercury tissue concentration in forage fish
%Cf	=	Percent of red drum diet composed of forage fish, or 0.3
Ccr	=	Methyl mercury tissue concentration in crustaceans
%Ccr	=	Percent of red drum diet composed of crustaceans, or 0.6
Cinv	=	Methyl mercury tissue concentrations in infaunal benthic invertebrates
%Cinv	=	Percent of red drum diet composed of benthic invertebrates, or 0.1

The first part of the mercury model equation calculates the bioaccumulation factor for methyl mercury, adjusting for input and excretion of this metal (which are assumed to be in balance at steady state).

The second portion of the equation estimates the accumulation of methyl mercury from the prey pathway, based on the assumption of a diet composed of 30% forage fish, 60% crustaceans, and 10% infaunal invertebrates. For the purposes of this risk assessment, the submodel results for fish will be replaced by the fish tissue results from each of the Operable Units included in this RI. The details of how Ccr and Cinv are calculated are presented in the Evans and Engel model.

8.7.1.4 Food-Chain Model Evaluation of Risk

Both of these models output an estimate of the exposure to each assessment endpoint. This exposure estimate is then compared to toxicity reference values (TRVs) from the scientific literature using the HQ approach. Where possible, both a "no observed adverse effects" level (NOAEL) and a "lowest observed adverse effects" level (LOAEL) are obtained from the literature, so a protective range can be evaluated.

8.7.1.5 Input Parameters for Food-Chain Models

The literature-based input parameters for the food web models are summarized in Table 8-5. These input parameters include life history data taken from scientific literature for each of the proposed model species and site-specific media concentrations from the previous investigations. The ingestion rates and body weights used are reported on a dry weight basis. Only dry weight values were used for consistency with the laboratory data.

8.7.1.6 Site-Specific Food-Chain Model Inputs

Each of the food chain models described above will be applied to the following list of wetland groupings:

- **OU 1 Wetlands:** Those wetlands, located within the general area of OU 1, are potentially impacted by the Site 1 landfill. Wetlands in this group include: Wetland 1, Wetland 3, Wetland 4D, Wetland 15, Wetland 16, Wetland 17, Wetland 18A, and Wetland 18B.
- **OU 2 Wetlands:** Wetlands in this group include: Wetland 5A and 5B, Wetland 6, and Wetland 64.
- **OU 10 Wetlands:** Wetlands in this group include: Wetland 10, Wetland 11, and Wetland 13.
- **Chevalier Field Wetlands:** Wetlands in this group include: 63A and 63B.
- **Forrest Sherman Field Wetlands:** Wetlands in this group include: Wetland 19, Wetland 52, Wetland 56, Wetland 57, Wetland 58, Wetland 72, Wetland 79, Wetland W2, Wetland W1, Wetland 48, and Wetland 49.

Exposure Scenarios

Since work has been completed in several phases at Site 41, two general exposure scenarios will be evaluated for each wetland grouping listed above. For each OU listed above, a food-chain model will be completed showing the concentrations present during the Phase II sampling event and the Phase III sampling event. The data used are presented in Appendix M. It should be noted that the tissue concentrations used in the food-chain models were collected during the Phase III sampling event. Therefore, the site-specific biota data will only be utilized in the food-chain models summarizing conditions during the Phase III sampling event. Biota concentrations for the Phase II sampling event will be derived using literature-based bioaccumulation factors presented in Table 8-6.

For each wetland grouping, the site-specific media concentrations (sediment and biota tissue, where available) to be utilized in the food web models will include the maximum concentration detected in an OU (using one-half the sample quantitation limit for all NDs) and the average concentration. Fish tissue was collected during the Phase III sampling event at targeted wetlands, based on Phase II results of previous investigation concentrations. Since fish were the biota selected for collection during this field event, the food-chain models will assume all predators feed exclusively on fish tissue. The red drum model will use the prey assumptions discussed in that model (Evans and Engel, 1994).

8.7.2 Benthic Community Analysis

Benthic community data can reveal what effects are actually occurring from site contamination in the area sampled. Species diversity results by themselves are not considered a reliable indicator of ecological risk. This is because many factors influence diversity, including: (1) sediment type;

(2) deposition rates; (3) water temperature; (4) salinity; (5) waterborne nitrates and phosphates; (6) dissolved oxygen; or (7) many other factors which may or may not be directly related to IR site contamination. Therefore, it is important to view species diversity in context with contaminant concentrations and toxicity test results.

This approach is referred to as the Sediment Quality Triad. The three indices used to categorize species diversity for Phase III (Shannon Weiner, Pielou's Evenness, and Margalef's Richness Diversity) are described below. The Shannon Weiner Diversity Index refers to the diversity of a community taking into account the evenness and richness of individuals and species collected. The Shannon Weiner Diversity Index ranges from 1.3 (low diversity) to 6.5 (high diversity) and is always presented with the other two indices, which also influence diversity. A low value would indicate a higher chance that one or two species dominate a particular site.

Pielou's Evenness Index measures the abundance of species. In an ideal setting, a community of 100 individuals would be composed of 100 species. The Pielou Evenness Index ranges from zero to 1.0, with 1.0 indicating perfect evenness.

Margalef's Species Richness Index refers to species abundance and distribution over a given area. An example of this would be a community of 100 individuals composed of 10 species, of which 90% of those individuals belong to a single species. The remaining 10% of the community are distributed among the nine species, which would indicate low evenness. Margalef's Species Richness Index ranges from 1.0 to 10, with 10 being the best range.

The Shannon Weiner Diversity Index should be evaluated by itself and not averaged with Pielou's Evenness Index or Margalef's Species Richness Index, as they are components in the diversity index. From this type of data, it is possible to assess whether a particular habitat is healthy, in a recovery state, or impacted.

8.7.3 Toxicity Tests

Toxicity tests were performed on sediment and surface water samples collected at selected locations from Phase III wetlands. The test species used include the freshwater species, the fathead minnow *(Pimephales promelas)* and larval midge (Chironomus tentans); and the estuarine species, the marine amphipod *(Leptocheirus plumulosus)* and marine polychaete *(Neanthes arenaceodentata)*.

These are considered surrogate species for naturally occurring fish, benthic macroinvertebrates, and polychaetes. Acute (survival endpoint) and chronic (survival and sublethal endpoints) exposures were

performed on the freshwater and estuarine sediments collected from the Phase III wetlands. Statistical analyses were then performed on the results to determine differences between the subject samples and the control samples.

To assist in the evaluation of these processes, a triad matrix is developed that gives equal weight to the sediment chemistry, toxicity tests, and benthic assessments. Interpretation of the matrix and the logical steps to be followed are shown in the decision flow-charts discussed later in this section.

Decision making for sediment assessment will proceed based on the triad assessment results presented in the matrices below. Sediment chemistry is evaluated by comparing the detected concentrations to the SVs and RVs. Benthic diversity is assessed by measures in: (1) abundance; (2) diversity; or (3) the presence of pollution indicator species. Biological decision making triads are be used to assess biological test results. These results will be processed through the Project Decision Making Triad to establish decisions at the project level.

"Unacceptable" and "adverse effects" (terms used below) mean "statistically different" using methods accompanying each test protocol. "Acceptable" means results were not statistically significant. For weighting purposes, "unacceptable" on survival is considered twice as important as "unacceptables" on reproduction or growth. This is because survival (i.e., mortality) is irreversible, whereas reproduction and growth endpoints are potentially reversible; therefore, two sublethal unacceptables equal one lethal unacceptable. After the bioassays are considered individually, their results will be combined for input to the triad matrix assuming the compounding of cumulative adverse effects.

Within the triad matrix, +'s and —'s are used to reflect the continuum of chemistry, toxicity, and benthic community response one normally encounters. In the interpretation, multiple +'s reflect a higher score for a particular interpretation. These scores consider the strength or weakness one should associate with a particular interpretation.

Sediment Toxicity Test

The boxes below chart the possible outcomes for the *Leptocheirus plumulosus* amphipod test, the *Neanthes* polychaete test, and the *Chironomous tentans* midge test, conducted to analyze the sediments of a particular wetland.

Possible outcomes from the *Leptocheirus plumulosus* amphipod test:

Survival	Scoring
Acceptable (>80%)	—
Not Acceptable (<80%)	+

Possible outcomes from the *Neanthes* Polychaete test:

Survival	Weight	Scoring
Acceptable	Acceptable	—
Acceptable	Unacceptable	+
Not Acceptable	Acceptable	++
Not Acceptable	Unacceptable	+++

Possible outcomes from the *Chironomous tentans* midge test:

Survival	Weight	Emergence	Scoring
Acceptable	Acceptable	Acceptable	—
Acceptable	Acceptable	Unacceptable	+
Acceptable	Unacceptable	Unacceptable	++
Acceptable	Unacceptable	Unacceptable	++
Acceptable	Unacceptable	Acceptable	++
Unacceptable	Acceptable	Acceptable	++
Unacceptable	Acceptable	Unacceptable	+++
Unacceptable	Unacceptable	Acceptable	+++
Unacceptable	Unacceptable	Unacceptable	++++

At locations with more than one toxicity test result for sediment, the results are integrated as shown in the box below:

Combined Score	Biological Interpretation Considering both Bioassays	Input to Triad Matrix		
—	No adverse effects	—	=	—
+	Acceptable survival in both species 1 sublethal significant difference result in one species	—	=	—
++	1 unacceptable survival in one species or two sublethal significant difference results	+	=	+
+++	1 unacceptable survival result in one species and/or adverse sublethal effects	+	=	+
++++	Unacceptable survival results in 1-2 species and/or adverse sublethal effects	++	=	+
+++++	Unacceptable survival results in both test species and significantly different sublethal effects	+++	=	+

Sediment Decision Making Triad

The decision making triad is composed of the combined scores for sediment chemistry, benthic assessment, and toxicity tests. Using the triad, the condition of a wetland's surface water can be interpreted, along with any degradation impacting sediment. The conditions and their interpretations are explained in the box below.

Surface water conditions and their interpretations are also presented below but will be explained in the assessment of fish viability endpoint.

Condition	Chemistry	Toxicity Tests	Benthic Assessment	Interpretation
1	+	+	+	Strong evidence for pollution-induced degradation.
2	—	—	—	Strong evidence for the absence of pollution-induced degradation.
3	+	—	—	Contaminants are not bioavailable.
4	—	+	—	Unmeasured contaminants or conditions exist that have the potential to cause degradation.
5	—	—	+	Alteration of benthic community is probably not due to toxic chemical contamination.
6	+	+	—	Toxic chemicals are probably stressing the system.
7	—	+	+	Unmeasured toxic chemicals are causing degradation.
8	+	—	+	Benthic community degraded by toxic chemicals but toxicity test not sensitive to toxic chemicals present or chemicals are not bioavailable or alteration is not due to toxic chemicals.

Notes:
+ = Measured difference between test and control or reference conditions
— = No measurable difference between test and control or reference conditions
The shaded area relates to surface water acute tests and is described in Figure 7-5

8.7.4 Assessment Endpoint: Protection of Fish Viability

Determining potential impact to the fish community involves a more complex analysis of different lines of evidence depending on the wetland. The first line of evidence is the comparison of surface water concentrations to surface water quality criteria to estimate the effect of contaminant concentrations.

Surface water data are presented in the wetland-specific ERAs in Section 10 through 15. The second line of evidence is the comparison of body burden values in foraging fish species to ERED values, then calculating HQ values and determining whether these whole-body residue concentrations are associated with any adverse effects.

The second line of evidence is similar to the first but incorporates the TTC, which predicts effects on predatory fish species based on the whole-body residue concentrations in foraging fish tissue. In the third line of evidence, toxicity are evaluated for the fathead minnow. For Wetlands 18B and 64, all four lines of evidence were applied. For Wetland 3, only toxicity and chemistry data were analyzed, because the shallow depth of the surface water does not support upper trophic level fish.

Surface Water Toxicity Test

The box below charts the possible outcomes for the *Pimephales promelas* fathead minnow test conducted to analyze surface water conditions:

Survival	Growth	Scoring
Acceptable (>80%)	No Significant Difference	—
Acceptable (>80%)	Significant Difference	+
Not Acceptable (<80%)	No Significant Difference	++
Not Acceptable (<80%)	Significant Difference	+++

Because only one surface water toxicity test is performed at each location, the above scores will be put directly into the Triad Matrix. Multiple +'s will be input as a single +.

Surface Water Decision Making Triad

The surface water decision making triad is comprised of the combined scores for surface water chemistry, benthic assessment, and toxicity tests. Using the triad, the condition of a wetland's surface water can be interpreted, along with degradation which may have an impact on the wetland.

8.8 ERA Uncertainties

All sampling programs may produce unavoidable design variations. Uncertainties in field conditions, laboratory procedures, or other circumstances may have resulted in overestimation or underestimation of risk in the Site 41 ERAs.

These include:

- Analytical matrix interferences, due to excess organic material in sediment, may over- or underestimate risk. Some wetland samples included roots and other benthic organisms.

- Many constituents lack criteria or benchmark values, which can over- or underestimate risk and increase the uncertainty for screening level assessments.

- The HQ approach does not consider natural background metals concentrations, synergistic or antagonistic effects, and the effects of TOC as they relate to bioavailability. These factors could lead to over- or underestimating risk.

- Three exposure point scenarios will be developed for each constituent: (1) The maximum exposure point scenario will assume that each receptor spends all its time feeding in the area with maximum concentration (using half detection limits for any non-detected parameters in total PCBs, endrins, chlordanes, total DDT, and BHCs) for each constituent; (2) A maximum exposure calculated using only detected parameters; and (3) An average exposure scenario was calculated using one-half the detection limits for any location where a constituent may have been reported as not detected.

- For simplicity, it is assumed that all piscivorous predators evaluated with the simple food-chain models consume a diet of 100 percent fish (with the exception of the red drum mercury model).

- Fish tissue data are available from a small number of wetlands. The rationale for sampling these wetlands was they were deemed to be a reasonable representative of constituent levels throughout NAS Pensacola. While many things can affect bioaccumulation of constituents into prey tissue, it is assumed that the concentrations measured during the Phase III sampling are representative of exposure throughout each OU grouping.

Since the fish sampled during the Phase III sampling event were not analyzed for mercury, fish samples collected at nearby sampling stations from the Site 40 RI were used. While this introduces some uncertainty, since the fish tissue samples were not collocated with the sediment samples, it should present a reasonable substitute for the Site 41 data due to the sample locations close proximity to Wetland 18B.

The ERA process is applied to surface water data, but the main focus of the ERA is on sediment data. This is because sediment contaminants are more persistent than surface water contaminants, correlate better with long-term effects, and can drive the development of remedial options. This is particularly important when the surface water data are reviewed in comparison to SVs. In some cases, contaminant HQ values are elevated for surface water, even though similar constituents are not detected in the associated sediment samples, and the contaminants do not appear to be associated with impacts from an IR site. It is suspected that these elevated HQs are due to high turbidity (an uncertainty previously discussed) during collection of the surface water samples or other possible non-site-related factors.

Table 8-1
Site 41
Sediment Screening/Refinement Values and Reference Concentrations

Parameter	Screening Value (SV) Value	Screening Value (SV) Source	Refinement Value (RV) Value	Refinement Value (RV) Source	Freshwater Reference Concentration	Saltwater Reference Concentration	Units
Metals (mg/kg)							
Aluminum	N/S	N/A	N/R	N/A	13,610	4,274	mg/kg
Antimony	12	1	N/R	N/A	4.43	0.26	mg/kg
Arsenic	7.24	1, 2	41.6	PEL	6.62	2.14	mg/kg
Barium	N/S	N/A	N/R	N/A	14	3.84	mg/kg
Beryllium	N/S	N/A	N/R	N/A	0.84	0.13	mg/kg
Cadmium	0.68	2	4.21	PEL	1.8	0.39	mg/kg
Calcium	N/S	N/A	N/R	N/A	10,756.67	1,978.80	mg/kg
Chromium	52.3	1, 2	160	PEL	39.37	13.1	mg/kg
Cobalt	N/S	N/A	N/R	N/A	2.8	0.91	mg/kg
Copper	18.7	1, 2	108	PEL	19.5	8.44	mg/kg
Cyanide (CN)	N/S	N/A	N/R	N/A	5.22	1.29	mg/kg
Iron	N/S	N/A	N/R	N/A	11,911.67	2,684.40	mg/kg
Lead	30.2	1, 2	112	PEL	82.47	21.04	mg/kg
Magnesium	N/S	N/A	N/R	N/A	7,513.33	2,943.60	mg/kg
Manganese	N/S	N/A	N/R	N/A	37.97	9.81	mg/kg
Mercury	0.13	1, 2	0.696	PEL	0.55	0.11	mg/kg
Nickel	15.9	1, 2	42.8	PEL	9.28	3.69	mg/kg
Potassium	N/S	N/A	N/R	N/A	1,628.67	899.72	mg/kg
Selenium	N/S	N/A	N/R	N/A	3.45	0.66	mg/kg
Silver	0.73	2	1.77	PEL	2.1	0.52	mg/kg
Sodium	N/S	N/A	N/R	N/A	18,993.33	11,439.60	mg/kg
Thallium	N/S	N/A	N/R	N/A	1.57	0.39	mg/kg
Vanadium	N/S	N/A	N/R	N/A	28.67	8.59	mg/kg
Zinc	124	1, 2	271	PEL	36.73	14.36	mg/kg
Pesticides and PCBs (g/kg)							
Aldrin	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Dieldrin	0.715	2	4.3	PEL	N/A	N/A	g/kg
Endosulfan I	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Endosulfan II	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Endosulfan sulfate	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Heptachlor	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Heptachlor epoxide	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Methoxychlor	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Toxaphene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
alpha-BHC	0.32	2	0.99	PEL	N/A	N/A	g/kg
beta-BHC	0.32	2	0.99	PEL	N/A	N/A	g/kg
delta-BHC	0.32	2	0.99	PEL	N/A	N/A	g/kg
gamma-BHC (Lindane)	0.32	2	0.99	PEL	N/A	N/A	g/kg
Total BHCs	0.32	2	0.99	PEL	N/A	N/A	g/kg
alpha-Chlordane	1.7	1	4.79	PEL	N/A	N/A	g/kg
gamma-Chlordane	1.7	1	4.79	PEL	N/A	N/A	g/kg
Total Chlordanes	1.7	1	4.79	PEL	N/A	N/A	g/kg
4,4'-DDD	1.22	2	7.81	PEL	50	50	g/kg
4,4'-DDE	2.07	2	374	PEL	40	40	g/kg
4,4'-DDT	1.19	2	4.77	PEL	20	20	g/kg
Total 4,4'-DDx	3.3	1	51.7	PEL	110	110	g/kg
Endrin	3.3	1	N/R	N/A	N/A	N/A	g/kg
Endrin aldehyde	3.3	1	N/R	N/A	N/A	N/A	g/kg
Endrin ketone	3.3	1	N/R	N/A	N/A	N/A	g/kg
Total Endrins	3.3	1	N/R	N/A	N/A	N/A	g/kg
Aroclor-1016	21.6	2	189	PEL	N/A	N/A	g/kg
Aroclor-1221	67	1	189	PEL	N/A	N/A	g/kg
Aroclor-1232	21.6	2	189	PEL	N/A	N/A	g/kg
Aroclor-1242	21.6	2	189	PEL	N/A	N/A	g/kg
Aroclor-1248	21.6	2	189	PEL	N/A	N/A	g/kg
Aroclor-1254	21.6	2	189	PEL	N/A	N/A	g/kg
Aroclor-1260	21.6	2	189	PEL	N/A	N/A	g/kg
Total PCBs	21.6	2	189	PEL	N/A	N/A	g/kg

Table 8-1
Site 41
Sediment Screening/Refinement Values and Reference Concentrations

Parameter	Screening Value (SV) Value	Screening Value (SV) Source	Refinement Value (RV) Value	Refinement Value (RV) Source	Freshwater Reference Concentration	Saltwater Reference Concentration	Units
SVOCs (g/kg)							
1,2,4-Trichlorobenzene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
1,2-Dichlorobenzene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
1,3-Dichlorobenzene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
1,4-Dichlorobenzene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2,4,5-Trichlorophenol	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2,4,6-Trichlorophenol	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2,4-Dichlorophenol	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2,4-Dimethylphenol	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2,4-Dinitrophenol	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2,4-Dinitrotoluene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2-Chloronaphthalene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2-Chlorophenol	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2-Methyl-4,6-Dinitrophenol	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2-Methylphenol (o-Cresol)	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2-Nitroaniline	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2-Nitrophenol	N/S	N/A	N/R	N/A	N/A	N/A	N/A
3,3'-Dichlorobenzidine	N/S	N/A	N/R	N/A	N/A	N/A	N/A
3-Nitroaniline	N/S	N/A	N/R	N/A	N/A	N/A	N/A
4-Bromophenyl-phenylether	N/S	N/A	N/R	N/A	N/A	N/A	N/A
4-Chloro-3-methylphenol	N/S	N/A	N/R	N/A	N/A	N/A	N/A
4-Chloroaniline	N/S	N/A	N/R	N/A	N/A	N/A	N/A
4-Chlorophenylphenyl ether	N/S	N/A	N/R	N/A	N/A	N/A	N/A
4-Methylphenol (p-Cresol)	N/S	N/A	N/R	N/A	N/A	N/A	N/A
4-Nitroaniline	N/S	N/A	N/R	N/A	N/A	N/A	N/A
4-Nitrophenol	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Benzo(b)fluoranthene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Benzo(g,h,i)perylene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
bis(2-Chloroethoxy)methane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
bis(2-Chloroethyl)ether	N/S	N/A	N/R	N/A	N/A	N/A	N/A
bis(2-Ethylhexyl)phthalate (BEHP)	182	1, 2	2,647	PEL	N/A	N/A	g/kg
Butylbenzylphthalate	182	3	2,647	PEL	N/A	N/A	g/kg
Carbazole	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Dibenzofuran	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Diethylphthalate	182	3	2,647	PEL	N/A	N/A	g/kg
Dimethylphthalate	182	3	2,647	PEL	N/A	N/A	g/kg
Di-n-butylphthalate	182	3	2,647	PEL	N/A	N/A	g/kg
Di-n-octylphthalate	182	3	2,647	PEL	N/A	N/A	g/kg
Hexachlorobenzene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Hexachlorobutadiene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Hexachlorocyclopentadiene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Hexachloroethane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Indeno(1,2,3-cd)pyrene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Isophorone	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Nitrobenzene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
N-Nitroso-di-n-propylamine	N/S	N/A	N/R	N/A	N/A	N/A	N/A
N-Nitrosodiphenylamine	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Pentachlorophenol	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Phenol	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2-Methylnaphthalene	20.2	2	201	PEL	N/A	N/A	g/kg
Acenaphthene	6.71	2	88.9	PEL	N/A	N/A	g/kg
Acenaphthylene	5.87	2	128	PEL	N/A	N/A	g/kg
Anthracene	46.9	2	245	PEL	N/A	N/A	g/kg
Benzo(a)anthracene	74.8	2	693	PEL	N/A	N/A	g/kg
Benzo(a)pyrene	88.8	2	763	PEL	N/A	N/A	g/kg
Chrysene	108	2	846	PEL	N/A	N/A	g/kg
Dibenz(a,h)anthracene	6.22	2	135	PEL	N/A	N/A	g/kg
Fluoranthene	113	2	1,494	PEL	N/A	N/A	g/kg
Fluorene	21.2	2	144	PEL	N/A	N/A	g/kg
Naphthalene	34.6	2	391	PEL	N/A	N/A	g/kg
Phenanthrene	86.7	2	544	PEL	N/A	N/A	g/kg
Pyrene	153	2	1,398	PEL	N/A	N/A	g/kg
Total PAHs	1684	2	16,770	PEL	N/A	N/A	g/kg
TOC Normalized PAHs	290	5	1,800	MEC	N/A	N/A	mg/kg-oc

Table 8-1
Site 41
Sediment Screening/Refinement Values and Reference Concentrations

Parameter	Screening Value (SV) Value	Screening Value (SV) Source	Refinement Value (RV) Value	Refinement Value (RV) Source	Freshwater Reference Concentration	Saltwater Reference Concentration	Units
VOCs (g/kg)							
1,1,1-Trichloroethane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
1,1,2,2-Tetrachloroethane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
1,1,2-Trichloroethane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
1,1-Dichloroethane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
1,1-Dichloroethene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
1,2-Dichloroethane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
1,2-Dichloroethene (total)	N/S	N/A	N/R	N/A	N/A	N/A	N/A
1,2-Dichloropropane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2-Butanone (MEK)	N/S	N/A	N/R	N/A	N/A	N/A	N/A
2-Hexanone	N/S	N/A	N/R	N/A	N/A	N/A	N/A
4-Methyl-2-Pentanone (MIBK)	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Acetone	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Benzene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Bromodichloromethane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Bromoform	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Bromomethane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Carbon disulfide	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Carbon tetrachloride	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Chlorobenzene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Chloroethane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Chloroform	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Chloromethane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
cis-1,3-Dichloropropene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Dibromochloromethane	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Ethylbenzene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Methylene chloride	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Styrene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Tetrachloroethene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Toluene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
trans-1,3-Dichloropropene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Trichloroethene	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Vinyl chloride	N/S	N/A	N/R	N/A	N/A	N/A	N/A
Xylene (Total)	N/S	N/A	N/R	N/A	N/A	N/A	N/A

Notes:
1 = USEPA value.
2 = FDEP value.
1,2 = USEPA/FDEP values.
3 = 182 ug/kg EPA/FDEP value for BEHP used as a surrogate, per decision from the July 15-16, 2002 Eco Subgroup meeting.
4 = Swartz Threshold effects concentration (TEC).

Table 8-2
Site 41
Surface Water Screening/Refinement Values and Reference Concentrations

Fresh	Parameter	SV	Source	Ref. Conc.	Salt	Parameter	SV_SW	Source	Ref Conc.
Metals									
F	Aluminum	13	FDEP	1,090.25	S	Aluminum	1,500	FDEP	2927.5
F	Antimony	160	USEPA	4	S	Antimony	4,300	FDEP	4.15
F	Arsenic	50	FDEP	2.7	S	Arsenic	36	USEPA	3.6
F	Barium		N/A	3.675	S	Barium		N/A	9.425
F	Beryllium	0.13	FDEP	1	S	Beryllium	0.13	FDEP	0.82
F	Cadmium	0.66	USEPA	3	S	Cadmium	9.3	FDEP	2.395
F	Calcium		N/A	7,675	S	Calcium		N/A	76800
F	Chromium	11	FDEP	8	S	Chromium	50	FDEP	10.87
F	Cobalt		N/A	3	S	Cobalt		N/A	2.3825
F	Copper	6.54	USEPA	4	S	Copper	2.9	FDEP	7.025
F	Cyanide (CN)	5.2	FDEP	5	S	Cyanide (CN)	1	FDEP	4.1
F	Iron	1,000	FDEP	2,360	S	Iron	300	FDEP	1352
F	Lead	1.32	USEPA	3.2	S	Lead	8.5	FDEP	13.75
F	Magnesium		N/A	20,260	S	Magnesium		N/A	243650
F	Manganese		N/A	13.2	S	Manganese		N/A	12.15
F	Mercury	0.012	FDEP	0.13	S	Mercury	0.025	FDEP	0.21
F	Nickel	87.71	USEPA	12	S	Nickel	8.3	FDEP	9.3
F	Potassium		N/A	6,995	S	Potassium		N/A	81250
F	Selenium	5	FDEP	3	S	Selenium	71	FDEP	2.9
F	Silver	0.012	USEPA	4	S	Silver	0.23	USEPA	3.0075
F	Sodium		N/A	182,200	S	Sodium		N/A	1952000
F	Thallium	4	USEPA	4.2	S	Thallium	6.3	FDEP	2.55
F	Vanadium		N/A	4.7	S	Vanadium		N/A	6.6925
F	Zinc	58.91	USEPA	5.525	S	Zinc	86	FDEP	12.875
Pesticides/PCBs									
F	4,4'-DDD	0.0003	FDEP	N/A	S	4,4'-DDD	0.0003	FDEP	N/A
F	4,4'-DDE	0.0002	FDEP	N/A	S	4,4'-DDE	0.0002	FDEP	N/A
F	4,4'-DDT	0.00059	FDEP	N/A	S	4,4'-DDT	0.00059	FDEP	N/A
F	Aldrin	0.00014	FDEP	N/A	S	Aldrin	0.00014	FDEP	N/A
F	alpha-BHC	0.005	FDEP	N/A	S	alpha-BHC	0.005	FDEP	N/A
F	alpha-Chlordane	0.00059	FDEP	N/A	S	alpha-Chlordane	0.00059	FDEP	N/A
F	Aroclor-1016	0.000045	FDEP	N/A	S	Aroclor-1016	0.000045	FDEP	N/A
F	Aroclor-1221	0.000045	FDEP	N/A	S	Aroclor-1221	0.000045	FDEP	N/A
F	Aroclor-1232	0.000045	FDEP	N/A	S	Aroclor-1232	0.000045	FDEP	N/A
F	Aroclor-1242	0.000045	FDEP	N/A	S	Aroclor-1242	0.000045	FDEP	N/A
F	Aroclor-1248	0.000045	FDEP	N/A	S	Aroclor-1248	0.000045	FDEP	N/A
F	Aroclor-1254	0.000045	FDEP	N/A	S	Aroclor-1254	0.000045	FDEP	N/A
F	Aroclor-1260	0.014	FDEP	N/A	S	Aroclor-1260	0.014	FDEP	N/A
F	beta-BHC	0.046	FDEP	N/A	S	beta-BHC	0.046	FDEP	N/A
F	delta-BHC		N/A	N/A	S	delta-BHC		N/A	N/A
F	Dieldrin	0.00014	FDEP	N/A	S	Dieldrin	0.00014	FDEP	N/A
F	Endosulfan I	0.056	FDEP	N/A	S	Endosulfan I	0.0087	FDEP	N/A
F	Endosulfan II	0.056	FDEP	N/A	S	Endosulfan II	0.0087	FDEP	N/A
F	Endosulfan sulfate	0.056	FDEP	N/A	S	Endosulfan sulfate	0.0087	FDEP	N/A
F	Endrin	0.0023	FDEP	N/A	S	Endrin	0.0023	FDEP	N/A
F	Endrin aldehyde	0.0023	FDEP	N/A	S	Endrin aldehyde	0.0023	FDEP	N/A
F	Endrin ketone	0.0023	FDEP	N/A	S	Endrin ketone	0.0023	FDEP	N/A
F	gamma-BHC (Lindane)	0.08	FDEP	N/A	S	gamma-BHC (Lindane)	0.016	USEPA	N/A
F	gamma-Chlordane	0.00059	FDEP	N/A	S	gamma-Chlordane	0.00059	FDEP	N/A
F	Heptachlor	0.0038	FDEP	N/A	S	Heptachlor	0.0036	USEPA	N/A
F	Heptachlor epoxide	0.00004	FDEP	N/A	S	Heptachlor epoxide	0.00004	FDEP	N/A
F	Methoxychlor	0.03	FDEP	N/A	S	Methoxychlor	0.03	FDEP	N/A
F	Total BHC		N/A	N/A	S	Total BHC		N/A	N/A
F	Total Chlordane	0.0043	FDEP	N/A	S	Total Chlordane	0.004	USEPA	N/A
F	Total DDT		N/A	N/A	S	Total DDT	0.00059	FDEP	N/A
F	Total Endrin		N/A	N/A	S	Total Endrin	0.0023	FDEP	N/A
F	Total PCB		N/A	N/A	S	Total PCB		N/A	N/A
F	Toxaphene	0.0002	FDEP	N/A	S	Toxaphene	0.0002	FDEP	N/A
SVOCs									
F	1,2,4-Trichlorobenzene	23	FDEP	N/A	S	1,2,4-Trichlorobenzene	4.5	USEPA	N/A
F	1,2-Dichlorobenzene	15.8	USEPA	N/A	S	1,2-Dichlorobenzene	19.7	USEPA	N/A
F	1,3-Dichlorobenzene	50.2	USEPA	N/A	S	1,3-Dichlorobenzene	28.5	USEPA	N/A
F	1,4-Dichlorobenzene	3	FDEP	N/A	S	1,4-Dichlorobenzene	3	FDEP	N/A
F	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)		N/A	N/A	S	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)		N/A	N/A
F	2,4,5-Trichlorophenol	23	FDEP	N/A	S	2,4,5-Trichlorophenol	23	FDEP	N/A
F	2,4,6-Trichlorophenol	3.2	USEPA	N/A	S	2,4,6-Trichlorophenol	6.5	FDEP	N/A
F	2,4-Dichlorophenol	36.5	FDEP	N/A	S	2,4-Dichlorophenol	13	FDEP	N/A
F	2,4-Dimethylphenol	21.2	USEPA	N/A	S	2,4-Dimethylphenol	160	FDEP	N/A
F	2,4-Dinitrophenol	3	FDEP	N/A	S	2,4-Dinitrophenol	3	FDEP	N/A
F	2,4-Dinitrotoluene	9.1	FDEP	N/A	S	2,4-Dinitrotoluene	9.1	FDEP	N/A
F	2,6-Dinitrotoluene	0.7	FDEP	N/A	S	2,6-Dinitrotoluene	0.7	FDEP	N/A
F	2-Chloronaphthalene	1,600	FDEP	N/A	S	2-Chloronaphthalene	1,600	FDEP	N/A
F	2-Chlorophenol	43.8	USEPA	N/A	S	2-Chlorophenol	130	FDEP	N/A
F	2-Methyl-4,6-Dinitrophenol	2.3	USEPA	N/A	S	2-Methyl-4,6-Dinitrophenol		N/A	N/A
F	2-Methylnaphthalene	30	FDEP	N/A	S	2-Methylnaphthalene	30	FDEP	N/A
F	2-Methylphenol (o-Cresol)	250	FDEP	N/A	S	2-Methylphenol (o-Cresol)	250	FDEP	N/A
F	2-Nitroaniline		N/A	N/A	S	2-Nitroaniline		N/A	N/A
F	2-Nitrophenol	3,500	USEPA	N/A	S	2-Nitrophenol		N/A	N/A
F	3,3'-Dichlorobenzidine	0.03	FDEP	N/A	S	3,3'-Dichlorobenzidine	0.03	FDEP	N/A
F	3-Methylphenol/4-Methylphenol		N/A	N/A	S	3-Methylphenol/4-Methylphenol		N/A	N/A
F	3-Nitroaniline		N/A	N/A	S	3-Nitroaniline		N/A	N/A
F	4-Bromophenyl-phenylether		N/A	N/A	S	4-Bromophenyl-phenylether		N/A	N/A
F	4-Chloro-3-methylphenol	100	FDEP	N/A	S	4-Chloro-3-methylphenol	100	FDEP	N/A
F	4-Chloroaniline	2.5	FDEP	N/A	S	4-Chloroaniline		N/A	N/A
F	4-Chlorophenylphenyl ether		N/A	N/A	S	4-Chlorophenylphenyl ether		N/A	N/A
F	4-Methylphenol (p-Cresol)	70	FDEP	N/A	S	4-Methylphenol (p-Cresol)	70	FDEP	N/A
F	4-Nitroaniline	1,200	FDEP	N/A	S	4-Nitroaniline	1,200	FDEP	N/A
F	4-Nitrophenol	55	FDEP	N/A	S	4-Nitrophenol	55	FDEP	N/A
F	Acenaphthene	3	FDEP	N/A	S	Acenaphthene	3	FDEP	N/A
F	Acenaphthylene		N/A	N/A	S	Acenaphthylene		N/A	N/A
F	Anthracene	0.3	FDEP	N/A	S	Anthracene	0.3	FDEP	N/A
F	Benzo(a)anthracene		N/A	N/A	S	Benzo(a)anthracene		N/A	N/A
F	Benzo(a)pyrene		N/A	N/A	S	Benzo(a)pyrene		N/A	N/A
F	Benzo(b)fluoranthene		N/A	N/A	S	Benzo(b)fluoranthene		N/A	N/A
F	Benzo(g,h,i)perylene		N/A	N/A	S	Benzo(g,h,i)perylene		N/A	N/A
F	Benzo(k)fluoranthene		N/A	N/A	S	Benzo(k)fluoranthene		N/A	N/A
F	bis(2-Chloroethoxy)methane		N/A	N/A	S	bis(2-Chloroethoxy)methane		N/A	N/A
F	bis(2-Chloroethyl)ether	0.5	FDEP	N/A	S	bis(2-Chloroethyl)ether	0.5	FDEP	N/A
F	bis(2-Ethylhexyl)phthalate (BEHP)	0.3	USEPA	N/A	S	bis(2-Ethylhexyl)phthalate (BEHP)	2.2	FDEP	N/A
F	Butylbenzylphthalate	22	USEPA	N/A	S	Butylbenzylphthalate	26	FDEP	N/A
F	Carbazole	47	FDEP	N/A	S	Carbazole		N/A	N/A
F	Chrysene		N/A	N/A	S	Chrysene		N/A	N/A
F	Dibenz(a,h)anthracene		N/A	N/A	S	Dibenz(a,h)anthracene		N/A	N/A
F	Dibenzofuran	67	FDEP	N/A	S	Dibenzofuran	67	FDEP	N/A
F	Diethylphthalate	380	FDEP	N/A	S	Diethylphthalate	75.9	USEPA	N/A
F	Dimethylphthalate	330	USEPA	N/A	S	Dimethylphthalate	580	USEPA	N/A
F	Di-n-butylphthalate	9.4	USEPA	N/A	S	Di-n-butylphthalate	3.4	USEPA	N/A

Table 8-2
Site 41
Surface Water Screening/Refinement Values and Reference Concentrations

Fresh	Parameter	SV	Source	Ref. Conc.	Salt	Parameter	SV_SW	Source	Ref Conc.
SVOCs									
F	Di-n-octylphthalate		N/A	N/A	S	Di-n-octylphthalate		N/A	N/A
F	Fluoranthene	0.3	FDEP	N/A	S	Fluoranthene	0.3	FDEP	N/A
F	Fluorene	30	FDEP	N/A	S	Fluorene	30	FDEP	N/A
F	Hexachlorobenzene	0.0003	FDEP	N/A	S	Hexachlorobenzene	0.0003	FDEP	N/A
F	Hexachlorobutadiene	0.93	USEPA	N/A	S	Hexachlorobutadiene	0.32	USEPA	N/A
F	Hexachlorocyclopentadiene	0.07	USEPA	N/A	S	Hexachlorocyclopentadiene	0.07	USEPA	N/A
F	Hexachloroethane	3.3	FDEP	N/A	S	Hexachloroethane	3.3	FDEP	N/A
F	Indeno(1,2,3-cd)pyrene		N/A	N/A	S	Indeno(1,2,3-cd)pyrene		N/A	N/A
F	Isophorone	650	FDEP	N/A	S	Isophorone	129	USEPA	N/A
F	Napthalene	26	FDEP	N/A	S	Naphthalene	23.5	USEPA	N/A
F	Nitrobenzene	90	FDEP	N/A	S	Nitrobenzene	66.8	USEPA	N/A
F	N-Nitroso-di-n-propylamine	0.5	FDEP	N/A	S	N-Nitroso-di-n-propylamine	0.5	FDEP	N/A
F	N-Nitrosodiphenylamine	6	FDEP	N/A	S	N-Nitrosodiphenylamine	6	FDEP	N/A
F	Pentachlorophenol	8.2	FDEP	N/A	S	Pentachlorophenol	7.9	FDEP	N/A
F	Phenanthrene		N/A	N/A	S	Phenanthrene		N/A	N/A
F	Phenol	6.5	FDEP	N/A	S	Phenol	6.5	FDEP	N/A
F	Pyrene	0.3	FDEP	N/A	S	Pyrene	0.3	FDEP	N/A
F	Total PAH	0.031	FDEP	N/A	S	Total PAH	0.031	FDEP	N/A
F	Petroleum Hydrocarbons, TPH	5,000	FDEP	N/A	S	Petroleum Hydrocarbons, TPH		N/A	N/A
VOCs									
F	1,1,1-Trichloroethane	270	FDEP	N/A	S	1,1,1-Trichloroethane	270	FDEP	N/A
F	1,1,2,2-Tetrachloroethane	10.8	FDEP	N/A	S	1,1,2,2-Tetrachloroethane	90.2	FDEP	N/A
F	1,1,2-Trichloroethane	16	FDEP	N/A	S	1,1,2-Trichloroethane	16	FDEP	N/A
F	1,1-Dichloroethane		N/A	N/A	S	1,1-Dichloroethane		N/A	N/A
F	1,1-Dichloroethene	3.2	N/A	N/A	S	1,1-Dichloroethene	3.2	FDEP	N/A
F	1,2-Dibromo-3-Chloropropane		N/A	N/A	S	1,2-Dibromo-3-Chloropropane		N/A	N/A
F	1,2-Dibromoethane	13	FDEP	N/A	S	1,2-Dibromoethane	13	FDEP	N/A
F	1,2-Dichlorobenzene	15.8	USEPA	N/A	S	1,2-Dichlorobenzene	19.7	USEPA	N/A
F	1,2-Dichloroethane	37	FDEP	N/A	S	1,2-Dichloroethane	37	FDEP	N/A
F	1,2-Dichloroethene (total)	7,000	FDEP	N/A	S	1,2-Dichloroethene (total)	7,000	FDEP	N/A
F	1,2-Dichloropropane	14	FDEP	N/A	S	1,2-Dichloropropane	14	FDEP	N/A
F	1,3-Dichlorobenzene	50.2	USEPA	N/A	S	1,3-Dichlorobenzene	85	USEPA	N/A
F	1,4-Dichlorobenzene	3	FDEP	N/A	S	1,4-Dichlorobenzene	3	FDEP	N/A
F	2-Butanone (MEK)	120,000	FDEP	N/A	S	2-Butanone (MEK)	120,000	FDEP	N/A
F	2-Hexanone		N/A	N/A	S	2-Hexanone		N/A	N/A
F	4-Methyl-2-Pentanone (MIBK)	23,000	FDEP	N/A	S	4-Methyl-2-Pentanone (MIBK)	23,000	FDEP	N/A
F	Acetone	1,700	FDEP	N/A	S	Acetone	1,700	FDEP	N/A
F	Benzene	53	USEPA	N/A	S	Benzene	71.28	FDEP	N/A
F	Bromochloromethane		N/A	N/A	S	Bromochloromethane		N/A	N/A
F	Bromodichloromethane	22	FDEP	N/A	S	Bromodichloromethane	22	FDEP	N/A
F	Bromoform	293	USEPA	N/A	S	Bromoform	360	FDEP	N/A
F	Bromomethane	35	FDEP	N/A	S	Bromomethane	35	FDEP	N/A
F	Carbon disulfide	110	FDEP	N/A	S	Carbon disulfide	110	FDEP	N/A
F	Carbon tetrachloride	4.42	FDEP	N/A	S	Carbon tetrachloride	4.42	FDEP	N/A
F	Chlorobenzene	17	FDEP	N/A	S	Chlorobenzene	17	FDEP	N/A
F	Chloroethane		N/A	N/A	S	Chloroethane		N/A	N/A
F	Chloroform	289	USEPA	N/A	S	Chloroform	470.8	FDEP	N/A
F	Chloromethane	470.8	FDEP	N/A	S	Chloromethane	470.8	FDEP	N/A
F	cis-1,2-Dichloroethene		N/A	N/A	S	cis-1,2-Dichloroethene	7.9	USEPA	N/A
F	cis-1,3-Dichloropropene		N/A	N/A	S	cis-1,3-Dichloropropene		N/A	N/A
F	Dibromochloromethane	34	FDEP	N/A	S	Dibromochloromethane	34	FDEP	N/A
F	Ethylbenzene	453	USEPA	N/A	S	Ethylbenzene	4.3	USEPA	N/A
F	Methylene chloride	1,580	FDEP	N/A	S	Methylene chloride	1,580	FDEP	N/A
F	Styrene	460	FDEP	N/A	S	Styrene	460	FDEP	N/A
F	Tetrachloroethene	84	FDEP	N/A	S	Tetrachloroethene	45	USEPA	N/A
F	Toluene	175	USEPA	N/A	S	Toluene	37	USEPA	N/A
F	trans-1,2-Dichloroethene		FDEP	N/A	S	trans-1,2-Dichloroethene	11,000	FDEP	N/A
F	trans-1,3-Dichloropropene		N/A	N/A	S	trans-1,3-Dichloropropene		USEPA	N/A
F	Trichloroethene	80.7	FDEP	N/A	S	Trichloroethene	80.7	FDEP	N/A
F	Vinyl chloride	2.4	FDEP	N/A	S	Vinyl chloride	2.4	FDEP	N/A
F	Xylene (Total)	370	FDEP	N/A	S	Xylene (Total)	370	FDEP	N/A

Notes:
All values are in micrograms per liter or parts per billion
N/A = Not Applicable

Table 8-3
Wetland Functional Use Assessment Phase III
NAS Pensacola Site 41
Wetland (Group)

Condition	64(A)	5(B)	3(B)	16(C)	18(C)
Fishery Habitat	Consistent	Consistent	Consistent	Consistent	Consistent
Wading Bird Habitat	Consistent	Variable	Variable	Consistent	Variable
Diving Bird Habitat	Consistent			Consistent	
Benthic Macro. Habitat	Consistent	Consistent	Consistent	Consistent	Consistent
Mammal Usage	Consistent	Consistent	Consistent	Consistent	Consistent

Table 8-4
Phase III Wetlands and Assessment and Measurement Endpoints
NAS Pensacola Site 41

Wetland Groups and Representative Wetland(s)	Assessment Endpoints	Measurement Endpoints
Group A (Wetland 64)	A) Piscivourous bird and mammal health and reproduction	A) Whole-body contaminant levels in a foraging fish species used in a food chain model and residue effects analysis
	B) Survival and growth of macroinvertebrates associated with the benthic environment (general benthic community)	B1) 10-day marine amphipod *Leptocheirus plumulosus* acute toxicity sediment test B2) 20-day marine polychaete *Neanthes arenacoedentata* chronic toxicity test B3) Benthic community indices
	C) Protection of fish viability (foraging and predatory fish species)	C1) Correlation of fish body burden values with effects values in literature C2) Comparison of surface water data with state and federal water quality standards C3) Fish trophic transfer model and residue effects analysis
Group B (Wetlands 5A and 3)	A) Survival, growth and emergence of macroinvertebrates associated with the benthic environment (general benthic community)	A1) 28-day midge larvae *Chironomus tentans* survival, growth and emergence A2) Benthic community indices
	B) Protection of fish viability using fathead minnow *(Pimephales promelas)*	B) 7-day fathead minnow *Pimephales promelas* survival and growth
Group C (Wetlands 16 and 18)	A) Survival and growth of macroinvertebrates associated with the benthic environment (general benthic community)	A1) 10-day marine amphipod *Leptocheirus plumulosus* acute toxicity sediment test A2) 20-day marine polychaete *Neanthes arenacoedentata* chronic toxicity test 3) Benthic community indices
	B) Health of piscivorous birds (great blue heron in Wetland 18 only)	B) Whole body contaminant levels in foraging fish species (Wetland 18 only) used in a food chain model and residue effects analysis
	C) Protection of fish viability (foraging and predatory fish species in Wetland 18 only)	C1) Correlation of fish body burden values with effects values in literature C2) Fish trophic transfer model and residue effects analysis

Table 8-5
Input Parameters
Food Chain Models

Exposure Scenario	Body Weight (kg)	Dietary Composition	Area Use Factor/ Alternate AUF	PCB Concentration in Media (biotic/abiotic)	Food Ingestion Rate (kg/day dry weight)	Surface Water Ingestion Rate (L/day)	Sediment/Soil Ingestion Rate (kg/day dry weight)
ASSESSMENT ENDPOINT 1 - Piscivorous Bird							
Representative Species - Green Heron (*Butorides virescens*)							
Maximum	0.241 [a]	100 percent fish	1/1	Max./Max.	0.0115 [b]	0.0227 [c]	0.00023 [d]
RME	0.241 [a]	100 percent fish	1/1	95%UCL/95% UCL	0.0115 [b]	0.0227 [c]	0.00023 [d]
Average	0.241 [a]	100 percent fish	1/1	Mean/Mean	0.0115 [b]	0.0227 [c]	0.00023 [d]
ASSESSMENT ENDPOINT 2 - Piscivorous Mammal							
Representative Species - Mink (*Mustela vison*)							
Maximum	0.55 [l]	100 percent fish	1/0.9	Max./Max.	0.0290 [m]	0.0578 [c]	0.003 [d]
RME	0.55 [l]	100 percent fish	1/0.9	95%UCL/95%UCL	0.0290 [m]	0.0578 [c]	0.003 [d]
Average	0.55 [l]	100 percent fish	1/0.9	Mean/Mean	0.0290 [m]	0.0578 [c]	0.003 [d]

Notes:

[a] Niethammer and Kaiser (1983).
[b] Kushlan (1978).
[c] Calder and Braun (1983).
[d] Estimated based on the results of Beyer et al. (1994).
[e] Derived from McLane and Hughes (1980).
[f] Derived from Peakall and Peakall (1973).
[g] Henny and Van Camp (1979).
[h] Nagy et al. (1999).
[i] Owen and Krohn (1973).
[j] Sheldon (1967).
[k] Beyer et al. (1994).
[l] Mitchell (1961).
[m] Bleavins and Aulerich (1981).
[n] Derived from Aulerich and Ringer (1977).
[o] Fagerstone (1987).
[p] Guilday (1957).
[q] Based on Morrison (1957)
[r] Chew (1951).

Table 8-6
Literature Based BSAFs

Parameter	Species	BSAF Reported	Reference
Chlordane	Salmonids	2.22	A
		2	C
		4.77	C
	Carp	0.498	B
		0.762	B
		1.439	B
		1.3878	B
		1.4825	B
		2.9939	B
	White Sucker	0.301	B
		1.307	B
		2.379	B
		0.9073	B
		4.0389	B
		6.1861	B
	Slimy sculpin	2.47	A
		4.821	A
Average Chlordane BSAF		2.350794118	
DDT	Eel	6.78	D
		16.88	D
		8.44	D
		7.39	D
	Salmonids	1.09	A
		1.67	C
	Mountain Whitefish	1.706	E
		0.12	E
	mixed suckers	0.135	E
		2.385	E
	slimy sculpin	0.544	A
Average DDT BSAF		4.285454545	
Total PCBs	Salmonids	1.85	A
	Lake Trout	4.3	F, G
		10.7	F, G
		3.8	F, G
	Golden shiner	1.8	F, G
		7.3	F, G
		3	F, G
		0.9	F, G
		2.9	F, G
		0.13	F, G
	Bluntnose minnow	3.1	F, G
		2.8	F, G
		4.3	F, G
		1.6	F, G
		13.2	F, G
		13.8	F, G
Average Total PCBs BSAF		4.7175	
Dieldrin		4.83	C

References:

A Oliver, B.G., and A. J. Niimi. (1988). Trophodynamic analysis of polychlorinated biphenyl congeners and other chlorinated hydrocarbons in the Lake Ontario ecosystem.

B Tate, C.M. and J.S. Heiny. (1996). Organochlorine compounds in bed sediment and fish tissue in the South Platte River Basin, USA. 1992-1993. Arch. Environ. Contam. Toxicol. 30:62-78.

C USEPA. (1995). Great Lakes Water Quality Initiative Technical Support Document for the procedure to determine bioaccumulation factors. EPA 820-B-95-005. U.S. Environmental Protection Agency, Office of Water, Washington D.C.

D Van der Oost, R.A Opperhuizen, K. Satumalay, H. Heida, and P.E. Vermulen. (1996). Biomonitoring aquatic pollution with feral eel (*Anguilla anguilla*). I. Bioaccumulation: Biota-sediment ratios of PCBs, OCPs, PCDDs and PCDFs. Aquat. Toxicol. 35:21-46.

E Johnson, A., D. Norton, and B. Yake. (1988). Persistence of DDT in the Yakima River drainage, Washington. Arch. Environ. Contam. Tox. 17:291-297.

F Macdonald, C.R., C.D. Metcalfe. (1991). Concentration and distribution of PCB congeners in isolated Ontario lakes contaminated by atmospheric deposition. Can. J. Fish. Aquat. Sci. 48:371-381.

G Macdonald, C.R., C.D. Metcalfe, G.C. Balch, and T.L. Metcalfe. (1993). Distributions of PCB congeners in seven lake systems: Interaction between sediment and food-web transport. Environ. Toxicol. Chem. 12:1991-2003.

9.0 HUMAN HEALTH RISK ASSESSMENT METHODS

This section presents the methods used in the human health risk assessment (HHRA).

Wetland-specific risk evaluations are presented in Sections 10 through 15.

9.1 Introduction

A baseline risk assessment (BRA) estimates current and future risk assuming no remedial actions are undertaken to facilitate risk management and remedial decisions. "Risk" is the estimated potential for toxic effects on actual or hypothetical human or ecological receptors, while "baseline risk" refers to risk arising from exposure to chemicals, assuming overall site conditions remain unchanged. Baseline risk can vary with time according to changing fate and transport conditions or changing source amounts and properties. Risk may be reduced to acceptable levels by remediation or removal; engineered barriers and/or institutional controls to prevent or limit exposure; or natural attenuation over time.

Generally, a BRA contains two parts; one assessing human health risk and a second one addressing ecological risk. Because ecological risk is expected to be the risk driver at Site 41, the HHRA is limited in scope. The HHRA for Site 41 examines human health risk posed by exposure to contaminants in sediment, fish tissue, and surface water based on current and future land-use scenarios. Screening calculations are performed on fish tissue data to address these scenarios and assist risk managers in identifying potential data gaps.

Acceptable risk and hazard levels and remedial actions are determined by FDEP, USEPA, and the Navy, who are the managers that use risk assessments in their decision-making process. USEPAs acceptable incremental cancer risk range is 1E-6 to 1E-4, which reflects one in 1 million to one in 10,000 chances of contracting cancer. FDEP's threshold is 1E-6. Both agencies' hazard index (HI) threshold is 1. A HI greater than 1 could indicate the potential for toxic effects other than cancer. The Site 41 HHRA presents risk and hazard estimates for land-use scenarios and exposure pathways relative to the wetlands at NAS Pensacola. Risk managers will decide which thresholds are acceptable for those scenarios and if remedial or other actions will be necessary to reduce or further characterize risk.

9.1.1 Site Background

Various releases from industrial activities at NAS Pensacola may have impacted wetlands, such as spills from tanks or broken or leaking pipelines, releases from waste dumping, landfill operations,

pesticide use, and other activities. Many of the IR sites are adjacent to or nearby the Site 41 wetlands.

Site 41 wetlands were sampled in four events to correlate chemical concentrations with toxicity, diversity, and bioaccumulation samples. Sediment and surface water sampling were conducted during most phases, and whole preyfish body tissue samples were collected and analyzed to support the ERA. This HHRA summarizes the conceptual site model, methods, and uncertainties. In following sections of this report, human health risk is screened and characterized for each wetland.

9.1.2 Objectives of the HHRA

The objectives of this section are to:

- Characterize the source media and data sources.
- Identify potential receptors and quantify their likely exposure under current and future conditions to all affected environmental media.
- Determine the COPCs for affected environmental media.
- Qualitatively and quantitatively evaluate adverse effects associated with the site-specific COPCs in each medium.
- Characterize the baseline carcinogenic and noncarcinogenic risks associated with exposure to environmental media at the sites under current and future land-use conditions.
- Evaluate the uncertainties related to exposure predictions, toxicological data, and resulting carcinogenic risk and noncarcinogenic hazard estimations.
- Establish chemicals of concern (COCs) in each environmental medium, based on risk/hazard, to facilitate risk management decision-making.

9.2 Site Characterization

When performing a risk assessment, environmental data are compiled to determine potential site-related chemicals and exposures as outlined in Risk Assessment Guidance for Superfund

(RAGS), Volume I- Human Health Evaluation Manual, Part A (USEPA, 1989a). The data sources used in this risk assessment are summarized in the following sections.

9.2.1 Data Sources

Surface water, sediment, and tissue data were collected from selected Site 41 wetlands and were used in this assessment. Data collection methods are described in Section 4 of this RI report.

9.2.2 Data Validation

Data validation is an independent, systematic process of evaluating data and comparing them with established criteria to confirm they are of the technical quality necessary to support the decisions made in the RI process. Parameters specific to the data are reviewed to determine whether they meet the stipulated data quality objectives (DQOs). These quality objectives address five principal parameters: precision, accuracy, completeness, comparability, and representativeness. To verify that these objectives are met, field measurements, sampling and handling procedures, laboratory analysis and reporting, and nonconformances and discrepancies in the data are examined to determine compliance with appropriate and applicable procedures.

Data validation methods and results are described in Section 5 of this RI report. Data are summarized in Sections 10 through 15 for individual wetlands.

9.2.3 Management of Site-Related Data

All environmental sampling data are evaluated for suitability for use in the quantitative BRA. Data obtained by the following methods are considered inappropriate:

- Analytical methods not specific to a particular chemical, such as total organic carbon, total organic halogen, or total petroleum hydrocarbons.

- Field screening instruments, including total organic vapor monitoring units and organic vapor analyzers.

9.2.3.1 Not Detects and Assumed Concentrations

Chemicals are often reported in few samples relative to the number collected. These "not detected" chemicals indicate they are not present at or above the sample quantitation limit, although the chemicals could be present at concentrations between zero and the sample quantitation limit. In accordance with RAGS Part A (USEPA, 1989a), one-half the sample quantitation limit is assumed to be the concentration of "not detected" chemicals when

estimating exposure in a given area or when calculating benzo(a)pyrene equivalent (BEQ) concentrations. This assumption is applicable only to chemicals detected in at least one sample in a wetland. If a chemical is not detected in any samples within a wetland, exposure is not estimated for that chemical.

Some data are qualified by the reporting laboratory or during data validation. Data qualified as estimated concentrations, or "J" values, are assumed to be detected at the reported concentrations. Additional data validation results are described in Section 5 of this RI report.

9.2.3.2 Benzo(a)pyrene Equivalent Concentrations

USEPA recommends using BEQ concentrations to assess carcinogenic PAHs (cPAHs) (USEPA, 1993b). Calculating equivalent concentrations is a common method of assessing chemicals with similar toxicology. Benzo(a)pyrene is assumed to be the standard, and the relative toxicities of other similar chemicals are determined through research.

The relative toxicity is reflected in the toxicity equivalence factors (TEFs) (USEPA, 1993b), listed in Table 9-1 (tables are located at the end of each section). The equivalent concentration is calculated by multiplying the TEF by the reported concentration of a given chemical. For example, if benzo(b)fluoranthene is reported at 5 mg/kg and the TEF for this chemical is 0.1, the equivalent concentration would be 0.5 mg/kg. Similar methods are used to determine slope factors for cPAHs.

9.3 Exposure Assessment and Conceptual Model

This section of the HHRA will determine the magnitude of contact that a potential receptor may have with site-related chemicals. Exposure assessment documents the following for Site 41 wetlands:

- Physical setting and land use of the site
- Potential receptors under various land use or site condition scenarios, and the pathways through which they might be exposed
- Appropriate screening values and resulting COPCs
- Intake rates, or contact rates, of COPCs

9.3.1 Exposure Setting

Site setting and land use are detailed in Section 2 of this RI report, and wetland-specific discussions are included in Sections 10 through 15. Exposure pathways and land-use scenarios are summarized in Table 9-2. Some wetlands could be impacted by NAS Pensacola IR sites, with effects potentially migrating from one wetland to another. Homeland security and other access issues isolated most Site 41 wetlands from human contact, as summarized in Table 9-3. Site-specific conceptual models are summarized in Sections 10 through 15.

9.3.2 Exposed Populations

Site 41 wetlands are generally unused. Therefore, trespassers and site maintenance workers would be the most likely current and future receptors. Trespassers can be characterized as individuals who infrequently visit any given wetland to fish or collect frogs or crabs. The site maintenance workers can be characterized as individuals who infrequently landscape in and around the wetlands, or those who maintain NAS Pensacola storm water drainage ditches (many of NAS Pensacola's wetlands encompass portions of the base's storm water drainage system). Exposure assumptions for the trespasser are selected based on a reasonable maximum exposure scenario as recommended by USEPA. The maintenance worker scenario is similar to the default commercial/industrial worker scenario provided in RAGS Part B (USEPA, 1991b), except that the exposure frequency is expected to be much less for the maintenance worker.

Recreational fishing occurs near some wetlands, so human exposure could occur when fishing is not restricted or when restrictions are not enforced. Commercial fishing does not occur in Pensacola Bay or any Florida coastal water because of the net ban, so fishing is generally limited to a recreational activity pattern. Potential human receptors for the ingestion of contaminated fish species include hypothetical recreational fishermen. A hypothetical subsistence fishermen scenario is included for Wetland 64 due to site access and a lack of certain restrictions, as explained in Sections 10 through 15.

Security Restrictions

Fishing near NAS Pensacola is limited by homeland security restrictions. NAS Pensacola Instruction 5500.1F contains the *Pensacola Complex Physical Security Plan* (NAS Pensacola, 2003), which details the security measures used to protect aviation and floating assets. Forrest Sherman Field, waterfront piers, and other areas are restricted to public access. The base is now protected by a waterborne security zone extending 500 feet from the shoreline, which is marked by permanently stationed buoys in Bayou Grande and Pensacola Bay. The buoys are clearly marked to warn unauthorized craft to stay clear of the waterborne security zone. Enforcement of the

Security Plan rests with the U.S. Coast Guard for security zone areas offshore and NAS Pensacola police for onshore areas (NAS Pensacola, 2003).

Consideration is given to homeland security issues and other restrictions that affect access to Site 41 wetlands. In restricted areas, only the site maintenance worker scenario is considered. In unrestricted areas where trespassing could occur, both the maintenance worker and child trespasser scenarios are evaluated. Table 9-3 shows a detailed summary conceptual site model for the Site 41 wetlands and the considerations given for pathway development. Table 9-4 details the models and receptors to be evaluated for each wetland.

9.3.3 Exposure Pathways and Media

Exposure pathways and media considered for the Site 41 HHRA are explained in Table 9-2. For the Site 41 wetlands, the relevant pathways considered for the risk assessment include: (1) sediment ingestion and dermal exposure; (2) surface water ingestion and dermal exposure; and (3) game fish ingestion. From these exposure pathways, a summary conceptual site model is developed based on three scenarios.

- Some Site 41 wetlands experience seasonal periods of wetness and dryness. Depending on the seasonal conditions at these wetlands, a human receptor could be exposed to sediment and/or surface water. Sediment and surface water dermal exposure and ingestion pathways are evaluated at these wetlands. Water depth, habitat, or security restrictions preclude fishing in this scenario.

- Some Site 41 wetlands are inundated with surface water year round. Therefore, direct contact with sediment is excluded from the pathways assessed for these wetlands. Water depth and habitat are suitable for game fish, and security restrictions do not preclude fishing. At these wetlands, the sediment pathway is insignificant because sediments remain submerged year round. Surface water dermal exposures, surface water ingestion, and game fish ingestion pathways are evaluated at these wetlands.

- Some Site 41 wetlands include the same exposure pathways listed above with the exception of fish tissue exposure, because water depth and habitat are either not suitable for game fish, or security restrictions preclude this scenario. Only surface water dermal exposure and ingestion pathways were evaluated at these wetlands.

9.3.4 Identification of Chemicals of Potential Concern

COPCs in this assessment were quantified based on comparisons with reference concentrations. In accordance with RAGS Part A (USEPA 1989a), site screening for this HHRA focused on chemicals most likely to pose significant excess risk because of: (1) likely exposure pathways; (2) reference concentrations; and (3) reported concentrations. Fate and transport issues pertinent to the Site 41 wetlands are characterized in Section 7.

9.3.4.1 Fish Tissue

As summarized in Table 9-5, biota sediment accumulation factors (BSAFs) were calculated to model fish tissue concentrations using sediment and fish tissue data. The data set for this exposure pathway is limited to whole fish data collected from preyfish. To account for the uncertainty associated with using bait fish tissue to evaluate the fish ingestion exposure route, a TTC (Suedel, et.al., 1994) is applied to the bait fish tissue in order to model the expected concentration in game fish (*Table IIID-3, Food-Chain Multipliers For Trophic Levels 2, 3, and 4*, of Vol. 63, No. 157 of the August 14, 1998 *Federal Register Notice* (USEPA, 1998b).

9.3.4.2 Sediment and Surface Water

As described in Section 4, a phased sampling approach was used to assess many of the Site 41 wetlands. A quantitative assessment is performed for sediment and surface water data independent of the fish consumption analysis, since consumption of fish tissue would not be expected to correlate with exposure to sediment and surface water (fishing would likely involve the use of a boat). The exposure assessments follow the models presented in Section 9.3.3 above. Table 9-6 outlines the exposure parameters used to develop the risk calculations for Site 41.

Each wetland corresponds with one of three conceptual site models, as outlined in Tables 9-3 and 9-4. Risk tables are developed for each wetland based on exposure pathways, as summarized below. Sections 10 through 15 contain the human health risk tables for each wetland.

Sediment Exposure	Surface Water Exposure	Fish Ingestion Exposure
Dermal absorbed dose/maintenance worker and/or child trespasser	Dermal absorbed dose/ maintenance worker and/or child trespasser	Fish tissue ingestion/recreational and subsistence fishermen
Sediment dermal risk/maintenance worker and/or child trespasser	Surface water dermal risk/ maintenance worker and/or child trespasser	—
Sediment ingestion risk/maintenance worker and/or child trespasser	Surface water ingestion/ maintenance worker and/or child trespasser	—

Where access restrictions are enforced, the trespasser scenario is not evaluated (see Tables 9-3 and 9-4). The risk tables contain the equations used to calculate wetland risks and an explanation of the variables used in these equations. The exposure parameters used in the risk equations are listed in Table 9-6.

Essential Nutrients

In accordance with RAGS Part A (USEPA, 1989a), essential elements that are potentially toxic only at extremely high concentrations may be eliminated as COPCs in a risk assessment. Specifically, an essential nutrient may be screened out if it is present at concentrations not associated with adverse health effects. The following essential nutrients are excluded, because their potential for toxicity is low relative to the COPCs identified, and no sources were identified:

- Calcium
- Magnesium
- Potassium
- Sodium

9.3.5 Quantification of Exposure

Equations for sediment and surface water dermal and ingestion risk, and fish ingestion risk can be found on each risk table in Sections 10 through 15, and exposure parameters used in the risk equations are summarized in Table 9-6. Most exposure parameters can be referenced to guidance documents, as noted in Table 9-6. However, parameters related to fish tissue ingestion are discussed in more detail below.

Ingestion of Edible Fish Tissue

The ingestion rates for the various receptor populations are based on information provided by the *Exposure Factors Handbook* (USEPA, 1997b). The model involves several steps. The first step is determining the chemical concentration in fish tissue. Some tissue data were available, but data were limited to prey fish species. Bioaccumulation is often higher in higher trophic level predators, so a TTC is used to estimate tissue concentrations in game fish species based on concentrations reported in prey fish species.

The TTC is defined as the increase in tissue concentration of a particular contaminant as it moves through the food chain from Level 3 (e.g., bait fish) to Level 4 (e.g., game fish), and is used to predict the contaminant tissue concentration in Level 4 fish species. For this evaluation, TTCs are obtained from *Table IIID-3, Food-Chain Multipliers for Trophic Levels 2, 3, and 4*, of Vol. 63,

No. 157 of the August 14, 1998, *Federal Register Notice* (USEPA, 1998b). The TTC is multiplied by the concentration found in prey fish to estimate the concentration in game fish. Tables in Sections 10 through 15 document the TTC used for each chemical.

Tissue data were available for prey species at some wetlands, and bioaccumulation from prey species to higher trophic levels is possible. It is assumed that BSAFs would be similar for Site 41 wetlands. BSAFs are calculated when no tissue concentrations are available.

Fish tissue risk could not be estimated for chemicals that met one of two conditions:

1) A chemical was detected in sediment but not in tissue
2) A chemical was detected in tissue but not in sediment

Site-specific foraging factors (SFFs) are typically incorporated into fish tissue uptake models. The SFF represents the percent diet of the predator (trophic Level 4) fish species from a particular wetland and is apportioned based on the estimated foraging area of the predatory fish species. Given sufficient data, the SFF is calculated by dividing the total surface area (exposure area) of a wetland by the total surface area of Bayou Grande (960 acres). Site 41 data were collected during four separate sampling phases, spanning many years, and few samples were collected from each wetland. Therefore, no SFF adjustment is used in the human health calculations.

9.3.5.1 Chronic Daily Intake for a Recreational Fisherman

For recreational fishermen in the Gulf of Mexico, the 95th percentile and mean fish ingestion rates are 26 g/day and 7.2 g/day, respectively (USEPA, 1997b).

The USEPA *Exposure Factors Handbook* (USEPA, 1997b) also states that only 33% of the total fish consumed by recreational fishermen is actually caught locally and the remaining 66% is purchased commercially. To address the potential uncertainty and variability in modeled fish tissue concentrations, the unmodified ingestion rate for recreational fishers of 26 g/day is used.

USEPA (1997b) reports that between 25% to 50% of whole fish is edible. However, fish tissue ingestion rates are not modified based on edible fractions.

9.3.5.2 Chronic Daily Intake for a Subsistence Fisherman

The *Exposure Factors Handbook* (USEPA, 1997b) details how the recommended default fish ingestion rate for subsistence fishermen is 170 g/day for the 95th percentile. This rate is for Native American subsistence fishers living along the Columbia River. It should be emphasized that the rates above refer only to Native American subsistence fishing populations, not the Native American population in general. Several studies show intake rates of recreationally caught fish among Native Americans with state fishing licenses are 50% to 100% higher than intake rates among other anglers, but far lower than the above rates for Native American subsistence populations. As with recreational fishers, uncertainty and variability exist in trophic transfer models, fish tissue models, and data sets for most wetlands that are relatively small. Consequently, fish ingestion rates are not modified based on edible fractions. It is assumed that all fish consumed by subsistence fishers would be caught locally.

9.3.5.3 Summary Equations

Equations used to estimate sediment, surface water, and fish tissue intake are summarized below. These equations are also provided on corresponding tables.

Sediment

Dermal Absorbed Dose of Sediment:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DADsd = Dermal Absorbed Dose-soil contact (mg/kg-day)
DAevent = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2)
EV = Event frequency (events/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg) 70 kg (adult) 45 kg (child)
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr carcinogenic effects AT = 70 yr x 365 dy/yr

Equation for DAevent for Sediment Contact:

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

Where:

Csd	=	Chemical concentration in sediment (mg/kg)
CF	=	Conversion factor (10-6 kg/mg)
AF	=	Adherence factor of sediment to soil (mg/cm2-event); 0.2 (children playing in wet soil), 0.1 (construction worker)
ABsd	=	Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1 (USEPA, 2004a); (2) 2002 USEPA Region 9 RBC; Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values

Exposure Parameters:

EV	=	1 event per day (child trespasser/adult maintenance worker)
ED	=	10 yrs (child trespasser); 25 yrs (adult maintenance worker)
EF	=	52 dys/yr (child trespasser/adult maintenance worker)
SA		5,000 cm2 (child trespasser); 10,400 cm2 (adult maintenance worker) Source: Tables 6-6 and 6-8 *Exposure Factors Handbook (USEPA, 1997b)*
BW	=	45 kg (child trespasser); 70 kg (adult maintenance worker)
AT	=	Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker) Cancer — 25,550 days (child trespasser/adult maintenance worker)

Equations for Sediment Ingestion Intake:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

Where:

CDI	=	Chronic daily intake (mg/kg-day)
EPCsd	=	Exposure point concentration in sediment (mg/kg)
IRsd	=	Incidental ingestion rate for sediment (mg/day).
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
CF	=	Conversion factor (1E-6 kg/mg)
BW	=	Body weight (kg) 70 kg (adult) 45 kg (child)
AT	=	Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr; carcinogenic effects AT = 70 yr x 365 dy/yr

Exposure Parameters:

IRsd	=	100 mg/day for age groups greater than 6 years old
EF	=	52 days/yr (child trespasser/adult maintenance worker)
ED	=	10 yrs (child trespasser); 25 yrs (adult maintenance worker)
BW	=	45 kg (child trespasser); 70 kg (adult maintenance worker)
AT	=	Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker) Cancer — 25,550 days (child trespasser/adult maintenance worker)

Surface Water

Dermal Absorbed Dose of Surface Water:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DADsw = Dermal absorbed dose-water contact (mg/kg-day)
DAevent = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2)
EV = Event frequency (events/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg) 70 kg (adult) 45 kg (child)
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr carcinogenic effects AT = 70 yr x 365 dy/yr

Equation for DAevent for Inorganic Constituents:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr);
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4 (USEPA, 2004a)
Cw = Chemical concentration in water (mg/cm3)
Tevent = Event duration (hr/event)

Equation for DAevent for Organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1+B} + 2\tau_{event} \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4 (USEPA, 2004a)
Kp = Dermal permeability coefficient of compound in water (cm/hr);
Source: (1) RAGS Part E, Exhibit B-4 (USEPA, 2004a)
Cw = Chemical concentration in water (mg/cm3)
Tevent = Event duration (hr/event)
Tau event = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4 (USEPA, 2004a)

B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation:

$$B = \frac{K_p\sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr)
Source: (1) RAGS Part E (USEPA, 2004a)
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker)
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker)
EF = 52 days/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2 (child trespasser); 10,400 cm2 (adult maintenance worker);
Source: Tables 6-6 and 6-8 *Exposure Factors Handbook (*USEPA, 1997b*)*
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker)
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker)
Cancer — 25,550 days (child trespasser/adult maintenance worker)
Tevent = 2.6 hrs/day (child trespasser/adult maintenance worker)

Fish

Equation for Fish Ingestion Intake Based on Sediment Concentrations:

$$CDI = \frac{EPC_t \times IR_t \times EF \times ED \times CF}{BW \times AT}$$

Where:

CDI = Chronic daily intake (mg/kg-day)
EPCt = Exposure point concentration in sediment (mg/kg)
IRt = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
CF = conversion factor (0.001 kg/g)
BW = Body weight (kg) 70 kg (adult) 45 kg (child)
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr; carcinogenic effects AT = 70 yr x 365 dy/yr

Exposure Parameters:

IRt	=	Fish tissue ingestion rate for sediment (recreational: 26 g/day; subsistence: 170 g/day)
EF	=	52 days/yr (child trespasser/adult maintenance worker)
ED	=	10 yrs (child trespasser); 25 yrs (adult maintenance worker)
BW	=	45 kg (child trespasser); 70 kg (adult maintenance worker)
AT	=	Noncancer — 3,650 days (child trespasser) 9,125 days (adult maintenance worker) Cancer — 25,550 days (child trespasser/adult maintenance worker)

9.3.6 Toxicity Assessment

Risk information, usually obtained from the USEPA Integrated Risk Information System (IRIS) or Health Effects Assessment Summary Tables (HEAST) (USEPA, 1995b), is necessary to calculate risk and hazard estimates. This information is based on toxicological and epidemiological data critiqued and approved by the scientific and regulatory community.

There is a generally recognized uncertainty in human toxicological risk values developed from experimental data, primarily due to: (1) the uncertainty of approximating data from high to low-dose exposure, and (2) using animal data to approximate human experience. The site-specific uncertainty is mainly in the degree of accuracy of the exposure assumptions. Most assumptions used in this and any risk assessment have not been verified. For example, the degree of chemical absorption from the gut or through the skin or the amount of soil contact is not known with certainty.

USEPA has established slope factors (SFs) for carcinogenic compounds. The SF is defined as a "plausible upper-bound estimate of the probability of a response (cancer) per unit intake of a chemical over a lifetime" (RAGS, Part A [USEPA, 1989a]). Upper-bound estimates are likely to overestimate cancer potential.

In addition to potential carcinogenic effects, most substances may also produce other toxic responses at doses greater than experimentally derived threshold concentrations. USEPA has derived reference dose (RfD) values for these substances. A chronic RfD is defined as "an estimate (with uncertainty spanning perhaps an order of magnitude or greater) of a daily exposure concentration for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime." These toxicological values are used in risk formulae to assess the upper-bound level of noncancer hazard associated with exposure to a given chemical concentration.

For carcinogens, the potential risk posed by a chemical is computed by multiplying the CDI (as mg/kg-day) by the SF (in kilograms per day per milligram [mg/kg-day]$^{-1}$). The HQ (for noncarcinogens) is computed by dividing the CDI by the RfD (in mg/kg-day). USEPA has set points of departure to evaluate whether significant risk is posed by a chemical (or combination of chemicals). USEPA's acceptable risk range for carcinogens falls between one-in-10,000 (1E-4) and one-in-1 million (1E-6) excess cancer incidences resulting from exposure to toxic compounds from outside the body. The FDEP threshold for cancer risk is 1E-6. For noncarcinogens, other toxic effects are generally considered possible if the HQ (or sum of HQs for a pathway-hazard index) exceeds the threshold value of 1. Although both cancer and noncancer risks are generally additive only if the target organ is common to multiple chemicals, a most conservative estimate of each may be obtained by summing the individual risks or hazards, regardless of target organ. The Site 41 assessment uses the universal summation approach for each class of toxicant. Details regarding the risk formulae applied to site data are provided in Section 9.3.5, Quantification of Exposure.

Critical studies used by USEPA in establishing toxicity criteria are shown in the IRIS database, which is the primary source for information necessary to estimate risk (HEAST, 1995b, Fiscal Year 1995, is the secondary source). In addition, USEPA's National Center for Environmental Assessment (NCEA) will be used as a source when necessary. It is important to note that toxic effects reported in IRIS and HEAST are generally based on studies using single compounds, rather than mixtures. Therefore, synergistic or antagonistic mechanisms are possible when compound mixtures are involved. USEPA recommends the additive approach used in this assessment.

The following two equations are used to estimate excess cancer risks and hazard quotients:

$$Risk = CDI \times SF_{oral} \qquad Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:

CDI = Chronic daily intake (mg/kg-day)
RfD_{oral} = Oral reference dose from: (1) IRIS; or (2) RAIS
SF_{oral} = Oral Slope Factor from: (1) IRIS; or (2) RAIS

9.3.6.1 Evaluating Dermal Exposure and Resulting Toxicity

In accordance with RAGS Part E (USEPA, 2004a), dermal RfD values and SFs are derived using gastrointestinal absorption efficiencies (ABS_{GI}). The ABS_{GI} is expressed as a decimal to account for

the oral absorption efficiency relative to the gastro-intestinal system. For sediment, ABS_{GI}s were derived from the following priority of sources: (1) RAGS Part E, (USEPA, 2004a), (2) The USEPA Region 9 PRG table (USEPA, 2002), (3) the Risk Assessment Information System (RAIS), and (4) USEPA recommended interim default ABS_{GI}s from the Supplemental Guidance to RAGS (USEPA, 2004b). For surface water, ABS_{GI}s were derived from this priority of sources: (1) RAGS Part E, (USEPA, 2004a), (2) the RAIS, and (3) interim default ABS_{GI}s from Supplemental Guidance to RAGS (USEPA, 2004b).

Because dermal doses are expressed as absorbed rather than administered (intake) doses, the oral RfD is converted to a dermal RfD by multiplying the oral RfD by the appropriate ABS_{GI}.

For the same reasons, a dermal SF that is based on an administered dose is derived by dividing the oral SF by the appropriate ABS_{GI}. The oral SF is divided by an ABS_{GI} rather than multiplied because SFs are expressed as reciprocal doses.

Risk Calculation Equation, Cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk Calculation Equation, Noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Where:

RfDderma	=	Dermal reference dose.
RFDoral	=	Oral reference dose.
ABSGI	=	GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1 (USEPA, 2004a); (2) 2002 USEPA Region 9 RBC Table (USEPA Region 9, 2002); (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Equations for Dermal Reference Dose and Dermal Slope Factor:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

9.3.6.2 Toxicity Profiles for COPCs

In accordance with RAGS, toxicological summary paragraphs are presented in Appendix N for all human health risk COPCs. Most information for the profiles is obtained from Oak Ridge National Laboratory's RAIS, who maintain their toxicological summary information using IRIS, NCEA, HEAST, ATSDR and other cited supplemental sources. Any additional references are noted in the text. The profiles summarize adverse effects of COPCs and the chemical quantities associated with such effects.

9.3.7 Risk Characterization

Risks are characterized separately for each wetland, and summary tables are included in Sections 10 through 15 that provide totals for the exposure media and land use scenarios. Chemicals identified as COCs are summarized for each wetland and exposure medium.

This document focuses on ecological risk, because it is more likely to drive decisions for Site 41 wetlands, human exposure is generally unlikely, and the human exposure models and data set used in this HHRA include uncertainty and variability that could over- or under-estimate risks. Consequently, no human health-based remedial goal options are developed for chemicals identified as ecological concerns. Risk-based remedial goal options are developed for chemicals identified as human health concerns only using target excess cancer risks of 1E-6, 1E-5, and 1E-4 and hazard indices of 0.1, 1.0, and 3 in accordance with USEPA Region 4 *Supplemental Guidance to RAGS Bulletins* (USEPA, 2000).

9.3.8 Uncertainty and Variability

Uncertainty and variability are inherent in the risk assessment process and are addressed as a whole in this section. Uncertainty and variability in the analytical data are functions of matrix characteristics and heterogeneity, the precision and accuracy of sampling, and preparation and analysis methods used. Although data are typically considered exact values, they are, in reality, the laboratory's best estimate within a range defined by method control limits. As a result, reported concentrations for any chemical can under- or overestimate actual concentrations.

In general, conservative exposure assumptions would likely overestimate risk for the trespasser and maintenance worker land use scenarios in this HHRA; however, the lack of game fish tissue data could result in over- or under-estimates. Analytical data and different toxicological effects, test organisms, and endpoints introduce a wide range of variability, which is compounded when multiplied by many conservative assumptions.

9.3.8.1 Exposure

Sources of uncertainty and variability are addressed in this section relative to fish tissue, sediment, and surface water. Variability in analytical data is evident by the QA/QC requirements, such as +/- 25% accuracy, etc.

Data reported as estimated concentrations, or "J" qualified data, are assumed to be detected concentrations. Although this allows smaller concentrations to be used that could otherwise be reported as not detected, use of estimated concentrations increases the variability in chemical concentrations because the reported results are estimates only. Variability in analytical data could under- or over-estimate exposure.

Data validation is detailed in Section 5.

9.3.8.1.1 Fish Tissue

Uncertainty and potential variability are high in this medium. Subsistence fishing at Site 41 would be unlikely, because areas attractive to fishermen are around Bayou Grande and in Pensacola Bay, homeland security restrictions limit access.

As described in the site ERAs, ingestion of game fish tissue could be a complete exposure pathway for some wetlands. As previously discussed, whole baitfish tissue data were collected from Wetlands 18 and 64 for the ecological risk assessment. Therefore, bioaccumulation in game fish is an uncertainty that could span orders of magnitude, over- or underestimating human exposure. In addition, the baitfish collected has relatively low lipid content, when compared to popular game fish, such as mullet or red drum. More bioaccumulation would be expected in species higher in the food chain and with higher lipid content. Although the TTC is used to account for differences in bioaccumulation between trophic levels, this is an additional source of uncertainty that could over or under estimate human exposure to chemicals in fish tissue.

Interspecies variability in lipids, metabolism, and, ultimately, accumulation, as well as preparation methods by human receptors, could over- or underestimate human exposure to tissue.

BSAFs are calculated and used to estimate tissue uptake, based on sediment concentrations for chemicals detected in both sediment and tissue. Limited tissue sampling events instill uncertainty and variability in the fish tissue data set. Upper-bound fish tissue ingestion rates and other exposure assumptions are used to address uncertainties in the fish tissue data set.

Chemicals that are not detected in both sediment and fish tissue are excluded from fish tissue risk estimates, because no information is available to develop a site-specific BSAF. For these chemicals, exposure could be underestimated, because uptake could occur from multiple, unknown sources.

Pesticides and PCBs were reported in prey fish tissue samples collected from Wetlands 18 and 64. They were also reported in Wetland 33, which is a reference wetland, so some uncertainties exist with respect to the source of these chemicals. Wetland 75 was designated a reference wetland but was subsequently deemed unsuitable because of the detected concentrations. Mosquito control and related applications could be a source of these pesticides, considering the absence of industrial activities in the area. Crabbing and mullet fishing could occur in some wetlands year round, although the Florida Marine Patrol Office indicated very limited fishing in Site 41 wetlands relative to Pensacola Bay and Bayou Grande, which would be considered more attractive to fishermen. Homeland security restrictions limit access to the shoreline of NAS Pensacola in these areas.

PCBs, aldrin, dieldrin, endosulfan I, and lindane were reported in tissue samples from Wetlands 18 and 64 but not in reference-area fish tissue. However, game fish could contain these chemicals from bioaccumulation and bioconcentration due to various sources. Tissue data were not normalized for percent lipid content. Game fish data normalized for percent lipid content would be necessary to put risk estimates in perspective for risk managers.

Uncertainty exists about the potential for bioaccumulation in game species, which could result in higher risk estimates because most of these pesticides and PCBs tend to bioaccumulate. The limited sample size and lack of identified sources contribute to uncertainty and could result in over- or underestimated risk, with variability potentially spanning orders of magnitude.

However, the tissue data used in the risk assessment are from whole-body analysis, not edible tissue only. Bones, lipids, and organs, not typically eaten by humans, are where many contaminants accumulate, and food preparation methods are also unknown.

9.3.8.1.2 Sediment

Uncertainty and variability in the ingestion rate, exposure frequency and duration, bioavailability of chemicals in sediment, dermal contact uptake assumptions, and rinsing action of surface water result in highly uncertain exposure estimates such that USEPA Region 4 excludes direct sediment exposure pathways for wetlands that are inundated with water all the time. Variability among individuals as well as day-to-day variability in the same individual would influence these factors.

For wetlands that are sometimes dry, sediment exposure is assumed to be equivalent to soil exposure. Most wetlands would not likely be attractive to swimmers because of physical and biological hazards, so exposure would likely be overestimated.

When habitat and site access information indicate trespassers could catch game fish at a wetland, fish tissue concentrations are modeled based on tissue data and sediment data, as described in Section 9.3.8.1.1. When no fish tissue data are available for a wetland, sediment concentrations are used to estimate tissue concentrations. Although many sediment samples were collected, sample distribution was relatively limited within each wetland. Fish tissue sampling was limited to a few wetlands. Therefore, sampling was biased to find contamination to address the uncertainty in the number of samples collected from each wetland.

9.3.8.1.3 Surface Water

Incidental ingestion of and dermal contact with surface water are assessed assuming a trespasser would swim or wade in a wetland for 2.6 hours, with an ingestion rate of 50 ml/hour. A similar rate of exposure to surface water is assumed for maintenance workers, who may be required to provide grounds upkeep in the vicinity of certain wetlands. Most wetlands would not be attractive to swimmers or conducive to intensive exposure to surface water, primarily due to most wetlands' shallow depth and physical and biological hazards. Consequently, surface water exposure would be overestimated. Like sediment, variability between individuals and daily variability in the same individual could over- or underestimate exposure.

For surface water exposures, it is assumed that the VOC inhalation pathway is insignificant due to the unlimited dilutional capacity of the ambient air. Should these wetlands ever be contained in some manner, risks associated with VOCs could be underestimated in this risk assessment.

9.3.8.2 Toxicological Data

There is a generally recognized uncertainty in human risk values developed from experimental data, due primarily to the uncertainty of data extrapolation in the areas of: (1) high- to low-dose exposure, and (2) animal effects data to human effects data. The site-specific uncertainty is mainly in the degree of accuracy of the exposure assumptions. Most of the assumptions used in this and any risk assessment have not been verified. For example, the degree of chemical absorption from the gut or through the skin or the amount of soil contact is not known with certainty.

Due to the uncertainty of toxicological values from the IRIS and HEAST databases provided by USEPA, the USEPA and the risk assessor are obligated to make conservative assumptions to minimize the chance that the actual health risk will be greater than what the process determines.

9.3.8.3 Fish Tissue Assessment

In general, sampling biased to locate existing contamination would over estimate site-wide exposure because some areas with little or no contamination would exist. Site 41 was sampled with a biased approach.

Game fish would be the most likely fish tissue ingested near NAS Pensacola. Prey species were sampled to support the ecological risk assessment for Site 41, and higher trophic level fish-tissue data were not available. Therefore, TTCs are used to model predator fish tissue concentrations and to account for the uncertainty associated with using bait fish tissue data to evaluate the fish ingestion exposure route. Intra- and inter-species variability exists in the TTC calculations as applied to prey fish data at NAS Pensacola.

Site-specific BSAFs are calculated to model fish tissue concentrations, using sediment and fish tissue data. The data set for this exposure pathway is limited to whole fish data collected from prey species. These BSAFs were used to estimate tissue concentrations when no tissue concentrations were available. It was assumed that BSAFs would be similar for various Site 41 wetlands. Variability in sediment to prey fish is a source of variability in the fish tissue concentrations.

Site 41 wetlands differ, so uptake could vary. Whole prey fish data are used. This is applicable because whole fish would be ingested by higher trophic level predator fish. However, humans would ingest only certain portions of the predator fish. Depending on the biological fate of chemicals within predator fish, the chemicals may or may not be ingested (e.g., fish liver vs. fillet).

Fish tissue BSAFs could not be estimated for some chemicals that are detected. A chemical detected in sediment but not in tissue could be below tissue detection limits or may not accumulate in prey species. Chemicals could accumulate at faster rates in higher trophic level species, so this is a source of uncertainty that could underestimate exposure to contaminants in fish tissue. Chemicals detected in tissue but not in sediment could be present at concentrations in sediment below the detection limit or could be present in sediment locations that have not been sampled. Therefore, this is another source of uncertainty that could underestimate exposure to contaminants in fish tissue.

SFF usually affect tissue uptake models. The SFF represents the percent diet of the predator (trophic Level 4) fish species from a particular wetland and would be apportioned based on the estimated foraging area of the predatory fish species. Given sufficient data, the SFF is calculated by dividing the total surface area (exposure area) of a wetland by the total surface area of Bayou Grande (960 acres). Uncertainties are inherent in Site 41 data due to four separate sampling phases, sampling over many years, and a relatively limited number of samples. Therefore, no SFF adjustment is used in the human health calculations. For fish that would forage in other areas, exposure would be overestimated (e.g., red drum).

The USEPA *Exposure Factors Handbook* (1997b) states that only 33% of the total fish consumed by recreational fishermen is caught locally and that the remaining 66% is purchased commercially. In addition, USEPA (1997b) reports that between 25% to 50% of whole fish is edible. Some of these issues are addressed in EPA's recommended fish tissue ingestion rates. Fish tissue ingestion rates are not modified based on edible fractions. The unmodified 95th percentile ingestion rate for recreational fishermen of 26 g/day is used. This could over estimate exposure for fishermen that do not collect 100% of their fish from Site 41 wetlands and do not eat 100% of the fish. However, the assumption is appropriate, considering the uncertainties in distribution and trophic level modeling necessary to address this exposure pathway.

The USEPA *Exposure Factors Handbook* (1997b) indicates the recommended default fish ingestion rate for subsistence fishers is 170 g/day for the 95th percentile for Native American subsistence fishermen living along the Columbia River. It should be emphasized that the rates above refer only to Native American subsistence fishing populations, not the Native American population in general. Several studies show intake rates of recreationally caught fish among Native Americans with state fishing licenses are higher than intake rates among other anglers but far lower than the above rates for Native American subsistence populations.

As with recreational fishermen, uncertainty and variability exist in trophic transfer models, fish tissue models, and data sets for most wetlands that are relatively small. Consequently, it is assumed that all fish consumed by subsistence fishermen would be caught locally.

Uncertainties and sources of variability have been identified in the biased sampling approach, limited sampling distribution, surface water, sediment, tissue portions analyzed, and exposure models used herein. Conservative assumptions are used to address uncertainties. Risk managers should consider these uncertainties in risks estimated based on fish tissue ingestion.

Table 9-1
Toxic Equivalents for Carcinogenic PAHs

PAH	TEF
Benzo(a)pyrene	1
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenz(a,h)anthracene	1
Indeno(1,2,3-cd)pyrene	0.1

Table 9-2
Summary Justification for Eliminating Human Exposure Pathways Site 41
NAS Pensacola

Potentially Exposed Population	Medium and Exposure Pathway	Pathway Selected for Evaluation	Reason for Selection or Exclusion
Current & Future Site Trespassers (Adolescents)	Air/Inhalation of gaseous contaminants emanating from soil.	No.	Site 41 contains no soil. Accordingly, this pathway was considered insignificant.
	Air/Inhalation of chemicals entrained in fugitive dust.	No.	Site 41 contains no soil. Accordingly, this pathway was considered insignificant.
	Groundwater/Ingestion of contaminants during potable or general use	No.	Direct exposure to groundwater was considered an incomplete pathway for Site 41 wetlands.
	Groundwater/Inhalation of volatilized groundwater contaminants.	No.	Direct exposure to groundwater was considered an incomplete pathway for Site 41 wetlands.
	Surface Water/Incidental Ingestion of contaminants during recreational or maintenance events.	Yes.	Swimming is allowed near some wetland areas. The natural salinity of surface water precludes ingestion as a drinking water source, but incidental ingestion while swimming or wading could occur.
	Surface Water/Inhalation of volatilized contaminants.	No.	Exposure via this pathway is possible during swimming or wading activities. However, this pathway was considered insignificant.
	Surface Water/Dermal Contact.	Yes.	Exposure via this pathway is possible during swimming or wading activities.
	Soil/Incidental Ingestion.	No.	Site 41 contains no soil. Accordingly, this pathway was considered insignificant.
	Soil/Dermal Contact.	No.	Site 41 contains no soil. Accordingly, this pathway was considered insignificant.
	Sediment/Incidental Ingestion.	Yes.	According to RAGS Part A (USEPA, 1989), ingestion of sediments is not a relevant pathway for commercial/industrial land use. This pathway was therefore only considered relevant at Site 41 wetland sample locations where water is likely to at least occasionally recede or dry up.
	Sediment/Dermal Contact.	Yes.	According to RAGS Part E (USEPA, 2001b), sediments which are consistently covered with water for considerable amounts of time are likely to wash off before an individual reaches the shore. This pathway was therefore only considered relevant at Site 41 wetland sample locations where water is likely to at least occasionally recede or dry up.
Recreational and Subsistence Fishermen	Fish/Ingestion of tissue impacted by contaminated media.	Yes.	Fishing and crabbing do occur in some Site 41 wetlands. However, little data fishing occurrence was available. Despite the uncertainties associated with this pathway, the HHRA assessed risk to recreational and hypothetical subsistence fisherman at wetlands where game fish habitats might be found.
	Fruits and Vegetables/Ingestion of plant tissues grown in media.	No.	No agriculture occurs at NAS Pensacola. Aquaculture is not a proposed land use and would not be expected to occur at the base

Table 9-3
Site 41 Summary Conceptual Site Model

Wetland	Access		Notes	Always Inundated?	Maintenance Worker		Child Trespasser		Notes	Game Fish Habitat	Type of Game Fish Present	Trespasser Fishing?	Rationale
	Maintenance	Tresspasser			SW	Sed	SW	Sed					
OU 1 Wetlands													
1A	√		near cemetary		√	√	√	√					
1B			near cemetary		√	√	√	√					
3			adj. John Tower Road, culvert		√	√	√	√					
4D	√	√	golf course pond	√	√		√			√	Bass, Bream	No	Access restricted by MWR and HSR
15	√	√	on golf course		√	√	√	√					
16	√	√	Along trail near campground/picnic area	√	√		√			√	Mullet, Trout	No	Along trail near campground/picnic area
17	√	√	Along trail near campground/picnic area	√	√		√			√	Mullet, Trout	No	Along trail near campground/picnic area
18A	√	√	Along trail near campground/picnic area		√	√	√	√					
18B	√	√	Along trail near campground/picnic area		√	√	√	√					
OU 2 Wetlands													
5A	√	√	adj road		√	√	√						
5B	√	√	adj road	√	√		√						
6	√	√	adj road, NATTC complex	√	√		√						
64	√	√	adj road, yacht basin	√	√		√			√	Mullet, Trout, Redfish	Yes	Fishing from piers at Yacht Basin
OU 10 Wetlands													
10	√		adj road		√	√							
12	√		near IWTP, access restricted to authorized personnel		√	√							
13	√		near IWTP, access restricted to authorized personnel		√	√							
Chevalier Field Wetlands													
63A	√	√	near NATTC		√	√	√	√					
63B	√	√	near NATTC, picnic pavillions		√	√	√	√					
UST 18 Wetlands													
52	√		near airfield, access restricted to authorized personnel		√	√				√	Bass, Bream	No	Access restricted to authorized personnel
W1	√		near airfield, access restricted to authorized personnel		√	√							
72	√		near airfield, access restricted to authorized personnel	√	√					√	Bass, Bream	No	Access restricted to authorized personnel
Miscellaneous Wetlands													
19A	√		near airfield, access restricted to authorized personnel		√	√				√	Bass, Bream	No	Access restricted to authorized personnel
19B	√		near airfield, access restricted to authorized personnel	√	√						Bass, Bream	No	Access restricted to authorized personnel
48	√		near airfield, access restricted to authorized personnel		√	√							
49	√		near airfield, access restricted to authorized personnel		√	√							
56	√	√		√	√								
57	√	√			√	√	√	√					
58	√	√			√	√	√	√					
W2	√		near airfield, access restricted to authorized personnel	√	√						Bass, Bream	No	Access restricted to authorized personnel

Notes:
Unauthorized boat traffic is prohibited within 500 feet of NAS Pensacola shoreline under Homeland Security restrictions.
√ indicates applicable

Table 9-4
Wetland Specific Conceptual Site Model

Wetland	Scenario	Medium	Pathway: Ingestion	Pathway: Dermal	Pathway: Fish Tissue
1A					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√	√	
		Surface water	√	√	
	Fisherman				
		Fish Tissue Uptake from Sediment			
1B					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√	√	
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			
3					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√	√	
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			
15					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√	√	
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			√
16					
	Maintenance	Sediment			
		Surface water	√	√	
	Trespasser	Sediment			
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			√
17					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√	√	
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			√
18A					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√	√	
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			

Table 9-4
Wetland Specific Conceptual Site Model

Wetland	Scenario	Medium	Pathway: Ingestion	Pathway: Dermal	Pathway: Fish Tissue
18B					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√	√	
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			
4D					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√	√	
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			√
5A/B					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√	√	
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			
6					
	Maintenance	Sediment			
		Surface water	√	√	
	Trespasser	Sediment			
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			
64					
	Maintenance	Sediment			
		Surface water	√	√	
	Trespasser	Sediment			
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			√
10					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment			
		Surface water			
	Fisherman	Fish Tissue Uptake from Sediment			
12					
	Maintenance	Sediment	√	√	
		Surface water	√	√	

Table 9-4
Wetland Specific Conceptual Site Model

Wetland	Scenario	Medium	Pathway: Ingestion	Pathway: Dermal	Pathway: Fish Tissue
12 (cont.)	Trespasser	Sediment			
		Surface water			
	Fisherman	Fish Tissue Uptake from Sediment			
13					
	Maintenance	Sediment	√		
		Surface water	√		
	Trespasser	Sediment			
		Surface water			
	Fisherman	Fish Tissue Uptake from Sediment			
63A					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√	√	
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			
63B					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√	√	
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			
52					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment			
		Surface water			
	Fisherman	Fish Tissue Uptake from Sediment			
W1					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment			
		Surface water			
	Fisherman	Fish Tissue Uptake from Sediment			

Table 9-4
Wetland Specific Conceptual Site Model

Wetland	Scenario	Medium	Pathway: Ingestion	Pathway: Dermal	Pathway: Fish Tissue
72					
	Maintenance	Sediment			
		Surface water	√	√	
	Trespasser	Sediment			
		Surface water			
	Fisherman	Fish Tissue Uptake from Sediment			
19A					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment			
		Surface water			
	Fisherman	Fish Tissue Uptake from Sediment			
19B					
	Maintenance	Sediment			
		Surface water	√	√	
	Trespasser	Sediment			
		Surface water			
	Fisherman	Fish Tissue Uptake from Sediment			
48					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment			
		Surface water			
	Fisherman	Fish Tissue Uptake from Sediment			
49					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment			
		Surface water			
	Fisherman	Fish Tissue Uptake from Sediment			
56					
	Maintenance	Sediment			
		Surface water	√	√	

Table 9-4
Wetland Specific Conceptual Site Model

Wetland	Scenario	Medium	Pathway: Ingestion	Pathway: Dermal	Pathway: Fish Tissue
56 (cont.)	Trespasser	Sediment			
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			√
57					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√		
		Surface water	√		
	Fisherman	Fish Tissue Uptake from Sediment			
58					
	Maintenance	Sediment	√	√	
		Surface water	√	√	
	Trespasser	Sediment	√	√	
		Surface water	√	√	
	Fisherman	Fish Tissue Uptake from Sediment			
W2					
	Maintenance	Sediment			
		Surface water	√	√	
	Trespasser	Sediment			
		Surface water			
	Fisherman	Fish Tissue Uptake from Sediment			

Table 9-4
Human Health Risk Conceptual Site Models
Site 41 Wetlands

Wetland	Access Restrictions	Model 1: Sediment/Surface Water Exposure and Pathways		Model 2: Surface Water Exposure and ; Gamefish Tissue Pathways		Model 3: Surface Water Exposure and Pathways	
		Sample Locations	Human Receptors	Sample Locations	Human Receptors	Sample Locations	Human Receptors
OU 1 Wetlands							
Wetland 1A	a, b	001M000101 001W000101 041M010101 041M010201	M W M W M W M W	N/A	N/A	N/A	N/A
Wetland 1B	a, b	041M010301 041W010301 041M010401	M W M W M W	N/A	N/A	N/A	N/A
Wetland 3	a, trespassing possible	001M000301 001W000301 001M000302 001W000302 001M000303 001W000303 041M030101 041W030101 041W030101* 041M030201 041M030201* 041W030102 041M030301 041W030103 041M030401 041M030501 041M030601 041M030701 041M030701*	MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT	N/A	N/A	N/A	N/A
Wetland 4D	c, trespassing possible	041M04D501	MW/CT	041M04D101 041W04D101 041M04D201 041M04D301 041M04D401 041W04D401	F MW/CT/F F F F MW/CT/F	N/A	N/A
Wetland 15	N/A	041M150101 041W150101 041M150201 041W150201 041M150301 041M150401 041W150102**	MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT	N/A	N/A	N/A	N/A

Table 9-4
Human Health Risk Conceptual Site Models
Site 41 Wetlands

Wetland	Access Restrictions	Model 1: Sediment/Surface Water Exposure and Pathways		Model 2: Surface Water Exposure and ; Gamefish Tissue Pathways		Model 3: Surface Water Exposure and Pathways	
		Sample Locations	Human Receptors	Sample Locations	Human Receptors	Sample Locations	Human Receptors
Wetland 16	N/A	N/A	N/A	001M001601 001W001601 041M160101 041W160101 041M160201 041W160201 041M160301 041M160301 041M160301*	F MW/CT/F F MW/CT/F F MW/CT/F F F F	N/A	N/A
Wetland 17	N/A	N/A	N/A	041M170101 041W170101 041M170102 041M170103 041W170102**	F MW/CT/F F F MW/CT/F	N/A	N/A
Wetland 18A	N/A	001M001801 001W001801 041M18A101 041M18A201 041W18A201 041M18A301	MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT	N/A	N/A	N/A	N/A
Wetland 18B	N/A	041M18B101 041W18B101 041M18B101*	MW/CT MW/CT MW/CT	N/A	N/A	N/A	N/A
OU 2 Wetlands							
Wetland 5A	N/A	041M5A0101 041W5A0101 041M5A0201 041W5A0201 041M5A0301 041M5A0401 041W5A0401 041M5A0701 041W5A0701 041M5A0401* 041W5A0401*	MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT MW/CT	N/A	N/A	041M5A0501 041W5A0501 041M5A0601 041W5A0601 041M5A0501* 041W5A0501* 041M5A0601* 041W5A0601*	N/A MW/CT N/A MW/CT N/A MW/CT N/A MW/CT

Table 9-4
Human Health Risk Conceptual Site Models
Site 41 Wetlands

Wetland	Access Restrictions	Model 1: Sediment/Surface Water Exposure and Pathways		Model 2: Surface Water Exposure and ; Gamefish Tissue Pathways		Model 3: Surface Water Exposure and Pathways	
		Sample Locations	Human Receptors	Sample Locations	Human Receptors	Sample Locations	Human Receptors
Wetland 5B	N/A	N/A	N/A	N/A	N/A	041M5B0101 041M5B0201 041W5B0201 041M5B0202** 041M5B0301** 041M5B0401** 041M5B0501** 041M5B0601**	N/A N/A MW/CT N/A N/A N/A N/A N/A
Wetland 6	N/A	N/A	N/A	N/A	N/A	010M000101 041M060101 041M060201 041M060301 041W060301 041M060401 041M060501 041M060601 041M060701 041W060701 041M060801 041M060901 041M061001 041W061001 041M061101 041W061002**	N/A N/A N/A N/A MW/CT N/A N/A N/A N/A MW/CT N/A N/A N/A MW/CT N/A MW/CT
Wetland 64	N/A	N/A	N/A	041M640101 041M640201 041M640301 041M640401 041M640501 041M640601 041M640701 041M640801 041M640901 041M641001 041M641101 041M641201 041M641301 041M641401	F F F F F F F F F F F F F F	N/A	N/A

Table 9-4
Human Health Risk Conceptual Site Models
Site 41 Wetlands

Wetland	Access Restrictions	Model 1: Sediment/Surface Water Exposure and Pathways		Model 2: Surface Water Exposure and ; Gamefish Tissue Pathways		Model 3: Surface Water Exposure and Pathways	
		Sample Locations	Human Receptors	Sample Locations	Human Receptors	Sample Locations	Human Receptors
Wetland 64 (cont.)				041M641501 041M641601 041M641701 041M641801 041M641901 041M642001 041M642101 041M642201 041M642301 041M642401 041W640101* 041M640401* 041M640501* 041W640501* 041M640601* 041M640202*** 041M640302*** 041M640502*** 041M640602*** 041M640702*** 041M641102*** 041M642402***	F F F F F F F F F F MW/CT/F F F MW/CT/F F F F F F F F F		
OU 10 Wetlands							
Wetland 10	b	N/A	N/A	N/A	N/A	041M10A101 041M10A201 041M10A301 033M001001 033W001002 033M002001 033W002002 033M003001 033W003002 033M004001 033W004002 033W000102**	N/A N/A N/A N/A MW N/A MW N/A MW N/A MW MW
Wetland 12	b	041M120201	MW	N/A	N/A	041M120101 041W120101	N/A MW
Wetland 13	b	041M130101 041W130101	MW MW	N/A	N/A	N/A	N/A

Table 9-4
Human Health Risk Conceptual Site Models
Site 41 Wetlands

Wetland	Access Restrictions	Model 1: Sediment/Surface Water Exposure and Pathways		Model 2: Surface Water Exposure and ; Gamefish Tissue Pathways		Model 3: Surface Water Exposure and Pathways	
		Sample Locations	Human Receptors	Sample Locations	Human Receptors	Sample Locations	Human Receptors
Chevalier Field Wetlands							
Wetland 63A	N/A	041M63A301 041M63A401 041M63A501	MW/CT MW/CT MW/CT	N/A	N/A	041M63A101 041M63A201 041W63A201 041W63A202**	N/A N/A MW/CT MW/CT
Wetland 63B	N/A	041M63B101	MW/CT	N/A	N/A	041M63B201 041W63B201 041M63B301 041M63B401 041W63B401	N/A MW/CT N/A N/A MW/CT
UST 18 Wetlands							
Wetland 52	b	041M52A101 041W52A101 041M52D101 041M52E101 041M52E201 041M52E301 041W52E301	MW MW MW MW MW MW MW	041M52A101 041W52A101 041M52D101 041M52E101 041M52E201	F MW/F F F F	N/A	N/A
Wetland W1	b	003M000101 003M000201 003M000401 003M000501 003M000601 003M000701 003M000801 003M000901 003M001001 003M001101 003M001201 003M001301 041WW10101 041WW10201 041WW10301	MW MW MW MW MW MW MW MW MW MW MW MW MW MW MW	N/A	N/A	N/A	N/A
Wetland 72	b	N/A	N/A	041M720101 041W720101 041M720201 041W720102**	MW MW MW MW	N/A	N/A

Table 9-4
Human Health Risk Conceptual Site Models
Site 41 Wetlands

Wetland	Access Restrictions	Model 1: Sediment/Surface Water Exposure and Pathways		Model 2: Surface Water Exposure and ; Gamefish Tissue Pathways		Model 3: Surface Water Exposure and Pathways	
		Sample Locations	Human Receptors	Sample Locations	Human Receptors	Sample Locations	Human Receptors
Miscellaneous Site Wetlands							
Wetland 19	b	041M19A101 041W190101 041M19A101** 041W19A102**	MW MW MW MW	041M19A201	F	N/A	N/A
Wetland 19B	b	N/A	N/A	041M19B101 041W190301	F F	N/A	N/A
Wetland 48	b	041M480101 041W480101	MW MW	N/A	N/A	N/A	N/A
Wetland 49	b	041M490101 041W490101 041M490201 041M490301 041W490301	MW MW MW MW MW	N/A	N/A	N/A	N/A
Wetland 56	N/A	N/A	N/A	041M56A101 041W56A101	F MW/CT/F	N/A	N/A
Wetland 57	N/A	041M570101 041W570101	MW/CT MW/CT	N/A	N/A	N/A	N/A
Wetland 58	N/A	041M580101 041W580101	MW/CT MW/CT	N/A	N/A	N/A	N/A
Wetland 75	N/A	041M750101 041W750101	MW/CT MW/CT	N/A	N/A	N/A	N/A
Wetland W2	b	N/A	N/A	041MW20101 041MW20201 041WW20201 041MW20301	F F MW/F F	N/A	N/A
Reference Wetlands							
Wetland 25	b	041M250101 041W250101 041M250201 041M250301 041W250301	MW MW MW MW MW	N/A	N/A	N/A	N/A
Wetland 27	b	041M270101 041M270201 041W270201	MW MW MW	N/A	N/A	N/A	N/A

Table 9-4
Human Health Risk Conceptual Site Models
Site 41 Wetlands

Wetland	Access Restrictions	Model 1: Sediment/Surface Water Exposure and Pathways		Model 2: Surface Water Exposure and ; Gamefish Tissue Pathways		Model 3: Surface Water Exposure and Pathways	
		Sample Locations	Human Receptors	Sample Locations	Human Receptors	Sample Locations	Human Receptors
Wetland 32	b	041M320101 041W320101 041M320201 041M320301 041W320301	MW/CT MW/CT MW/CT MW/CT MW/CT	N/A	N/A	N/A	N/A
Wetland 33	b	N/A	N/A	041M330101 041W330101 041M330201 041M330301 041W330301 041M330101* 041W330101* 041M330201* 041W330201*	F MW/CT/F F F MW/CT/F F MW/CT/F F MW/CT/F	N/A	N/A

Notes:

a	=	Access restricted by OU-1 LUCIP.
b	=	Access restricted by homeland security restrictions.
c	=	Golf course restrictions do not allow recreational use for fishing or swimming.
*	=	Phase IIB/III sample.
**	=	2004 sample.
***	=	2001 sample.
MW	=	Maintenance worker receptor.
CT	=	Child trespasser receptor.
F	=	Recreational/subsistence fishermen receptors.

Table 9-5
OU 1 and OU2 Wetlands Phase III
Biota Sediment Accumulation Factor (BSAF)

Contaminant		Tissue Concentrations mg/kg	Sediment Concentrations mg/kg	BSAF
OU1 Wetlands (Phase III)				
Mercury				
	Max	ND	0.1	NA
	Average	ND	0.06	NA
Aldrin				
	Max	ND	ND	ND
	Average	8.5	2.5125	3.383084577
Total BHC				
	Max	ND	ND	ND
	Average	34	9.575	3.550913838
Total Chlordane				
	Max	9.9	2.54	3.897637795
	Average	9.9	4.76	2.079831933
Total DDT				
	Max	132.85	152.1	0.873438527
	Average	132.85	68.7	1.933770015
Total Endrin				DI
	Max	ND	18.8	NA
	Average	49.5	12.34	4.011345219
Total PCB				
	Max	1247	ND	NA
	Average	1247	388	3.213917526
Chromium				
	Max	0.45	24.6	0.018292683
	Average	0.45	14.825	0.030354132
Copper				
	Max	2.3	16	0.14375
	Average	2.3	5.675	0.405286344
Iron				
	Max	40.2	246000	0.000163415
	Average	40.2	87725	0.00045825
Zinc				
	Max	33.9	234	0.144871795
	Average	33.9	88.5	0.383050847
BEHP				
	Max	92	500	0.184
	Average	92	517.5	0.177777778
OU 2 Wetlands Phase III				
Mercury*				
	Max	0.096	0.26	0.369230769
	Average	0.0364	0.175	0.208
Aldrin				
	Max	0.00038	ND	NA
	Average	0.00104	0.005276	0.19711903
Total BHC				
	Max	0.00571	0.02169	0.263254956
	Average	0.00435	0.02739	0.158817087
Total Chlordane				
	Max	0.0031	0.0124	0.25
	Average	0.001815	0.0143	0.126923077
Total DDT				
	Max	0.0259	0.196	0.132142857
	Average	0.0216	0.1168583	0.184839245
Total Endrin				
	Max	ND	0.0065	NA
	Average	0.007425	0.032	0.23203125
Total PCB				
	Max	0.4595	1.22	0.376639344
	Average	0.36525	1.18867	0.307276199
Arsenic				
	Max	0.44	7.8	0.056410256
	Average	0.415	3.779	0.109817412
Barium*				
	Max	20	17.2	1.162790698
	Average	8.125	14.32	0.567388268

Table 9-5
OU 1 and OU2 Wetlands Phase III
Biota Sediment Accumulation Factor (BSAF)

Contaminant		Tissue Concentrations mg/kg	Sediment Concentrations mg/kg	BSAF
BEHP				
	Max	ND	3.9	NA
	Average	0.165	1.772	0.093115124
Cadmium				
	Max	0.23	20.2	0.011386139
	Average	0.067	10.62	0.006308851
Chromium				
	Max	1.1	868	0.001267281
	Average	0.895	365.4	0.002449371
Copper				
	Max	2	146	0.01369863
	Average	1.6	86.35	0.018529241
Dieldrin				
	Max	0.00066	0.02	0.033
	Average	0.00053	0.01626	0.032595326
Endosulfan I				
	Max	0.0012	0.0052	0.230769231
	Average	0.000695	0.00608	0.114309211
Total Heptachlor				
	Max	0.0021	ND	NA
	Average	0.0019	0.01369	0.138787436
Iron				
	Max	51.8	13600	0.003808824
	Average	43.35	7276	0.005957944
Lead				
	Max	2.5	346	0.007225434
	Average	2.2	233.8	0.009409752
Manganese				
	Max	4.9	65.8	0.074468085
	Average	4.45	34.13	0.130383827
Selenium				
	Max	ND	1.6	NA
	Average	0.43	0.878	0.489749431
Vanadium				
	Max	0.28	18.4	0.015217391
	Average	0.265	10.2	0.025980392
Zinc				
	Max	33.2	468	0.070940171
	Average	31.65	279.7	0.113156954

Notes:
BSAF = Tissue Concentration/Sediment Concentration
ND = Not Detected
* = Tissue concentrations for mercury derive from 2001 sample data.
Tissue Data collected in 1997 and 2001 from Wetland 64

Table 9-6
Exposure Parameters Used for the Site 41 Wetland Risk Calculations

		Sediment Receptor		Surface Water Receptor		Fish Ingestion Receptor	
Exposure Parameter	**Pathway**	**Child Trespasser**	**Maintenance Worker**	**Child Trespasser**	**Maintenance Worker**	**Recreational Fisherman**	**Subsistence Fisherman**
Event Frequency (EV)(events/day)	Dermal	1	1	1	1		
Exposure Frequency (EF) (days/year)	Dermal/Ingestion	52	52	52	52	52	52
Exposure Duration (ED)(years)	Dermal/Ingestion	10	25	10	25		
Body Weight (kg)[a]	Dermal/Ingestion	45	70	45	70		
Averaging Time (AT)-noncancer risk (days)[b]	Dermal/Ingestion	3,635	9,125	3,635	9,125		
Averaging Time (AT)-cancer risk (days)[c]	Dermal/Ingestion	25,550	25,550	25,550	25,550		
Event Duration (t_{event}) (hrs/event)	Dermal	N/A	N/A	2.6	2.6	N/A	N/A
Lag time per event (τ_{event}) (hrs/event)[d]	Dermal	N/A	N/A	RAGS Part E	RAGS Part E	N/A	N/A
Dermal permeability coefficient of compound in water (Kp) (cm/hr)[e]	Dermal	N/A	N/A	RAGS Part E	RAGS Part E	N/A	N/A
Skin surface area available for contact (SA) (cm^2)[f]	Dermal	5,000	10,400	5,000	10,400	N/A	N/A
Incidental ingestion rate for sediment (IR_{sd}) (mg/day)[g]	Ingestion	100	100	N/A	N/A	N/A	N/A
Incidental ingestion rate for surface water (L/day)[h]	Ingestion	N/A	N/A	0.01	0.01	N/A	N/A
Fish tissue ingestion rate for sediment (IR_t) (g/day)[i]	Ingestion	N/A	N/A	N/A	N/A	26	170

Notes:

a = USEPA (1989) Risk Assessment Guidance for Superfund Vol. I, Human Health Evaluation Manual (Part A).
b = Calculated as the product of ED (years) x 365 days/year.
c = Calculated as the product of 70 years (assumed lifetime) x 365 days per year.
d = From Exhibit B-3, RAGs Part E (USEPA, 2001b).
e = From Exhibit B-3 (organics) or B-4 (inorganics), RAGS Part E (USEPA, 2001b).
f = SA contact with sedin
g = IRsd of 100 mg/day f
h = IRsw of 0.01 L/day b
I = IRt from Exposure F

FINAL REMEDIAL INVESTIGATION REPORT
SITE 41 — OPERABLE UNIT 16 — NAS PENSACOLA WETLANDS

NAVAL AIR STATION
PENSACOLA, FLORIDA

SOUTHNAVFACENGCOM
CONTRACT NUMBER: N62467-89-D-0318

CTO-036

VOLUME II OF XI
SECTION 10.0 — 10.3

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10.0 OPERABLE UNIT 1 — WETLANDS

Operable Unit 1 is the former sanitary landfill (IR Site 1). As shown on Figure 10-1 (figures are located at the end of each section), the landfill is an approximately 85-acre area situated approximately a half-mile east of Forrest Sherman Field (EnSafe, 1998a). It is bound to the north by Bayou Grande, and to the east by the A. C. Read Golf Course. The new cemetery extension for the Barrancas National Cemetery lies to the south. The base Brush Disposal Area (Site 16) is to the west.

OU 1 Site History

During the early 1950s and continuing until 1976, a variety of domestic and industrial wastes generated from NAS Pensacola and other outlying Navy facilities were disposed at the Site 1 landfill. A partial list of wastes and quantities disposed at the site included:

- Ketone-soaked rags
- PCB- and transformer-oil-soaked rags (6,500 cubic feet [ft^3])
- Paint chips
- Paint sludge from water wall paint booth (170,000 pounds)
- Paint sludge (5,200 gallons)
- Dry air-filter pads from paint booths
- Compressed air cylinders (200)
- Asbestos from building demolition
- Wood soaked with plating solutions
- Pesticide rinsate
- Garbage (64,800 tons)
- Containers of paints, pesticides, oils, strippers, plating chemicals, solvents, thinners, etc.
- Mercury

Previous investigation documents and drawings indicated disposal activities moved from one portion of the site to another during the time the landfill was active (NEESA, 1983). The southernmost portion of the site, used during the 1950s, is the landfill's oldest known section. In the early 1960s, waste disposal operations were moved approximately 3,000 feet north, to the northernmost portion of the site. Additionally, an area along the northwestern border of the site also was reportedly filled with construction rubble during the 1950s and 1960s. During the late 1960s and until the closure of the landfill, waste was disposed in its central portion. During the earlier years of disposal at Site 1, wastes commonly were burned before burial; however, this practice ended in the late 1960s due to residents' concern over air pollution in nearby areas.

The landfill officially closed October 1, 1976. The current surface topography of Site 1 is shown on Figure 10-2.

Chronology of Events and Previous Investigations at OU 1

The following chronology of events and previous investigations at Site 1 provides a basis for understanding the history and focus of the remedial investigation/feasibility study.

1974 Discovery of Landfill Leachate Discharge — In 1974, landfill leachate was discharging from an abandoned drainage field into a nearby golf course pond. At that time, the drainage outlet was plugged, causing the water table to rise and leachate to seep from the surface. As a result, an investigation was performed in 1974 and 1975 during which seven galvanized-steel monitoring wells were installed and sampled. Groundwater sample analysis indicated the presence of phenol and several metals (Geraghty & Miller, 1984). This investigation reportedly concluded shallow groundwater flowed north toward Bayou Grande, and groundwater was contaminated in the upper portion of the Sand-and-Gravel Aquifer near the landfill (NEESA, 1983).

1983 Initial Assessment Study — An Initial Assessment Study was performed by NEESA (since renamed) under the Navy Assessment and Control of Installation Pollutants (NACIP) program (NEESA, 1983). As the first phase of the NACIP program, the study's purpose was to identify and assess sites posing a threat to human health or the environment due to contamination from hazardous materials operations. This study included reviewing facility records and aerial photographs, interviewing facility personnel, and conducting field surveys. During the survey, limited sampling of landfill leachate and sediment collected from site ponds was performed. Sample analysis detected concentrations of cadmium, chromium, mercury, nickel, and lead in sediments, and cadmium and mercury in the leachate (NEESA, 1983). The survey concluded Site 1 presented a threat to human health and the environment and therefore was recommended for further investigation to include a confirmation study, Phase II of the NACIP program.

1984 Verification Study — Part I of the NACIP confirmation study, the verification study, was performed by Geraghty & Miller Inc. to confirm whether groundwater contaminants were present at sites recommended for study in the IAS (Geraghty & Miller, 1984). During this study, eight shallow monitoring wells were installed and sampled. Groundwater samples were analyzed for VOCs, SVOCs, pesticides, PCBs, metals, cyanide, and field parameters. Analytical results indicated that shallow groundwater beneath the landfill had been affected by past disposal practices. VOCs were detected in all groundwater samples collected. The highest concentrations of organic compounds, most of which were VOCs, were detected in samples from the central portion

of the site. Only trace concentrations of SVOCs were detected. No PCBs or pesticides were present at concentrations above method detection limits. All detected metals concentrations did not exceed drinking water standards. Water levels measured in the study indicated shallow groundwater flows north, northwest, and northeast toward surface water bodies, where it discharges to the bayou, site ponds, and tidal inlets (Geraghty and Miller, 1984).

1986 Characterization Study — Part II of the NACIP confirmation study, the characterization study, was performed by Geraghty & Miller to determine the nature and extent of contamination at verification study sites requiring additional analysis (Geraghty & Miller, 1986). During this investigation, five additional shallow monitoring wells (GM-38 through GM-42) and three deep wells (GM-43 through GM-45) were installed. Groundwater samples were collected from all new wells and the eight verification study wells. Groundwater samples from the new wells were analyzed for the USEPA's list of organic priority pollutants, including VOCs, SVOCs, pesticides, and PCBs. Samples collected from the previously installed wells were analyzed for VOCs only. No metals analysis was performed for either well group. Samples collected from 12 of the 16 wells contained one or more VOCs. Additionally, two samples collected from deep wells exhibited VOC contamination. However, the presence of certain VOCs during the characterization study was not consistent with the results of the verification study (e.g., vinyl chloride only detected during characterization, methylene chloride detected only during verification). SVOCs, pesticides, or PCBs were not detected during the characterization study. Water level elevation data again confirmed the generally northward flow of shallow groundwater toward site surface water bodies. However, deep-well water-levels indicated a slight gradient to the south (Geraghty & Miller, 1986).

1991 Contamination Assessment/Remedial Activities Investigation — Phase I of a Contamination Assessment/Remedial Activities Investigation was performed by E&E Inc. (E&E, 1991a), to identify principal areas and primary COCs at Site 1 and to provide recommendations for subsequent phases of investigation. Various preliminary surveys were conducted, and site surface water, sediment, surface soil, and groundwater were sampled for laboratory analysis. TRPHs, SVOCs, and metals were detected in the Site 1 sediment samples, while chromium and zinc were detected in Site 1 surface water samples at levels generally below FDEP Class III Surface Water Quality Standards. Groundwater samples had significant concentrations of metals, VOCs, SVOCs, and TRPHs. Detections of metals and VOCs above drinking-water standards were limited to within or adjacent to the landfill boundary. Surface soil samples did not exhibit widespread contamination, except for TRPH. Complete discussions of the investigation are in the 1991 Interim Data Report (E&E, 1991b).

1992 ESD Field Investigation — A field investigation was performed by USEPA Region 4, Environmental Services Division (ESD), Environmental Compliance Branch (ECB), Hazardous Waste Section (HWS) to provide high-quality baseline data on sediments, surface water, and groundwater within the Site 1 vicinity. Sediment and surface water samples were collected from several site wetlands and Bayou Grande. Groundwater samples were collected from two existing monitoring wells (one shallow and one deep). All samples were analyzed for the TAL/TCL. The analytical results indicate concentrations of the following contaminants are present in Site 1 media:

- Wetlands sediments — metals, pesticides, and SVOCs
- Wetlands surface water — metals and SVOCs
- Bayou sediments — metals, pesticides, and SVOCs
- Bayou surface water — metals only
- Groundwater — metals and VOCs (shallow well)

Most of the detected contaminants are assumed to originate from the landfill. However, ubiquitous, low concentrations of lead and pesticides detected at NAS Pensacola may be attributed to other sources (i.e., pesticides commonly used for insect control, low concentrations of lead likely occur naturally at NAS Pensacola). In general, groundwater contamination was minimal in the shallow well and nonexistent in the deep well.

Additionally, pesticides, organic compounds, and metals were detected more frequently and at higher concentrations in wetlands sediments than in bayou sediments, indicating wetland sediments are effectively binding these materials.

1993-1996 Remedial Investigation — During the Site 1 RI, surface and subsurface soil, groundwater, sediment, and surface water samples were collected and analyzed. A potentiometric map is presented in Figure 10-3, and sample locations are shown on Figure 10-4. The *Final RI Report — Site 1* (E/A&H, 1996b) concluded subsurface soil inside the landfill boundary has been impacted by past activities there. Appendix A contains summary tables of detected parameters at Site 1. Buried waste in the landfill has been characterized as containing detectable concentrations of all analyzed parameter groups (metals, VOCs, SVOCs, pesticides, and PCBs).

Shallow and intermediate depth groundwater flows in an overall northward direction during both low and high tide, with components of flow to the north-northwest, northwest, and

northeast toward Bayou Grande and other surface water features (Figure 10-3). This flow pattern generally mimics site topography, which is characteristic of unconfined surficial aquifers with high transmissivities. The nature and extent of landfill-impacted groundwater revealed relatively low concentrations of inorganic and organic constituents are present in the surficial zone (shallow and intermediate well depths) beneath the site (E/A&H, 1996b). Groundwater analytical results from samples collected in 1993 (with Teflon bailers) compared with those collected in 1994 (via quiescent sampling techniques) indicate 1993 metals analytical results were significantly affected (biased) due to sample turbidity. Based on 1994 analytical results, the greatest impact from metals to shallow and intermediate groundwater quality appeared to be limited to the center of the site, along the landfill's eastern, western, and northwestern boundaries (E/A&H, 1996b). Except for aluminum, iron, and manganese (indicated by reference data to naturally occur at elevated concentrations), inorganic concentrations exceeding groundwater criteria were generally limited to areas within and around the landfill perimeter (E/A&H, 1996b). Summary tables of parameters detected at Site 1 are provided in Appendix A.

Consistent with the distribution of elevated metals, the highest concentrations of organics were detected in the center of the site and along the eastern and western boundaries (E/A&H, 1996b). Relatively lower organic concentrations extended down-gradient from the landfill to areas along Bayou Grande's coastline, adjacent wetlands, and east-northeast beneath the golf course. However, no elevated metals or organics (except for a single low-pesticide concentration) were detected in samples collected from the most down-gradient monitoring well across the golf course opposite the landfill. This indicated the extent of organic-impacted groundwater migrating east-northeast from the landfill is limited to the area beneath the adjacent golf course. As with metals, organic concentrations exceeding groundwater criteria were generally limited to areas within and around the landfill perimeter. Groundwater quality within the main producing zone beneath the site does not appear to have been affected by site activities (E/A&H, 1996b).

Based on the data collected during the Site 1 RI, the *Final ROD* issued on August 19, 1998 (EnSafe, 1998a), outlined three RAOs for the OU 1 site:

- Protection of groundwater from leachable compounds
- Restoration of groundwater and prevention of further contamination of shallow/intermediate groundwater
- Prevention of further contamination of surface water in Wetland 3

The remedial actions selected for the site included:

- Institutional controls to restrict groundwater use and intrusive activities
- Implementation of a groundwater monitoring program to ensure that natural processes are effectively reducing the concentrations of organic compounds to attain performance standards
- A groundwater interceptor system to treat the iron-contaminated groundwater that is migrating from the landfill and discharging to Wetland 3

The long-term monitoring plan was implemented by TetraTech NUS (TtNUS). Groundwater was monitored for the following constituents: nickel, benzene, chlorobenzene, vinyl chloride, 1,1,2,2-tetrachlorethane, xylenes, aluminum, cadmium, chromium, iron, and manganese. Based upon collected data, the Third Annual Groundwater Monitoring Report recommended continued monitoring for benzene, xylenes, vinyl chloride, aluminum, cadmium, iron, and manganese (TtNUS, 2003b). The other constituents did not exceed MCLs any longer and were dropped from the monitoring plan.

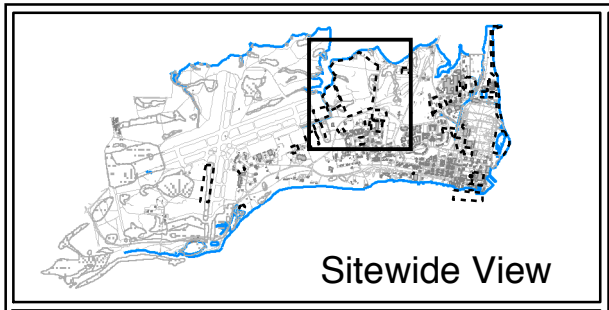
As stated in the *Final ROD* (EnSafe, 1998a), the interceptor trench was installed to prevent iron-contaminated groundwater from discharging to Wetland 3. At that time, FDEP considered the point where groundwater discharged to surface water at Wetland 3 to be the point of compliance. The interceptor trench was installed by Bechtel and has operated since 1999. Intercepted groundwater has been discharged to the FOTW for treatment. Despite the operation of that system, iron concentrations in Wetland 3 remain above reference concentrations. As stated in the Optimization Study by TtNUS (2004b), the current recommendation is to discontinue the pumping operation to modify the monitoring program in the trench and Wetland 3 area. In addition, the study recommends that the point of compliance should be moved to either where Wetland 3 discharges to Wetland 4D or to where Wetland 4/4D discharges to Bayou Grande (TtNUS, 2004b).

OU 1 Associated Wetlands

The Site 41 wetlands associated with OU 1 include Wetlands 1A, 1B, 3, 4D, 15, 16, 17, 18A, and 18B. As shown in Figure 10-1, Wetlands 1A and 1B lie south and southwest of Site 1, respectively. Wetland 3 lies along the eastern boundary. Wetland 4D lies northeast within the golf course, and receives surface water discharge from Wetland 3 via a culvert that runs beneath a

golf course fairway. Wetland 4D then discharges surface water into Bayou Grande. Wetland 15 also lies northeast, along Bayou Grande. Wetland 16 is directly north of the landfill, and is also along Bayou Grande. Wetland 17 is northeast, also along Bayou Grande, where it intersects Redoubt Bayou. Wetlands 18A and 18B lie west of Site 1, discharging into Redoubt Bayou. Of the OU 1 wetlands, Wetlands 1A, 1B, 3, and 18A are freshwater. Wetlands 4D, 15, 16, 17, and 18B are estuarine and are tidally influenced.

This section presents the nature and extent of contamination, ecological risk assessment, fate and transport analysis, and human health risk assessment by wetland. To assist in the data evaluation, Figure 10-5 presents OU 1 Total DDT for sediment, Figure 10-6 presents the Swartz TOC normalized PAHs, and Figure 10-7 presents the Mean ERM quotient categories. Figure 10-8 presents the chemistry and toxicity samples collected during Phases III and IV. To assess effects to selected measurement endpoints, such as the green heron, a food-chain model for all the wetlands associated with OU 1 is presented in Section 10.8.



Legend

- Operable Unit (OU)
- OU 1 Wetland- Approximate
- Wetland- Approximate
- Site
- Building
- Road
- Shoreline
- Storm water Inlet
- Storm water Headwall
- Storm water Pipe

Note: Only the wetlands associated with OU1 have labels.

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Figure 10-1
Operable Unit 1 Wetlands and Nearby Sites

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Bayou Grande

Redoubt Bayou

Wetland 15
Wetland 16
Wetland 17
Wetland 18B
Wetland 18A
Wetland 3
Wetland 4D
Wetland 4C
Wetland 4B
Wetland 4A
Wetland 1A
Wetland 1B

Site 1
OU 1

OU 4
Site 15

Monitored Outfall 030

Site 16b
Site 16a
Site 6
Site 5
Site 7
Site 22
Site 8
OU 13
OU 13
Site 24
OU 14
Site 17

John Tower Road
Taylor Road
Duncan Road
Tow Road

N
S
E
W

0 917 1,834 Feet

Legend

Sitewide Sample Location

- Soil
- Site 41 RI Sediment
- Site 41 RI Surface Water
- Groundwater
- Operable Unit (OU)
- Wetland- Approximate
- OU 1 Wetland- Approximate
- Site
- Building
- Road
- Shoreline
- Topographic Contour (ft)
- Storm water Inlet
- Storm water Headwall
- Storm water Pipe

Note: Only the wetlands associated with OU1 have labels.

Wetland 15
Bayou Grande
Wetland 16
Wetland 17
Wetland 18B
Wetland 18A
Redoubt Bayou
Site 1
OU 1
Wetland 3
Wetland 4D
Wetland 4C
Wetland 4B
Wetland 4A
OU 4
Site 15
Monitored Outfall 030
Site 16b
Wetland 1A
Wetland 1B
Site 16a
OU 13
Site 24
Site 22
Site 8
OU 13
Site 6
Kingsfer Tower Rd
Fowl Farm Road
Davis Rd
Dunmire Rd
0 500 1,000 Feet

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Figure 10-2
Operable Unit 1
Study Area Topography

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Site 41
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Legend

Shallow Potentiometric Surface

- Contour (2 ft interval)
- Groundwater flow direction

Sitewide Sample Location

- Groundwater Well
- Site 41 RI Sediment
- Operable Unit (OU)
- OU 1 Wetland- Approximate
- Wetland- Approximate
- Site
- Building
- Road
- Shoreline

Note:
Groundwater potentiometric contours are from the Site 16 PSC report and the Site 1 RI report.
Only the wetlands associated with OU1 have labels.

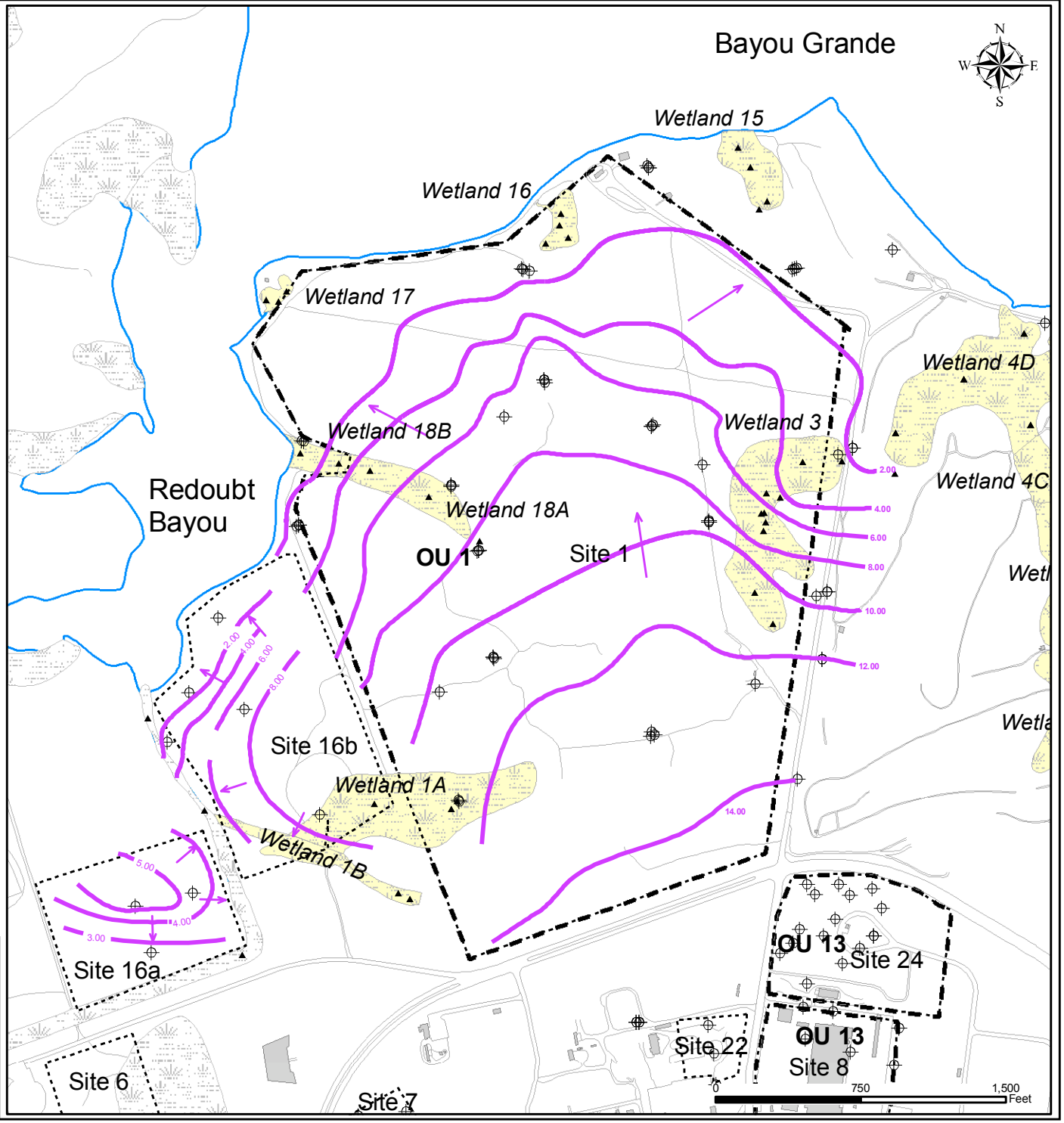

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Figure 10-3
Operable Unit 1 Wetlands
Shallow Potentiomentric Surface

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Site 41
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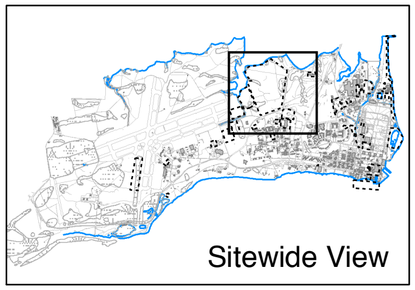

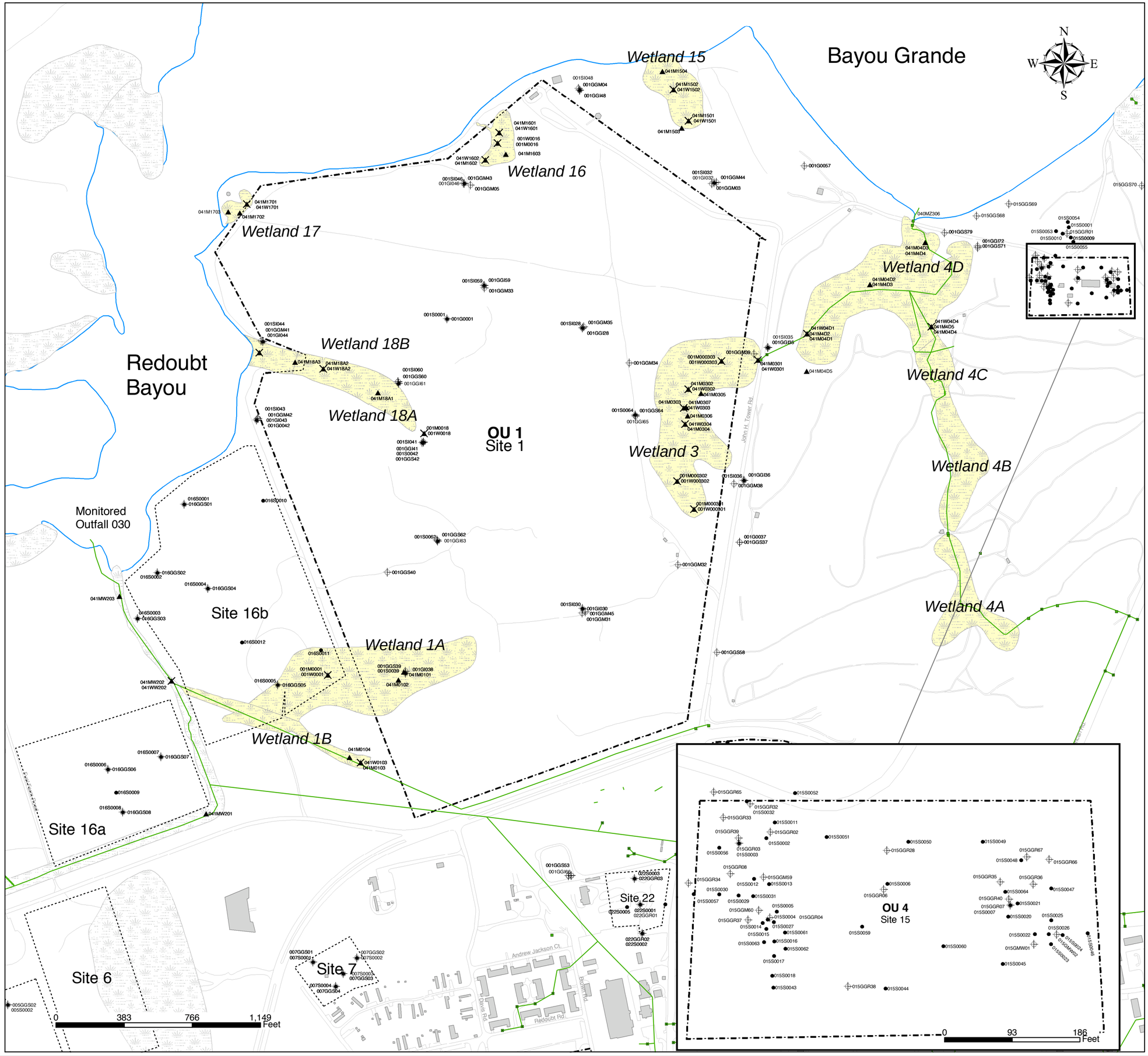

Legend

Sitewide Sample Location

- Soil
- Site 41 RI Sediment
- Site 41 RI Surface Water
- Groundwater
- Operable Unit (OU)
- Site
- Wetland- Approximate
- OU 1 Wetland- Approximate
- Building
- Road
- Shoreline
- Storm water Inlet
- Storm water Headwall
- Storm water Pipe

Note: Only the wetlands associated with OU1 have labels.

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FIGURE 10-4
Operable Unit 1 Wetlands, Nearby Sites, and Adjacent Soil Borings and Monitoring Wells

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Legend

Site 41 RI Sediment Sample

Phase II Total DDT

- 0.285 - 109.99
- 110.00(BL) - 3460.00

Phase III Total DDT

- 8.10 - 109.99
- 110.00(BL) - 196.00
- Operable Unit (OU)
- OU 1 Wetland- Approximate
- Wetland- Approximate
- Site
- Building
- Road
- Shoreline

Note:
BL is the total DDT basewide level.
Result units are ug/kg.
Only the wetlands
associated with OU1 have labels.

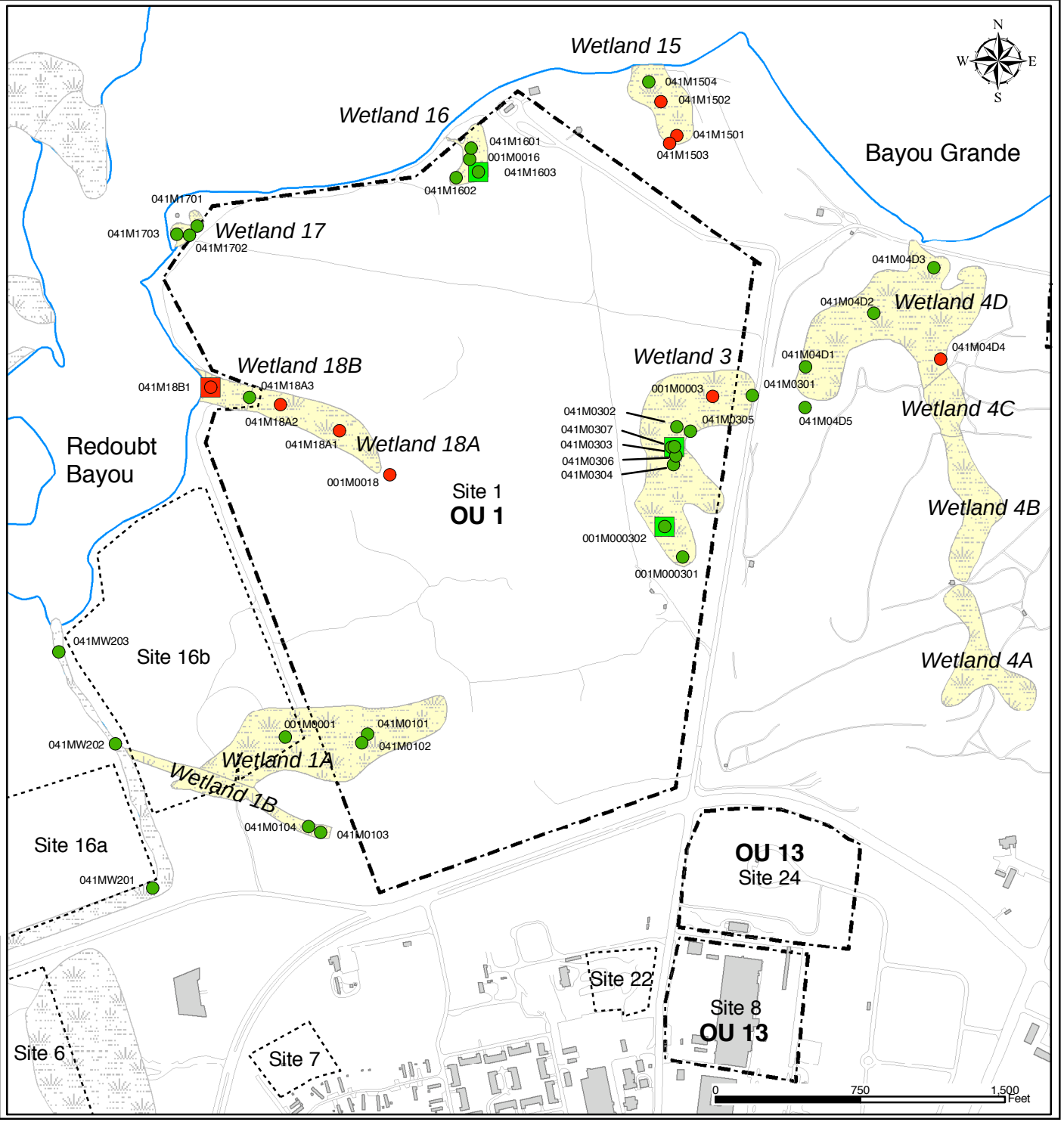

Figure 10-5
Operable Unit 1 Wetlands
Sediment Total DDT

Final Remedial Investigation Report
Site 41
NAS Pensacola, FL

Date: 9/29/04 | Drwn by: CT | File: K:/GIS/Navy-Pensacola/CTO-036/Projects/Fig10-5.mxd

Legend

Site 41 RI Sediment Sample

Phase II TOC Normalized Total PAHs

- 1.94 - 289.99
- 290.00(TEC) - 1262.56

Phase III TOC Normalized Total PAHs

- 196.28 - 289.99
- 290.00(TEC) - 369.00
- Nondetect TOC Normalized Total PAH
- Operable Unit (OU)
- OU 1 Wetland- Approximate
- Wetland- Approximate
- Site
- Building
- Road
- Shoreline

Note:
Result units are mg/kg-oc.
Only the wetlands associated with OU1 have labels.

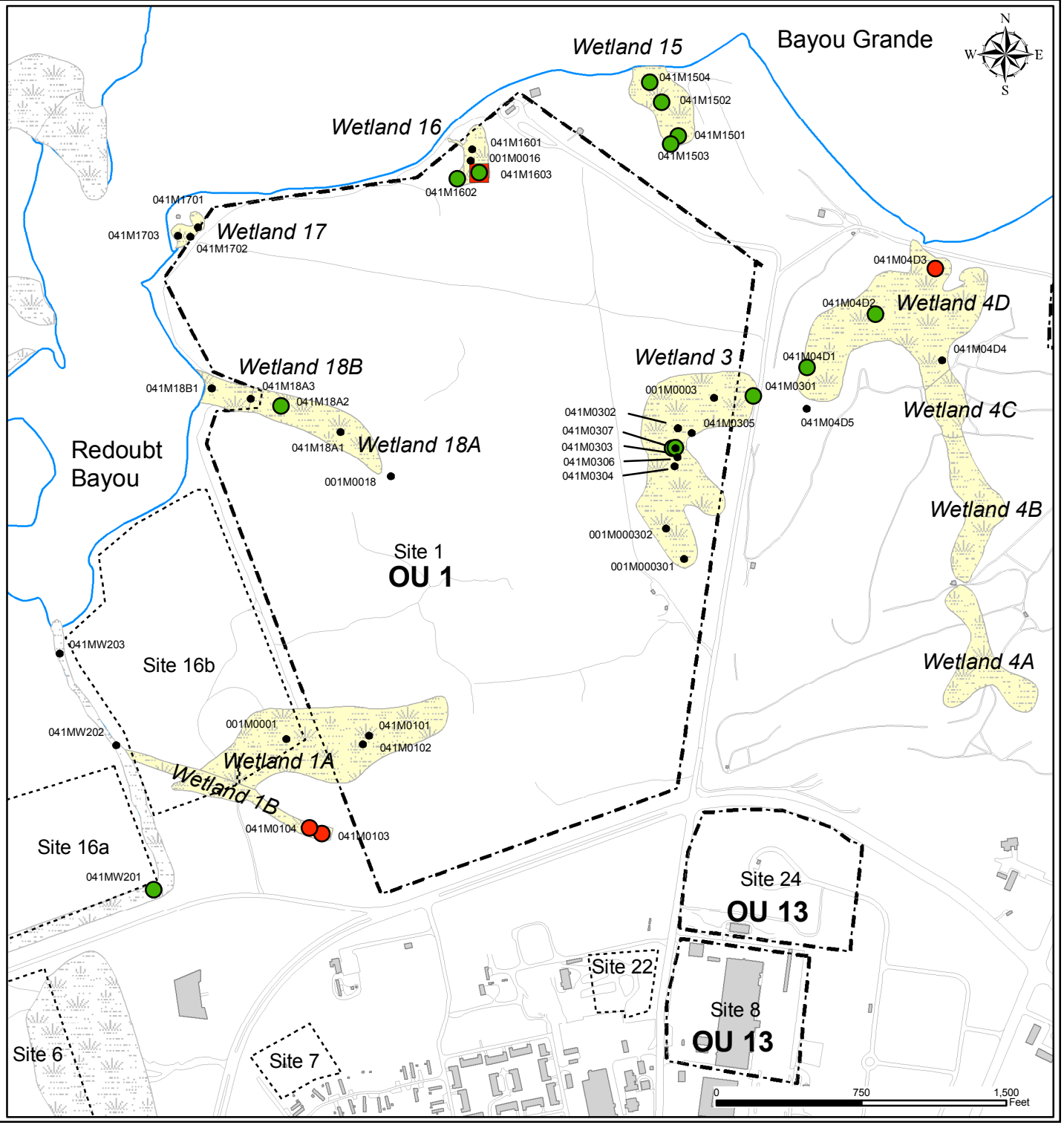

Figure 10-6
Operable Unit 1 Wetlands
Sediment Swartz Normalized Total PAHs

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Site 41
NAS Pensacola, FL

Date: 3/8/05 | Drwn by: CT | File: K:/GIS/Navy-Pensacola/CTO-036/Projects/Fig10-6.mxd

Legend

OU 1 Sediment Sample with ERM Category

Phase II Mean ERM Quotient Category

- 1
- 2
- 3
- 4

Phase III Mean ERM Quotient Category

- 2
- Sediment Sample Associated with another OU
- Operable Unit (OU)
- OU 1 Wetland- Approximate
- Wetland- Approximate
- Site
- Building
- Road
- Shoreline

Table indicates parameters that exceeded the ERM for each sample phase.				
Sample ID	Phase II	Phase III	Phase 2001	Phase 2004

Notes:
Samples without parameter table do not have parameters that exceed the ERM value.
Only the wetlands associated with OU1 have labels.

Sample ID	Phase II	Phase III
041M18B101	4,4'-DDT	4,4'-DDT
041M18B101	Arsenic	

Sample ID	Phase II
041M18A201	4,4'-DDE
041M18A201	4,4'-DDT

Sample ID	Phase II
041M18A101	4,4'-DDE
041M18A101	4,4'-DDT

Sample ID	Phase II
001M001801	4,4'-DDE

Sample ID	Phase II
041M010401	Benzo(a)anthracene
041M010401	Benzo(a)pyrene
041M010401	Chrysene
041M010401	Fluoranthene
041M010401	Phenanthrene
041M010401	Pyrene

Sample ID	Phase II
041M150101	4,4'-DDE

Sample ID	Phase II
041M150301	4,4'-DDE
041M150301	Arsenic

Sample ID	Phase II
041M150201	4,4'-DDE

Sample ID	Phase II
041M04D201	4,4'-DDE
041M04D201	Lead

Sample ID	Phase II
001M000303	4,4'-DDE
001M000303	4,4'-DDT

Sample ID	Phase II
041M030701	Cadmium

Sample ID	Phase II
041M04D401	4,4'-DDE

Sample ID	Phase II
041M04D101	4,4'-DDE

Sample ID	Phase II
041M030201	Total PCBs

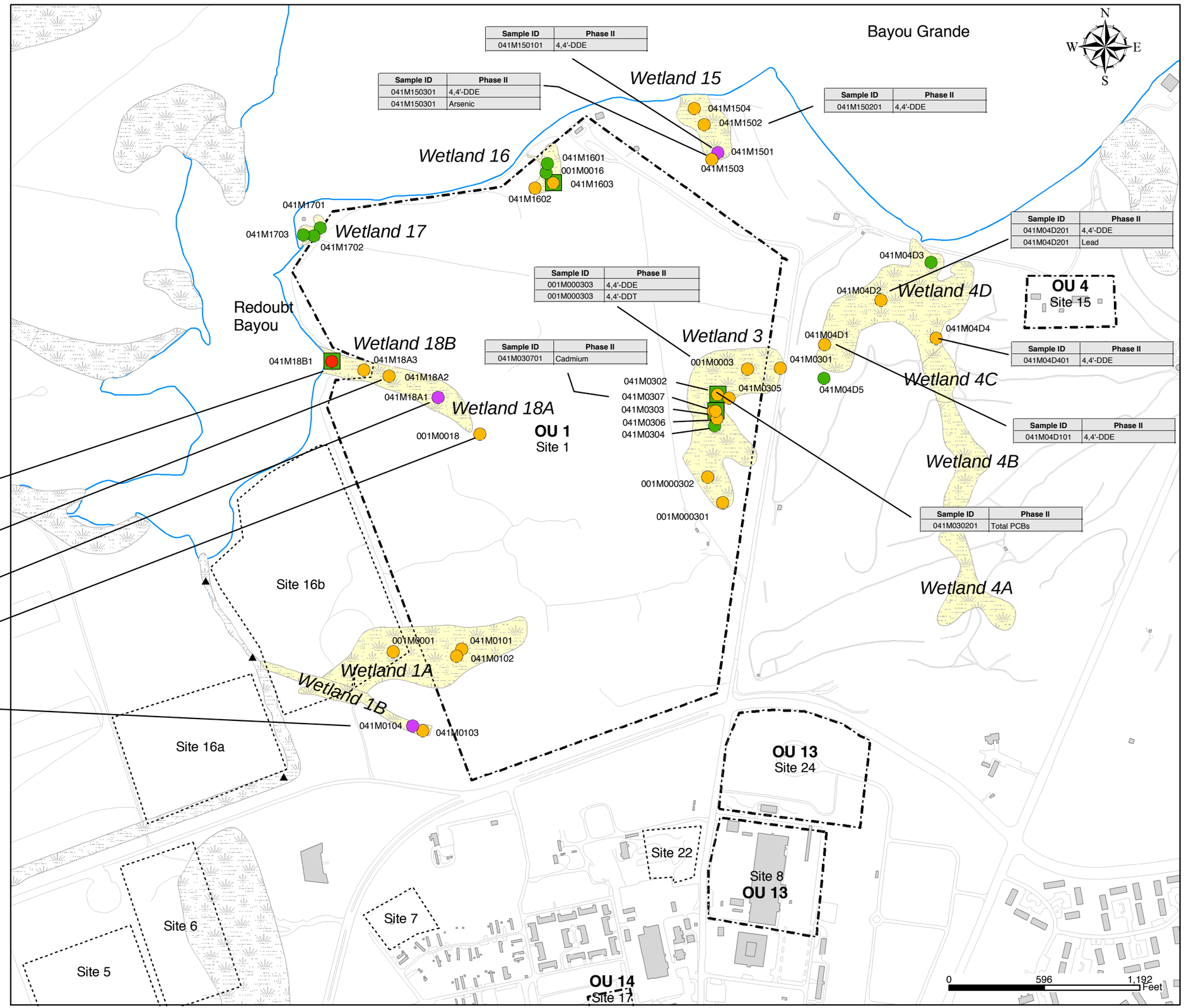

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Figure 10-7
Operable Unit 1 Sediment Sample ERM Quotient Categories and Parameters that Exceeded the ERM

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Site 41
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Date: 10/19/04 | Drwn by: CT | File: K:/GIS/Navy-Pensacola/CTO-036/Projects/Fig10-7.mxd

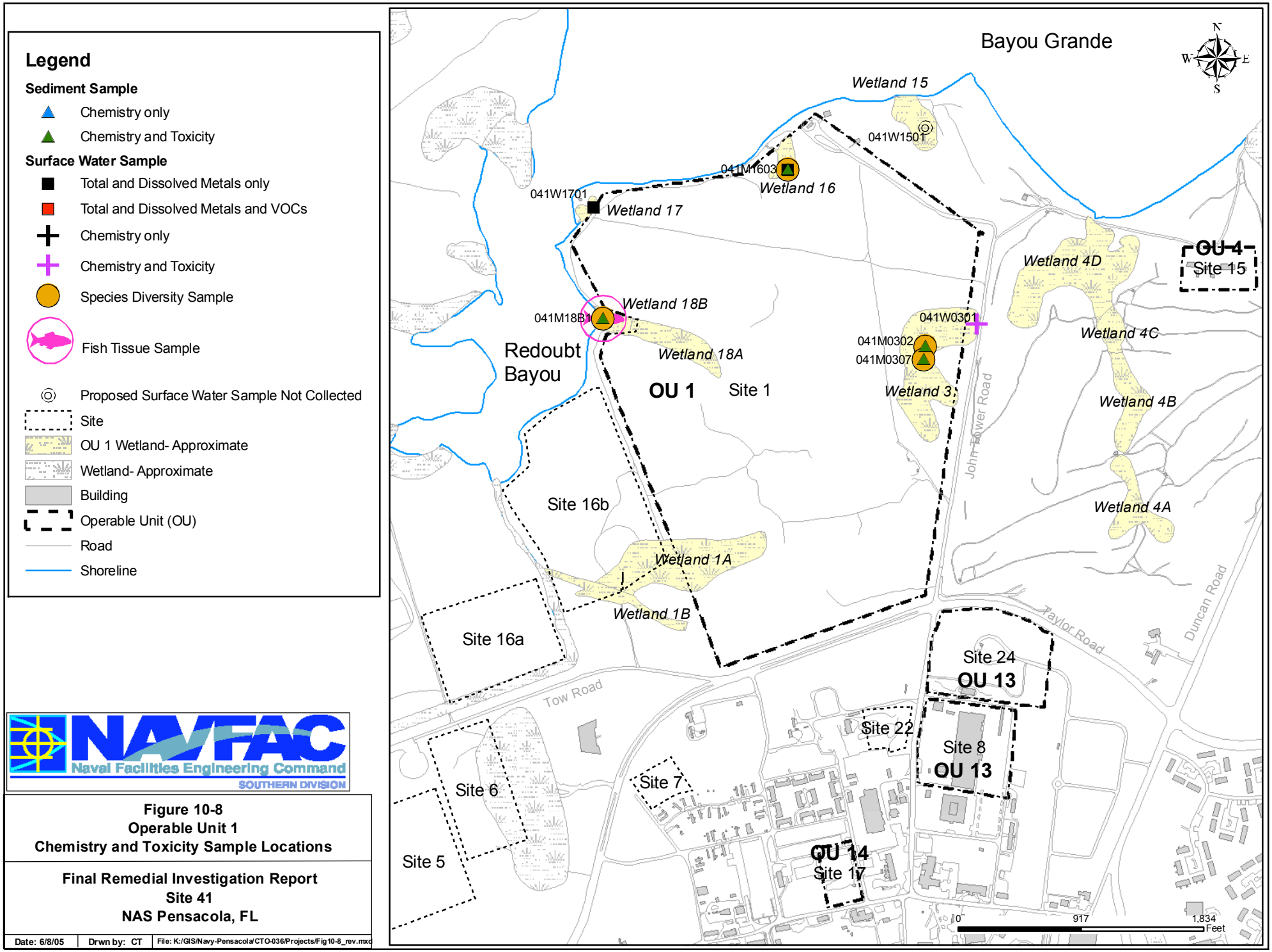

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Figure 10-8
Operable Unit 1
Chemistry and Toxicity Sample Locations

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Site 41
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Date: 6/8/05	Drwn by: CT	File: K:/GIS/Navy-Pensacola/CTO-036/Projects/Fig10-8_rev.mxd

10.1 Wetland 1 Screening Level Problem Formulation

10.1.1 Site Description and Habitats Present at Wetland 1

Wetland 1 is north of the intersection of Taylor and Tow Way Roads. The wetland is approximately 1,500 feet southwest of the center of Site 1 and approximately 900 feet southeast of Site 16 (Figure 10-1). In 2003, the U.S. Department of Veterans Affairs expanded the Barrancas National Cemetery on the north side of Taylor Road. This cemetery expansion is near the southern border of Wetland 1A.

Photograph 1 Wetland 1B — Facing South-Southeast

Parsons and Pruitt (USEPA, 1991a) identified Wetland 1 as a palustrine, forested system dominated by slash pines (*Pinus elliotti*). During the Site 41 investigation, both the wetland and a nearby drainage ditch were sampled. However, the ditch is a part of the NAS Pensacola storm water drainage system and conveys runoff to Bayou Grande (Figure 10-1). The ditch is under the auspices of

the NAS Pensacola Storm Water Pollution Prevention Program. For this report, the wetland and ditch samples have been separated and will be discussed separately.
Wetland 1A is the wetland as noted by Parsons and Pruitt (USEPA, 1991a), while Wetland 1B is the adjacent storm water ditch.

The IR site potentially affecting Wetlands 1A and 1B is Site 1, while Wetland 1B may also be influenced by storm water discharges.

As described in Section 10, the Site 1 landfill was used from the mid-1950s until 1976 as the predominant disposal site for all solid wastes generated on the base. Based on the data collected during the Site 1 RI, the *Final ROD* issued on August 19, 1998, outlined three RAOs for the OU 1 site:

- Protection of groundwater from leachable compounds
- Restoration of groundwater and prevention of further contamination of shallow/intermediate groundwater
- Prevention of further contamination of surface water in Wetland 3

The following remedial actions were selected for the site:

- Institutional controls to restrict groundwater use and intrusive activities
- Implementation of a groundwater monitoring program to ensure that natural processes are effectively reducing the concentrations of organic compounds to attain performance standards
- A groundwater interceptor system to treat the iron-contaminated groundwater that is migrating from the landfill and discharging to Wetland 3

The long-term monitoring plan was implemented by TetraTech NUS. Groundwater was monitored for the following constituents: 1,1,2,2-tetrachlorethane, benzene, chlorobenzene, vinyl chloride, xylenes, aluminum, cadmium, chromium, iron, manganese, and nickel.

Based upon collected data, the Third Annual Groundwater Monitoring Report recommended continued monitoring for benzene, xylenes, vinyl chloride, aluminum, cadmium, iron, and manganese (TtNUS, 2003b). The other constituents no longer exceeded MCLs and were dropped from the monitoring plan. Treatment of iron at Wetland 3 is discussed in Section 10.2.

Wetland 1B is also influenced by Site 1 and is also impacted by storm water discharges. As described in the Storm Water Pollution Prevention Plan (SWPPP [NAVFAC Southeast, 2002]), NAS Pensacola filed an NOI to be covered by the Florida Generic Permit that was later approved by FDEP. The facility identification number assigned to NAS Pensacola is FLR05F507. Outfall 30 is one of four outfalls monitored under this permit, and Wetland 1B is one of the tributaries discharging storm water at Outfall 30 as shown on Figure 10-1. The SWPPP (NAVFAC Southeast, 2002) outlines best management practices to be followed and the monitoring requirements for storm water at this outfall.

Because the wetlands may be impacted by different sources, Wetlands 1A and 1B are discussed separately in the following sections.

10.1.2 Wetland 1A — Sample Location Description

Phase II Sediment Sample Location Description

Three sediment samples were collected and analyzed at Wetland 1A. Sample locations for Wetland 1A were in areas where groundwater seeps could occur and depositional areas. These sample locations are centrally located within the wetland (Figure 10-4). Table 10-1-1 (tables are located at the end of each section) provides a physical description of the sediments collected at Wetland 1A. Sediments at Wetland 1A were composed of black silty sand with organics (041M010101) to black sandy silt with organics (041M010201). TOC concentrations were 3.63% and 14.5% for 041M010101 and 041M010201, respectively. No data were collected for 001M000101.

Phase II Surface Water Sampling Locations Description

One surface water sample was collected at Wetland 1A, location 001W000101 (Figure 10-4), which was located with sediment location 041M000M0101. The surface water sample was taken during the 1994 Site 1 investigation. Surface water from Wetland 1A was not analyzed for physical parameters; therefore, no data can be presented in this report.

10.1.3 Wetland 1A — Nature and Extent of Sediment Contamination

Phase II Sediment

Table 10-1-2 summarizes the analytical results of the three sediment samples collected at Wetland 1A. Figure 10-4 presents the sediment sampling locations for Wetland 1A.

Metals — Twenty-one metals were detected during sediment sampling at Wetland 1A. The greatest number of inorganic detections and reference value exceedances at Wetland 1A was centered at location 041M010201, where 20 analytes were detected. Of these 20 detections, only six — aluminum, barium, chromium, copper, vanadium, and zinc — exceeded the freshwater reference values. Location 041M010101 exhibited a concentration of 87.3 mg/kg for lead, which only slightly exceeded the reference value of 82.5 mg/kg. Location 001M000101 exhibited 12 detections, with none exceeding the reference value.

Pesticides and PCBs — Eight pesticide compounds and Aroclor-1260 were detected during sediment sampling at Wetland 1A. The greatest number of pesticides detected in Wetland 1A sediment samples was at location 041M010201, which had seven pesticide compounds and aroclor-1260 present. Location 001M000101 exhibited concentrations of five pesticide compounds. The sample from 041M010101 had no pesticide or PCBs detected.

SVOCs — One SVOC, BEHP, was detected in sediment samples collected at Wetland 1A. BEHP was reported at relatively low concentrations at locations 041M010101 and 041M010201.

VOCs — Acetone and 2-butanone (MEK) were the only VOCs detected in sediments collected from Wetland 1A. Both compounds were detected at location 041M010201.

Summary

Location 041M010201 exhibited the greatest number and generally the highest concentration of metals, pesticides, PCBs, SVOCs, and VOCs in Wetland 1A sediment.

Phase II Surface Water

Table 10-1-3 summarizes the analytical results of the Wetland 1A surface water sample, and Figure 10-4 presents the surface water sampling location.

Metals — Fourteen metals were detected in the single surface water sample collected from Wetland 1A at location 001W000101. Aluminum, arsenic, barium, calcium, chromium, copper, iron, lead, manganese, vanadium, and zinc were detected at concentrations exceeding their respective freshwater reference concentrations.

Organic Compounds — No pesticides, PCBs, SVOCs, or VOCS were detected in the surface water sample from Wetland 1A.

10.1.4 Ecological Risk Assessment

Phase II Investigation Summary — Wetland 1A

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-1-4, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values are carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-1-5.

Baseline Problem Formulation — Wetland 1A Sediment COPC Refinement

During the COPC refinement, additional information is used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. After COPC refinement, the risk assessment will present a statement of potential risk for each of the preliminary COPCs.

The COPC refinement process will include the following:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to base-wide (reference) concentrations for total DDT
- Comparison of inorganic constituents to reference wetland values
- Interpretive tool for metals
- Di Toro EqP SQGs for VOCs
- Comparison to Swartz consensus values
- Mean ERM quotients
- Description of exceedances of RVs and their extent

The methods used in the COPC refinement in the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 10-1-6. COPCs retained after refinement are presented in Table 10-1-7.

For Wetland 1A, aluminum, barium, chromium, copper, lead, and vanadium exceeded their Site 41 freshwater sediment reference concentrations (Table 10-1-6). However, barium concentrations did not appear enriched when normalized to aluminum and iron concentrations using FDEP's interpretative tool (Appendix L).

Of the metals that exceeded their screening values (both maximum concentration and average concentration), only lead (at locations 041M010101 and 001M000101) indicated enriched conditions when normalized to both aluminum and iron. None of the detected metals exceeded their refinement value. At Wetland 1A, aluminum, barium, and vanadium are the only inorganic constituents retained as COPCs.

As shown on Figure 10-5, total DDT was below the base-wide level, indicating that 4,4'-DDT and its daughter products are not a concern for Wetland 1A (Table 10-1-6). Dieldrin was detected, and exceeded its SV, at two sample locations, while only the highest detection (6.9 µg/kg), occurring at 041M10201, exceeded the RV. Since dieldrin exceeds its RV, it is retained as a COPC. Total chlordane exceeded the SV at one location; however, it did not exceed the RV. No background values are available for these compounds. VOCs (2-butanone and acetone) were detected at sediment sample location 041M010201 with concentration of 110 µg/kg and 250 µg/kg, respectively. When normalized to detected TOC concentrations, neither VOCs nor PAHs appear to be risk drivers for Wetland 1A. The distribution of total PAHs is shown on Figure 10-6. BEHP was detected at two locations but only exceeded its screening criteria in one location (041M010201).

Table 10-1-8 presents the mean ERL and ERM values, the mean ERM quotients, and the mean ERM quotient category by individual sample location. Based on this approach, all three sample locations (001M000101, 041M010101, and 041M010201) were determined to be Category 2, which indicates sediments in these wetlands, according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments. However, this category also has the highest level of uncertainty in predicting toxicity. None of the 25 constituents included in this evaluation exceeded its ERM value for the three sediment samples within Wetland 1A. Figure 10-7 shows the mean ERM category for each sediment sample location at Wetland 1A.

Surface Water Screening — Level Risk Estimation and Risk Calculation

As presented in Tables 10-1-9, surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values are carried forward to COPC refinement (Table 10-1-10).

Baseline Problem Formulation — Wetland 1A Surface Water COPC Refinement

During the surface water COPC refinement, additional information is used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs.

The COPC refinement process will include the following:

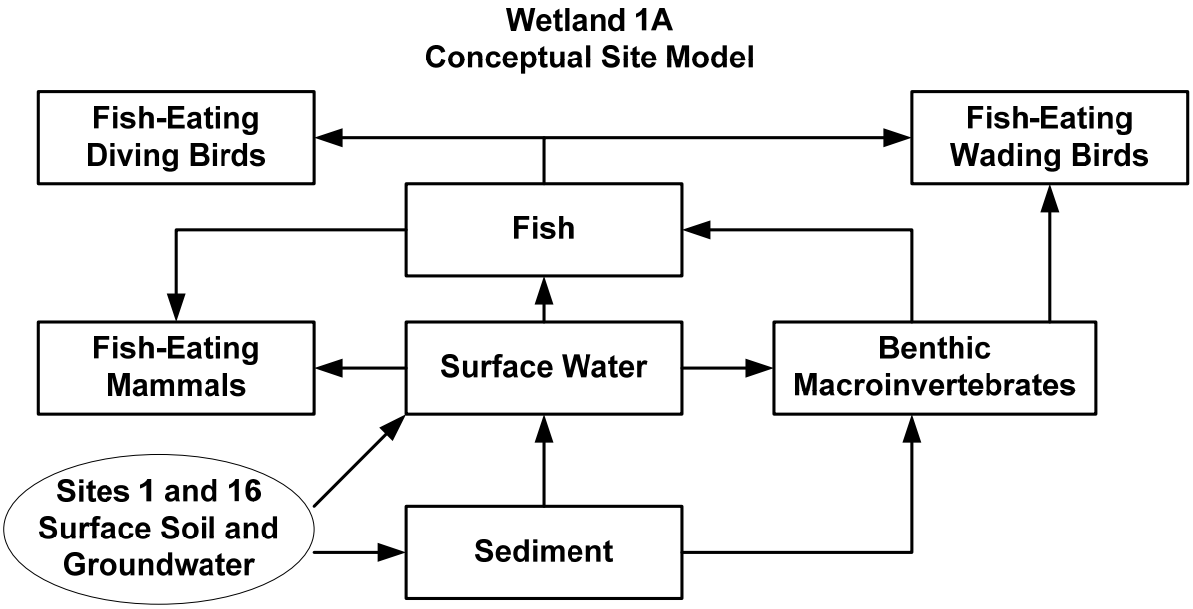
- Comparison of maximum SV concentrations to average SV concentrations
- Comparison of inorganic constituents to reference wetland values
- Description of surface water exceedances and their extent

The methods used in the COPC refinement in the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 10-1-11. Additionally, the tables compare 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland and 2) Wetland 1A concentrations to reference concentrations. Parameters retained after refinement are presented in Table 10-1-12.

For Wetland 1A, aluminum, chromium, iron, and lead generated screening HQs greater than 1. Aluminum, barium, calcium, chromium, iron, lead, manganese, and vanadium exceeded their Site 41 freshwater reference surface water concentrations (Table 10-1-11). The majority of the inorganic detections in surface water were located at sample location 001W000101. The surface water exceedance for calcium was located at sample location 041W010301.

At Wetland 1A during the Phase II investigation, two of the same constituents were retained in sediment and surface water samples. These two constituents, aluminum and vanadium, were detected at the same location — 041M000101/041W000101 — and have been retained as COPCs.

The conceptual model below symbolizes environmental habitats that may be impacted by Wetland 1A Phase II constituents retained during the ERA process.



10.1.5 Wetland 1A — Human Health Risk Assessment

Wetland 1 is described in Section 10.1.1, and the HHRA is summarized below.

10.1.5.1 Site Data

Surface water and sediment data were collected at Wetland 1 during Phase II of the RI. Section 10.1.3 summarizes the nature and extent of contamination for this wetland. Surface water and sediment data are summarized in Tables 10-1-2 and 10-1-3.

10.1.5.2 Conceptual Site Model

As described in Section 10.1.1, Wetland 1 was separated into freshwater Wetlands 1A and 1B, where Wetland 1A is the palustrine wetland documented by Parsons and Pruitt, and Wetland 1B is the adjacent storm water ditch. Access to Wetland 1 is limited by homeland security restrictions, so it is unlikely to be accessed by trespassers. However, Navy personnel could walk and/or wade through the area. Some sediment at this wetland is exposed for most of the year, so sediment exposure was assessed using soil exposure models. Dermal contact could be a significant exposure pathway and was included in this HHRA. Based on the species present, depth of surface water, and available habitat, fishing would not likely occur, and wading would be the most likely exposure scenario.

COPCs were identified as described in Section 9. The following scenarios and exposure pathways were evaluated for this wetland:

Scenario	Medium	Ingestion	Dermal
Maintenance	Sediment	√	√
	Surface water	√	√
Trespasser	Sediment	√	√
	Surface water	√	√

10.1.5.3 Wetland 1A — Risk Characterization

The child trespasser and adult maintenance worker scenarios were assessed for this wetland as described in Section 9.

Wetland 1A

Trespasser

As shown in Tables 10-1-13 through 10-1-18, there were no risk drivers for sediment or surface water at Wetland 1A. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 10-1-13 through 10-1-18, there were no risk drivers for sediment or surface water at Wetland 1A. Hazard indices were below 1.0.

Summary of Wetland 1A Phase Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	1.77E-2	5.25E-7
	Surface water	1.59E-2	NA
Trespasser	Sediment	2.16E-01	5.25E-06
	Surface water	6.34E-02	NA

Wetland 1A HHRA COC Summary

Based on the data, no COCs were identified for Wetland 1A.

10.1.6 Wetland 1A — Fate and Transport Analysis

This wetland lies on the southern side of IR Site 1, and the wetland drains to the west toward Wetland 1B and the headwaters of Redoubt Bayou (Figure 10-1). Two sediment samples and one surface water sample were collected at the headwaters of this wetland. Because there are no

associated soil borings, only the groundwater-surface water and groundwater-sediment pathways are evaluated.

The sediment and surface water COPCs retained after refinement are listed in Table 10-1-7 and 10-1-12 respectively. Associated monitoring wells to Wetland 1A are 01GI038 and 01GS039. There are no associated soil borings or contiguous wetlands contributing to Wetland 1A.

Groundwater to Wetland Media Pathways:

Surface Water — Based on the data from the associated monitoring wells, the groundwater to surface water pathway is not validated for any of the retained parameters (**note:** the 1993 metals data are not used for validation purposes due to potential bias introduced by the sampling methodology).

Sediment — Based on the data from the associated monitoring wells, the groundwater to sediment pathway is not validated for any of the retained parameters (**note:** the 1993 metals data are not used for validation purposes due to potential bias introduced by the sampling methodology).

Surface Water/Sediment Transport within the Wetland:

To evaluate this pathway, upgradient sediment 041M0101 was compared to downgradient location 041M0201.

Surface Water — Because only one surface water sample was collected, only the sediment transport pathway was evaluated.

Sediment — Evaluation of upgradient 041M0101 with downgradient 041M0201 indicates an increase in detected parameters (16 metals/one organic upgradient versus 20 metals/13 organics downgradient). Upgradient to downgradient, 13 metals increased, two decreased, and five were not detected upgradient. For the organics, 13 were not detected upgradient, and one increased. TOC exhibited a marked increase in concentration, and the increases in metals and organics are likely due in large part to this: the TOC provides a ready substrate for adsorption and thus "fixes" (immobilizes) the contaminants and reduces further transport within the wetland.

10.1.7 Wetland 1B — Sample Location Description

Phase II Sediment Sample Location Description

Wetland 1B is a storm water ditch adjacent to Wetland 1A. Two sediment samples were collected and analyzed for the Wetland 1B ERA. Sample locations for Wetland 1B were located at the base of the

concrete head wall (041M010301), which houses the storm water drainage system, and 50 feet downstream of the head wall (041M010401) (Figure 10-4). Table 10-1-19 provides a physical description of the sediments collected at Wetland 1B. Sediments at Wetland 1B were a very dark grayish brown poorly graded sand (041M010301) to a black silty sand with organics (041M010401). Wetland 1B is about 3 to 5 feet wide and up to 3 feet deep with TOC concentrations ranging from 0.53% to 3.06%.

Phase II Surface Water Sample Location Description

One surface water sample was collected at Wetland 1B (location 041W010301), closest to the cement head wall and located with one of the two sediment samples collected from this wetland (Figure 10-4). Table 10-1-20 provides a physical description of the surface water collected at Wetland 1B. Surface water from Wetland 1B was found to be moderately hard and slightly acidic. Surface water at Wetland 1B had a pH concentration of 6.70. Specific conductivity concentration was 0.231 mS/cm. Hardness as CaCO3 reported a concentration of 87.1 mg/L, and salinity was 0%. Surface water at Wetland 1B had a turbidity reading of 2 NTUs.

10.1.8 Wetland 1B — Nature and Extent of Contamination

Phase II Sediment

Table 10-1-21 summarizes the analytical results of the two sediment samples collected at Wetland 1B. Figure 10-4 presents the sediment sampling location.

Metals — Twenty metals were detected during sediment sampling at Wetland 1B. The greatest number of inorganic detections and reference value exceedances at Wetland 1B was centered at location 041M010401, where 20 analytes were detected. Of these 20 detections, only five — barium, cadmium, copper, lead, and zinc — exceeded the applicable freshwater reference values. Location 041M010301 exhibited detections of 17 metals, including a single reference value exceedance for zinc.

Pesticides and PCBs — Nine pesticide compounds and aroclor-1260 were detected during sediment sampling at Wetland 1B. Total DDT was calculated for each location by adding the concentrations of 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT. Likewise, a base-wide total DDT reference concentration was calculated using the base-wide concentrations for these same constituents. Total DDT did not exceed the base-wide level.

Both locations, 041M010301 and 041M010401, had detections of seven pesticide compounds and aroclor-1260. The highest concentrations of pesticides and PCBs detected in Wetland 1B sediment samples were at location 041M010401, except for endrin aldehyde at location 041M010301.

SVOCs — Six SVOCs were detected in Wetland 1B sediment samples. The highest concentrations were present at location 041M010401.

VOCs — No VOCs were detected in sediments collected from Wetland 1B.

Location 041M010401 exhibited the greatest number and generally the highest concentration of metals, pesticides, PCBs, and SVOCs in Wetland 1B sediments.

Phase II Surface Water

Table 10-1-22 summarizes the Wetland 1B surface water sample results.

Metals — Eight metals were detected in the single surface water sample collected at location 041W010301. Concentrations of barium, calcium, manganese, and zinc exceeded their respective freshwater reference values. Detected concentrations of iron, magnesium, potassium, and sodium were below reference concentrations.

Organic Constituents — No pesticides, PCBs, or SVOCs were detected during surface water sampling at Wetland 1B. The only VOC detected in the Wetland 1B surface water sample was MEK.

10.1.9 Ecological Risk Assessment

Phase II Investigation Summary — Wetland 1B

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-1-23, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values are carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-1-24.

Baseline Problem Formulation — Wetland 1B Sediment COPC Refinement

The same approach (Section 10.1.4) used to refine Wetland 1A sediments were applied to Wetland 1B sediments.

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 10-1-25. Parameters retained after refinement are summarized in Table 10-1-26.

For Wetland 1B, barium, cadmium, copper, lead, and zinc exceeded their Site 41 freshwater sediment reference concentrations and were retained for further consideration. The regression analysis presented in Appendix L shows that barium concentrations are below the expected natural background condition for both normalizers; therefore, barium is dropped as a COPC.

A maximum concentration of 153 mg/kg of lead was detected at one sample location, 041M010104, exceeding the screening and refinement value. Lead and zinc are retained through this process, since their concentrations exceeded natural background levels and risk-based screening and refinement values.

At Wetland 1B, total DDT was below base-wide level, indicating that 4,4'-DDT and its daughter products are not a concern for this wetland (Figure 10-5). Several pesticides, PCBs, and SVOCs were also detected at sample location 041M010401 and retained as screening COPCs during the ERA process. The pesticide constituents retained include: endosulfan sulfate (maximum detection 1.6 µg/kg); methoxychlor (maximum detection 6.6 µg/kg); and total chlordane (maximum detection 15.7 µg/kg). While the other pesticides do not have risk-based screening and refinement values, total chlordane exceeded its SV and RV at the location of the maximum detection. Total PCBs were not retained since they did not exceed their RV at any location; however, their average concentration does exceed the SV. BEHP was also detected at both locations and exceeded the RV at location 041M0104. The other SVOC included as a COPC is carbazole, which was only detected at location 041M0104.

Table 10-1-25 shows that, as a group, the PAHs had the highest organic HQs, but were refined out when applying the median effects concentration (MEC). The total PAH distribution is shown on Figure 10-6.

Table 10-1-27 presents the mean ERL and ERM values, the mean ERM quotients, and the mean ERM quotient category by individual sample location. Based on the methods and the approach detailed in Section 8, sample location 041M010301 was determined to be a Category 2. Sample location 041M010401 was determined to be a Category 3, indicating sediments are likely to cause adverse effects. The elevated constituents that drive sample location 041M010401 into

Category 3 are primarily PAHs. Figure 10-7 shows the mean ERM category for each sediment sample location at Wetland 1B.

Surface Water Screening — Level Risk-Estimation and Risk Calculation

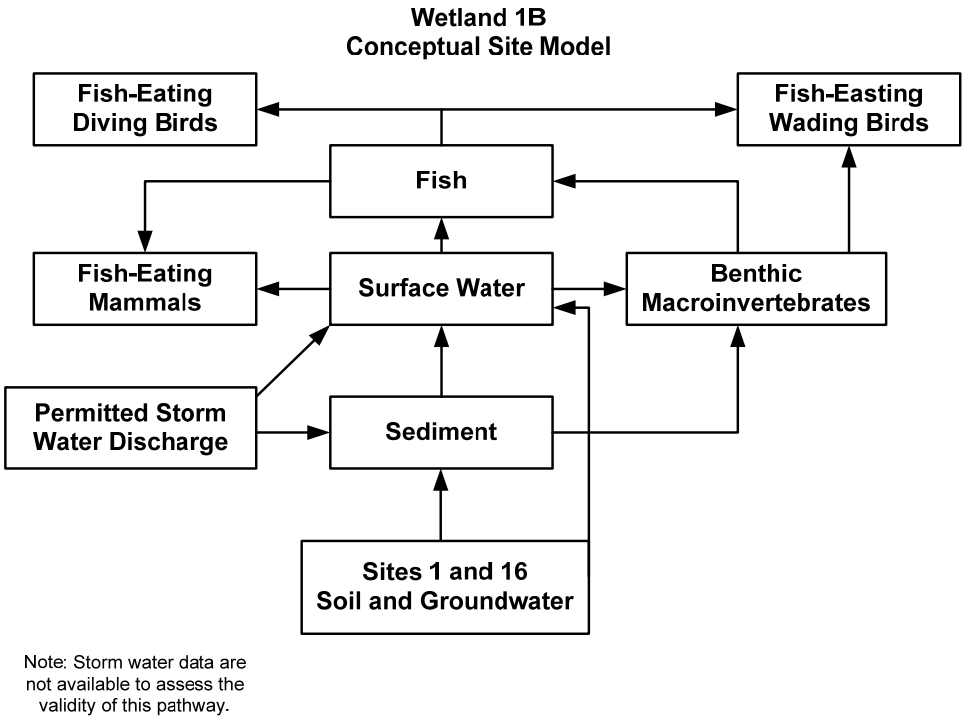
As presented in Table 10-1-28, surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values are carried forward to COPC refinement (Table 10-1-29).

Baseline Problem Formulation — Wetland 1B Surface Water COPC Refinement

The same approach (Section 10.1.4) used to refine Wetland 1A surface water were applied to Wetland 1B surface water. The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 10-1-30. Additionally, the tables compare 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland and 2) Wetland 1B concentrations to reference concentrations. COPCs retained after refinement are presented in Table 10-1-31.

For Wetland 1B, barium, calcium, and manganese exceeded their Site 41 freshwater reference concentrations (Table 10-1-30). Barium and manganese are included as COPCs; however, since calcium is considered an essential nutrient, the constituent was not retained. At Wetland 1B during the Phase II investigation, none of the same retained constituents were detected in sediment and surface water samples. Wetland 1B sediments had relatively low TOC values combined with several PAH detections, which could result from frequent runoff conditions scouring this storm water ditch.

The conceptual model below symbolizes which environmental habitats that may be impacted by Wetland 1B Phase II constituents retained during the ERA process.



As outlined in the approved *Final RI/FS SAP Addendum* (E/A&H, 1997d), Wetland 1 was classified as a Group D wetland and was not sampled during Phase III. To assess risks from contaminants that bioaccumulate, the results from Wetlands 1A and 1B will be used in the OU 1 food-chain model presented in Section 10.8.

10.1.10 Wetland 1B — Human Health Risk Assessment

Wetland 1 is described in Section 10.1.1, and the HHRA is summarized below.

10.1.10.1 Site Data

Surface water and sediment data were collected at Wetland 1 during Phase II of the RI. Section 10.1.8 summarizes the nature and extent of contamination for this wetland. Surface water and sediment data are summarized in Tables 10-1-21 and 10-1-22.

10.1.10.2 Conceptual Site Model

As described in Section 10.1.1, Wetland 1 was separated into freshwater Wetlands 1A and 1B, where Wetland 1A is the palustrine wetland documented by Parsons and Pruitt, and Wetland 1B is the adjacent storm water ditch. Access to Wetland 1 is limited by homeland security restrictions, so it is unlikely to be accessed by trespassers.

However, Navy personnel could walk and/or wade through the area. Some sediment at this wetland is exposed for most of the year, so sediment exposure was assessed using soil exposure models. Dermal contact could be a significant exposure pathway and was included in this HHRA. Based on the species present, depth of surface water, and available habitat, fishing would not likely occur, and wading would be the most likely exposure scenario.

COPCs were identified as described in Section 9. The following scenarios and exposure pathways were evaluated for this wetland:

Scenario	Medium	Ingestion	Dermal
Maintenance	Sediment	√	√
	Surface water	√	√
Trespasser	Sediment	√	√
	Surface water	√	√

10.1.10.3 Risk Characterization

The child trespasser and adult maintenance worker scenarios were assessed for this wetland as described in Section 9.

Wetland 1B

Trespasser

As shown in Tables 10-1-32 through 10-1-34, sediment ingestion risk estimates for maintenance workers exceed the FDEP risk threshold of 1E-6 for benzo(a)pyrene. Dermal contact risk estimates for maintenance workers exceed the FDEP risk threshold of 1E-6 for benzo(a)pyrene. As shown in Tables 10-1-35 through 10-1-37, surface water ingestion and dermal contact risk estimates for maintenance workers were below the FDEP risk threshold. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 10-1-32 through 10-1-34, sediment ingestion risk estimates for maintenance workers exceed the FDEP risk threshold of 1E-6 for benzo(a)pyrene. Dermal contact risk estimates for maintenance workers exceed the FDEP risk threshold of 1E-6 for benzo(a)pyrene and benzo(b)fluoranthene.

As shown in Tables 10-1-35 through 10-1-37, surface water ingestion and dermal contact risk estimates for maintenance workers were below the FDEP risk threshold. Hazard indices were below 1.0.

Summary of Wetland 1B Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	1.98E-3	1.61E-5
	Surface water	2.94E-4	NA
Trespasser	Sediment	2.68E-03	1.01E-05
	Surface water	1.85E-02	NA

Wetland 1B HHRA COC Summary

The following parameters were determined in the HHRA to be COCs for Wetland 1B:

- Benzo(a)pyrene
- Benzo(b)fluoranthene

10.1.11 Wetland 1B — Fate and Transport Analysis

This wetland lies immediately outside the southwest corner of OU 1. Two sediment samples and one surface water sample were collected at the headwaters of this wetland, well above its confluence with Wetland 1A; the wetland drains to the northwest toward its confluence with Wetland 1A and the headwaters of Redoubt Bayou. There are no associated monitoring wells or borings for Wetland 1B; therefore, only the surface water/sediment transport pathways within the wetland are evaluated.

The sediment and surface water COPCs retained after refinement for Wetland 1B are listed in Table 10-1-25 and 10-1-31 respectively.

Surface Water/Sediment Transport to other Wetland Media Pathways:

To evaluate this, parameters detected in upgradient location 041M010301 were compared with downgradient location 041M010401.

Surface Water — Only one surface water sample was collected; therefore, this pathway could not be evaluated.

Sediment — Evaluation of upgradient 041M010301 with downgradient 041M010401 indicates an increase in detected parameters (17 metals/20 organics upgradient versus 20 metals/21 organics downgradient). Three metals were present downgradient that were not detected upgradient, and 17 metals exhibited mostly moderate increases in concentration. Two organic parameters were present downgradient that were not detected upgradient, and 19 organic parameters exhibited generally

marked increases in concentration. TOC also exhibited a marked increase and is likely influencing this downgradient enrichment in parameters.

Wetland 1B

Wetland 1B is an adjacent, open storm water ditch. This drainage ditch begins at an outfall formed by twin 54-inch concrete pipes and merges downstream with Wetland W2. Sample locations 041M010301 and 041M010401 were collected just downstream from this outfall. A review of the NAS Pensacola SWPPP shows a system of underground concrete pipes leading to this outfall. Wetland 1B is currently being monitored under the Storm Water Pollution Prevention Program in accordance with the Florida Generic Permit.

Based on the review of Screening HQs, Refinement HQs, and the other refinement tools, the constituents most likely to occur at concentrations high enough to cause adverse effects are pesticides and PAHs. Storm water runoff from roads and parking lots into the storm water drainage system is the likely source of PAHs at locations 041M010301 and 041M010401.

Since Wetland 1B will continue to be used as a storm water conveyance system, it is likely that the system will recontaminate itself after every rain event and continue to generate HQ exceedances for PAHs.

Based on the Phase II results, Wetland 1 (wetland and drainage ditch) was identified in the approved *Final RI/FS SAP Addendum* (E/A&H, 1997d) as an Orange-Coded Wetland, indicating contamination that was possibly related to nearby IR sites, but with limited contaminants exceeding sediment criteria and reference concentrations. Contaminants detected in these wetlands were also considered to be possible sources of ecological risk. In addition, Wetland 1 was classified as a Group D wetland. Group D also contains Wetlands 10, 6, 5B, and W1. As stated in the approved *Final RI/FS SAP Addendum* (E/A&H, 1997d), Group D wetlands were removed from further consideration based on the potential receptors to contaminant concentrations.

Table 10-1-1
Wetland 1A Phase II
Sediment Physical Parameters

Parameter		041M010101	041M010201
Percent Solids (%)		74.0000	42.2000
TOC (%)		3.6300	14.5000
Grain Size Analysis			
(percent of composition[1])			
	Fine Gravel	N/A	1.0000
	Coarse Sand	0.0000	1.0000
	Medium Sand	5.0000	13.0000
	Fine Sand	71.0000	32.0000
	Silt and Clay	24.0000	53.0000
	Description	Black Silty Sand with Organics	Black Sandy Silt with Organics

Note:
1 = Derived from sieve analyses.

Table 10-1-2
Wetland 1A Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	13,610.0	1	3	3	2,230.0	27,800.0	11,500.0	041M010201
Antimony	4.430	1	1	3	3.10	3.10	3.210	041M010201
Arsenic	6.620	0	2	3	0.440	2.50	1.180	041M010101
Barium	14.0	1	3	3	3.70	73.90	29.50	041M010201
Beryllium	0.840	0	1	3	0.750	0.750	0.340	041M010201
Cadmium	1.80	0	1	3	1.20	1.20	0.675	041M010201
Calcium	10,756.670	0	3	3	327.0	2,390.0	1,090.0	041M010201
Chromium	39.370	1	3	3	1.50	57.70	22.30	041M010201
Cobalt	2.80	0	1	3	1.80	1.80	0.925	041M010201
Copper	19.50	1	3	3	1.10	22.30	9.830	041M010201
Iron	11,911.670	0	3	3	484.0	6,150.0	2,710.0	041M010201
Lead	82.470	1	3	3	1.80	87.30	37.0	041M010101
Magnesium	7,513.330	0	3	3	75.90	621.0	276.0	041M010201
Manganese	37.970	0	3	3	3.70	17.80	8.50	041M010201
Mercury	0.550	0	2	3	0.070	0.250	0.142	041M010201
Nickel	9.280	0	2	3	0.80	8.0	5.780	041M010201
Potassium	1,628.670	0	2	3	55.90	309.0	303.0	041M010201
Selenium	3.450	0	1	3	1.30	1.30	0.80	041M010101
Sodium	18,993.330	0	2	3	97.0	204.0	103.0	001M000101
Vanadium	28.670	1	3	3	2.30	35.30	14.0	041M010201
Zinc	36.730	1	3	3	2.20	91.0	34.50	041M010201
Pesticides and PCBs (g/kg)								
Aroclor-1260	N/A	0	1	3	7.70	7.70	13.60	041M010201
Total PCBs	N/A	0	1	3	22.0	22.0	96.10	041M010201
Dieldrin	N/A	0	2	3	3.70	6.90	3.570	041M010201
alpha-Chlordane	N/A	0	1	3	2.70	2.70	1.470	041M010201
gamma-Chlordane	N/A	0	1	3	1.90	1.90	1.20	041M010201
Total Chlordane	N/A	0	1	3	4.60	4.60	2.670	041M010201
4,4'-DDD	50.0	0	2	3	3.10	7.90	3.710	041M010201
4,4'-DDE	40.0	0	2	3	5.80	8.60	4.840	041M010201
4,4'-DDT	20.0	0	2	3	1.10	1.20	0.805	001M000101
Total DDT	110.0	0	2	3	10.10	17.60	9.350	041M010201
SVOCs (g/kg)								
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	2	3	41.0	260.0	207.0	041M010201
VOCs (g/kg)								
2-Butanone (MEK)	N/A	0	1	3	110.0	110.0	42.30	041M010201
Acetone	N/A	0	1	3	250.0	250.0	90.30	041M010201

Notes:
g/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
N/A = Not Applicable

Table 10-1-3
Wetland 1A Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (g/L)								
Aluminum	1,090.25	1	1	1	2,120.0	2,120.0	2,120.0	001W000101
Arsenic	2.7	1	1	1	3.4	3.4	3.4	001W000101
Barium	3.68	1	1	1	32.1	32.1	32.1	001W000101
Calcium	7,675.0	1	1	1	11,700.0	11,700.0	11,700.0	001W000101
Chromium	8.0	1	1	1	13.5	13.5	13.5	001W000101
Copper	4.0	1	1	1	7.5	7.5	7.5	001W000101
Iron	2,360.0	1	1	1	3,540.0	3,540.0	3,540.0	001W000101
Lead	3.2	1	1	1	6.0	6.0	6.0	001W000101
Magnesium	20,260.0	0	1	1	2,140.0	2,140.0	2,140.0	001W000101
Manganese	13.2	1	1	1	143.0	143.0	143.0	001W000101
Potassium	6,995.0	0	1	1	1,040.0	1,040.0	1,040.0	001W000101
Sodium	182,200.0	0	1	1	5,510.0	5,510.0	5,510.0	001W000101
Vanadium	4.7	1	1	1	10.2	10.2	10.2	001W000101
Zinc	5.53	1	1	1	39.7	39.7	39.7	001W000101

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 10-1-4
Wetland 1A Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	3	3			2,230	27,800	041M010201	27,800	J		N/A		Yes	No SV
Antimony	1	3	0.075	6.45	3.1	3.1	041M010201	3.1	J	12	2	0.26	No	Max Detect < SV
Arsenic	2	3	0.6	0.6	0.44	2.5	041M010101	2.5		7.24	1, 2	0.35	No	Max Detect < SV
Barium	3	3			3.7	73.9	041M010201	73.9			N/A		Yes	No SV
Beryllium	1	3	0.035	0.235	0.75	0.75	041M010201	0.75			N/A		Yes	No SV
Cadmium	**1**	**3**	**0.075**	**0.75**	**1.2**	**1.2**	**041M010201**	**1.2**		**0.676**	**1**	**1.78**	**Yes**	**Max Detect > SV**
Calcium	3	3			327	2,390	041M010201	2,390	J		N/A		Yes	No SV
Chromium	**3**	**3**			**1.5**	**57.7**	**041M010201**	**57.7**		**52.3**	**1, 2**	**1.1**	**Yes**	**Max Detect > SV**
Cobalt	1	3	0.075	0.9	1.8	1.8	041M010201	1.8	J		N/A		Yes	No SV
Copper	**3**	**3**			**1.1**	**22.3**	**041M010201**	**22.3**		**18.7**	**1, 2**	**1.19**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	3	0.315	0.6			ND	0.6	U		N/A		Yes	No SV
Iron	3	3			484	6,150	041M010201	6,150			N/A		Yes	No SV
Lead	**3**	**3**			**1.8**	**87.3**	**041M010101**	**87.3**		**30.2**	**1, 2**	**2.89**	**Yes**	**Max Detect > SV**
Magnesium	3	3			75.9	621	041M010201	621	J		N/A		Yes	No SV
Manganese	3	3			3.7	17.8	041M010201	17.8			N/A		Yes	No SV
Mercury	**2**	**3**	**0.105**	**0.105**	**0.07**	**0.25**	**041M010201**	**0.25**		**0.13**	**1, 2**	**1.92**	**Yes**	**Max Detect > SV**
Nickel	2	3	8.55	8.55	0.8	8	041M010201	8		15.9	1, 2	0.50	No	Max Detect < SV
Potassium	2	3	545	545	55.9	309	041M010201	309	J		N/A		Yes	No SV
Selenium	1	3	0.25	0.85	1.3	1.3	041M010101	1.3			N/A		Yes	No SV
Silver	0	3	0.185	0.85			ND	0.85	U	0.733	1	1.16	Yes	Max SQL> SV
Sodium	2	3	8	8	97	204	001M000101	204			N/A		Yes	No SV
Thallium	0	3	0.15	0.75			ND	0.75	U		N/A		Yes	No SV
Vanadium	3	3			2.3	35.3	041M010201	35.3			N/A		Yes	No SV
Zinc	3	3			2.2	91	041M010201	91		124	1, 2	0.73	No	Max Detect < SV
PAHs (µg/kg)														
2-Methylnaphthalene	0	3	22.5	320			ND	320	U	20.2	1	15.8	No	TOC normalized PAHs < TEC
Acenaphthene	0	3	11	320			ND	320	U	6.71	1	47.7	No	TOC normalized PAHs < TEC
Acenaphthylene	0	3	22.5	320			ND	320	U	5.87	1	54.5	No	TOC normalized PAHs < TEC
Anthracene	0	3	22.5	320			ND	320	U	46.9	1	6.82	No	TOC normalized PAHs < TEC
Benzo(a)anthracene	0	3	22.5	320			ND	320	U	74.8	1	4.28	No	TOC normalized PAHs < TEC
Benzo(a)pyrene	0	3	22.5	320			ND	320	U	88.8	1	3.6	No	TOC normalized PAHs < TEC
Chrysene	0	3	22.5	320			ND	320	U	108	1	2.96	No	TOC normalized PAHs < TEC
Dibenz(a,h)anthracene	0	3	22.5	320			ND	320	U	6.22	1	51.4	No	TOC normalized PAHs < TEC
Fluoranthene	0	3	22.5	320			ND	320	U	113	1	2.83	No	TOC normalized PAHs < TEC
Fluorene	0	3	11	320			ND	320	U	21.2	1	15.1	No	TOC normalized PAHs < TEC
Naphthalene	0	3	22.5	320			ND	320	U	34.6	1	9.25	No	TOC normalized PAHs < TEC
Phenanthrene	0	3	22.5	320			ND	320	U	86.7	1	3.69	No	TOC normalized PAHs < TEC
Pyrene	0	3	22.5	320			ND	320	U	153	1	2.09	No	TOC normalized PAHs < TEC
Total PAHs	0	3	270	4160			ND	4160	U	1684	1, 2	2.47	No	TOC normalized PAHs < TEC
TOC Normalized PAHs	0	3	7.42	114.6			ND	114.6	U	290	3	0.395	No	Max SQL< SV
PCBs (µg/kg)														
Aroclor-1016	0	3	1.15	32			ND	32	UJ	21.6	N/A	1.48	Yes	Max SQL> SV
Aroclor-1221	0	3	2.3	65			ND	65	UJ	67	2	0.97	No	Max SQL< SV
Aroclor-1232	0	3	1.15	32			ND	32	UJ	21.6	N/A	1.48	Yes	Max SQL> SV
Aroclor-1242	0	3	1.15	32			ND	32	UJ	21.6	N/A	1.48	Yes	Max SQL> SV
Aroclor-1248	0	3	1.15	32			ND	32	UJ	21.6	N/A	1.48	Yes	Max SQL> SV
Aroclor-1254	0	3	1.15	32			ND	32	UJ	21.6	N/A	1.48	Yes	Max SQL> SV
Aroclor-1260	1	3	1.15	32	7.7	7.7	041M010201	7.7	J	21.6	N/A	0.36	No	Max Detect < SV
Total PCBs	**1**	**3**	**9.2**	**257**	**22**	**22**	**041M010201**	**22**		**21.6**	**1**	**1.02**	**Yes**	**Max Detect > SV**
Pesticides (µg/kg)														
Aldrin	0	3	0.055	1.65			ND	1.65	U		N/A		Yes	No SV
Dieldrin	**2**	**3**	**0.115**	**0.115**	**3.7**	**6.9**	**041M010201**	**6.9**	**J**	**0.716**	**1**	**9.64**	**Yes**	**Max Detect > SV**
Endosulfan I	0	3	0.055	1.65			ND	1.65	U		N/A		Yes	No SV
Endosulfan II	0	3	0.115	3.2			ND	3.2	U		N/A		Yes	No SV
Endosulfan sulfate	0	3	0.115	3.2			ND	3.2	U		N/A		Yes	No SV
Heptachlor	0	3	0.055	1.65			ND	1.65	U		N/A		Yes	No SV
Heptachlor epoxide	0	3	0.055	1.65			ND	1.65	U		N/A		Yes	No SV
Methoxychlor	0	3	0.55	16.5			ND	16.5	U		N/A		Yes	No SV
Toxaphene	0	3	11.5	165			ND	165	U		N/A		Yes	No SV
alpha-Chlordane	**1**	**3**	**0.055**	**1.65**	**2.7**	**2.7**	**041M010201**	**2.7**	**J**	**1.7**	**1**	**1.59**	**Yes**	**Max Detect > SV**
gamma-Chlordane	**1**	**3**	**0.055**	**1.65**	**1.9**	**1.9**	**041M010201**	**1.9**	**J**	**1.7**	**1**	**1.12**	**Yes**	**Max Detect > SV**
Total Chlordane	**1**	**3**	**0.11**	**3.3**	**4.6**	**4.6**	**041M010201**	**4.6**		**1.7**	**1**	**2.71**	**Yes**	**Max Detect > SV**
Endrin	0	3	0.115	3.2			ND	3.2	U	3.3	2	0.97	No	Max SQL< SV
Endrin aldehyde	0	3	0.115	3.2			ND	3.2	U	3.3	2	0.97	No	Max SQL< SV
Endrin ketone	0	3	0.115	3.2			ND	3.2	U	3.3	2	0.97	No	Max SQL< SV
Total Endrin	0	3	0.345	9.6			ND	9.6	U	3.3	2	2.91	Yes	Max SQL> SV
alpha-BHC	0	3	0.055	1.65			ND	1.65	UJ		N/A		Yes	No SV
beta-BHC	0	3	0.055	1.65			ND	1.65	UJ	0.32	N/A	5.16	Yes	Max SQL> SV
delta-BHC	0	3	0.055	1.65			ND	1.65	UJ	0.32	N/A	5.16	Yes	Max SQL> SV
gamma-BHC (Lindane)	0	3	0.055	1.65			ND	1.65	UJ	0.32	1	5.16	Yes	Max SQL> SV
Total BHC	0	3	0.22	6.6			ND	6.6	U	0.32	2	20.6	Yes	Max SQL> SV
4,4'-DDD	**2**	**3**	**0.115**	**0.115**	**3.1**	**7.9**	**041M010201**	**7.9**	**J**	**1.22**	**1**	**6.48**	**Yes**	**Max Detect > SV**
4,4'-DDE	**2**	**3**	**0.115**	**0.115**	**5.8**	**8.6**	**041M010201**	**8.6**	**J**	**2.07**	**1**	**4.15**	**Yes**	**Max Detect > SV**
4,4'-DDT	**2**	**3**	**0.115**	**0.115**	**1.1**	**1.2**	**001M000101**	**1.2**	**J**	**1.19**	**1**	**1.01**	**Yes**	**Max Detect > SV**
Total DDT	**2**	**3**	**0.345**	**0.345**	**10.1**	**17.6**	**041M010201**	**17.6**		**3.3**	**2**	**5.33**	**Yes**	**Max Detect > SV**
SVOCs (µg/kg)														
1,2,4-Trichlorobenzene	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	3	550	4,850			ND	4,850	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	3	550	4,850			ND	4,850	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
2-Chloronaphthalene	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
2-Chlorophenol	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	3	550	4,850			ND	4,850	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
2-Nitroaniline	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
2-Nitrophenol	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
3-Nitroaniline	0	3	550	4,850			ND	4,850	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
4-Chloroaniline	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
4-Nitroaniline	0	3	550	4,850			ND	4,850	U		N/A		Yes	No SV
4-Nitrophenol	0	3	550	4,850			ND	4,850	U		N/A		Yes	No SV
Benzo(b)fluoranthene	0	3	22.5	320			ND	320	U		N/A		No	TOC normalized PAHs < TEC
Benzo(g,h,i)perylene	0	3	22.5	320			ND	320	U		N/A		No	TOC normalized PAHs < TEC
Benzo(k)fluoranthene	0	3	22.5	320			ND	320	U		N/A		No	TOC normalized PAHs < TEC
bis(2-Chloroethoxy)methane	0	3	225	2,000			ND	2000	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**2**	**3**	**320**	**320**	**41**	**260**	**041M010201**	**260**	**J**	**182**	**1, 2**	**1.43**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	0	3	225	2,000			ND	2,000	U	182	1, 2	11	Yes	Max SQL > SV
Carbazole	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
Dibenzofuran	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
Diethylphthalate	0	3	225	2,000			ND	2,000	U	182	1, 2	11	Yes	Max SQL > SV
Dimethylphthalate	0	3	225	2,000			ND	2,000	U	182	1, 2	11	Yes	Max SQL > SV
Di-n-butylphthalate	0	3	225	2,000			ND	2,000	U	182	1, 2	11	Yes	Max SQL > SV
Di-n-octylphthalate	0	3	225	2,000			ND	2,000	U	182	1, 2	11	Yes	Max SQL > SV
Hexachlorobenzene	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
Hexachlorobutadiene	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
Hexachloroethane	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	3	22.5	320			ND	320	U		N/A		No	TOC normalized PAHs < TEC
Isophorone	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
Nitrobenzene	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	3	22.5	320			ND	320	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV
Pentachlorophenol	0	3	550	4,850			ND	4,850	U		N/A		Yes	No SV
Phenol	0	3	225	2,000			ND	2,000	U		N/A		Yes	No SV

Table 10-1-4
Wetland 1A Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
VOCs (µg/kg)														
1,1,1-Trichloroethane	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
1,1,2-Trichloroethane	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
1,1-Dichloroethane	0	3	7	10.5			ND	10.5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	3	7	10.5			ND	10.5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	3	7	10.5			ND	10.5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	3	7	10.5			ND	10.5	U		N/A		Yes	No SV
1,2-Dichloropropane	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
2-Butanone (MEK)	1	3	7	10	110	110	041M010201	110			N/A		Yes	No SV
2-Hexanone	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
Acetone	1	3	7	14	250	250	041M010201	250			N/A		Yes	No SV
Benzene	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
Bromodichloromethane	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
Bromoform	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
Bromomethane	0	3	7	10.5			ND	10.5	U		N/A		Yes	No SV
Carbon disulfide	0	3	7	10.5			ND	10.5	U		N/A		Yes	No SV
Carbon tetrachloride	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
Chlorobenzene	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
Chloroethane	0	3	7	10.5			ND	10.5	U		N/A		Yes	No SV
Chloroform	0	3	7	10.5			ND	10.5	U		N/A		Yes	No SV
Chloromethane	0	3	7	10.5			ND	10.5	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
Dibromochloromethane	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
Ethylbenzene	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
Methylene chloride	0	3	7	60			ND	60	U		N/A		Yes	No SV
Styrene	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
Tetrachloroethene	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
Trichloroethene	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV
Vinyl chloride	0	3	2	10			ND	10	U		N/A		Yes	No SV
Xylene (Total)	0	3	7	10.5			ND	10.5	UJ		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 10-1-5
Wetland 1A Phase II
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	Dieldrin	bis(2-Ethylhexyl)phthalate (BEHP)	2-Butanone (MEK)
Barium	alpha-Chlordane		Acetone
Beryllium	gamma-Chlordane		
Cadmium	Total Chlordane		
Calcium	4,4'-DDD		
Chromium	4,4'-DDE		
Cobalt	4,4'-DDT		
Copper	Total DDT		
Iron	Total PCBs		
Lead			
Magnesium			
Manganese			
Mercury			
Potassium			
Selenium			
Sodium			
Vanadium			
		Not Detected Parameters	
Cyanide (CN)	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Thallium	Endosulfan I	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
Silver	Endosulfan II	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Endosulfan sulfate	1,4-Dichlorobenzene	1,1-Dichloroethane
	Heptachlor	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Heptachlor epoxide	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Methoxychlor	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
	Toxaphene	2,4-Dichlorophenol	1,2-Dichloropropane
	Total Endrin	2,4-Dimethylphenol	2-Hexanone
	alpha-BHC	2,4-Dinitrophenol	4-Methyl-2-Pentanone (MIBK)
	beta-BHC	2,4-Dinitrotoluene	Benzene
	delta-BHC	2,6-Dinitrotoluene	Bromodichloromethane
	gamma-BHC (Lindane)	2-Chloronaphthalene	Bromoform
	Total BHC	2-Chlorophenol	Bromomethane
	Aroclor-1016	2-Methyl-4,6-Dinitrophenol	Carbon disulfide
	Aroclor-1232	2-Methylphenol (o-Cresol)	Carbon tetrachloride
	Aroclor-1242	2-Nitroaniline	Chlorobenzene
	Aroclor-1248	2-Nitrophenol	Chloroethane
	Aroclor-1254	3,3'-Dichlorobenzidine	Chloroform
		3-Nitroaniline	Chloromethane
		4-Bromophenyl-phenylether	cis-1,3-Dichloropropene
		4-Chloro-3-methylphenol	Dibromochloromethane
		4-Chloroaniline	Ethylbenzene
		4-Chlorophenylphenyl ether	Methylene chloride
		4-Methylphenol (p-Cresol)	Styrene
		4-Nitroaniline	Tetrachloroethene
		4-Nitrophenol	Toluene
		bis(2-Chloroethoxy)methane	trans-1,3-Dichloropropene
		bis(2-Chloroethyl)ether	Trichloroethene
		Butylbenzylphthalate	Vinyl chloride
		Carbazole	Xylene (Total)
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 10-1-6
Wetland 1A Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	3	3				11,500	2,230	27,800	27,800	J	041M010201			NA					0	13,610	1	Yes	EPC > RC and no RV
Barium	3	3				29.5	3.7	73.9	73.9		041M010201			NA					0	14	1	Yes	EPC > RC and no RV
Beryllium	1	3	0.135	0.035	0.235	0.34	0.75	0.75	0.75		041M010201			NA					0	0.84	0	No	EPC < RC
Cadmium	1	3	0.412	0.075	0.75	0.675	1.2	1.2	1.2		041M010201	0.68	4.21	PEL	1.78	1.00	0.29	0.16	0	1.8	0	No	EPC < RC and RV
Calcium	3	3				1,090	327	2,390	2,390	J	041M010201			NA					0	10,756.67	0	No	EPC < RC
Chromium	3	3				22.3	1.5	57.7	57.7		041M010201	52.3	160	PEL	1.1	0.43	0.36	0.14	0	39.37	1	No	EPC > RC, but < RV
Cobalt	1	3	0.487	0.075	0.9	0.925	1.8	1.8	1.8	J	041M010201			NA					0	2.8	0	No	EPC < RC
Copper	3	3				9.83	1.1	22.3	22.3		041M010201	18.7	108	PEL	1.19	0.53	0.21	0.09	0	19.5	1	No	EPC > RC, but < RV
Cyanide (CN)	0	3	0.488	0.315	0.6	0.488			0.6	U	ND			NA					0	5.22	0	No	EPC < RC
Iron	3	3				2,710	484	6,150	6,150		041M010201			NA					0	11,911.67	0	No	EPC < RC
Lead	3	3				37	1.8	87.3	87.3		041M010101	30.2	112	PEL	2.89	1.23	0.78	0.33	0	82.47	1	No	EPC > RC, but < RV
Magnesium	3	3				276	75.9	621	621	J	041M010201			NA					0	7,513.33	0	No	EPC < RC
Manganese	3	3				8.5	3.7	17.8	17.8		041M010201			NA					0	37.97	0	No	EPC < RC
Mercury	2	3	0.105	0.105	0.105	0.142	0.07	0.25	0.25		041M010201	0.13	0.696	PEL	1.92	1.09	0.36	0.20	0	0.55	0	No	EPC < RC and RV
Potassium	2	3	545	545	545	303	55.9	309	309	J	041M010201			NA					0	1,628.67	0	No	EPC < RC
Selenium	1	3	0.55	0.25	0.85	0.8	1.3	1.3	1.3		041M010101			NA					0	3.45	0	No	EPC < RC
Silver	0	3	0.45	0.185	0.85	0.45			0.85	U	ND	0.73	1.77	PEL	1.16	0.61	0.48	0.25	0	2.1	0	No	EPC < RC and RV
Sodium	2	3	8	8	8	103	97	204	204		001M000101			NA					0	18933.33	0	No	EPC < RC
Thallium	0	3	0.383	0.15	0.75	0.383			0.75	U	ND			NA					0	1.57	0	No	EPC < RC
Vanadium	3	3				14	2.3	35.3	35.3		041M010201			NA					0	28.77	1	Yes	EPC > RC and no RV
PAHs (g/kg)																							
2-Methylnaphthalene	0	3	181	22.5	320	181			320	U	ND	20.2	201	PEL	15.8	8.95	1.59	0.9	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthene	0	3	142	11	320	142			320	U	ND	6.71	88.9	PEL	47.7	21.2	3.6	1.6	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthylene	0	3	181	22.5	320	181			320	U	ND	5.87	128	PEL	54.5	30.8	2.5	1.41	0		0	No	Parameter Not Detected; Max SQL > RV
Dibenz(a,h)anthracene	0	3	181	22.5	320	181			320	U	ND	6.22	135	PEL	51.4	29.1	2.37	1.34	0		0	No	Parameter Not Detected; Max SQL > RV
PCBs (g/kg)																							
Aroclor-1016	0	3	11.7	1.15	32	11.7			32	UJ	ND	21.6	189	PEL	1.48	0.54	0.17	0.06	0		0	No	RV HQ <1 and no RC
Aroclor-1221	0	3		2.3	65				65	J	ND	67	189	PEL	0.97		0.34		0		0	No	RV HQ <1 and no RC
Aroclor-1232	0	3	11.7	1.15	32	11.7			32	UJ	ND	21.6	189	PEL	1.48	0.54	0.17	0.06	0		0	No	RV HQ <1 and no RC
Aroclor-1242	0	3	11.7	1.15	32	11.7			32	UJ	ND	21.6	189	PEL	1.48	0.54	0.17	0.06	0		0	No	RV HQ <1 and no RC
Aroclor-1248	0	3	11.7	1.15	32	11.7			32	UJ	ND	21.6	189	PEL	1.48	0.54	0.17	0.06	0		0	No	RV HQ <1 and no RC
Aroclor-1254	0	3	11.7	1.15	32	11.7			32	UJ	ND	21.6	189	PEL	1.48	0.54	0.17	0.06	0		0	No	RV HQ <1 and no RC
Aroclor-1260	1	3		1.15	32				7.7	J	041M010201	21.6	189	PEL	0.36		0.04		0		0	No	RV HQ <1 and no RC
Total PCBs	1	3	133	9.2	257	96.1	22	22	22		041M010201	21.6	189	PEL	1.02	4.45	0.12	0.51	0		0	No	RV HQ <1 and no RC
Pesticides (g/kg)																							
Aldrin	0	3	0.602	0.055	1.65	0.602			1.65	U	ND			NA					0		0	No	Parameter Not Detected
Dieldrin	**2**	**3**	**0.115**	**0.115**	**0.115**	**3.57**	**3.7**	**6.9**	**6.9**	**J**	**041M010201**	**0.7**	**4.3**	**PEL**	**9.64**	**4.99**	**1.6**	**0.83**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Endosulfan I	0	3	0.602	0.055	1.65	0.602			1.65	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	3	1.17	0.115	3.2	1.17			3.2	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	0	3	1.17	0.115	3.2	1.17			3.2	U	ND			NA					0		0	No	Parameter Not Detected
Endrin	0	3		0.115	3.2				3.2	U	ND	3.3			0.97				0		0	No	Parameter Not Detected
Endrin aldehyde	0	3		0.115	3.2				3.2	U	ND	3.3			0.97				0		0	No	Parameter Not Detected
Endrin ketone	0	3		0.115	3.2				3.2	U	ND	3.3			0.97				0		0	No	Parameter Not Detected
Total Endrin	0	3		0.345	9.6				9.6	U	ND	3.3			2.91				0		0	No	Parameter Not Detected
Heptachlor	0	3	0.602	0.055	1.65	0.602			1.65	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	3	0.602	0.055	1.65	0.602			1.65	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	3	6.02	0.55	16.5	6.02			16.5	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	3	65.7	11.5	165	65.7			165	U	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	1	3	0.853	0.055	1.65	1.47	2.7	2.7	2.7	J	041M010201	1.7	4.79	PEL	1.59	0.86	0.56	0.31	0		0	No	RV HQ <1 and no RC
gamma-Chlordane	1	3	0.853	0.055	1.65	1.2	1.9	1.9	1.9	J	041M010201	1.7	4.79	PEL	1.12	0.71	0.40	0.25	0		0	No	RV HQ <1 and no RC
Total Chlordane	1	3	1.71	0.11	3.3	2.67	4.6	4.6	4.6		041M010201	1.7	4.79	PEL	2.71	1.57	0.96	0.56	0		0	No	RV HQ <1 and no RC
alpha-BHC	0	3	0.602	0.055	1.65	0.602			1.65	UJ	ND		0.99	PEL			1.67	0.61	0		0	No	Parameter Not Detected; Max SQL > RV
beta-BHC	0	3	0.602	0.055	1.65	0.602			1.65	UJ	ND	0.32	0.99	PEL	5.16	1.88	1.67	0.61	0		0	No	Parameter Not Detected; Max SQL > RV
delta-BHC	0	3	0.602	0.055	1.65	0.602			1.65	UJ	ND	0.32	0.99	PEL	5.16	1.88	1.67	0.61	0		0	No	Parameter Not Detected; Max SQL > RV
gamma-BHC (Lindane)	0	3	0.602	0.055	1.65	0.602			1.65	UJ	ND	0.32	0.99	PEL	5.16	1.88	1.67	0.61	0		0	No	Parameter Not Detected; Max SQL > RV
Total BHC	0	3	2.41	0.22	6.6	2.41			6.6	U	ND	0.32	0.99	PEL	20.6	7.52	6.67	2.43	0		0	No	Parameter Not Detected; Max SQL > RV
4,4'-DDD	**2**	**3**	**0.115**	**0.115**	**0.115**	**3.71**	**3.1**	**7.9**	**7.9**	**J**	**041M010201**	**1.2**	**7.81**	**PEL**	**6.48**	**3.04**	**1.01**	**0.47**	**1**	**50**	**0**	**No**	**EPC > RV, but < RC**
4,4'-DDE	2	3	0.115	0.115	0.115	4.84	5.8	8.6	8.6	J	041M010201	2.07	374	PEL	4.15	2.34	0.02	0.01	0	40	0	No	EPC < RC and RV
4,4'-DDT	2	3	0.115	0.115	0.115	0.805	1.1	1.2	1.2	J	001M000101	1.19	4.77	PEL	1.01	0.68	0.25	0.17	0	20	0	No	EPC < RC and RV
Total DDT	2	3	0.345	0.345	0.345	9.35	10.1	17.6	17.6		041M010201	3.3	51.7	PEL	5.33	2.83	0.34	0.18	0	110	0	No	EPC < RC and RV
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	3	2,050	550	4,850	2,050			4,850	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	3	2,050	550	4,850	2,050			4,850	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	3	2,050	550	4,850	2,050			4,850	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	3	992	225	2,000	992			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	3	2,050	550	4,850	2,050			4,850	U	ND			NA					0		0	No	Parameter Not Detected

Table 10-1-6
Wetland 1A Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
4-Bromophenyl-phenylether	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	3	2,050	550	4,850	2,050			4,850	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	3	2,050	550	4,850	2,050			4,850	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	3	181	22.5	320	181			320	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	3	181	22.5	320	181			320	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	3	181	22.5	320	181			320	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	3	181	22.5	320	181			320	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	2	3	320	320	320	207	41	260	260	J	041M010201	182	2647	PEL	1.43	1.14	0.10	0.08	0		0	No	EPC < RV and no RC
Butylbenzylphthalate	0	3	848	225	2,000	848			2,000	U	ND	182	2647	PEL	11	4.66	0.76	0.32	0		0	No	RV HQ <1 and no RC
Carbazole	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	0	3	848	225	2,000	848			2,000	U	ND	182	2647	PEL	11	4.66	0.76	0.32	0		0	No	RV HQ <1 and no RC
Dimethylphthalate	0	3	848	225	2,000	848			2,000	U	ND	182	2647	PEL	11	4.66	0.76	0.32	0		0	No	RV HQ <1 and no RC
Di-n-butylphthalate	0	3	848	225	2,000	848			2,000	U	ND	182	2647	PEL	11	4.66	0.76	0.32	0		0	No	RV HQ <1 and no RC
Di-n-octylphthalate	0	3	848	225	2,000	848			2,000	U	ND	182	2647	PEL	11	4.66	0.76	0.32	0		0	No	RV HQ <1 and no RC
Hexachlorobenzene	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	3	181	22.5	320	181			320	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	3	181	22.5	320	181			320	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	3	2,050	550	4,850	2,050			4,850	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	3	848	225	2,000	848			2,000	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	3	9.17	7	10.5	9.17			10.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	3	9.17	7	10.5	9.17			10.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	3	9.17	7	10.5	9.17			10.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	3	9.17	7	10.5	9.17			10.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	1	3	8.5	7	10	42.3	110	110	110		041M010201			NA					0		0	Yes	No SV, no RV, and no RC
2-Hexanone	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Acetone	1	3	10.5	7	14	90.3	250	250	250		041M010201			NA					0		0	Yes	No SV, no RV, and no RC
Benzene	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	3	9.17	7	10.5	9.17			10.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	3	9.17	7	10.5	9.17			10.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Chloroethane	0	3	9.17	7	10.5	9.17			10.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	3	9.17	7	10.5	9.17			10.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	3	9.17	7	10.5	9.17			10.5	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	3	25.8	7	60	25.8			60	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Toluene	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	3	5	2	10	5			10	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	3	9.17	7	10.5	9.17			10.5	UJ	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected; SQL is estimated
D = Diluted Result

Supporting Information:
SV = Screening Value (detailed explanation for SVs provided in Section 8).
RV = Refinement Value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable Effects Level.

N/R = No refinement value available
N/A = Not applicable
Average result calculations include summing detections and one-half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections.
NAS Pensacola base-wide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 10-1-7
Wetland 1A Phase II
Sediment COPCs Retained after Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum Barium Vanadium	Dieldrin	None	None

Table 10-1-8
Wetland IA Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
001M000101	6/29/1994	mg/kg	0.6	U	Arsenic	8.2	70	0.01
001M000101	6/29/1994	mg/kg	0.75	U	Cadmium	1.2	9.6	0.08
001M000101	6/29/1994	mg/kg	7.8		Chromium	81	370	0.02
001M000101	6/29/1994	mg/kg	6.1		Copper	34	270	0.02
001M000101	6/29/1994	mg/kg	22	J	Lead	46.7	218	0.10
001M000101	6/29/1994	mg/kg	0.105	U	Mercury	0.15	0.71	0.15
001M000101	6/29/1994	mg/kg	8.55	U	Nickel	20.9	51.6	0.17
001M000101	6/29/1994	mg/kg	0.85	U	Silver	1	3.7	0.23
001M000101	6/29/1994	mg/kg	10.4		Zinc	150	410	0.03
001M000101	6/29/1994	g/kg	5.8	J	4,4'-DDE	2.2	27	0.21
001M000101	6/29/1994	g/kg	1.2	J	4,4'-DDT	1.58	46.1	0.03
001M000101	6/29/1994	g/kg	257	U	Total PCBs	22.7	180	1.43
001M000101	6/29/1994	g/kg	320	U	2-Methylnaphthalene	70	670	0.48
001M000101	6/29/1994	g/kg	320	U	Acenaphthene	16	500	0.64
001M000101	6/29/1994	g/kg	320	U	Acenaphthylene	44	640	0.50
001M000101	6/29/1994	g/kg	320	U	Anthracene	85.3	1,100	0.29
001M000101	6/29/1994	g/kg	320	U	Benzo(a)anthracene	261	1,600	0.20
001M000101	6/29/1994	g/kg	320	U	Benzo(a)pyrene	430	1,600	0.20
001M000101	6/29/1994	g/kg	320	U	Chrysene	384	2,800	0.11
001M000101	6/29/1994	g/kg	320	U	Dibenz(a,h)anthracene	63.4	260	1.23
001M000101	6/29/1994	g/kg	320	U	Fluoranthene	600	5,100	0.06
001M000101	6/29/1994	g/kg	320	U	Fluorene	19	540	0.59
001M000101	6/29/1994	g/kg	320	U	Naphthalene	160	2,100	0.15
001M000101	6/29/1994	g/kg	320	U	Phenanthrene	240	1,500	0.21
001M000101	6/29/1994	g/kg	320	U	Pyrene	665	2,600	0.12
001M000101	6/29/1994				ERM Quotient Sum			7.27
001M000101	6/29/1994				Mean ERM Quotient			0.29
001M000101	6/29/1994				Mean ERM Quotient without ND			0.02
001M000101	6/29/1994				Mean ERM Quotient Category			2
041M010101	1/17/1996	mg/kg	2.5		Arsenic	8.2	70	0.04
041M010101	1/17/1996	mg/kg	0.075	U	Cadmium	1.2	9.6	0.01
041M010101	1/17/1996	mg/kg	1.5		Chromium	81	370	0.00
041M010101	1/17/1996	mg/kg	1.1	J	Copper	34	270	0.00
041M010101	1/17/1996	mg/kg	87.3		Lead	46.7	218	0.40
041M010101	1/17/1996	mg/kg	0.07	J	Mercury	0.15	0.71	0.10
041M010101	1/17/1996	mg/kg	0.8	J	Nickel	20.9	51.6	0.02
041M010101	1/17/1996	mg/kg	0.185	U	Silver	1	3.7	0.05
041M010101	1/17/1996	mg/kg	2.2		Zinc	150	410	0.01
041M010101	1/17/1996	g/kg	0.115	UJ	4,4'-DDE	2.2	27	0.00
041M010101	1/17/1996	g/kg	0.115	UJ	4,4'-DDT	1.58	46.1	0.00
041M010101	1/17/1996	g/kg	9.2	U	Total PCBs	22.7	180	0.05
041M010101	1/17/1996	g/kg	22.5	U	2-Methylnaphthalene	70	670	0.03
041M010101	1/17/1996	g/kg	11	U	Acenaphthene	16	500	0.02
041M010101	1/17/1996	g/kg	22.5	U	Acenaphthylene	44	640	0.04
041M010101	1/17/1996	g/kg	22.5	U	Anthracene	85.3	1,100	0.02
041M010101	1/17/1996	g/kg	22.5	U	Benzo(a)anthracene	261	1,600	0.01
041M010101	1/17/1996	g/kg	22.5	U	Benzo(a)pyrene	430	1,600	0.01
041M010101	1/17/1996	g/kg	22.5	U	Chrysene	384	2,800	0.01
041M010101	1/17/1996	g/kg	22.5	U	Dibenz(a,h)anthracene	63.4	260	0.09
041M010101	1/17/1996	g/kg	22.5	U	Fluoranthene	600	5,100	0.00
041M010101	1/17/1996	g/kg	11	U	Fluorene	19	540	0.02
041M010101	1/17/1996	g/kg	22.5	U	Naphthalene	160	2,100	0.01
041M010101	1/17/1996	g/kg	22.5	U	Phenanthrene	240	1,500	0.02
041M010101	1/17/1996	g/kg	22.5	U	Pyrene	665	2,600	0.01
041M010101	1/17/1996				ERM Quotient Sum			0.97
041M010101	1/17/1996				Mean ERM Quotient			0.04
041M010101	1/17/1996				Mean ERM Quotient without ND			0.02
041M010101	1/17/1996				Mean ERM Quotient Category			2

Table 10-1-8
Wetland IA Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M010201	1/17/1996	mg/kg	0.44	J	Arsenic	8.2	70	0.01
041M010201	1/17/1996	mg/kg	1.2		Cadmium	1.2	9.6	0.13
041M010201	1/17/1996	mg/kg	57.7		Chromium	81	370	0.16
041M010201	1/17/1996	mg/kg	22.3		Copper	34	270	0.08
041M010201	1/17/1996	mg/kg	1.8		Lead	46.7	218	0.01
041M010201	1/17/1996	mg/kg	0.25		Mercury	0.15	0.71	0.35
041M010201	1/17/1996	mg/kg	8		Nickel	20.9	51.6	0.16
041M010201	1/17/1996	mg/kg	0.315	U	Silver	1	3.7	0.09
041M010201	1/17/1996	mg/kg	91		Zinc	150	410	0.22
041M010201	1/17/1996	g/kg	8.6	J	4,4'-DDE	2.2	27	0.32
041M010201	1/17/1996	g/kg	1.1	J	4,4'-DDT	1.58	46.1	0.02
041M010201	1/17/1996	g/kg	22		Total PCBs	22.7	180	0.12
041M010201	1/17/1996	g/kg	200	U	2-Methylnaphthalene	70	670	0.30
041M010201	1/17/1996	g/kg	95	U	Acenaphthene	16	500	0.19
041M010201	1/17/1996	g/kg	200	U	Acenaphthylene	44	640	0.31
041M010201	1/17/1996	g/kg	200	U	Anthracene	85.3	1,100	0.18
041M010201	1/17/1996	g/kg	200	U	Benzo(a)anthracene	261	1,600	0.13
041M010201	1/17/1996	g/kg	200	U	Benzo(a)pyrene	430	1,600	0.13
041M010201	1/17/1996	g/kg	200	U	Chrysene	384	2,800	0.07
041M010201	1/17/1996	g/kg	200	U	Dibenz(a,h)anthracene	63.4	260	0.77
041M010201	1/17/1996	g/kg	200	U	Fluoranthene	600	5,100	0.04
041M010201	1/17/1996	g/kg	95	U	Fluorene	19	540	0.18
041M010201	1/17/1996	g/kg	200	U	Naphthalene	160	2,100	0.10
041M010201	1/17/1996	g/kg	200	U	Phenanthrene	240	1,500	0.13
041M010201	1/17/1996	g/kg	200	U	Pyrene	665	2,600	0.08
041M010201	1/17/1996				ERM Quotient Sum			4.25
041M010201	1/17/1996				Mean ERM Quotient			0.17
041M010201	1/17/1996				Mean ERM Quotient without ND			0.06
041M010201	1/17/1996				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 10-1-9
Wetland 1A Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Qual	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	**1**	**1**				**2,120**	**2,120**	**2,120**	**001W000101**	**2,120**		**13**	**FDEP**	**163**	**Yes**	**Max Detect > SV**
Antimony	0	1	27.9	27.95	27.95	27.9			ND	27.95	U	160	EPA	0.18	No	Max SQL< SV
Arsenic	1	1				3.4	3.4	3.4	001W000101	3.4		50	FDEP	0.07	No	Max Detect < SV
Barium	1	1				32.1	32.1	32.1	001W000101	32.1			NA		Yes	No SV
Beryllium	0	1	0.25	0.25	0.25	0.25			ND	0.25	U	0.13	FDEP	1.92	Yes	Max SQL > SV
Cadmium	0	1	2.3	2.3	2.3	2.3			ND	2.3	UJ	0.66	EPA	3.48	Yes	Max SQL > SV
Calcium	1	1				11,700	11,700	11,700	001W000101	11,700			NA		Yes	No SV
Chromium	**1**	**1**				**13.5**	**13.5**	**13.5**	**001W000101**	**13.5**		**11**	**EPA**	**1.23**	**Yes**	**Max Detect > SV**
Cobalt	0	1	3.65	3.65	3.65	3.65			ND	3.65	U		NA		Yes	No SV
Copper	**1**	**1**				**7.5**	**7.5**	**7.5**	**001W000101**	**7.5**		**6.54**	**EPA**	**1.15**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	1	5	5	5	5			ND	5	U	5.2	EPA	0.96	No	Max SQL< SV
Iron	1	1				3,540	3,540	3,540	001W000101	3,540			NA		Yes	No SV
Lead	**1**	**1**				**6**	**6**	**6**	**001W000101**	**6**	**J**	**1.32**	**EPA**	**4.55**	**Yes**	**Max Detect > SV**
Magnesium	1	1				2,140	2,140	2,140	001W000101	2,140			NA		Yes	No SV
Manganese	1	1				143	143	143	001W000101	143			NA		Yes	No SV
Mercury	0	1	0.1	0.1	0.1	0.1			ND	0.1	U	0.012	EPA	8.33	Yes	Max SQL > SV
Nickel	0	1	8.2	8.2	8.2	8.2			ND	8.2	U	87.71	EPA	0.09	No	Max SQL< SV
Potassium	1	1				1,040	1,040	1,040	001W000101	1,040			NA		Yes	No SV
Selenium	0	1	1.95	1.95	1.95	1.95			ND	1.95	U	5	EPA	0.39	No	Max SQL< SV
Silver	0	1	1.8	1.8	1.8	1.8			ND	1.8	U	0.012	EPA	150	Yes	Max SQL > SV
Sodium	1	1				5,510	5,510	5,510	001W000101	5,510			NA		Yes	No SV
Thallium	0	1	1.8	1.8	1.8	1.8			ND	1.8	UJ	4	EPA	0.45	No	Max SQL< SV
Vanadium	1	1				10.2	10.2	10.2	001W000101	10.2			NA		Yes	No SV
Zinc	1	1				39.7	39.7	39.7	001W000101	39.7		58.91	EPA	0.67	No	Max Detect < SV
Pesticides (g/L)																
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.056	EPA	0.45	No	Max SQL< SV
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	6.58	Yes	Max SQL > SV
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	11.6	Yes	Max SQL > SV
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	No	Max SQL< SV
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Table 10-1-9
Wetland 1A Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Qual	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
PCBs (g/L) - cont.																
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	35.7	Yes	Max SQL > SV
Total PCB	0	1	4	4	4	4			ND	4	U		NA		Yes	No SV
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	1	5	5	5	5			ND	5	U	15.8	EPA	0.32	No	Max SQL< SV
1,3-Dichlorobenzene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Chloronaphthalene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Chlorophenol	0	1	5	5	5	5			ND	5	U	43.8	EPA	0.11	No	Max SQL< SV
2-Methyl-4,6-Dinitrophenol	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Nitroaniline	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
2-Nitrophenol	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
3-Nitroaniline	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Chloroaniline	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Nitroaniline	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
4-Nitrophenol	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	1.5	1.5	1.5	1.5			ND	1.5	U	0.3	EPA	5	Yes	Max SQL > SV
Butylbenzylphthalate	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Carbazole	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Dibenzofuran	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Diethylphthalate	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Dimethylphthalate	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Di-n-butylphthalate	0	1	5	5	5	5			ND	5	U	9.4	EPA	0.53	No	Max SQL< SV
Di-n-octylphthalate	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Hexachlorobenzene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Hexachlorobutadiene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Hexachloroethane	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Isophorone	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Nitrobenzene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Pentachlorophenol	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Acenaphthene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Acenaphthylene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
PAHs (g/L) - cont.																

Table 10-1-9
Wetland 1A Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Qual	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Anthracene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Benzo(a)anthracene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Benzo(a)pyrene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Chrysene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Fluoranthene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Fluorene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Naphthalene	0	1	5	5	5	5			ND	5	U	26	FDEP	0.19	No	Max SQL< SV
Phenanthrene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Pyrene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Total PAH	0	1	65	65	65	65			ND	65	U		NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	0	1	5	5	5	5			ND	5	U	270	FDEP	0.02	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
1,1-Dichloroethene	0	1	5	5	5	5			ND	5	U	3.2	FDEP	1.56	Yes	Max SQL > SV
1,2-Dichloroethane	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
1,2-Dichloroethene (total)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
1,2-Dichloropropane	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Butanone (MEK)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Hexanone	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Acetone	0	1	17.5	17.5	17.5	17.5			ND	17.5	U		NA		Yes	No SV
Benzene	0	1	5	5	5	5			ND	5	U	53	EPA	0.09	No	Max SQL< SV
Bromodichloromethane	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Bromoform	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Bromomethane	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Carbon disulfide	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Carbon tetrachloride	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Chlorobenzene	0	1	5	5	5	5			ND	5	U	17	FDEP	0.29	No	Max SQL< SV
Chloroethane	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Chloroform	0	1	5	5	5	5			ND	5	U	289	EPA	0.02	No	Max SQL< SV
Chloromethane	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Dibromochloromethane	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Ethylbenzene	0	1	5	5	5	5			ND	5	U	453	EPA	0.01	No	Max SQL< SV
Methylene chloride	0	1	5	5	5	5			ND	5	U	1,580	FDEP	0.00	No	Max SQL< SV
Styrene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Tetrachloroethene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Toluene	0	1	5	5	5	5			ND	5	U	175	EPA	0.03	No	Max SQL< SV
trans-1,3-Dichloropropene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Trichloroethene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Vinyl chloride	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Xylene (Total)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected; SQL is estimated
D = Diluted Result

Supporting Information:
SV = Screening Value (detailed explanation for SVs provided in Section 8)
RV = Refinement Value (detailed explanation of RVs provided in Section 8)
HQ = Hazard Quotient
N/R = No refinement value available
N/A = Not Applicable

Average result calculations include summing detections and one-half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 10-1-10
Wetland 1A Phase II
Surface Water COPCs Retained after Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	None	None
Barium			
Calcium			
Chromium			
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Potassium			
Sodium			
Vanadium			
		Not Detected Parameters	
Beryllium	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Cadmium	Dieldrin	1,3-Dichlorobenzene	1,1,2-Trichloroethane
Cobalt	Endosulfan II	1,4-Dichlorobenzene	1,1-Dichloroethane
Mercury	Endosulfan sulfate	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
Silver	Heptachlor	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Heptachlor epoxide	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
	Methoxychlor	2,4-Dichlorophenol	1,2-Dichloropropane
	Toxaphene	2,4-Dimethylphenol	2-Butanone (MEK)
	alpha-Chlordane	2,4-Dinitrophenol	2-Hexanone
	gamma-Chlordane	2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
	Total Chlordane	2,6-Dinitrotoluene	Acetone
	Endrin	2-Chloronaphthalene	Bromodichloromethane
	Endrin aldehyde	2-Methyl-4,6-Dinitrophenol	Bromoform
	Endrin ketone	2-Methylphenol (o-Cresol)	Bromomethane
	Total Endrin	2-Nitroaniline	Carbon disulfide
	alpha-BHC	2-Nitrophenol	Carbon tetrachloride
	beta-BHC	3,3'-Dichlorobenzidine	Chloroethane
	delta-BHC	3-Nitroaniline	Chloromethane
	Total BHC	4-Bromophenyl-phenylether	cis-1,3-Dichloropropene
	4,4'-DDD	4-Chloro-3-methylphenol	Dibromochloromethane
	4,4'-DDE	4-Chloroaniline	Styrene
	4,4'-DDT	4-Chlorophenylphenyl ether	Tetrachloroethene
	Total DDT	4-Methylphenol (p-Cresol)	trans-1,3-Dichloropropene
	Aroclor-1016	4-Nitroaniline	Trichloroethene
	Aroclor-1221	4-Nitrophenol	Vinyl chloride
	Aroclor-1232	Benzo(b)fluoranthene	Xylene (Total)
	Aroclor-1242	Benzo(g,h,i)perylene	
	Aroclor-1248	Benzo(k)fluoranthene	
	Aroclor-1254	bis(2-Chloroethoxy)methane	
	Aroclor-1260	bis(2-Chloroethyl)ether	
	Total PCB	bis(2-Ethylhexyl)phthalate (BEHP)	
		Butylbenzylphthalate	
		Carbazole	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAH	

Table 10-1-11
Wetland 1A Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
Metals (µg/L)																				
Aluminum	**1**	**1**				**2,120**	**2,120**	**2,120**	**001W000101**	**2,120**		**13**	**FDEP**	**163.1**	**163**	**1,090**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
Barium	1	1				32.1	32.1	32.1	001W000101	32.1			NA			3.7	1	**1**	Yes	Max Result > Ref. Conc.
Beryllium	0	1	0.25	0.25	0.25	0.25			ND	0.25	U	0.13	FDEP	1.9	1.92	1	0	1	No	Parameter Not Detected; Max SQL > SV
Cadmium	0	1	2.3	2.3	2.3	2.3			ND	2.3	UJ	0.66	EPA	3.5	3.48	3	0	1	No	Parameter Not Detected; Max SQL > SV
Calcium	1	1				11,700	11,700	11,700	001W000101	11,700			NA			7,675	1	**1**	No	Essential Nutrient
Chromium	**1**	**1**				**13.5**	**13.5**	**13.5**	**001W000101**	**13.5**		**11**	**EPA**	**1.2**	**1.23**	**8**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
Cobalt	0	1	3.65	3.65	3.65	3.65			ND	3.65	U		NA			3	0	1	No	Max SQL > Ref. Conc.
Copper	**1**	**1**				**7.5**	**7.5**	**7.5**	**001W000101**	**7.5**		**6.54**	**EPA**	**1.1**	**1.15**	**4**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
Iron	1	1				3,540	3,540	3,540	001W000101	3,540			NA			2,360	1	**1**	Yes	Max Result > Ref. Conc.
Lead	**1**	**1**				**6**	**6**	**6**	**001W000101**	**6**	**J**	**1.32**	**EPA**	**4.5**	**4.55**	**3.2**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
Magnesium	1	1				2,140	2,140	2,140	001W000101	2,140			NA			20,260	0	1	No	Max Result < Ref. Conc.
Manganese	1	1				143	143	143	001W000101	143			NA			13.2	1	**1**	Yes	Max Result > Ref. Conc.
Mercury	0	1	0.1	0.1	0.1	0.1			ND	0.1	U	0.012	EPA	8.3	8.33	0.13	0	1	No	Parameter Not Detected; Max SQL > SV
Potassium	1	1				1,040	1,040	1,040	001W000101	1,040			NA			6,995	0	1	No	Max Result < Ref. Conc.
Silver	0	1	1.8	1.8	1.8	1.8			ND	1.8	U	0.012	EPA	150.0	150	4	0	1	No	Parameter Not Detected; Max SQL > SV
Sodium	1	1				5,510	5,510	5,510	001W000101	5,510			NA			18,220	0	1	No	Max Result < Ref. Conc.
Vanadium	1	1				10.2	10.2	10.2	001W000101	10.2			NA			4.2	1	**1**	Yes	Max Result > Ref. Conc.
Pesticides (µg/L)																				
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	7.0	6.58		0	1	No	Parameter Not Detected; Max SQL > SV
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625.0	625		0	1	No	Parameter Not Detected; Max SQL > SV
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	1	No	Parameter Not Detected
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	12.0	11.6		0	1	No	Parameter Not Detected; Max SQL > SV
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22.0	21.7		0	1	No	Parameter Not Detected; Max SQL > SV
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	1	No	Parameter Not Detected
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	1	No	Parameter Not Detected
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167.0	167		0	1	No	Parameter Not Detected; Max SQL > SV
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250.0	250		0	1	No	Parameter Not Detected; Max SQL > SV
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85.0	84.7		0	1	No	Parameter Not Detected; Max SQL > SV
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	1	No	Parameter Not Detected
PCBs (µg/L)																				
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA				0	1	No	Parameter Not Detected
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	36.0	35.7		0	1	No	Parameter Not Detected; Max SQL > SV
Total PCB	0	1	4	4	4	4			ND	4	U		NA				0	1	No	Parameter Not Detected
SVOCs (µg/L)																				
1,2,4-Trichlorobenzene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
1,4-Dichlorobenzene	0	1	5	5	5	5			ND	5	U	3	FDEP	1.7	1.67		0	1	No	Parameter Not Detected; Max SQL > SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlo	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	1	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2,4-Dichlorophenol	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2,4-Dimethylphenol	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2,4-Dinitrophenol	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	1	No	Parameter Not Detected
2,4-Dinitrotoluene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2,6-Dinitrotoluene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2-Chloronaphthalene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	1	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2-Nitroaniline	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	1	No	Parameter Not Detected
2-Nitrophenol	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
3-Nitroaniline	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	1	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
4-Chloroaniline	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
4-Nitroaniline	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	1	No	Parameter Not Detected
4-Nitrophenol	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	1	No	Parameter Not Detected
Benzo(b)fluoranthene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Benzo(k)fluoranthene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	1.5	1.5	1.5	1.5			ND	1.5	U	0.3	EPA	5.0	5		0	1	No	Parameter Not Detected; Max SQL > SV
Butylbenzylphthalate	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Carbazole	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Dibenzofuran	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Diethylphthalate	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Dimethylphthalate	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Di-n-octylphthalate	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Hexachlorobenzene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Hexachlorobutadiene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected

Table 10-1-11
Wetland 1A Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
SVOCs (µg/L) - cont.																				
Hexachlorocyclopentadiene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Hexachloroethane	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Isophorone	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Nitrobenzene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Pentachlorophenol	0	1	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	1	No	Parameter Not Detected
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
PAHs (µg/L)																				
2-Methylnaphthalene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Acenaphthene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Acenaphthylene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Anthracene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Benzo(a)anthracene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Benzo(a)pyrene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Chrysene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Fluoranthene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Fluorene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
																		1		
Phenanthrene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Pyrene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Total PAH	0	1	65	65	65	65			ND	65	U		NA				0	1	No	Parameter Not Detected
VOCs (µg/L)																				
1,1,2,2-Tetrachloroethane	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
1,1-Dichloroethene	0	1	5	5	5	5			ND	5	U	3.2	FDEP	1.6	1.56		0	1	No	Parameter Not Detected; Max SQL > SV
1,2-Dichloroethane	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloropropane	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2-Butanone (MEK)	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2-Hexanone	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Acetone	0	1	17.5	17.5	17.5	17.5			ND	17.5	U		NA				0	1	No	Parameter Not Detected
Bromodichloromethane	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Bromoform	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Bromomethane	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Carbon disulfide	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Carbon tetrachloride	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Chloroethane	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Chloromethane	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Dibromochloromethane	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Styrene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Tetrachloroethene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Trichloroethene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Vinyl chloride	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Xylene (Total)	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL

UJ = Not detected; SQL is estimated
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening Value (detailed explanation for SVs provided in Section 8)
RV = Refinement Value (detailed explanation of RVs provided in Section 8)
PEL = Probable Effects Level
N/R = No refinement value available

N/A = Not Applicable
Average result calculations include summing detections and one-half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded reference concentrations.

Table 10-1-12
Wetland 1A Phase II
Surface Water COPCs Retained after Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	None	None
Iron			
Lead			
Manganese			
Barium			
Chromium			
Copper			
Vanadium			

Table 10-1-13
Wetland 1A Phase II
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max. Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	2.2E+03	J	2.8E+04	J	MG/KG	041M010201	3 / 3	NAV	1.1E+04	1.0E-03	3	5.56E-06	2.78E-06	8.80E-05	5.88E-05
7440393	Barium	N	3.7E+00	J	7.4E+01	=	MG/KG	041M010201	3 / 3	NAV	3.0E+01	1.0E-03	3	1.48E-08	7.39E-09	2.34E-07	1.56E-07
7440417	Beryllium	N	N/A	N/A	7.5E-01	=	MG/KG	041M010201	1 / 3	7.0E-02 / 4.7E-01	3.4E-01	1.0E-03	3	1.50E-10	7.50E-11	2.37E-09	1.59E-09
7440439	Cadmium	N	N/A	N/A	1.2E+00	=	MG/KG	041M010201	1 / 3	1.5E-01 / 1.5E+00	6.8E-01	1.0E-03	3	2.40E-10	1.20E-10	3.80E-09	2.54E-09
7440473	Chromium	N	1.5E+00	=	5.8E+01	=	MG/KG	041M010201	3 / 3	NAV	2.2E+01	1.0E-03	3	1.15E-08	5.77E-09	1.83E-07	1.22E-07
7440484	Cobalt	C	N/A	N/A	1.8E+00	J	MG/KG	041M010201	1 / 3	1.5E-01 / 1.8E+00	9.3E-01	1.0E-03	3	3.60E-10	1.80E-10	8.14E-10	1.36E-09
7440508	Copper	N	1.1E+00	J	2.2E+01	=	MG/KG	041M010201	3 / 3	NAV	9.8E+00	1.0E-03	3	4.46E-09	2.23E-09	7.06E-08	4.72E-08
7439896	Iron	N	4.8E+02	=	6.2E+03	=	MG/KG	041M010201	3 / 3	NAV	2.7E+03	1.0E-03	3	1.23E-06	6.15E-07	1.95E-05	1.30E-05
7439921	Lead	N	1.8E+00	=	8.7E+01	=	MG/KG	041M010101	3 / 3	NAV	3.7E+01	1.0E-03	3	1.75E-08	8.73E-09	2.76E-07	1.85E-07
7439965	Manganese	N	3.7E+00	=	1.8E+01	=	MG/KG	041M010201	3 / 3	NAV	8.5E+00	1.0E-03	3	3.56E-09	1.78E-09	5.64E-08	3.77E-08
7487947	Mercury	N	7.0E-02	J	2.5E-01	=	MG/KG	041M010201	2 / 3	N/A / 2.1E-01	1.4E-01	1.0E-03	3	5.00E-11	2.50E-11	7.91E-10	5.29E-10
7782492	Selenium	N	N/A	N/A	1.3E+00	=	MG/KG	041M010101	1 / 3	5.0E-01 / 1.7E+00	8.0E-01	1.0E-03	3	2.60E-10	1.30E-10	4.12E-09	2.75E-09
7440622	Vanadium	N	2.3E+00	J	3.5E+01	=	MG/KG	041M010201	3 / 3	NAV	1.4E+01	1.0E-03	3	7.06E-09	3.53E-09	1.12E-07	7.47E-08
72548	4,4'-DDD	C	3.1E-03	J	7.9E-03	J	MG/KG	041M010201	2 / 3	N/A / 2.3E-04	3.7E-03	3.0E-02	1	4.74E-11	2.37E-11	1.07E-10	1.79E-10
72559	4,4'-DDE	C	5.8E-03	J	8.6E-03	J	MG/KG	041M010201	2 / 3	N/A / 2.3E-04	4.8E-03	3.0E-02	1	5.16E-11	2.58E-11	1.17E-10	1.95E-10
50293	4,4'-DDT	C	1.1E-03	J	1.2E-03	J	MG/KG	001M000101	2 / 3	N/A / 2.3E-04	8.1E-04	3.0E-02	1	7.20E-12	3.60E-12	1.63E-11	2.72E-11
5103719	alpha-Chlordane	C	N/A	N/A	2.7E-03	J	MG/KG	041M010201	1 / 3	1.1E-04 / 3.3E-03	1.5E-03	4.0E-02	2	2.16E-11	1.08E-11	4.88E-11	8.16E-11
11096825	Aroclor-1260	C	N/A	N/A	7.7E-03	J	MG/KG	041M010201	1 / 3	2.3E-03 / 6.4E-02	1.4E-02	1.4E-01	1	2.16E-10	1.08E-10	4.88E-10	8.15E-10
60571	Dieldrin	C	3.7E-03	J	6.9E-03	J	MG/KG	041M010201	2 / 3	N/A / 2.3E-04	3.6E-03	1.0E-01	2	1.38E-10	6.90E-11	3.12E-10	5.22E-10
57749	gamma-Chlordane	C	N/A	N/A	1.9E-03	J	MG/KG	041M010201	1 / 3	1.1E-04 / 3.3E-03	1.2E-03	4.0E-02	2	1.52E-11	7.60E-12	3.44E-11	5.75E-11
117817	(BEHP)	C	4.1E-02	J	2.6E-01	J	MG/KG	041M010201	2 / 3	N/A / 6.4E-01	2.1E-01	1.0E-01	1	5.20E-09	2.60E-09	1.18E-08	1.97E-08
78933	2-Butanone (MEK)	N	N/A	N/A	1.1E-01	=	MG/KG	041M010201	1 / 3	1.4E-02 / 2.0E-02	4.2E-02	1.0E-01	1	2.20E-09	1.10E-09	3.48E-08	2.33E-08
67641	Acetone	N	N/A	N/A	2.5E-01	=	MG/KG	041M010201	1 / 3	1.4E-02 / 2.8E-02	9.0E-02	1.0E-01	1	5.00E-09	2.50E-09	7.91E-08	5.29E-08

Equation for sediment risk:

$$DADsd = \frac{DAevent \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day)
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2)
EV = Event frequency (events/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg) 70 kg (adult) 45 kg (child)
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker)
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker)
EF = 52 dys/yr (child trespasser/adult maintenance worker)
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker)
Source: Tables 6-6 and 6-8 Exposure Factors Handbook
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker)
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker)
Cancer — 25,550 days (child trespasser/adult maintenance worker)

Equation for DA_{event} for sediment contact:

$$DAevent = Csd \times CF \times AF \times ABSd$$

Where:

C_{sd} = Chemical concentration in sediment (mg/kg)
CF = Conversion factor (10^{-6} kg/mg)
AF = Adherence factor of sediment to soil (mg/cm2-event)
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;
(2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values

Table 10-1-14
Wetland 1A Phase II
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
Sediment Dermal Risk	Aluminum	N	2.8E+04	1.0E+00	N/A	1.0E-01	2	1.00E-01	N/A	8.1E-04	N/A	5.88E-04	N/A
	Barium	N	7.4E+01	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	4.7E-05	N/A	3.2E-05	N/A
	Beryllium	N	7.5E-01	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	4.4E-02	N/A	1.1E-04	N/A
	Cadmium	N	1.2E+00	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	9.0E-05	N/A	2.0E-04	N/A
	Chromium	N	5.8E+01	3.0E-03	N/A	2.5E-02	1	7.5E-05	N/A	2.9E-03	N/A	1.6E-03	N/A
	Cobalt	C	1.8E+00	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	1.0E-04	N/A	8.5E-08	N/A
	Copper	N	2.2E+01	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	1.0E-01	N/A	3.9E-06	N/A
	Iron	N	6.2E+03	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	8.7E+01	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.8E+01	1.4E-01	N/A	4.0E-02	1, 3	5.6E-03	N/A	1.1E-06	N/A	6.7E-06	N/A
	Mercury	N	2.5E-01	3.0E-04	N/A	7.0E-02	1	2.1E-05	N/A	2.4E-02	N/A	2.5E-05	N/A
	Selenium	N	1.3E+00	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	2.0E-06	N/A	1.0E-06	N/A
	Vanadium	N	3.5E+01	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	8.9E-06	N/A	4.1E-04	N/A
	4,4'-DDD	C	7.9E-03	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	3.6E-10	N/A	1.4E-09
	4,4'-DDE	C	8.6E-03	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	2.5E-10	N/A	2.2E-09
	4,4'-DDT	C	1.2E-03	5.0E-04	3.4E-01	3.0E-02	2	1.5E-05	1.1E+01	2.7E-06	4.5E-10	1.8E-06	3.1E-10
	alpha-Chlordane	C	2.7E-03	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	5.5E-06	9.6E-10	2.0E-07	3.6E-11
	Aroclor-1260	C	7.7E-03	2.2E+00	2.0E+00	1.4E-01	2	3.1E-01	1.4E+01	4.1E-11	1.8E-10	2.6E-09	1.2E-08
	Dieldrin	C	6.9E-03	5.0E-05	1.6E+01	5.0E-01	3	2.5E-05	3.2E+01	1.8E-07	1.4E-10	2.1E-05	1.7E-08
	gamma-Chlordane	C	1.9E-03	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	6.8E-07	1.2E-10	1.4E-07	2.5E-11
	bis(2-Ethylhexyl)phthalate (BEHP)	C	2.6E-01	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	2.7E-07	7.5E-11	9.8E-06	2.8E-09
	2-Butanone (MEK)	N	1.1E-01	6.0E-01	N/A	1.0E-01	2	6.0E-02	N/A	9.5E-09	N/A	3.9E-07	N/A
	Acetone	N	2.5E-01	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	4.4E-08	N/A	5.3E-06	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose
RFD_{oral} = Oral reference dose
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-1-15
Wetland 1A Phase II
Sediment Incidental Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	2.8E+04	1.0E+00	N/A	8.80E-03	N/A	5.66E-03	N/A
	Barium	N	7.4E+01	7.0E-02	N/A	3.34E-04	N/A	2.15E-04	N/A
	Beryllium	N	7.5E-01	2.0E-03	N/A	1.19E-04	N/A	7.63E-05	N/A
	Cadmium	N	1.2E+00	5.0E-04	N/A	7.60E-04	N/A	4.88E-04	N/A
	Chromium	N	5.8E+01	3.0E-03	N/A	6.09E-03	N/A	3.91E-03	N/A
	Cobalt	C	1.8E+00	2.0E-02	N/A	4.07E-06	N/A	6.54E-06	N/A
	Copper	N	2.2E+01	4.0E-02	N/A	1.76E-04	N/A	1.13E-04	N/A
	Iron	N	6.2E+03	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	8.7E+01	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.8E+01	1.4E-01	N/A	4.03E-05	N/A	2.59E-05	N/A
	Mercury	N	2.5E-01	3.0E-04	N/A	2.64E-04	N/A	1.70E-04	N/A
	Selenium	N	1.3E+00	5.0E-03	N/A	8.23E-05	N/A	5.29E-05	N/A
	Vanadium	N	3.5E+01	7.0E-03	N/A	1.60E-03	N/A	1.03E-03	N/A
	4,4'-DDD	C	7.9E-03	N/A	2.4E-01	N/A	8.58E-11	N/A	1.38E-10
	4,4'-DDE	C	8.6E-03	N/A	3.4E-01	N/A	1.32E-10	N/A	2.13E-10
	4,4'-DDT	C	1.2E-03	5.0E-04	3.4E-01	1.09E-07	1.85E-11	1.74E-07	2.97E-11
	alpha-Chlordane	C	2.7E-03	5.0E-04	3.5E-01	2.44E-07	4.27E-11	3.93E-07	6.87E-11
	Aroclor-1260	C	7.7E-03	2.2E+00	2.0E+00	1.57E-10	6.96E-10	2.52E-10	1.12E-09
	Dieldrin	C	6.9E-03	5.0E-05	1.6E+01	6.24E-06	4.99E-09	1.00E-05	8.02E-09
	gamma-Chlordane	C	1.9E-03	5.0E-04	3.5E-01	1.72E-07	3.01E-11	2.76E-07	4.83E-11
	bis(2-Ethylhexyl)phthalate (BEHP)	C	2.6E-01	2.0E-02	1.4E-02	5.88E-07	1.65E-10	9.45E-07	2.65E-10
	2-Butanone (MEK)	N	1.1E-01	6.0E-01	N/A	5.80E-08	N/A	3.73E-08	N/A
	Acetone	N	2.5E-01	1.0E-01	N/A	7.91E-07	N/A	5.09E-07	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = chronic daily intake (mg/kg-day).

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
IRsd = 100 mg/day for age groups greater than 6 years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 10-1-16
Wetland 1A Phase II
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	N/A	N/A	2.1E+03	=	UG/L	001W000101	1 / 1	NAV	2.1E+03	2.1E-03	1.0E-03	5.51E-06	8.73E-05	1.17E-04
7440393	Barium	N	N/A	N/A	3.2E+01	=	UG/L	001W000101	1 / 1	NAV	3.2E+01	3.2E-05	1.0E-03	8.35E-08	1.32E-06	1.77E-06
7440473	Chromium	N	N/A	N/A	1.4E+01	=	UG/L	001W000101	1 / 1	NAV	1.4E+01	1.4E-05	1.0E-03	3.51E-08	5.56E-07	7.43E-07
7439896	Iron	N	N/A	N/A	3.5E+03	=	UG/L	001W000101	1 / 1	NAV	3.5E+03	3.5E-03	2.5E-04	2.30E-06	3.64E-05	4.87E-05
7439921	Lead	N	N/A	N/A	6.0E+00	J	UG/L	001W000101	1 / 1	NAV	6.0E+00	6.0E-06	3.4E-04	5.30E-09	8.40E-08	1.12E-07
7439965	Manganese	N	N/A	N/A	1.4E+02	=	UG/L	001W000101	1 / 1	NAV	1.4E+02	1.4E-04	1.0E-03	3.72E-07	5.89E-06	7.87E-06
7440622	Vanadium	N	N/A	N/A	1.0E+01	=	UG/L	001W000101	1 / 1	NAV	1.0E+01	1.0E-05	1.0E-03	2.65E-08	4.20E-07	5.61E-07

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).

EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = Kp \times Cw \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times Kp \times Cw \left[\frac{t_{event}}{1+B} + 2\tau_{event} \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound,
calculated using the equation below:

$$B = \frac{Kp\sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 10-1-17
Wetland 1A Phase II
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	2.1E-03	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	8.8E-04	N/A	1.2E-03	N/A
	Barium	N	3.2E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	4.8E-04	N/A	3.6E-04	N/A
	Chromium	N	1.4E-05	3.0E-03	N/A	2.5E-02	1	7.5E-05	N/A	2.1E-03	N/A	9.9E-03	N/A
	Iron	N	3.5E-03	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	6.0E-06	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.4E-04	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	5.1E-05	N/A	1.4E-03	N/A
	Vanadium	N	1.0E-05	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	6.0E-02	N/A	3.1E-03	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABSGI.
Dermal SF = Dermal slope factor adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-1-18
Wetland 1A Phase II
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	2.1E-03	1.0E+00	N/A	6.7E-08	N/A	4.3E-08	N/A
	Barium	N	3.2E-05	7.0E-02	N/A	1.5E-08	N/A	9.3E-09	N/A
	Chromium	N	1.4E-05	3.0E-03	N/A	1.4E-07	N/A	9.2E-08	N/A
	Iron	N	3.5E-03	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	6.0E-06	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.4E-04	1.4E-01	N/A	3.2E-08	N/A	2.1E-08	N/A
	Vanadium	N	1.0E-05	7.0E-03	N/A	4.6E-08	N/A	3.0E-08	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg): 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 10-1-19
Wetland 1B Phase II
Sediment Physical Parameters

Parameter	041M010301	041M010401
Percent Solids (%)	76.80	61.00
TOC (%)	0.53	3.06
Grain Size Analysis (percent of composition[1])		
Fine Gravel	0.00	0.00
Coarse Sand	1.00	0.00
Medium Sand	18.00	8.00
Fine Sand	78.00	74.00
Silt and Clay	3.00	18.00
Description	Very Dark Grayish Brown Poorly Graded Sand with Trace Silt	Black Silty Sand with Organics

Notes:
mg/kg = milligrams per kilogram or parts per million (ppm)
[1] = Derived from sieve analyses.

Table 10-1-20
Wetland 1B Phase II
Surface Water Physical Parameters

Parameter	041W010301
Hardness as CaCO3 (mg/L)	87.1
pH	6.7
Specific Conductivity (mS/cm)	0.231
Turbidity (NTU)	2
Salinity (%)	0

Notes:
mg/L = Milligrams per liter
MS/cm = Millsiemens per centimeter
NTU = Nephelometric turbidity units
% = Percent

Table 10-1-21
Wetland 1B Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	13,610.0	0	2	2	1,510.0	4,290.0	2,900.0	041M010401
Antimony	4.430	0	1	2	0.470	0.470	0.270	041M010401
Arsenic	6.620	0	2	2	0.40	2.50	1.450	041M010401
Barium	14.0	1	2	2	5.90	17.70	11.80	041M010401
Beryllium	0.840	0	1	2	0.110	0.110	0.073	041M010401
Cadmium	1.80	1	2	2	0.530	2.0	1.270	041M010401
Calcium	10,756.670	0	2	2	921.0	1,080.0	1,000.0	041M010401
Chromium	39.370	0	2	2	9.80	27.30	18.60	041M010401
Cobalt	2.80	0	2	2	0.40	0.990	0.695	041M010401
Copper	19.50	1	2	2	18.30	31.80	25.10	041M010401
Iron	11,911.670	0	2	2	1,770.0	2,930.0	2,350.0	041M010401
Lead	82.470	1	2	2	48.80	153.0	101.0	041M010401
Magnesium	7,513.330	0	2	2	144.0	250.0	197.0	041M010401
Manganese	37.970	0	2	2	10.40	11.30	10.90	041M010401
Mercury	0.550	0	2	2	0.170	0.20	0.185	041M010401
Nickel	9.280	0	2	2	3.90	7.50	5.70	041M010401
Potassium	1,628.670	0	2	2	28.0	65.30	46.60	041M010401
Sodium	18,993.330	0	1	2	33.0	33.0	20.90	041M010401
Vanadium	28.670	0	2	2	2.50	10.30	6.40	041M010401
Zinc	36.730	2	2	2	69.10	294.0	182.0	041M010401
PAHs (g/kg)								
Anthracene	N/A	0	1	2	990.0	990.0	600.0	041M010401
Benzo(a)anthracene	N/A	0	2	2	420.0	3,800.0	2,110.0	041M010401
Benzo(a)pyrene	N/A	0	2	2	480.0	4,300.0	2,390.0	041M010401
Chrysene	N/A	0	2	2	530.0	4,200.0	2,370.0	041M010401
Fluoranthene	N/A	0	2	2	1,200.0	7,200.0	4,200.0	041M010401
Phenanthrene	N/A	0	2	2	420.0	4,000.0	2,210.0	041M010401
Pyrene	N/A	0	2	2	930.0	6,200.0	3,570.0	041M010401
Total PAHs	N/A	0	2	2	5,230.0	33,420.0	19,300.0	041M010401
Pesticides and PCBs (g/kg)								
Aroclor-1260	N/A	0	2	2	110.0	140.0	125.0	041M010401
Total PCBs	N/A	0	2	2	117.350	140.0	129.0	041M010401
Endosulfan sulfate	N/A	0	2	2	0.450	1.60	1.030	041M010401
Methoxychlor	N/A	0	1	2	6.60	6.60	3.580	041M010401
alpha-Chlordane	N/A	0	2	2	1.10	6.20	3.650	041M010401
gamma-Chlordane	N/A	0	2	2	3.30	9.50	6.40	041M010401
Total Chlordane	N/A	0	2	2	4.40	15.70	10.10	041M010401
Endrin aldehyde	N/A	0	1	1	1.50	1.50	1.50	041M010301
Total Endrin	N/A	0	1	1	1.710	1.710	1.710	041M010301
4,4'-DDD	50.0	0	2	2	5.0	25.0	15.0	041M010401
4,4'-DDE	40.0	0	2	2	0.480	4.50	2.490	041M010401
Total DDT	110.0	0	2	2	6.880	39.50	23.20	041M010401
SVOCs (g/kg)								
Benzo(g,h,i)perylene	N/A	0	2	2	250.0	1,900.0	1,080.0	041M010401
Benzo(k)fluoranthene	N/A	0	2	2	220.0	1,700.0	960.0	041M010401
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	2	2	680.0	3,500.0	2,090.0	041M010401
Carbazole	N/A	0	1	2	880.0	880.0	1,490.0	041M010401
Indeno(1,2,3-cd)pyrene	N/A	0	2	2	220.0	2,000.0	1,110.0	041M010401

Notes:
g/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
N/A = Not Applicable

Table 10-1-22
Wetland 1B Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (g/L)								
Barium	3.68	1	1	1	10.8	10.8	10.8	041W010301
Calcium	7,675.0	1	1	1	30,700.0	30,700.0	30,700.0	041W010301
Iron	2,360.0	0	1	1	302.0	302.0	302.0	041W010301
Magnesium	20,260.0	0	1	1	2,560.0	2,560.0	2,560.0	041W010301
Manganese	13.2	1	1	1	17.4	17.4	17.4	041W010301
Potassium	6,995.0	0	1	1	2,300.0	2,300.0	2,300.0	041W010301
Sodium	182,200.0	0	1	1	7,370.0	7,370.0	7,370.0	041W010301
Zinc	5.53	1	1	1	19.3	19.3	19.3	041W010301
VOCs (g/L)								
2-Butanone (MEK)	N/A	0	1	1	2.0	2.0	2.0	041W010301

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 10-1-23
Wetland 1B Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	2	2			1,510	4,290	041M010401	4,290	J		N/A		Yes	No SV
Antimony	1	2	0.07	0.07	0.47	0.47	041M010401	0.47	J	12	2	0.04	No	Max Detect < SV
Arsenic	2	2			0.4	2.5	041M010401	2.5		7.24	1, 2	0.35	No	Max Detect < SV
Barium	2	2			5.9	17.7	041M010401	17.7			N/A		Yes	No SV
Beryllium	1	2	0.035	0.035	0.11	0.11	041M010401	0.11	J		N/A		Yes	No SV
Cadmium	**2**	**2**			**0**	**2**	**041M010401**	**2**		**0.676**	**1**	**2.96**	**Yes**	**Max Detect > SV**
Calcium	2	2			921	1,080	041M010401	1,080	J		N/A		Yes	No SV
Chromium	2	2			9.8	27.3	041M010401	27.3		52.3	1, 2	0.52	No	Max Detect < SV
Cobalt	2	2			0.4	0.99	041M010401	0.99	J		N/A		Yes	No SV
Copper	**2**	**2**			**18.3**	**31.8**	**041M010401**	**31.8**		**18.7**	**1, 2**	**1.7**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	2	0.31	0.395			ND	0.395	U		N/A		Yes	No SV
Iron	2	2			1,770	2,930	041M010401	2,930			N/A		Yes	No SV
Lead	**2**	**2**			**48.8**	**153**	**041M010401**	**153**		**30.2**	**1, 2**	**5.07**	**Yes**	**Max Detect > SV**
Magnesium	2	2			144	250	041M010401	250	J		N/A		Yes	No SV
Manganese	2	2			10.4	11.3	041M010401	11.3			N/A		Yes	No SV
Mercury	**2**	**2**			**0.17**	**0.2**	**041M010401**	**0.2**		**0.13**	**1, 2**	**1.54**	**Yes**	**Max Detect > SV**
Nickel	2	2			3.9	7.5	041M010401	7.5		15.9	1, 2	0.47	No	Max Detect < SV
Potassium	2	2			28	65.3	041M010401	65.3	J		N/A		Yes	No SV
Selenium	0	2	0.135	0.175			ND	0.175	U		N/A		Yes	No SV
Silver	0	2	0.17	0.215			ND	0.215	U	0.733	1	0.29	No	Max SQL< SV
Sodium	1	2	8.75	8.75	33	33	041M010401	33	J		N/A		Yes	No SV
Thallium	0	2	0.135	0.175			ND	0.175	U		N/A		Yes	No SV
Vanadium	2	2			2.5	10.3	041M010401	10.3			N/A		Yes	No SV
Zinc	**2**	**2**			**69.1**	**294**	**041M010401**	**294**		**124**	**1, 2**	**2.37**	**Yes**	**Max Detect > SV**
PAHs (µg/kg)														
2-Methylnaphthalene	0	2	210	550			ND	550	U	20.2	1	27.2	Yes	Max SQL > SV
Acenaphthene	0	2	100	265			ND	265	U	6.71	1	39.5	Yes	Max SQL > SV
Acenaphthylene	0	2	210	550			ND	550	U	5.87	1	93.7	Yes	Max SQL > SV
Anthracene	**1**	**2**	**210**	**210**	**990**	**990**	**041M010401**	**990**	**J**	**46.9**	**1**	**21.1**	**Yes**	**Max Detect > SV**
Benzo(a)anthracene	**2**	**2**			**420**	**3,800**	**041M010401**	**3,800**		**74.8**	**1**	**50.8**	**Yes**	**Max Detect > SV**
Benzo(a)pyrene	**2**	**2**			**480**	**4,300**	**041M010401**	**4,300**		**88.8**	**1**	**48.4**	**Yes**	**Max Detect > SV**
Chrysene	**2**	**2**			**530**	**4,200**	**041M010401**	**4,200**		**108**	**1**	**38.9**	**Yes**	**Max Detect > SV**
Dibenz(a,h)anthracene	0	2	210	550			ND	550	U	6.22	1	88.4	Yes	Max SQL > SV
Fluoranthene	**2**	**2**			**1,200**	**7,200**	**041M010401**	**7,200**		**113**	**1**	**63.7**	**Yes**	**Max Detect > SV**
Fluorene	0	2	100	265			ND	265	U	21.2	1	12.5	Yes	Max SQL > SV
Naphthalene	0	2	210	550			ND	550	U	34.6	1	15.9	Yes	Max SQL > SV
Phenanthrene	**2**	**2**			**420**	**4,000**	**041M010401**	**4,000**		**86.7**	**1**	**46.1**	**Yes**	**Max Detect > SV**
Pyrene	**2**	**2**			**930**	**6,200**	**041M010401**	**6,200**		**153**	**1**	**40.5**	**Yes**	**Max Detect > SV**
Total PAHs	**2**	**2**			**5,230**	**33,400**	**041M010401**	**33,400**		**1684**	**1, 2**	**19.8**	**Yes**	**Max Detect > SV**
TOC Normalized PAHs	**2**	**2**			**983.08**	**1,092.16**	**041M010401**	**1,092.16**		**290**	**3**	**3.77**	**Yes**	**Max Detect > SV**
PCBs (µg/kg)														
Aroclor-1016	0	1	1.05	1.05			ND	1.05	UJ	21.6	N/A	0.05	No	Max SQL< SV
Aroclor-1221	0	1	2.1	2.1			ND	2.1	UJ	67	2	0.03	No	Max SQL< SV
Aroclor-1232	0	1	1.05	1.05			ND	1.05	UJ	21.6	N/A	0.05	No	Max SQL< SV
Aroclor-1242	0	1	1.05	1.05			ND	1.05	UJ	21.6	N/A	0.05	No	Max SQL< SV
Aroclor-1248	0	1	1.05	1.05			ND	1.05	UJ	21.6	N/A	0.05	No	Max SQL< SV
Aroclor-1254	0	1	1.05	1.05			ND	1.05	UJ	21.6	N/A	0.05	No	Max SQL< SV
Aroclor-1260	**2**	**2**			**110**	**140**	**041M010401**	**140**	**DJ**	**21.6**	**N/A**	**6.48**	**Yes**	**Max Detect > SV**
Total PCBs	**2**	**2**			**117**	**140**	**041M010401**	**140**		**21.6**	**1**	**6.48**	**Yes**	**Max Detect > SV**
Pesticides (µg/kg)														
Aldrin	0	1	0.055	0.055			ND	0.055	UJ		N/A		Yes	No SV
Dieldrin	0	1	0.105	0.105			ND	0.105	UJ	0.716	1	0.15	No	Max SQL< SV
Endosulfan I	0	1	0.055	0.055			ND	0.055	UJ		N/A		Yes	No SV
Endosulfan II	0	1	0.105	0.105			ND	0.105	UJ		N/A		Yes	No SV
Endosulfan sulfate	2	2			0.45	1.6	041M010401	1.6	J		N/A		Yes	No SV
Heptachlor	0	1	0.055	0.055			ND	0.055	UJ		N/A		Yes	No SV
Heptachlor epoxide	0	1	0.055	0.055			ND	0.055	UJ		N/A		Yes	No SV
Methoxychlor	1	2	0.55	0.55	6.6	6.6	041M010401	6.6	J		N/A		Yes	No SV
Toxaphene	0	1	11	11			ND	11	UJ		N/A		Yes	No SV

Table 10-1-23
Wetland 1B Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Pesticides (µg/kg) - cont.														
alpha-Chlordane	**2**	**2**			**1.1**	**6.2**	**041M010401**	**6.2**	**DJ**	**1.7**	**1**	**3.65**	**Yes**	**Max Detect > SV**
gamma-Chlordane	**2**	**2**			**3.3**	**9.5**	**041M010401**	**9.5**	**DJ**	**1.7**	**1**	**5.59**	**Yes**	**Max Detect > SV**
Total Chlordane	**2**	**2**			**4.4**	**15.7**	**041M010401**	**15.7**		**1.7**	**1**	**9.24**	**Yes**	**Max Detect > SV**
Endrin	0	1	0.105	0.105			ND	0.105	UJ	3.3	2	0.03	No	Max SQL< SV
Endrin aldehyde	1	1			1.5	1.5	041M010301	1.5	J	3.3	2	0.46	No	Max Detect < SV
Endrin ketone	0	1	0.105	0.105			ND	0.105	UJ	3.3	2	0.03	No	Max SQL< SV
Total Endrin	1	1			1.71	1.71	041M010301	1.71		3.3	2	0.52	No	Max Detect < SV
alpha-BHC	0	1	0.055	0.055			ND	0.055	UJ		N/A		Yes	No SV
beta-BHC	0	1	0.055	0.055			ND	0.055	UJ	0.32	N/A	0.17	No	Max SQL< SV
delta-BHC	0	1	0.055	0.055			ND	0.055	UJ	0.32	N/A	0.17	No	Max SQL< SV
gamma-BHC (Lindane)	0	1	0.055	0.055			ND	0.055	UJ	0.32	1	0.17	No	Max SQL< SV
Total BHC	0	1	0.22	0.22			ND	0.22	U	0.32	2	0.69	No	Max SQL< SV
4,4'-DDD	**2**	**2**			**5**	**25**	**041M010401**	**25**	**DJ**	**1.22**	**1**	**20.5**	**Yes**	**Max Detect > SV**
4,4'-DDE	**2**	**2**			**0.48**	**4.5**	**041M010401**	**4.5**	**DJ**	**2.07**	**1**	**2.17**	**Yes**	**Max Detect > SV**
4,4'-DDT	**2**	**2**			**1.4**	**10**	**041M010401**	**10**	**DJ**	**1.19**	**1**	**8.4**	**Yes**	**Max Detect > SV**
Total DDT	**2**	**2**			**6.88**	**39.5**	**041M010401**	**39.5**		**3.3**	**2**	**12**	**Yes**	**Max Detect > SV**
SVOCs (µg/kg)														
1,2,4-Trichlorobenzene	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	2	5,000	13,500			ND	13,500	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	2	5,000	13,500			ND	13,500	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
2-Chloronaphthalene	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
2-Chlorophenol	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	2	5,000	13,500			ND	13,500	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
2-Nitroaniline	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
2-Nitrophenol	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
3-Nitroaniline	0	2	5,000	13,500			ND	13,500	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
4-Chloroaniline	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
4-Nitroaniline	0	2	5,000	13,500			ND	13,500	U		N/A		Yes	No SV
4-Nitrophenol	0	2	5,000	13,500			ND	13,500	U		N/A		Yes	No SV
Benzo(b)fluoranthene	2	2			600	5,400	041M010401	5,400			N/A		Yes	No SV
Benzo(g,h,i)perylene	2	2			250	1,900	041M010401	1,900			N/A		Yes	No SV
Benzo(k)fluoranthene	2	2			220	1,700	041M010401	1,700			N/A		Yes	No SV
bis(2-Chloroethoxy)methane	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	2	210	550			ND	550	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**2**	**2**			**680**	**3,500**	**041M010401**	**3,500**	**J**	**182**	**1, 2**	**19.2**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	0	2	2,100	5,500			ND	5,500	U	182	1, 2	30.2	Yes	Max SQL > SV
Carbazole	1	2	2,100	2,100	880	880	041M010401	880	J		N/A		Yes	No SV
Dibenzofuran	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
Diethylphthalate	0	2	2,100	5,500			ND	5,500	U	182	1, 2	30.2	Yes	Max SQL > SV
Dimethylphthalate	0	2	2,100	5,500			ND	5,500	U	182	1, 2	30.2	Yes	Max SQL > SV
Di-n-butylphthalate	0	2	2,100	5,500			ND	5,500	U	182	1, 2	30.2	Yes	Max SQL > SV
Di-n-octylphthalate	0	2	2,100	5,500			ND	5,500	U	182	1, 2	30.2	Yes	Max SQL > SV
Hexachlorobenzene	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
Hexachlorobutadiene	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV

Table 10-1-23
Wetland 1B Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (µg/kg) - cont.														
Hexachloroethane	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	2	2			220	2,000	041M010401	2,000			N/A		Yes	No SV
Isophorone	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
Nitrobenzene	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	2	210	550			ND	550	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
Pentachlorophenol	0	2	5,000	13,500			ND	13,500	U		N/A		Yes	No SV
Phenol	0	2	2,100	5,500			ND	5,500	U		N/A		Yes	No SV
VOCs (µg/kg)														
1,1,1-Trichloroethane	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
1,1-Dichloroethane	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
1,1-Dichloroethene	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
1,2-Dichloroethane	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
1,2-Dichloropropane	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
2-Butanone (MEK)	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
2-Hexanone	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Acetone	0	2	26.5	36			ND	36	U		N/A		Yes	No SV
Benzene	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Bromodichloromethane	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Bromoform	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Bromomethane	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Carbon disulfide	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Carbon tetrachloride	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Chlorobenzene	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Chloroethane	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Chloroform	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Chloromethane	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Dibromochloromethane	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Ethylbenzene	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Methylene chloride	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Styrene	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Tetrachloroethene	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Toluene	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Trichloroethene	0	2	6.5	7			ND	7	U		N/A		Yes	No SV
Vinyl chloride	0	2	2	2			ND	2	U		N/A		Yes	No SV
Xylene (Total)	0	2	6.5	7			ND	7	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Some PCB/Pesticide data were rejected at the laboratory.

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 10-1-24
Wetland 1B Phase II
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	Endosulfan sulfate	Benzo(b)fluoranthene	None
Barium	Methoxychlor	Benzo(g,h,i)perylene	
Beryllium	alpha-Chlordane	Benzo(k)fluoranthene	
Cadmium	gamma-Chlordane	bis(2-Ethylhexyl)phthalate (BEHP)	
Calcium	Total Chlordane	Carbazole	
Cobalt	4,4'-DDD	Indeno(1,2,3-cd)pyrene	
Copper	4,4'-DDE	Anthracene	
Iron	4,4'-DDT	Benzo(a)anthracene	
Lead	Total DDT	Benzo(a)pyrene	
Magnesium	Aroclor-1260	Chrysene	
Manganese	Total PCBs	Fluoranthene	
Mercury		Phenanthrene	
Potassium		Pyrene	
Sodium		Total PAHs	
Vanadium		TOC Normalized PAHs	
Zinc			
		Not Detected Parameters	
Cyanide (CN)	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Selenium	Endosulfan I	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
Thallium	Endosulfan II	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Heptachlor	1,4-Dichlorobenzene	1,1-Dichloroethane
	Heptachlor epoxide	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Toxaphene	2,4,5-Trichlorophenol	1,2-Dichloroethane
	alpha-BHC	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
		2,4-Dichlorophenol	1,2-Dichloropropane
		2,4-Dimethylphenol	2-Butanone (MEK)
		2,4-Dinitrophenol	2-Hexanone
		2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
		2,6-Dinitrotoluene	Acetone
		2-Chloronaphthalene	Benzene
		2-Chlorophenol	Bromodichloromethane
		2-Methyl-4,6-Dinitrophenol	Bromoform
		2-Methylnaphthalene	Bromomethane
		2-Methylphenol (o-Cresol)	Carbon disulfide
		2-Nitroaniline	Carbon tetrachloride
		2-Nitrophenol	Chlorobenzene
		3,3'-Dichlorobenzidine	Chloroethane
		3-Nitroaniline	Chloroform
		4-Bromophenyl-phenylether	Chloromethane
		4-Chloro-3-methylphenol	cis-1,3-Dichloropropene
		4-Chloroaniline	Dibromochloromethane
		4-Chlorophenylphenyl ether	Ethylbenzene
		4-Methylphenol (p-Cresol)	Methylene chloride
		4-Nitroaniline	Styrene
		4-Nitrophenol	Tetrachloroethene
		Acenaphthene	Toluene
		Acenaphthylene	trans-1,3-Dichloropropene
		bis(2-Chloroethoxy)methane	Trichloroethene
		bis(2-Chloroethyl)ether	Vinyl chloride
		Butylbenzylphthalate	Xylene (Total)
		Dibenz(a,h)anthracene	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		Fluorene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Naphthalene	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 10-1-25
Wetland 1B Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	2	2				2,900	1,510	4,290	4,290	J	041M010401			NA					0	13,610	0	No	EPC < RC
Barium	2	2				11.8	5.9	17.7	17.7		041M010401			NA					0	14	1	Yes	EPC > RC and no RV
Beryllium	1	2	0.035	0.035	0.035	0.0725	0.11	0.11	0.11	J	041M010401			NA					0	0.84	0	No	EPC < RC
Cadmium	2	2				1.27	0.53	2	2		041M010401	0.676	4.21	PEL	2.96	1.87	0.48	0.3	0	1.8	1	No	EPC > RC, but < RV
Calcium	2	2				1,000	921	1,080	1,080	J	041M010401			NA					0	10,756.67	0	No	EPC < RC
Cobalt	2	2				0.695	0.4	0.99	0.99	J	041M010401			NA					0	2.8	0	No	EPC < RC
Copper	2	2				25.1	18.3	31.8	31.8		041M010401	18.7	108	PEL	1.7	1.34	0.29	0.23	0	19.5	1	No	EPC > RC, but < RV
Cyanide (CN)	0	2	0.353	0.31	0.395	0.353			0.395	U	ND			NA					0	5.22	0	No	EPC < RC
Iron	2	2				2,350	1,770	2,930	2,930		041M010401			NA					0	11,911.67	0	No	EPC < RC
Lead	**2**	**2**				**101**	**48.8**	**153**	**153**		**041M010401**	**30.2**	**112**	**PEL**	**5.07**	**3.34**	**1.37**	**0.90**	**1**	**82.47**	**1**	**Yes**	**EPC > RV and RC**
Magnesium	2	2				197	144	250	250	J	041M010401			NA					0	7,513.33	0	No	EPC < RC
Manganese	2	2				10.9	10.4	11.3	11.3		041M010401			NA					0	37.97	0	No	EPC < RC
Mercury	2	2				0.185	0.17	0.2	0.2		041M010401	0.13	0.696	PEL	1.54	1.42	0.29	0.27	0	0.55	0	No	EPC < RC and RV
Potassium	2	2				46.6	28	65.3	65.3	J	041M010401			NA					0	1,628.67	0	No	EPC < RC
Selenium	0	2	0.155	0.135	0.175	0.155			0.175	U	ND			NA					0	3.45	0	No	EPC < RC
Sodium	1	2	8.75	8.75	8.75	20.9	33	33	33	J	041M010401			NA					0	18,993.33	0	No	EPC < RC
Thallium	0	2	0.155	0.135	0.175	0.155			0.175	U	ND			NA					0	1.57	0	No	EPC < RC
Vanadium	2	2				6.4	2.5	10.3	10.3		041M010401			NA					0	28.67	0	No	EPC < RC
Zinc	**2**	**2**				**182**	**69.1**	**294**	**294**		**041M010401**	**124**	**271**	**PEL**	**2.37**	**1.46**	**1.08**	**0.67**	**1**	**36.73**	**2**	**Yes**	**EPC > RV and RC**
PAHs (g/kg)																							
2-Methylnaphthalene	0	2	380	210	550	380			550	U	ND	20.2	201	PEL	27.2	18.8	2.74	1.89	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthene	0	2	183	100	265	183			265	U	ND	6.71	88.9	PEL	39.5	27.2	2.98	2.05	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthylene	0	2	380	210	550	380			550	U	ND	5.87	128	PEL	93.7	64.7	4.3	2.97	0		0	No	Parameter Not Detected; Max SQL > RV
Anthracene	**1**	**2**	**210**	**210**	**210**	**600**	**990**	**990**	**990**	**J**	**041M010401**	**46.9**	**245**	**PEL**	**21.1**	**12.8**	**4.04**	**2.45**	**1**		**0**	**No**	**TOC Normalized PAHs < MEC**
Benzo(a)anthracene	**2**	**2**				**2,110**	**420**	**3,800**	**3,800**		**041M010401**	**74.8**	**693**	**PEL**	**50.8**	**28.2**	**5.48**	**3.04**	**1**		**0**	**No**	**TOC Normalized PAHs < MEC**
Benzo(a)pyrene	**2**	**2**				**2,390**	**480**	**4,300**	**4,300**		**041M010401**	**88.8**	**763**	**PEL**	**48.4**	**26.9**	**5.64**	**3.13**	**1**		**0**	**No**	**TOC Normalized PAHs < MEC**
Chrysene	**2**	**2**				**2,370**	**530**	**4,200**	**4,200**		**041M010401**	**108**	**846**	**PEL**	**38.9**	**21.9**	**4.96**	**2.8**	**1**		**0**	**No**	**TOC Normalized PAHs < MEC**
Dibenz(a,h)anthracene	0	2	380	210	550	380			550	U	ND	6.22	135	PEL	88.4	61.1	4.07	2.81	0		0	No	Parameter Not Detected; Max SQL > RV
Fluoranthene	**2**	**2**				**4,200**	**1,200**	**7,200**	**7,200**		**041M010401**	**113**	**1,494**	**PEL**	**63.7**	**37.2**	**4.82**	**2.81**	**1**		**0**	**No**	**TOC Normalized PAHs < MEC**
Fluorene	0	2	183	100	265	183			265	U	ND	21.2	144	PEL	12.5	8.61	1.84	1.27	0		0	No	Parameter Not Detected; Max SQL > RV
Naphthalene	0	2	380	210	550	380			550	U	ND	34.6	391	PEL	15.9	11	1.41	0.97	0		0	No	Parameter Not Detected; Max SQL > RV
Phenanthrene	**2**	**2**				**2,210**	**420**	**4,000**	**4,000**		**041M010401**	**86.7**	**544**	**PEL**	**46.1**	**25.5**	**7.35**	**4.06**	**1**		**0**	**No**	**TOC Normalized PAHs < MEC**
Pyrene	**2**	**2**				**3,570**	**930**	**6,200**	**6,200**		**041M010401**	**153**	**1,398**	**PEL**	**40.5**	**23.3**	**4.43**	**2.55**	**1**		**0**	**No**	**TOC Normalized PAHs < MEC**
Total PAHs	**2**	**2**				**19,300**	**5,230**	**33,400**	**33,400**		**041M010401**	**1,684**	**16,770**	**PEL**	**19.8**	**11.5**	**1.99**	**1.15**	**1**		**0**	**No**	**TOC Normalized PAHs < MEC**
TOC Normalized PAHs	2	2				1,037.62	983.08	1,092.16	1,092.16		041M010401	290	1,800	MEC	3.77	3.58	0.61	0.58	0		0	No	RV HQ <1 and no RC
PCBs (g/kg)																							
Aroclor-1016	0	1	1.05	1.05	1.05	1.05			1.05	UJ	ND	21.6	189	PEL	0.05	0.05	0.006	0.006	0		0	No	Parameter Not Detected; Max SQL < SV
Aroclor-1221	0	1	2.1	2.1	2.1	2.1			2.1	UJ	ND	67	189	PEL	0.03	0.03	0.01	0.01	0		0	No	Parameter Not Detected; Max SQL < SV
Aroclor-1232	0	1	1.05	1.05	1.05	1.05			1.05	UJ	ND	21.6	189	PEL	0.05	0.05	0.006	0.006	0		0	No	Parameter Not Detected; Max SQL < SV
Aroclor-1242	0	1	1.05	1.05	1.05	1.05			1.05	UJ	ND	21.6	189	PEL	0.05	0.05	0.006	0.006	0		0	No	Parameter Not Detected; Max SQL < SV
Aroclor-1248	0	1	1.05	1.05	1.05	1.05			1.05	UJ	ND	21.6	189	PEL	0.05	0.05	0.006	0.006	0		0	No	Parameter Not Detected; Max SQL < SV
Aroclor-1254	0	1	1.05	1.05	1.05	1.05			1.05	UJ	ND	21.6	189	PEL	0.05	0.05	0.006	0.006	0		0	No	Parameter Not Detected; Max SQL < SV
Aroclor-1260	2	2				125	110	140	140	DJ	041M010401	21.6	189	PEL	6.48	5.79	0.74	0.66	0		0	No	RV HQ <1 and no RC
Total PCBs	2	2				129	117	140	140		041M010401	21.6	189	PEL	6.48	5.96	0.74	0.68	0		0	No	RV HQ <1 and no RC
Pesticides (g/kg)																							
Aldrin	0	1	0.055	0.055	0.055	0.055			0.055	UJ	ND			NA					0		0	No	Parameter Not Detected
Endosulfan I	0	1	0.055	0.055	0.055	0.055			0.055	UJ	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	1	0.105	0.105	0.105	0.105			0.105	UJ	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	2	2				1.03	0.45	1.6	1.6	J	041M010401			NA					0		0	Yes	No SV, no RV, and no RC
Heptachlor	0	1	0.055	0.055	0.055	0.055			0.055	UJ	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	1	0.055	0.055	0.055	0.055			0.055	UJ	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	1	2	0.55	0.55	0.55	3.58	6.6	6.6	6.6	J	041M010401			NA					0		0	Yes	No SV, no RV, and no RC
Toxaphene	0	1	11	11	11	11			11	UJ	ND			NA					0		0	No	Parameter Not Detected
alpha-BHC	0	1	0.055	0.055	0.055				0.055	UJ	ND		0.99	PEL			0.06	0.06	0		0	No	RV HQ > 1 and no RC
alpha-Chlordane	**2**	**2**				**3.65**	**1.1**	**6.2**	**6.2**	**DJ**	**041M010401**	**1.7**	**4.79**	**PEL**	**3.65**	**2.15**	**1.29**	**0.76**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
gamma-Chlordane	**2**	**2**				**6.4**	**3.3**	**9.5**	**9.5**	**DJ**	**041M010401**	**1.7**	**4.79**	**PEL**	**5.59**	**3.76**	**1.98**	**1.34**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Total Chlordane	**2**	**2**				**10.1**	**4.4**	**15.7**	**15.7**		**041M010401**	**1.7**	**4.79**	**PEL**	**9.24**	**5.91**	**3.28**	**2.1**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	**2**	**2**				**15**	**5**	**25**	**25**	**DJ**	**041M010401**	**1.22**	**7.81**	**PEL**	**20.5**	**12.3**	**3.2**	**1.92**	**1**	**50**	**0**	**No**	**EPC > RV, but < RC**
4,4'-DDE	2	2				2.49	0.48	4.5	4.5	DJ	041M010401	2.07	374	PEL	2.17	1.2	0.01	0.01	0	40	0	No	EPC < RC and RV
4,4'-DDT	**2**	**2**				**5.7**	**1.4**	**10**	**10**	**DJ**	**041M010401**	**1.19**	**4.77**	**PEL**	**8.4**	**4.79**	**2.1**	**1.19**	**1**	**20**	**0**	**No**	**EPC > RV, but < RC**
Total DDT	2.00	2.00				23.20	6.88	39.50	39.50		041M010401	3.30	51.70	PEL	12.00	7.03	0.76	0.45	0.00	110.00	0.00	No	EPC < RC and RV
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	2	9,250	5,000	13,500	9,250			13,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	2	9,250	5,000	13,500	9,250			13,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	2	9,250	5,000	13,500	9,250			13,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	2	9,250	5,000	13,500	9,250			13,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	2	9,250	5,000	13,500	9,250			13,500	U	ND			NA					0		0	No	Parameter Not Detected

Table 10-1-25
Wetland 1B Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
4-Nitrophenol	0	2	9,250	5,000	13,500	9,250			13,500	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(b)fluoranthene	2	2				3,000	600	5,400	5,400		041M010401			NA					0		0	No	TOC Normalized PAHs < MEC
Benzo(g,h,i)perylene	2	2				1,080	250	1,900	1,900		041M010401			NA					0		0	No	TOC Normalized PAHs < MEC
Benzo(k)fluoranthene	2	2				960	220	1,700	1,700		041M010401			NA					0		0	No	TOC Normalized PAHs < MEC
bis(2-Chloroethoxy)methane	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	2	380	210	550	380			550	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	**2**	**2**				**2,090**	**680**	**3,500**	**3,500**	**J**	**041M010401**	**182**	**2,647**	**PEL**	**19.2**	**11.5**	**1.32**	**0.79**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Butylbenzylphthalate	0	2	3,800	2,100	5,500	3,800			5,500	U	ND	182	2,647	PEL	30.2	20.9	2.08	1.44	0		0	No	Parameter Not Detected; Max SQL > RV
Carbazole	1	2	2,100	2,100	2,100	1,490	880	880	880	J	041M010401			NA					0		0	Yes	No SV, no RV, and no RC
Dibenzofuran	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	0	2	3,800	2,100	5,500	3,800			5,500	U	ND	182	2,647	PEL	30.2	20.9	2.08	1.44	0		0	No	Parameter Not Detected; Max SQL > RV
Dimethylphthalate	0	2	3,800	2,100	5,500	3,800			5,500	U	ND	182	2,647	PEL	30.2	20.9	2.08	1.44	0		0	No	Parameter Not Detected; Max SQL > RV
Di-n-butylphthalate	0	2	3,800	2,100	5,500	3,800			5,500	U	ND	182	2,647	PEL	30.2	20.9	2.08	1.44	0		0	No	Parameter Not Detected; Max SQL > RV
Di-n-octylphthalate	0	2	3,800	2,100	5,500	3,800			5,500	U	ND	182	2,647	PEL	30.2	20.9	2.08	1.44	0		0	No	Parameter Not Detected; Max SQL > RV
Hexachlorobenzene	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	2	2				1,110	220	2,000	2,000		041M010401			NA					0		0	No	TOC Normalized PAHs < MEC
Isophorone	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	2	380	210	550	380			550	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	2	9,250	5,000	13,500	9,250			13,500	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	2	3,800	2,100	5,500	3,800			5,500	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
2-Hexanone	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	0	2	31.3	26.5	36	31.3			36	U	ND			NA					0		0	No	Parameter Not Detected
Benzene	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Chloroethane	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	2	2	2	2	2			2	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	2	6.75	6.5	7	6.75			7	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected; SQL is estimated
D = Diluted Result

Supporting Information:
SV = Screening Value (detailed explanation for SVs provided in Section 8)
RV = Refinement Value (detailed explanation of RVs provided in Section 8)
HQ = Hazard Quotient
PEL = Probable Effects Level

N/R = No Refinement value available
N/A = Not Applicable
Average result calculations include summing detections and one-half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections.
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 10-1-26
Wetland 1B Phase II
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Barium	Endosulfan sulfate	bis(2-Ethylhexyl)phthalate (BEHP)	None
Lead	Methoxychlor	Carbazole	
Zinc	alpha-Chlordane		
	gamma-Chlordane		
	Total Chlordane		

Table 10-1-27
Wetland 1B Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M010301	1/18/1996	mg/kg	0.4	J	Arsenic	8.2	70	0.01
041M010301	1/18/1996	mg/kg	0.53		Cadmium	1.2	9.6	0.06
041M010301	1/18/1996	mg/kg	9.8		Chromium	81	370	0.03
041M010301	1/18/1996	mg/kg	18.3		Copper	34	270	0.07
041M010301	1/18/1996	mg/kg	48.8		Lead	46.7	218	0.22
041M010301	1/18/1996	mg/kg	0.17		Mercury	0.15	0.71	0.24
041M010301	1/18/1996	mg/kg	3.9		Nickel	20.9	51.6	0.08
041M010301	1/18/1996	mg/kg	0.17	U	Silver	1	3.7	0.05
041M010301	1/18/1996	mg/kg	69.1		Zinc	150	410	0.17
041M010301	1/18/1996	g/kg	0.48	J	4,4'-DDE	2.2	27	0.02
041M010301	1/18/1996	g/kg	1.4	J	4,4'-DDT	1.58	46.1	0.03
041M010301	1/18/1996	g/kg	117.35		Total PCBs	22.7	180	0.65
041M010301	1/18/1996	g/kg	210	U	2-Methylnaphthalene	70	670	0.31
041M010301	1/18/1996	g/kg	100	U	Acenaphthene	16	500	0.20
041M010301	1/18/1996	g/kg	210	U	Acenaphthylene	44	640	0.33
041M010301	1/18/1996	g/kg	210	U	Anthracene	85.3	1,100	0.19
041M010301	1/18/1996	g/kg	420	J	Benzo(a)anthracene	261	1,600	0.26
041M010301	1/18/1996	g/kg	480		Benzo(a)pyrene	430	1,600	0.30
041M010301	1/18/1996	g/kg	530		Chrysene	384	2,800	0.19
041M010301	1/18/1996	g/kg	210	U	Dibenz(a,h)anthracene	63.4	260	0.81
041M010301	1/18/1996	g/kg	1,200		Fluoranthene	600	5,100	0.24
041M010301	1/18/1996	g/kg	100	U	Fluorene	19	540	0.19
041M010301	1/18/1996	g/kg	210	U	Naphthalene	160	2,100	0.10
041M010301	1/18/1996	g/kg	420	J	Phenanthrene	240	1,500	0.28
041M010301	1/18/1996	g/kg	930		Pyrene	665	2,600	0.36
041M010301	1/18/1996				ERM Quotient Sum			5.36
041M010301	1/18/1996				Mean ERM Quotient			0.21
041M010301	1/18/1996				Mean ERM Quotient without ND			0.13
041M010301	1/18/1996				Mean ERM Quotient Category			2.00
041M010401	1/17/1996	mg/kg	2.5		Arsenic	8.2	70	0.04
041M010401	1/17/1996	mg/kg	2		Cadmium	1.2	9.6	0.21
041M010401	1/17/1996	mg/kg	27.3		Chromium	81	370	0.07
041M010401	1/17/1996	mg/kg	31.8		Copper	34	270	0.12
041M010401	1/17/1996	mg/kg	153		Lead	46.7	218	0.70
041M010401	1/17/1996	mg/kg	0.2		Mercury	0.15	0.71	0.28
041M010401	1/17/1996	mg/kg	7.5		Nickel	20.9	51.6	0.15
041M010401	1/17/1996	mg/kg	0.215	U	Silver	1	3.7	0.06

Table 10-1-27
Wetland 1B Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M010401	1/17/1996	mg/kg	294		Zinc	150	410	0.72
041M010401	1/17/1996	g/kg	4.5	DJ	4,4'-DDE	2.2	27	0.17
041M010401	1/17/1996	g/kg	10	DJ	4,4'-DDT	1.58	46.1	0.22
041M010401	1/17/1996	g/kg	140		Total PCBs	22.7	180	0.78
041M010401	1/17/1996	g/kg	550	U	2-Methylnaphthalene	70	670	0.82
041M010401	1/17/1996	g/kg	265	U	Acenaphthene	16	500	0.53
041M010401	1/17/1996	g/kg	550	U	Acenaphthylene	44	640	0.86
041M010401	1/17/1996	g/kg	990	J	Anthracene	85.3	1,100	0.90
041M010401	**1/17/1996**	**g/kg**	**3,800**		**Benzo(a)anthracene**	**261**	**1,600**	**2.38**
041M010401	**1/17/1996**	**g/kg**	**4,300**		**Benzo(a)pyrene**	**430**	**1,600**	**2.69**
041M010401	**1/17/1996**	**g/kg**	**4,200**		**Chrysene**	**384**	**2,800**	**1.50**
041M010401	1/17/1996	g/kg	550	U	Dibenz(a,h)anthracene	63.4	260	2.12
041M010401	**1/17/1996**	**g/kg**	**7,200**		**Fluoranthene**	**600**	**5,100**	**1.41**
041M010401	1/17/1996	g/kg	265	U	Fluorene	19	540	0.49
041M010401	1/17/1996	g/kg	550	U	Naphthalene	160	2,100	0.26
041M010401	**1/17/1996**	**g/kg**	**4,000**		**Phenanthrene**	**240**	**1,500**	**2.67**
041M010401	**1/17/1996**	**g/kg**	**6,200**		**Pyrene**	**665**	**2,600**	**2.38**
041M010401	1/17/1996				ERM Quotient Sum			22.50
041M010401	1/17/1996				Mean ERM Quotient			0.90
041M010401	1/17/1996				Mean ERM Quotient without ND			0.69
041M010401	1/17/1996				Mean ERM Quotient Category			3

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 10-1-28
Wetland 1B Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	0	1	34	34.05	34.05	34			ND	34.05	U	13	FDEP	2.62	Yes	Max SQL > SV
Antimony	0	1	1	1	1	1			ND	1	UJ	160	EPA	0.01	No	Max SQL< SV
Arsenic	0	1	1	1	1	1			ND	1	U	50	FDEP	0.02	No	Max SQL< SV
Barium	1	1				10.8	10.8	10.8	041W010301	10.8	J		NA		Yes	No SV
Beryllium	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.13	FDEP	3.85	Yes	Max SQL > SV
Cadmium	0	1	1	1	1	1			ND	1	U	0.66	EPA	1.52	Yes	Max SQL > SV
Calcium	1	1				30,700	30,700	30,700	041W010301	30,700			NA		Yes	No SV
Chromium	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	11	EPA	0.23	No	Max SQL< SV
Cobalt	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Copper	0	1	2	2	2	2			ND	2	U	6.54	EPA	0.31	No	Max SQL< SV
Cyanide (CN)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	5.2	EPA	0.48	No	Max SQL< SV
Iron	1	1				302	302	302	041W010301	302			NA		Yes	No SV
Lead	0	1	1	1	1	1			ND	1	U	1.32	EPA	0.76	No	Max SQL< SV
Magnesium	1	1				2,560	2,560	2,560	041W010301	2,560	J		NA		Yes	No SV
Manganese	1	1				17.4	17.4	17.4	041W010301	17.4			NA		Yes	No SV
Mercury	0	1	0.07	0.07	0.07	0.07			ND	0.07	U	0.012	EPA	5.83	Yes	Max SQL > SV
Nickel	0	1	4.5	4.5	4.5	4.5			ND	4.5	U	87.71	EPA	0.05	No	Max SQL< SV
Potassium	1	1				2,300	2,300	2,300	041W010301	2,300	J		NA		Yes	No SV
Selenium	0	1	2	2	2	2			ND	2	U	5	EPA	0.4	No	Max SQL< SV
Silver	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	0.012	EPA	208	Yes	Max SQL > SV
Sodium	1	1				7,370	7,370	7,370	041W010301	7,370			NA		Yes	No SV
Thallium	0	1	2	2	2	2			ND	2	U	4	EPA	0.5	No	Max SQL< SV
Vanadium	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Zinc	1	1				19.3	19.3	19.3	041W010301	19.3	J	58.91	EPA	0.33	No	Max Detect < SV
Pesticides (g/L)																
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.056	EPA	0.45	No	Max SQL< SV
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	6.58	Yes	Max SQL > SV
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	11.6	Yes	Max SQL > SV
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	No	Max SQL< SV
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	35.7	Yes	Max SQL > SV
Total PCB	0	1	4	4	4	4			ND	4	U		NA		Yes	No SV
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	43.8	EPA	0.06	No	Max SQL< SV
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV

Table 10-1-28
Wetland 1B Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L) - cont.																
4-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Nitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	0.3	EPA	8.33	Yes	Max SQL > SV
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Di-n-butylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	9.4	EPA	0.27	No	Max SQL< SV
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pentachlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chrysene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluorene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Naphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	26	FDEP	0.02	No	Max SQL< SV
Phenanthrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Total PAH	0	1	6.5	6.5	6.5	6.5			ND	6.5	U		NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	270	FDEP	0.00	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.16	No	Max SQL< SV
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	15.8	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	3	FDEP	0.17	No	Max SQL< SV
2-Butanone (MEK)	1	1				2	2	2	041W010301	2	J		NA		Yes	No SV
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	53	EPA	0.01	No	Max SQL< SV
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	17	FDEP	0.03	No	Max SQL< SV
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	289	EPA	0.00	No	Max SQL< SV
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
cis-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	453	EPA	0.00	No	Max SQL< SV
Methylene chloride	0	1	3	3	3	3			ND	3	U	1,580	FDEP	0.00	No	Max SQL< SV
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	175	EPA	0.00	No	Max SQL< SV

Table 10-1-28
Wetland 1B Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
VOCs (g/L) - cont.																
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Vinyl chloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected; SQL is estimated
D = Diluted Result

Supporting Information:
SV = Screening Value (detailed explanation for SVs provided in Section 8).
RV = Refinement Value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient
N/R = No refinement value available.
N/A = Not Applicable

Average result calculations include summing detections and one-half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 10-1-29
Wetland 1B Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs	VOCs
		Detected Parameters	
Manganese	None	None	2-Butanone (MEK)
Barium			
Calcium			
Iron			
Magnesium			
Potassium			
Sodium			
		Not Detected Parameters	
Aluminum	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Beryllium	Dieldrin	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1,2-Trichloroethane
Cadmium	Endosulfan II	2,4,5-Trichlorophenol	1,1-Dichloroethane
Cobalt	Endosulfan sulfate	2,4,6-Trichlorophenol	1,2-Dibromo-3-Chloropropane
Mercury	Heptachlor	2,4-Dichlorophenol	1,2-Dibromoethane
Silver	Heptachlor epoxide	2,4-Dimethylphenol	1,2-Dichloroethane
Vanadium	Methoxychlor	2,4-Dinitrophenol	1,2-Dichloropropane
	Toxaphene	2,4-Dinitrotoluene	1,3-Dichlorobenzene
	alpha-Chlordane	2,6-Dinitrotoluene	2-Hexanone
	gamma-Chlordane	2-Chloronaphthalene	4-Methyl-2-Pentanone (MIBK)
	Total Chlordane	2-Methyl-4,6-Dinitrophenol	Bromochloromethane
	Endrin	2-Methylnaphthalene	Bromodichloromethane
	Endrin aldehyde	2-Methylphenol (o-Cresol)	Bromoform
	Endrin ketone	2-Nitroaniline	Bromomethane
	Total Endrin	2-Nitrophenol	Carbon disulfide
	alpha-BHC	3,3'-Dichlorobenzidine	Carbon tetrachloride
	beta-BHC	3-Nitroaniline	Chloroethane
	delta-BHC	4-Bromophenyl-phenylether	Chloromethane
	Total BHC	4-Chloro-3-methylphenol	cis-1,2-Dichloroethene
	4,4'-DDD	4-Chloroaniline	cis-1,3-Dichloropropene
	4,4'-DDE	4-Chlorophenylphenyl ether	Dibromochloromethane
	4,4'-DDT	4-Methylphenol (p-Cresol)	Styrene
	Total DDT	4-Nitroaniline	Tetrachloroethene
	Aroclor-1016	4-Nitrophenol	trans-1,2-Dichloroethene
	Aroclor-1221	Acenaphthene	trans-1,3-Dichloropropene
	Aroclor-1232	Acenaphthylene	Trichloroethene
	Aroclor-1242	Anthracene	Vinyl chloride
	Aroclor-1248	Benzo(a)anthracene	Xylene (Total)
	Aroclor-1254	Benzo(a)pyrene	
	Aroclor-1260	Benzo(b)fluoranthene	
	Total PCBs	Benzo(g,h,i)perylene	
		Benzo(k)fluoranthene	
		bis(2-Chloroethoxy)methane	
		bis(2-Chloroethyl)ether	
		bis(2-Ethylhexyl)phthalate (BEHP)	
		Butylbenzylphthalate	
		Chrysene	
		Dibenz(a,h)anthracene	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Fluoranthene	
		Fluorene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenanthrene	
		Phenol	
		Pyrene	
		Total PAHs	

Table 10-1-30
Wetland 1B Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Metals (µg/L)																			
Aluminum	0	1	34	34.05	34.05	34			ND	34.05	U	13	FDEP	3	2.62	1,090	0	No	Max SQL < Ref. Conc.
Barium	1	1				10.8	10.8	10.8	041W010301	10.8	J		NA			3.67	1	Yes	Max Result > Ref. Conc.
Beryllium	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.13	FDEP	4	3.85	1	0	No	Max SQL < Ref. Conc.
Cadmium	0	1	1	1	1	1			ND	1	U	0.66	EPA	1.52	1.52	3	0	No	Max SQL < Ref. Conc.
Calcium	1	1				30,700	30,700	30,700	041W010301	30,700			NA			7,680	1	No	Essential Nutrient
Cobalt	0	1	1	1	1	1			ND	1	U		NA			3	0	No	Max SQL < Ref. Conc.
Iron	1	1				302	302	302	041W010301	302			NA			2,360	0	No	Max Result < Ref. Conc.
Magnesium	1	1				2,560	2,560	2,560	041W010301	2,560	J		NA			20,300	0	No	Max Result < Ref. Conc.
Manganese	1	1				17.4	17.4	17.4	041W010301	17.4			NA			13.2	1	Yes	Max Result > Ref. Conc.
Mercury	0	1	0.07	0.07	0.07	0.07			ND	0.07	U	0.012	EPA	6	5.83	0.13	0	No	Max SQL < Ref. Conc.
Potassium	1	1				2,300	2,300	2,300	041W010301	2,300	J		NA			7,000	0	No	Max Result < Ref. Conc.
Silver	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	0.012	EPA	208.33	208	4	0	No	Max SQL < Ref. Conc.
Sodium	1	1				7,370	7,370	7,370	041W010301	7,370			NA			182,000	0	No	Max Result < Ref. Conc.
Vanadium	0	1	1	1	1	1			ND	1	U		NA			4.7	0	No	Max SQL < Ref. Conc.
Pesticides (µg/L)																			
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	7	6.58		0	No	Parameter Not Detected; Max SQL > SV
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	No	Parameter Not Detected; Max SQL > SV
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	No	Parameter Not Detected
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	12	11.6		0	No	Parameter Not Detected; Max SQL > SV
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22	21.7		0	No	Parameter Not Detected; Max SQL > SV
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
gamma-BHC (Lindane)	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	0.31		0	No	Parameter Not Detected; Max SQL > SV
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	No	Parameter Not Detected
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	No	Parameter Not Detected; Max SQL > SV
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	No	Parameter Not Detected; Max SQL > SV
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85	84.7		0	No	Parameter Not Detected; Max SQL > SV
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
PCBs (µg/L)																			
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA				0	No	Parameter Not Detected
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	36	35.7		0	No	Parameter Not Detected; Max SQL > SV
Total PCB	0	1	4	4	4	4			ND	4	U		NA				0	No	Parameter Not Detected
SVOCs (µg/L)																			
1,2,4-Trichlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Nitroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
3-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
4-Nitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	0.3	EPA	8.33	8.33		0	No	Parameter Not Detected; Max SQL > SV

Table 10-1-30
Wetland 1B Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
SVOCs (µg/L) - cont.																			
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Pentachlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
PAHs (µg/L)																			
2-Methylnaphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Acenaphthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Acenaphthylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(a)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(a)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chrysene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Fluorene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Phenanthrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Total PAH	0	1	6.5	6.5	6.5	6.5			ND	6.5	U		NA				0	No	Parameter Not Detected
VOCs (µg/L)																			
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,1-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
2-Butanone (MEK)	1	1				2	2	2	041W010301	2	J		NA				0	Yes	No Ref. Conc.
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	No	Parameter Not Detected
cis-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Trichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Vinyl chloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Xylene (Total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL

UJ = Not detected; SQL is estimated
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening Value (detailed explanation for SVs provided in Section 8)
RV = Refinement Value (detailed explanation of RVs provided in Section 8)
PEL = Probable Effects Level
N/R = No refinement value available

N/A = Not Applicable
Average result calculations include summing detections and one-half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 10-1-31
Wetland 1B Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Manganese Barium	None	None	2-Butanone (MEK)

Table 10-1-32
Wetland 1B Phase II
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7440439	Cadmium	N	5.3E-01	=	2.0E+00	=	MG/KG	041M010401	2 / 2	NAV	1.3E+00	1.0E-03	3	4.00E-10	2.00E-10	6.33E-09	4.23E-09
7440508	Copper	N	1.8E+01	=	3.2E+01	=	MG/KG	041M010401	2 / 2	NAV	2.5E+01	1.0E-03	3	6.36E-09	3.18E-09	1.01E-07	6.73E-08
7439921	Lead	N	4.9E+01	=	1.5E+02	=	MG/KG	041M010401	2 / 2	NAV	1.0E+02	1.0E-03	3	3.06E-08	1.53E-08	4.84E-07	3.24E-07
7440666	Zinc	N	6.9E+01	=	2.9E+02	=	MG/KG	041M010401	2 / 2	NAV	1.8E+02	1.0E-03	3	5.88E-08	2.94E-08	9.31E-07	6.22E-07
72548	4,4'-DDD	C	5.0E-03	DJ	2.5E-02	DJ	MG/KG	041M010401	2 / 2	NAV	1.5E-02	3.0E-02	1	1.50E-10	7.50E-11	3.39E-10	5.67E-10
72559	4,4'-DDE	C	4.8E-04	J	4.5E-03	DJ	MG/KG	041M010401	2 / 2	NAV	2.5E-03	3.0E-02	1	2.70E-11	1.35E-11	6.11E-11	1.02E-10
50293	4,4'-DDT	C	1.4E-03	J	1.0E-02	DJ	MG/KG	041M010401	2 / 2	NAV	5.7E-03	3.0E-02	1	6.00E-11	3.00E-11	1.36E-10	2.27E-10
5103719	alpha-Chlordane	C	1.1E-03	J	6.2E-03	DJ	MG/KG	041M010401	2 / 2	NAV	3.7E-03	4.0E-02	2	4.96E-11	2.48E-11	1.12E-10	1.87E-10
11096825	Aroclor-1260	C	1.1E-01	DJ	1.4E-01	DJ	MG/KG	041M010401	2 / 2	NAV	1.3E-01	1.4E-01	1	3.92E-09	1.96E-09	8.86E-09	1.48E-08
1031078	Endosulfan sulfate	N	4.5E-04	J	1.6E-03	J	MG/KG	041M010401	2 / 2	NAV	1.0E-03	1.0E-01	2	3.20E-11	1.60E-11	5.07E-10	3.39E-10
7421934	Endrin aldehyde	N	N/A	N/A	1.5E-03	J	MG/KG	041M010301	1 / 2	N/A / 2.7E-04	8.2E-04	1.0E-01	2	3.00E-11	1.50E-11	4.75E-10	3.17E-10
57749	gamma-Chlordane	C	3.3E-03	DJ	9.5E-03	DJ	MG/KG	041M010401	2 / 2	NAV	6.4E-03	4.0E-02	2	7.60E-11	3.80E-11	1.72E-10	2.87E-10
72435	Methoxychlor	N	N/A	N/A	6.6E-03	J	MG/KG	041M010401	1 / 2	N/A / 1.1E-03	3.6E-03	1.0E-01	2	1.32E-10	6.60E-11	2.09E-09	1.40E-09
120127	Anthracene	N	N/A	N/A	9.9E-01	J	MG/KG	041M010401	1 / 2	N/A / 4.2E-01	6.0E-01	1.0E-02	3	1.98E-09	9.90E-10	3.13E-08	2.10E-08
56553	Benzo(a)anthracene	C	4.2E-01	J	3.8E+00	=	MG/KG	041M010401	2 / 2	NAV	2.1E+00	1.3E-01	2	9.88E-08	4.94E-08	2.23E-07	3.73E-07
50328	Benzo(a)pyrene	C	4.8E-01	=	4.3E+00	=	MG/KG	041M010401	2 / 2	NAV	2.4E+00	1.3E-01	2	1.12E-07	5.59E-08	2.53E-07	4.23E-07
205992	Benzo(b)fluoranthene	C	6.0E-01	=	5.4E+00	=	MG/KG	041M010401	2 / 2	NAV	3.0E+00	1.3E-01	2	1.40E-07	7.02E-08	3.17E-07	5.31E-07
191242	Benzo(g,h,i)perylene	C	2.5E-01	J	1.9E+00	=	MG/KG	041M010401	2 / 2	NAV	1.1E+00	1.3E-01	2	4.94E-08	2.47E-08	1.12E-07	1.87E-07
207089	Benzo(k)fluoranthene	C	2.2E-01	J	1.7E+00	=	MG/KG	041M010401	2 / 2	NAV	9.6E-01	1.3E-01	2	4.42E-08	2.21E-08	1.00E-07	1.67E-07
117817	(BEHP)	C	6.8E-01	J	3.5E+00	J	MG/KG	041M010401	2 / 2	NAV	2.1E+00	1.0E-01	1	7.00E-08	3.50E-08	1.58E-07	2.65E-07
86748	Carbazole	C	N/A	N/A	8.8E-01	J	MG/KG	041M010401	1 / 2	N/A / 4.2E+00	1.5E+00	1.0E-01	2	1.76E-08	8.80E-09	3.98E-08	6.65E-08
218019	Chrysene	C	5.3E-01	=	4.2E+00	=	MG/KG	041M010401	2 / 2	NAV	2.4E+00	1.3E-01	2	1.09E-07	5.46E-08	2.47E-07	4.13E-07
206440	Fluoranthene	N	1.2E+00	=	7.2E+00	=	MG/KG	041M010401	2 / 2	NAV	4.2E+00	1.3E-01	2	1.87E-07	9.36E-08	2.96E-06	1.98E-06
193395	Indeno(1,2,3-cd)pyrene	C	2.2E-01	J	2.0E+00	=	MG/KG	041M010401	2 / 2	NAV	1.1E+00	1.3E-01	2	5.20E-08	2.60E-08	1.18E-07	1.97E-07
85018	Phenanthrene	N	4.2E-01	J	4.0E+00	=	MG/KG	041M010401	2 / 2	NAV	2.2E+00	1.0E-02	3	8.00E-09	4.00E-09	1.27E-07	8.47E-08
129000	Pyrene	N	9.3E-01	=	6.2E+00	=	MG/KG	041M010401	2 / 2	NAV	3.6E+00	1.0E-02	3	1.24E-08	6.20E-09	1.96E-07	1.31E-07

Equation for sediment risk:

$$DADsd = \frac{DAevent \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg): 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Equation for DA_{event} for sediment contact:

$$DAevent = Csd \times CF \times AF \times ABSd$$

Where:

C_{sd} = Chemical concentration in sediment (mg/kg).
CF = Conversion factor (10^{-6} kg/mg).
AF = Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;
(2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Table 10-1-33
Wetland 1B Phase II
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABSGI	ABSGIS ource	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
Sediment Dermal Risk	Cadmium	N	2.0E+00	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	5.1E-04	N/A	3.4E-04	N/A
	Copper	N	3.2E+01	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	8.4E-06	N/A	5.6E-06	N/A
	Lead	N	1.5E+02	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Zinc	N	2.9E+02	3.0E-01	N/A	2.0E-01	3, 4	6.0E-02	N/A	1.6E-05	N/A	1.0E-05	N/A
	4,4'-DDD	C	2.5E-02	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	2.7E-09	N/A	4.5E-09
	4,4'-DDE	C	4.5E-03	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	6.9E-10	N/A	1.2E-09
	4,4'-DDT	C	1.0E-02	5.0E-04	3.4E-01	3.0E-02	2	1.5E-05	1.1E+01	9.0E-06	1.5E-09	1.5E-05	2.6E-09
	alpha-Chlordane	C	6.2E-03	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	2.8E-07	4.9E-11	4.7E-07	8.2E-11
	Aroclor-1260	C	1.4E-01	2.2E+00	2.0E+00	1.4E-01	2	3.1E-01	1.4E+01	2.9E-08	1.3E-07	4.8E-08	2.1E-07
	Endosulfan sulfate	N	1.6E-03	6.0E-03	N/A	5.0E-01	3	3.0E-03	N/A	1.7E-07	N/A	1.1E-07	N/A
	Endrin aldehyde	N	1.5E-03	3.0E-04	N/A	2.0E-02	3	6.0E-06	N/A	7.9E-05	N/A	5.3E-05	N/A
	gamma-Chlordane	C	9.5E-03	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	4.3E-07	7.5E-11	7.2E-07	1.3E-10
	Methoxychlor	N	6.6E-03	5.0E-03	N/A	5.0E-01	3	2.5E-03	N/A	8.4E-07	N/A	5.6E-07	N/A
	Anthracene	N	9.9E-01	3.0E-01	N/A	7.6E-01	3	2.3E-01	N/A	1.4E-07	N/A	9.2E-08	N/A
	Benzo(a)anthracene	C	3.8E+00	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	5.3E-07	N/A	8.8E-07
	Benzo(a)pyrene	C	4.3E+00	N/A	7.3E+00	3.1E-01	3	N/A	2.4E+01	N/A	**6.0E-06**	N/A	**1.0E-05**
	Benzo(b)fluoranthene	C	5.4E+00	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	7.5E-07	N/A	**1.2E-06**
	Benzo(g,h,i)perylene	C	1.9E+00	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	2.6E-07	N/A	4.4E-07
	Benzo(k)fluoranthene	C	1.7E+00	N/A	7.3E-02	3.1E-01	3	N/A	2.4E-01	N/A	2.4E-08	N/A	3.9E-08
	bis(2-Ethylhexyl)phthalate (BEHP)	C	3.5E+00	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	7.9E-05	2.2E-08	1.3E-04	3.7E-08
	Carbazole	C	8.8E-01	N/A	2.0E-02	7.0E-01	3	N/A	2.9E-02	N/A	1.1E-09	N/A	1.9E-09
	Chrysene	C	4.2E+00	7.3E-03	N/A	3.1E-01	3	2.3E-03	N/A	1.1E-04	N/A	1.8E-04	N/A
	Fluoranthene	N	7.2E+00	N/A	4.0E-02	3.1E-01	3	N/A	1.3E-01	N/A	3.8E-07	N/A	2.6E-07
	Indeno(1,2,3-cd)pyrene	C	2.0E+00	7.3E-01	N/A	3.1E-01	3	2.3E-01	N/A	5.2E-07	N/A	8.7E-07	N/A
	Phenanthrene	N	4.0E+00	N/A	3.0E-02	7.3E-01	3	N/A	4.1E-02	N/A	5.2E-09	N/A	3.5E-09
	Pyrene	N	6.2E+00	N/A	3.0E-02	3.1E-01	3	N/A	9.7E-02	N/A	1.9E-08	N/A	1.3E-08

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfDdermal = Dermal reference dose.
RFDoral = Oral reference dose.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-1-34
Wetland 1B Phase II
Sediment Incidential Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
Sediment Incidental Ingestion	Cadmium	N	2.0E+00	5.0E-04	N/A	1.27E-03	N/A	8.14E-04	N/A
	Copper	N	3.2E+01	4.0E-02	N/A	2.52E-04	N/A	1.62E-04	N/A
	Lead	N	1.5E+02	N/A	N/A	N/A	N/A	N/A	N/A
	Zinc	N	2.9E+02	3.0E-01	N/A	3.10E-04	N/A	1.99E-04	N/A
	4,4'-DDD	C	2.5E-02	N/A	2.4E-01	N/A	2.71E-10	N/A	4.36E-10
	4,4'-DDE	C	4.5E-03	N/A	3.4E-01	N/A	6.92E-11	N/A	1.11E-10
	4,4'-DDT	C	1.0E-02	5.0E-04	3.4E-01	9.05E-07	1.54E-10	1.45E-06	2.47E-10
	alpha-Chlordane	C	6.2E-03	5.0E-04	3.5E-01	5.61E-07	9.81E-11	9.01E-07	1.58E-10
	Aroclor-1260	C	1.4E-01	2.2E+00	2.0E+00	2.85E-09	1.27E-08	4.58E-09	2.04E-08
	Endosulfan sulfate	N	1.6E-03	6.0E-03	N/A	8.44E-08	N/A	5.43E-08	N/A
	Endrin aldehyde	N	1.5E-03	3.0E-04	N/A	1.58E-06	N/A	1.02E-06	N/A
	gamma-Chlordane	C	9.5E-03	5.0E-04	3.5E-01	8.59E-07	1.50E-10	1.38E-06	2.42E-10
	Methoxychlor	N	6.6E-03	5.0E-03	N/A	4.18E-07	N/A	2.69E-07	N/A
	Anthracene	N	9.9E-01	3.0E-01	N/A	1.04E-06	N/A	6.72E-07	N/A
	Benzo(a)anthracene	C	3.8E+00	N/A	7.3E-01	N/A	1.25E-07	N/A	2.02E-07
	Benzo(a)pyrene	C	4.3E+00	N/A	7.3E+00	N/A	**1.42E-06**	N/A	**2.28E-06**
	Benzo(b)fluoranthene	C	5.4E+00	N/A	7.3E-01	N/A	1.78E-07	N/A	2.87E-07
	Benzo(g,h,i)perylene	C	1.9E+00	N/A	7.3E-01	N/A	6.27E-08	N/A	1.01E-07
	Benzo(k)fluoranthene	C	1.7E+00	N/A	7.3E-02	N/A	5.61E-09	N/A	9.02E-09
	bis(2-Ethylhexyl)phthalate (BEHP)	C	3.5E+00	2.0E-02	1.4E-02	7.91E-06	2.22E-09	1.27E-05	3.56E-09
	Carbazole	C	8.8E-01	N/A	2.0E-02	N/A	7.96E-10	N/A	1.28E-09
	Chrysene	C	4.2E+00	7.3E-03	N/A	2.60E-05	N/A	4.18E-05	N/A
	Fluoranthene	N	7.2E+00	N/A	4.0E-02	N/A	9.12E-08	N/A	5.86E-08
	Indeno(1,2,3-cd)pyrene	C	2.0E+00	7.3E-01	N/A	1.24E-07	N/A	1.99E-07	N/A
	Phenanthrene	N	4.0E+00	N/A	3.0E-02	N/A	3.80E-08	N/A	2.44E-08
	Pyrene	N	6.2E+00	N/A	3.0E-02	N/A	5.89E-08	N/A	3.79E-08

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = Chronic Daily Intake (mg/kg-day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPCsd \times IRsd \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Table 10-1-34
Wetland 1B Phase II
Sediment Incidential Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Where:

CDI	=	Chronic daily intake (mg/kg-day).
EPCsd	=	Exposure point concentration in sediment (mg/kg).
IRsd	=	Incidental ingestion rate for sediment (mg/day).
EF	=	Exposure frequency (days/year).
ED	=	Exposure duration (years).
CF	=	Conversion factor (1E-6 kg/mg).
BW	=	Body weight (kg): 70 kg (adult) 45 kg (child).
AT	=	Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr. Carcinogenic effects AT = 70 yr x 365 dy/yr.
	=	Oral reference dose.
	=	Oral slope factor.

Exposure Parameters:

IRsd	=	100 mg/day for age groups greater than 6 years old.
EF	=	52 dys/yr (child trespasser/adult maintenance worker).
ED	=	10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW	=	45 kg (child trespasser); 70 kg (adult maintenance worker).
AT	=	Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker). Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 10-1-35
Wetland 1B Phase II
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7440393	Barium	N	N/A	N/A	1.1E+01	J	UG/L	041W010301	1 / 1	NAV	1.1E+01	1.1E-05	1.0E-03	2.81E-08	4.44E-07	5.94E-07
7439965	Manganese	N	N/A	N/A	1.7E+01	=	UG/L	041W010301	1 / 1	NAV	1.7E+01	1.7E-05	1.0E-03	4.52E-08	7.16E-07	9.58E-07
78933	2-Butanone (MEK)	N	N/A	N/A	2.0E+00	J	UG/L	041W010301	1 / 1	NAV	2.0E+00	2.0E-06	9.6E-04	6.02E-09	9.52E-08	1.27E-07

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DADsw = \frac{DAevent \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal Absorbed Dose-water contact (mg/kg-day).
DA_{event} = Dermal Absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event Frequency (events/day).

EF = Exposure Frequency (days/year).
ED = Exposure duration (years).
BW = Body Weight (kg): 70 kg (adult) 45 kg (child).
AT = Averaging Time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DAevent = Kp \times Cw \times tevent$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction Absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 10-1-36
Wetland 1B Phase II
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
	Barium	N	1.1E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	1.8E-02	N/A	1.2E-04	N/A
	Manganese	N	1.7E-05	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	4.2E-04	N/A	1.7E-04	N/A
	2-Butanone (MEK)	N	2.0E-06	6.0E-01	N/A	1.0E-01	2	6.0E-02	N/A	2.6E-06	N/A	2.1E-06	N/A

Notes:

Oral RfD = Oral Reference Dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal Reference Dose adjusted for ABS_{GI}.
Dermal SF = Dermal Slope Factor adjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal Reference Dose.
RFD_{oral} = Oral Reference Dose.
SFdermal = Dermal Slope Factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-1-37
Wetland 1B Phase II
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
	Barium	N	1.1E-05	7.0E-02	N/A	4.9E-09	N/A	3.1E-09	N/A
	Manganese	N	1.7E-05	1.4E-01	N/A	3.9E-09	N/A	2.5E-09	N/A
	2-Butanone (MEK)	N	2.0E-06	6.0E-01	N/A	1.1E-10	N/A	6.8E-11	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:

CDI = Chronic Daily Intake (mg/kg-day).
EPC_{sw} = Exposure Point Concentration in surface water (mg/L).
IR_{sw} = Incidental Ingestion Rate for sediment (L/day).
EF = Exposure Frequency (days/year).
ED = Exposure Duration (years).
BW = Body weight (kg): 70 kg (adult) 45 kg (child).
AT = Averaging Time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
Carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:

Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

10.2 Wetland 3 — Screening Level Problem Formulation

10.2.1 Site Description and Habitats Present at Wetland 3

Wetland 3 is in the north central portion of Pensacola NAS, west of the A.C. Read Golf Course, and east of Site 1 (Figure 10-1). Parsons and Pruitt (USEPA, 1991a) describe this area, which was an old beaver pond, as a palustrine system with the predominant vegetation being scrub shrub emergent. Today, the wetland consists of a highly vegetated emergent area characterized by sweet bay magnolias (*Magnolia virginian*), cattails (*Typha latifolia*), and saw grass (*Cladium jamaicense*). A shallow sheet flow of clear water drains from the southwest to the northeast through a culvert, which runs under John Tower Road, and beneath a golf course fairway into Wetland 4D, which empties into Bayou Grande (Figure 10-1). The open water portion of the wetland ranges from 0 to about 3 feet in depth and from 3 to 500 feet in width.

Photograph 1 Close-up View of Groundwater Seep Discharge into Wetland 3 (Photograph excerpted from TtNUS, 2004b)

Photograph 2 Seep Discharge and Flow in Wetland 3 (Photograph excerpted from TtNUS, 2004b)

As described in Section 10, the Site 1 landfill was used from the mid-1950s until 1976 as the predominant disposal site for all solid wastes generated on the base. Nearly all solid waste generated at NAS Pensacola was disposed of in Site 1, which is suspected of impacting Wetlands 1 through 4 and 15 through 18. Generally, low concentrations of surface soil contamination appear limited to the landfill interior. Soil samples from test trenches showed elevated concentrations of semi-volatile compounds, pesticides, PCBs, and metals. Pesticides appear to be widely distributed throughout the surface soil of the landfill, in selected trenches, and in surface locations near the eastern golf course boundary. Both metals and organic compounds have been detected in groundwater at concentrations exceeding Florida and federal drinking-water quality standards. Shallow groundwater contamination is evident, but appears sporadic and not in a defined concentration gradient. Groundwater generally flows north across the landfill towards Wetlands 3, 15, 16, 17, and 18 and Bayou Grande (Figure 10-3).

Based on the data collected during the Site 1 RI, the *Final ROD* (EnSafe, 1998a) outlined three RAOs for the site:

1. Protection of groundwater from leachable compounds

2. Restoration of groundwater and prevention of further contamination of shallow/intermediate groundwater

3. Prevention of further contamination of surface water in Wetland 3

The remedial actions selected for the site included:

1. Institutional controls to restrict groundwater use and intrusive activities

2. Implementation of a groundwater monitoring program to ensure that natural processes are effectively reducing the concentrations of organic compounds to attain performance standards

3. A groundwater interceptor system to treat the iron-contaminated groundwater that is migrating from the landfill and discharging to Wetland 3

TtNUS implemented the long-term monitoring plan. Groundwater was monitored for the following constituents: 1,1,2,2-tetrachlorethane, benzene, chlorobenzene, vinyl chloride, xylenes, aluminum, cadmium, chromium, iron, manganese, and nickel.

Based upon collected data, the Third Annual Groundwater Monitoring Report recommended continued monitoring for benzene, vinyl chloride, xylenes, aluminum, cadmium, iron, and manganese (TtNUS, 2003b). The other constituents no longer exceeded MCLs any longer and were dropped from the monitoring plan.

As stated in the ROD, the interceptor trench was installed to prevent iron-contaminated groundwater from discharging to Wetland 3. The interceptor trench was installed by Bechtel and has operated since 1999. Intercepted groundwater has been discharged to the federally owned treatment works (FOTW) for treatment. Despite the operation of that system, iron concentrations in Wetland 3 remain above reference concentrations.

As stated in the Optimization Study by TtNUS (2004b), the current recommendation is to discontinue the pumping operation to modify the monitoring program in the trench and Wetland 3 area.

10.2.2 Wetland 3 — Sample Location Description

Phase II Sediment Sample Location Description

Ten sediment samples were collected and analyzed for Wetland 3 (Figure 10-4). Sample locations for Wetland 3 covered the aerial extent of the wetland, focusing on groundwater seeps and depositional areas. Sample locations 001M000301, 001M000302, and 001M000303 were collected in 1994 as part of the Site 1 investigation. The additional seven sediment samples were collected in 1995. Both sampling events were combined for use in the Wetland 3 assessment. Sediments at Wetland 3 were composed of black sandy organic silt (041M030201) to silty brown medium to fine poorly graded sands with silts (041M030601). TOC concentrations ranged from 0.478% at 041M030401 to 24.1% at 041M030201. Table 10-2-1 (tables are located at the end of each section) presents TOC and grain size results for samples collected from Wetland 3.

Phase III Sediment Sample Location Description

Two sediment samples were collected during Phase III at Wetland 3 (Figure 10-8) to quantify the site-specific risk attributable to the COPCs identified for this wetland. Sediment samples were collected to conduct toxicity tests and to determine community structure through benthic diversity evaluations. Table 10-2-2 provides a physical description of the Phase III sediment samples collected at Wetland 3. Sediments at Wetland 3 were composed of poorly graded fine sands. TOC concentrations in the two sediment samples were 1.2% and 10%.

Phase II Surface Water Sample Location Description

Seven surface water samples were collected in Wetland 3. Samples 001W000301, 001W000302, and 001W000303 were collected in 1994 during the Site 1 investigation, while 041W030101, 041W030201, 041W030301, and 041W030401 were collected in 1995 during the Site 41 sampling event. The data were combined for this report. Surface water samples were co-located with sediment samples as shown in Figure 10-4. Table 10-2-3 provides a physical description of the surface water. Samples from this wetland were found to be moderately hard (i.e., mineralized) and of neutral pH. Two of the sample locations, 041W030201 (470 NTUs) and 041W030301 (690 NTUs), had very high turbidity due to sampling technique used, which could result in elevated constituent levels in those samples.

Phase III Surface Water Sample Location Description

One surface water sample (041W030101) was collected during the Phase III portion of the investigation as shown on Figure 10-8.

10.2.3 Wetland 3 — Nature and Extent of Contamination

Phase II Sediment

Figure 10-4 presents the Phase II sediment sampling locations for Wetland 3. Table 10-2-4 summarizes the analytical results of the 10 sediment samples collected during the Phase II investigation at Wetland 3.

Metals — Nineteen metals and cyanide were detected during Phase II sediment sampling at Wetland 3. The distribution of inorganic detections and reference-value exceedances during Phase II at Wetland 3 was centered at location 041M030701, near the center of the wetland, where 16 analytes were detected. Of these 16 detections, 11 exceeded the freshwater reference values. Locations 041M030201 and 041M030301, also near the center of the wetland, exhibited reference value exceedances of six and five analytes, respectively. The most common analytes exceeding the reference values were arsenic, barium, cadmium, iron, and manganese.

Pesticides and PCBs — Thirteen pesticide compounds and aroclor-1260 were detected during Phase II sediment sampling at Wetland 3. Total DDT was calculated for each location by adding the concentrations of 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT.

Likewise, a base-wide total DDT reference concentration was calculated using the base-wide concentrations for these same constituents.

The greatest number of pesticides detected in Wetland 3 sediments during Phase II sampling was situated near the center of the wetland at locations 041M030201, 041M030301, and 041M030401. Each of these locations had seven detections. Location 041M030601, near the center of Wetland 3, and location 041M030101, near the culvert under John Tower Road, had six pesticide detections each. Location 001M000303 exhibited significantly higher concentrations of 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT than other locations. Aroclor-1260 was detected at a single location, 041M030201.

SVOCs — Twenty-one SVOCs were detected in sediment samples collected during Phase II sampling at Wetland 3. Many of the sample locations exhibited no detections of SVOCs. Location 041M030101 had the greatest number of SVOC detections, with 12 compounds detected; however, the concentrations were relatively low. Locations 041M030301 and 041M030201 had seven and

two detections, respectively. Although these had a lower number of detections, the concentrations detected were significantly higher. Particularly, location 041M030201 had concentrations of 1,2 dichlorobenzene and 1,4-dichlorobenzene. The distribution of SVOCs in Wetland 3 is similar to the other constituents; the highest concentrations are near the center of the wetland. Location 041M030101, near the culvert under John Tower Road, had the greatest diversity of SVOCs detected.

VOCs — Five VOCs were detected in sediments collected from Wetland 3 during Phase II sampling. The greatest number of constituents detected and generally the highest concentrations were at location 041M030701, near the center of the wetland. Locations 041M030201 and 041M030301, also near the center of the wetland, each had two detections. Specifically, the concentrations of chlorobenzene at 041M030201 and 041M030301 were significantly higher than other locations.

Phase III Sediment

Based on the results of the Phase II sampling, Phase III was initiated to confirm elevated detections at sediment locations 041M030201 and 041M030701 in Wetland 3. Table 10-2-5 summarizes the analytical results of the Phase III sediment sampling.

Metals — Twenty metals and cyanide were detected in either or both of the sediments collected during Phase III. The Phase III sample results were in close agreement with the Phase II results, confirming the common problematic analytes as arsenic, barium, cadmium, iron, and manganese.

Pesticides and PCBs — Six pesticides were detected during the Phase III investigation. In general, the Phase II and III results were in close agreement. The results for location 041M030201 were very close in analytes detected and in concentrations. The exception was the lack of aroclor-1260 in the Phase III results. Location 041M030701 exhibited similar constituents but at higher concentrations during Phase III.

SVOCs — The single compound BEHP was again detected at location 041M030701. During Phase III, the concentration almost doubled.

VOCs — Only three VOCs were detected during Phase III sediment sampling at Wetland 3 (2-Butanone, acetone, and carbon disulfide). At the location of the highest detection in Phase II, two of the constituents detected at location 041M030701 were similar; however, the concentrations

were significantly less during this most recent sampling event, and chlorobenzene and toluene were not detected.

At location 041M030201, the two compounds detected during Phase II sampling were no longer detected; however, elevated concentrations of 2-butanone, acetone, and carbon disulfide, not previously detected at this location, were present at appreciable concentrations.

Phase II Surface Water

Figure 10-4 presents the Phase II surface sampling locations for Wetland 3. Table 10-2-6 summarizes the analytical results of the ten Phase II surface water samples.

Metals — Sixteen metals were detected in Phase II surface water samples taken from Wetland 3. The distribution of detections and reference value exceedances are at locations 041W030201 and 041W030301, near the center of the wetland. Location 041W030201 had 16 detections, 12 of which exceeded their reference concentrations. Location 041W030301 had 14 detections and 10 exceedances. It is also important to note that these locations generally exhibited the highest concentrations and diversity of metals and had elevated turbidity readings of 470 NTU at 041W030201 and 690 NTU at 041W030301. Other locations exhibited multiple detections, with most having four or five reference value exceedances.

Pesticides and PCBs — Endrin ketone and aroclor-1260 were detected during Phase II surface water sampling at Wetland 3. Both were detected at relatively low concentrations at location 041W030201, near the center of the wetland. Entrained sediment in the sample may be contributing to the detections at this location.

SVOCs — Three SVOCs, 1,2-dichlorobenzene, 1,4-dichlorobenzene, and naphthalene, were detected in surface water samples. The most widespread was 1,4-dichlorobenzene, being detected in six of the seven samples collected.

Concentrations were generally low, but were relatively higher near the center of the wetland, at location 041W030301. The other two compounds were each detected in separate samples.

VOCs — Benzene, chlorobenzene, and methylene chloride were detected in two or more locations. Chlorobenzene was the most commonly detected VOC. The higher concentrations were centered on locations 041W030301, 041W030401, and 041W030201, near the center of the wetland.

Benzene was also widely detected, being present in five of the seven samples collected. Concentrations of benzene were generally low at 1 to 3 ppb.

Cis-1,2-dichloroethene was detected in only one sample, 041W030401. Methylene chloride was detected in only two samples, 041W030101 and 041W030401, and at relatively high concentrations compared to the other VOCs.

Phase III Surface Water Sampling

Phase III of the surface water sampling at Wetland 3 was implemented to confirm the previous Phase II results at location 041W030101. Table 10-2-7 summarize the Phase III surface water sample results.

Metals — Nine metals were detected in the Phase III surface water sample. In general, the concentrations were comparable to those observed during Phase II. The problematic analytes were barium, iron, and manganese. Each of these not only exceeded its reference concentration but increased in concentration from the Phase II results.

Pesticides and PCBs — No pesticides or PCBs were detected during Phase III sampling efforts.

SVOCs — No SVOCs were detected in the Phase III surface water sampling at Wetland 3.

VOCs — Acetone and chlorobenzene were detected in the Phase III surface water sample. Acetone was not present during Phase II sampling. Chlorobenzene, common to several locations during the Phase II sampling, was detected at a relatively low concentration at 0.82 ppb. Of interest is the absence of methylene chloride during Phase III results. During Phase II, this compound was reported at high concentrations.

10.2.4 Ecological Risk Assessment

10.2.4.1 Phase II Investigation Summary

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-2-8, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values are carried forward to COPC refinement. COPCs retained after screening are listed in Table 10-2-9.

Baseline Problem Formulation — Sediment COPC Refinement

During the COPC refinement, additional information is used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. After COPC refinement, the risk assessment will present a statement of potential risk for each of the preliminary COPCs (or groups of COPCs).

The COPC refinement process will include:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to base-wide (reference) concentrations for total DDT
- Comparison of inorganic constituents to reference wetland values
- Interpretive tool for metals
- Di Toro EqP SQGs for VOCs
- Comparison to Swartz consensus values
- Mean ERM quotients
- Description of exceedances of RVs and their extent

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 10-2-10. COPCs retained after refinement are presented in Table 10-2-11.

Aluminum, arsenic, barium, cadmium, calcium, chromium, copper, iron, lead, manganese, vanadium, and zinc exceeded their Site 41 freshwater sediment reference concentrations. However, barium concentrations appeared enriched when normalized to aluminum and iron concentrations using FDEP's interpretative tool (Appendix K). Since calcium is considered an essential nutrient and is not known to be an associated waste at Site 1, it is not included as a COPC for further evaluation. At Wetland 3, the highest inorganic exceedances were all detected at sample location 041M030701. Cadmium generated the largest inorganic SV and RV HQs (108 and 17.3, respectively). Of the 10 sediment samples, only two locations exceeded the cadmium RV (041M030201 and 041M030701).

The only other RV exceedances were for chromium and zinc; both exceedances were at location 041M030701. While chromium and zinc are present at levels that could affect ecological receptors and will be considered inorganic COPCs, their extent is limited to one out of 10 locations.

Based on the analysis of the inorganic constituents detected at Wetland 3, cadmium seems to be the primary concern for potential risk (high HQs and relatively widespread [six out of 10 sample locations exceed SV, two out of 10 exceed RV]). At Wetland 3, aluminum, barium, cadmium, chromium, iron, manganese, vanadium, and zinc are included as COPCs.

At Wetland 3, 4,4'-DDT and its daughter product, 4,4'-DDD, were detected above base-wide levels and therefore are carried forward as COPCs (Table 10-2-10). Sample location 001M000303 was the station with the highest 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT levels. This location is near John Tower Road. Total DDT and its daughter products were detected throughout the entire wetland (Figure 10-5). Based on total DDT, widespread exceedance of SV and RV, and magnitude of the HQs generated, it will be included as a COPC and evaluated further using a food-chain model. The remaining pesticides (aldrin, dieldrin, endosulfan sulfate, total endrin, and alpha-BHC), total PCBs, and SVOCs (1,2-dichlorobenzene, and 1,4-dichlorobenzene) were detected at various locations throughout the wetland. When normalized to TOC concentrations, PAHs do not drive risk for Wetland 3 (Figure 10-6). None of the locations where VOCs were detected exceeded their respective TOC adjusted DiToro SQGs (Appendix L).

Table 10-2-12 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Nine of the 10 sample locations were determined to be Category 2, indicating sediments in these wetlands, according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this Category also has the highest level of uncertainty in predicting toxicity. Sample location 041M030401 was determined to be Category 1, indicating the sediments at this locations are considered nontoxic. Figure 10-7 shows the Mean ERM quotient for each sediment sample location at Wetland 3.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-2-13, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values are carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-2-14.

Baseline Problem Formulation — Surface Water COPC Refinement

During the surface water COPC refinement, additional information is used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs.

The COPC refinement process includes:

- Comparison of maximum SV concentrations to average SV concentrations
- Comparison of inorganic constituents to reference wetland value
- Description of surface water exceedances and their extent

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 10-2-15. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland. COPCs retained after refinement are presented in Table 10-2-16.

For Wetland 3, aluminum, barium, cadmium, calcium, copper, iron, lead, manganese, and vanadium exceeded their Site 41 freshwater reference surface water concentrations (Table 10-2-15). However, the samples collected at 041W030201 and 041W030301 were identified as having high turbidities, which is likely contributing to the exceedances.

Calcium was detected at a maximum concentration of 32,600 µg/L at location 041W030201. Iron was detected at a maximum concentration of 176,000 µg/L at location 041W030301.

At Wetland 3, Station 041W030201 had the highest pesticide and PCB HQs (endrin ketone, total endrin, and aroclor-1260). This station is centrally located in the wetland and may receive some runoff from nearby John Tower Road.

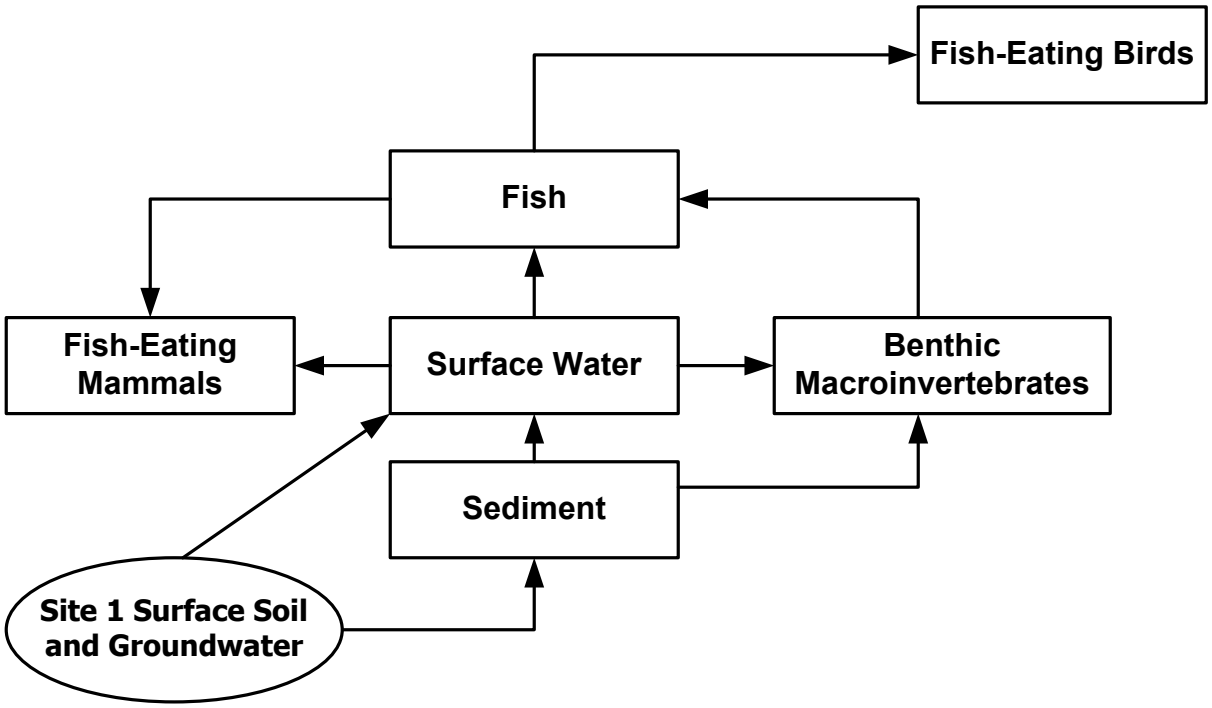
Sample location 041W030201 was one of the surface water locations that had elevated turbidity, which is likely the source of the elevated organics in this sample. 1,4-dichlorobenzene was also detected at nearby station 041W030301.

During the Wetland 3 Phase II investigation, many of the same constituents were detected in sediment and surface water samples. However, only two constituents were detected at the same location, aroclor-1260 at sampling location 041M030201/041W030201, and 1,4-dichlorobenzene at sampling location 041M030301/041W030301.

Wetland 3 was identified as a Red-Coded Wetland based on the Phase II results, indicating contaminants were detected and appeared to be directly related to nearby IR sites. Wetland 3 was also classified as a Group B wetland. Group B includes Wetlands 3 and 5A based on similar characteristics and contamination. Both Wetland 3 and 5A were sampled during Phase III.

The conceptual site model below symbolizes which environmental habitats may be impacted by Wetland 3 Phase II constituents retained during the ERA Process.

Wetland 3 Conceptual Site Model



10.2.4.2 Phase III Investigation Summary

Additional investigation was determined to be necessary based on the Phase II results. The following assessment and measurement endpoints were selected for Group B Wetlands (3 and 5A) based on the ecotoxicology of the contaminants identified during Phase II (primarily, cadmium, and pesticides):

Wetland Groups and Representative Wetland(s)	Assessment Endpoints	Measurement Endpoints
Group B Wetlands 3 and 5A	A) Survival, growth, and emergence of macroinvertebrates associated with the benthic environment	A1) 28-day midge larvae, *Chironomous tentans*, survival, growth, and emergence
		A2) Benthic community indices
	B) Protection of fish viability using fathead minnow (*Pimephales promelas*)	B1) 7-day fathead minnow, *Pimephales promelas*, survival and growth (by weight)
	C) Bioaccumulation in wading birds and mammals	C1) These endpoints will be evaluated in the Food Chain Model in Section 10.8.

As detailed in the approved *Final RI/FS SAP Addendum* (E/A&H, 1997d), additional data were collected from two locations (041M030201/041W030201 and 041M030701/041W030701) within Wetland 3 where COPC concentrations were high.

These samples were analyzed for the following parameters:

- Laboratory analysis of full TAL/TCL list
- TOC and other physical parameters
- Sediment toxicity testing
- Benthic Community Indices

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-2-17, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-2-18.

Baseline Problem Formulation — Phase III Sediment COPC Refinement

COPC refinement follows the same process as previously outlined for the Phase II Samples.

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 10-2-19.

Parameters remaining after refinement are summarized in Table 10-2-20. Additionally, the tables compare: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 3 concentrations to reference concentrations.

At Wetland 3, barium, cadmium, iron, manganese, and selenium exceeded their Site 41 freshwater sediment reference concentrations and were retained as COPCs. Barium, arsenic, cadmium, lead, and zinc were assessed using the interpretative tool (Appendix K). All these constituents were found to be enriched when normalized with aluminum at both locations with the exception of cadmium, which was only enriched at location 041M030701. For Wetland 3 Phase III sediments, a maximum concentration of 246,000 mg/kg of iron, 236 mg/kg of manganese, and 5.4 mg/kg of selenium were detected at one sample location, 041M030201. Sample location 041M030701 still generated the highest inorganic HQ for cadmium; however, it was reduced from an HQ greater than 100 to an HQ of approximately 14. Cadmium still generates the highest HQ of any metal.

Several pesticides, including endosulfan sulfate, total chlordane, and total endrin, were detected in the Wetland 3 Phase III samples; however, after refinement, only total endrin and endosulfan sulfate are retained as COPCs. Total DDT concentrations were below base-wide level. Three VOCs — MEK, acetone, and carbon disulfide — were detected at location 041M030201 with maximum detections of 120 µg/kg, 770 µg/kg, and 17 µg/kg, respectively. When normalized to detected TOC concentrations, VOCs and PAHs were not detected at levels expected to cause unacceptable ecological effects.

Table 10-2-21 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location.

Figure 10-7 shows the Mean ERM Category for each sediment sample at Wetland 3. Based on the methods and the approach detailed in Section 8, sample locations 041M030201 and 041M030701 were determined to be Category 2, which, according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this Category also has the highest level of uncertainty in predicting toxicity.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-2-22, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or

with no screening values are carried forward to COPC refinement. Parameters retained after screening are listed in Table 10-2-23.

Baseline Problem Formulation — Phase III Surface Water COPC Refinement

During the surface water COPC refinement, additional information is used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. The COPC refinement process for this wetland includes comparison to reference wetland values only, because a single surface water sample was collected.

In Wetland 3, barium, calcium, iron, and manganese exceeded their freshwater reference concentrations (Table 10-2-24). Since calcium is considered an essential nutrient and is not known to be an associated waste at Site 1, it is not included as a COPC for further evaluation. Parameters remaining after refinement are summarized in Table 10-2-25.

10.2.4.3 Comparison of Phase II and III Sediment and Surface Water Results

Both the Phase II and III results indicate that inorganic constituents and pesticides are of greatest concern in Wetland 3. Concentrations decreased among constituents common between the two phases. The exception is endosulfan sulfate, which increased during the same time period.

The differences between the Phase II and III sampling efforts are presented below.

Sediment

Constituent	Phase II	Phase III	Difference
Metals (mg/kg)			
Iron	386,000	246,000	-140,000 drop
Manganese	1,270	236	-1,034 drop
Cadmium	72.7	9.3	-63.4 drop
Organics (g/kg)			
Endosulfan sulfate	1.7	7.2	+5.5 increase
Total Endrins	33	18.8	-14.2 drop

Surface Water

Constituent	Phase II (g/L)	Phase III (g/L)	Difference (g/L)
Iron	176,000	19,600	-156,400 drop
Manganese	265	231	-34 drop

Notes:
mg/kg = Milligrams per kilogram
µg/kg = Micrograms per kilogram
µg/L = Micrograms per liter

Evaluation of Assessment Endpoints

In addition to the chemical analyses, during the Phase III sampling, two sediments and one surface water sample were collected for whole sediment and surface water toxicity tests and species diversity analysis. These tests were used as measurement endpoints to evaluate the assessment endpoints identified for Wetland 3.

Assessment Endpoint A — Survival, Growth, and Emergence of Macroinvertebrates Associated with the Benthic Environment

The benthic invertebrate communities inhabiting the sediments in the fresh and salt water marshes included in Site 41 were selected as important biological resources to be evaluated in these habitats. This assessment endpoint is aimed at maintaining an ecologically viable benthic community and organism sustainability.

The benthic macroinvertebrates were selected because:

- Their relatively sessile life habits cause potential for increased exposure to contaminated sediments
- They are important component in the aquatic food web
- They are a food source for many species of fish and crustaceans harvested for recreational and commercial purposes
- Benthos has been documented to be an excellent indicator of habitat condition

Risk Questions

- Is the toxicity of COPCs to benthic macroinvertebrates in onsite sediments significantly greater that those of control sediments?
- Are the toxic responses lethal or sublethal?
- Do the results of this study show any stressor-response relationship?

To address the risk questions for this assessment endpoint, the following measurement endpoints were proposed:

- Measurement Endpoint A1: Evaluate the toxicity of COPCs in sediment to the midge *Chironomus tentans* by conducting the 28-day, whole-sediment laboratory, toxicity tests measuring the survival, growth (measured by weight), and emergence.

- Measurement Endpoint A2: Evaluate the health of the onsite benthic community utilizing benthic community indices.

Measurement Endpoint A1

Additional sediments were collected at locations 041M030201 and 041M030701 during the Phase III portion of the investigation. Sediments from this freshwater wetland were prepared for testing with a terrestrial insect, *Chironomus tentans,* which spends its larval cycle in aquatic habitats. The larval midge *(C. tentans)* test includes several endpoints: survival, growth (measured by weight), and emergence (into its terrestrial flight stage).

Wetland 3 sediments were also tested against a laboratory control, which has a documented record of good survival and other test endpoint results, to determine if Wetland 3 sediments were impacting benthic species.

The test results are shown and explained below:

Sample Location	Midge Survival/100	Midge Weight (mg)	Emergence (%)
Laboratory Control	91	2.7	50
041M030201	83	2.9	60
041M030701	91	2.0*	70

The TAC are met when control survival rates are 90% or above for the control and 80% or above for the sediment being tested. The TAC for the control performance includes a minimum weight of 2.5 mg and at least 50% emergence. A simple statistical T-test is performed on sediment performance compared to the control performance once the TAC is met.

Neither station was statistically different from the control sample in the survival and emergence portions of the test. However, station 041M030701 sediments were found to be statistically different when compared to the control performance for growth, which is measured by weight and denoted with an asterisk in the table above.

Measurement Endpoint A2: Benthic Community Indices

In addition to collecting sediments for chemical characterization and toxicity tests, sediments were also collected for species identification at locations 041M030201 and 041M030701 during the Phase III portion of the investigation.

Section 8 describes the process for diversity sampling and explains the importance of evenness and richness.

The diversity finding for Wetland 3 are presented below:

Sample Location	Diversity Results
041M030201	2.24 Diversity 0.97 Evenness 9.77 Richness
041M030701	1.92 Diversity 1.39 Evenness 3.38 Richness

Diversity and richness of organisms was better at location 041M030201, whereas location 041M030701 exhibited better evenness. Species at location 041M030201 had representatives of the *Chironomus* and *Sphaerium* indicating the most dominant occurrence. *Tubifex tubifex*, an oligochaete, and *Culicoides*, an aquatic insect, were next in abundance. The same species were detected at location 041M030701, only with slightly lower diversity and richness.

Assessment Endpoint A: Conclusions

This assessment endpoint was assessed by evaluating sediment chemistry, midge toxicity test result, and community analysis. Based on the evaluation of the data collected for Wetland 3 to date, location 041M030701 indicates both a presence of inorganic constituents in sediments that exceed literature-based ecological risk screening and refinement values, and statistically significant sublethal effects on benthic invertebrates.

In addition to the sublethal effects shown at location 041M030701, the benthic community evaluation also showed slightly lower diversity and richness. While these results indicate the potential for adverse effects with in Wetland 3, it appears this potential is limited to the area around sample location 041M030701.

Assessment Endpoint B: Protection of Forage Fish Viability

The forage fish communities inhabiting surface waters within Site 41 were selected as an important biological resource to be evaluated in the aquatic habitat. The forage fish community was selected as an assessment endpoint because:

- The isolated nature of these habitats and the narrow habitat requirements for forage fish causes the potential for increased exposure to contaminated sediments.
- They are an important component of the estuarine and freshwater food web.
- They are a food source for many species of fish and piscivorous birds.

Risk Questions

Are statistically significant levels of toxicity occurring to forage fish using Site 41 wetlands for forage, cover, and breeding areas?

Measurement Endpoint B1

A surface water sample was collected from location 041W030101 during the Phase III sampling effort at Wetland 3. This sample was tested with the freshwater fathead minnow, *Pimephales promelas*. The endpoints measured for the surface water endpoints were survival and growth, measured by weight.

The TAC for the *P. promelas* test includes 90% survival of control organisms, and a minimum weight of 0.30 mg.

Wetland 3 Phase III surface water passed this toxicity test for both survival and growth endpoints, as can be seen in the table below:

Sample Location	Fathead Minnow Survival/100	Fathead Minnow Weight (mg)
Laboratory Control	100	0.58
041M030101	97.5	0.49

The toxicity data reflect that neither the survival nor the growth from this wetland surface water sample was statistically different from the control sample.

Assessment Endpoint B: Conclusions

This assessment endpoint was evaluated using the surface water chemistry and minnow toxicity test result. The data indicated that four inorganic constituents were present in surface water at concentrations greater than refinement values. No adverse effects were observed in the fathead minnow toxicity test. These results indicate that no adverse effects are occurring related to toxicity of forage fish communities.

Assessment Endpoint C: Bioaccumulation in Wading Birds and Mammals

To assess risks from contaminants that bioaccumulate, the results from Wetland 3 are used in the OU 1 food-chain model presented in Section 10.8.

10.2.5 Wetland 3 — Human Health Risk Assessment

Wetland 3 is described in Section 10.2.1, and the HHRA is summarized below.

10.2.5.1 Site Data

Surface water and sediment data were collected at Wetland 3 during Phases II and III of the RI. Section 10.2.2 summarizes the nature and extent of contamination for this wetland. Surface water and sediment data are summarized in Tables 10-2-4 through 10-2-7. PCB aroclor-1260 was excluded from dermal exposure estimates in accordance with USEPA's policy for chlorinated compounds with a molecular weight greater than 250.

10.2.5.2 Conceptual Site Model

As described in Section 10.2.1, this freshwater wetland has no recreational or functional uses (i.e., storm water management, etc.). The wetland could be accessed by Navy personnel or trespassers walking and/or wading through the area. Some sediment at this wetland is exposed for most of the year, so sediment exposure would be assessed using soil exposure models. Dermal contact could be a significant exposure pathway and was included in this HHRA. Based on the species present, depth of surface water, and available habitat, fishing would not likely occur, and wading would be the most likely exposure scenario. In addition, site access is limited by general access restrictions imposed by the Navy.

COPCs were identified as described in Section 9. The following scenarios and exposure pathways were evaluated for this wetland:

Scenario	Medium	Ingestion	Dermal
Maintenance	Sediment	√	√
	Surface water	√	√
Trespasser	Sediment	√	√
	Surface water	√	√

10.2.5.3 Risk Characterization

The child trespasser and adult maintenance worker scenarios were assessed for this wetland.

Trespasser

Phase II Data

As shown in Tables 10-2-26 through 10-2-31, sediment ingestion risk estimates exceed FDEP's risk threshold of 1E-6, and the only risk driver was arsenic. Surface water dermal contact risk estimate for methylene chloride exceed FDEP's risk threshold of 1E-6. Hazard indices were below 1.0.

Phase III Data

As shown in Tables 10-2-32 through 10-2-37, based on Phase III sediment data, sediment ingestion risk estimates for trespassers were below the FDEP risk threshold of 1E-6. Sediment dermal contact risk estimates for trespassers exceeded the FDEP threshold for lead. The tables also show that surface water ingestion and dermal contact risk estimates for trespassers were below the FDEP risk threshold. Hazard indices for trespassers based on Phase III data were below 1.0.

Maintenance Worker

Phase II Data

As shown in Tables 10-2-26 through 10-2-31, sediment ingestion risk estimates exceed FDEP's risk threshold of 1E-6, and the only risk driver was arsenic. Surface water dermal contact risk estimate for methylene chloride exceed FDEP's risk threshold of 1E-6. Hazard indices were below 1.0.

Phase III Data

As shown in Tables 10-2-31 through 10-2-37, based on Phase III data, sediment ingestion and dermal contact risk estimates for maintenance workers exceed the FDEP risk threshold of 1E-6 for barium. The tables also show that surface water dermal contact risk estimate for methylene chloride exceed FDEP's risk threshold of 1E-6.

The tables also show that surface water ingestion and dermal contact risk estimates for maintenance workers were below the FDEP risk threshold. Hazard indices for maintenance workers based on Phase III data were below 1.0.

Summary of Wetland 3 Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	0.3	8E-6
	Surface water	0.6	4E-4
Trespasser	Sediment	0.6	5E-6
	Surface water	0.4	1E-4

Based on Phase II data, arsenic, PCB aroclor-1260, and methylene chloride were identified as COCs.

Summary of Wetland 3 Phase III Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	1.95E-01	2.82E-06
	Surface water	3.95E-03	NA
Trespasser	Sediment	2.96E-01	1.73E-06
	Surface water	2.96E-03	NA

Based on Phase III data, arsenic was identified as a COC.

Wetland 3 HHRA COC Summary

The following parameters were determined in the HHRA to be COCs for Wetland 3:

- Arsenic
- Methylene chloride

10.2.6 Wetland 3 — Fate and Transport Analysis

As described, this wetland borders the eastern side of Site 1. Seven samples were collected from this wetland beginning near the center of the body and ending at its outlet. This wetland drains from north to south, redirecting from southwest to northeast at its outlet; it drains directly to Wetland 4D via a culvert (see Figure 10-1).

Sediment COPCs retained after refinement are summarized in Tables 10-2-11 (Phase II) and 10-2-20 (Phase III). Surface water COPCs retained after refinements are summarized in

Tables 10-2-16 (Phase II) and 10-2-25 (Phase III). Provided below are the associated soil borings and monitoring wells used for comparing data for the fate and transport analysis.

Associated Monitoring Wells: 001GM032, 001GS058, 001GS037, 001GM038, 001GI036, 001GS064, 001GI065, 001GM034, 001GM069

Associated Borings: 001SI036, 001S0064

Surface Water/Sediment Transport into the Wetlands:

Surface Water — There are no storm water data from the area proximal to this wetland; therefore, no statement can be made regarding validation of the pathway via storm water runoff into the wetland.

Sediment — Based on surface soil data from associated borings, the following parameters are valid and significant for the storm water runoff pathway into Wetland 3:

Phase II	Phase III
Aluminum	Iron
Iron	Barium
Manganese	Manganese
Vanadium	Endosulfan sulfate
Barium	Total Chlordanes
Chromium	Total Endrins
Zinc	Carbon disulfide
Endosulfan sulfate	
4,4'-DDD	
4,4'-DDT	
Total DDT	
Total Endrin	

Groundwater to Wetland Media Pathways:

Surface Water — Based on the data from associated monitoring wells, the groundwater to wetland surface water pathway is validated and significant for the following parameters (**note:** the 1993 metals data are not used for validation purposes due to potential bias introduced by the sampling methodology):

Phase II	Phase III
Aluminum	Barium
Barium	Iron
Cadmium	Manganese
Iron	
Lead	
Manganese	

Sediment — Based on the data from the associated monitoring wells, the groundwater to wetland sediment pathway is validated and significant for the following parameters (**note:** the 1993 metals data are not used for validation purposes due to potential bias introduced by the sampling methodology):

Phase II	Phase III
Aluminum	Cadmium
Cadmium	Barium
Barium	Iron
Iron	Manganese
Manganese	
Alpha-BHC	
Zinc	
4,4'-DDT	
Total BHCs	
Total DDT	
1,2-Dichlorobenzene	
1,4-Dichlorobenzene	
Phenol	
Benzene	
Chlorobenzene	
Toluene	

Surface Water/Sediment Transport within the Wetlands:

Evaluation of these pathways utilized comparison between upgradient locations 041M030401 (the most upgradient point in the central part of the wetland) and downgradient 041M030101 (the most downgradient sample location before discharge to Wetland 4B).

Surface Water — Evaluation of Phase II results for upgradient 041M030401 with downgradient 041M030101 indicates a decrease in detected parameters (11 metals/six organics upgradient versus nine metals/three organics downgradient).

For the metals, five decreased downgradient and four increased; for the organics, two decreased and one increased. The general reduction in detected parameters is due to dispersion and/or partitioning to wetland sediment.

Sediment — Evaluation of 041M030401 with 041M030101 indicates an increase in detected parameters (13 metals/12 organics upgradient versus 15 metals/19 organics downgradient). For the metals, three were present downgradient that were not detected upgradient, and 12 increased. For the organics, 13 were present downgradient that were not detected upgradient, five increased, and one decreased. In general, there were only moderate increases in concentrations of metals and organics, but the increase in detections of both is likely due to a combination of a moderate increase in TOC (providing more adsorption substrate), surface water runoff from Site 1, and/or groundwater discharge partitioning to sediment.

Temporal Evaluation

Wetland 3 Sediment

Two locations (041M030201 and 041M030701) were sampled as part of Phase II and Phase III activities.

An evaluation of both sets of data indicates the following:

Location 041M0302 — 18 metals/12 organics were detected during Phase II, versus 15 metals/six organics during Phase III. For metals, seven decreased in concentration and eight increased. For organics, 10 detected in Phase II were not detected in Phase III, and four were detected in Phase III that were not present in Phase II; of two organic parameters that were detected in both phases, one organic parameter increased in concentration and the other parameter decreased. Finally, TOC concentrations were decreased in Phase III. Given the inherent heterogeneity in sediment matrix, it can be concluded that the fraction of organic contamination in sediment decreased between Phase II and Phase III.

Location 041M0307 — 16 metals/10 organics were detected during Phase II, versus 21 metals/eight organics during Phase III. For metals, five detected in Phase III were not detected in Phase II; all others exhibited a decrease in concentration in Phase III. For organics, four detected in Phase II were not detected in Phase III, and two were detected in Phase III that were not present in Phase II; of six that were detected in both phases, four increased in concentration (primarily pesticides), and two decreased (VOCs). Finally, TOC concentrations were decreased in Phase III. It can be concluded that the fraction of inorganic contamination in

sediment decreased significantly between Phase II and Phase III, and the lower TOC and abundant iron in Phase III would suggest that those organics demonstrating an increase are being sorbed to iron oxy-hydroxides.

Wetland 3 — Surface Water

One (01) was sampled as part of Phase II and Phase III activities. An evaluation of both sets of data indicates the following:

Location 041W0301 — nine metals/three organics were detected during Phase II, versus nine metals/two organics during Phase III. For metals, six increased in concentration, two decreased, and one remained essentially the same. For organics, two detected in Phase II were not detected in Phase III, and one was detected in Phase III that was not present in Phase II; of one that was detected in both phases, it decreased in concentration. Although metals tended to generally increase, the magnitude of these increases were not great; it can be concluded that there is not a significant change in surface water with respect to them. Organic contamination was observed to have diminished considerably.

Table 10-2-1
Wetland 3 Phase II
Sediment Physical Parameters

Parameter	001M000301	001M000302	001M000303	041M030101	041M030201	041M030301	041M030401	041M030501	041M030601	041M030701
TOC (%)	No Data	No Data	No Data	0.815	24.1	5.18	0.478	1.08	0.672	7.39
Percent Solids (%)	No Data	No Data	No Data	76.8	9.6	32.6	78.4	94.8	63.4	17.3
Grain Size Analysis (percent of composition[1])										
Fine Gravel	No Data	No Data	No Data	6	0	0	0	0	0	0
Coarse Sand	No Data	No Data	No Data	3	0	0	0	0	0	21
Medium Sand	No Data	No Data	No Data	12	6	29	30	46	32	38
Fine Sand	No Data	No Data	No Data	71	11	59	65	23	63	19
Silt and Clay	No Data	No Data	No Data	8	83	12	5	31	5	22
Description	N/A	N/A	N/A	Brown Silty Medium to Fine Sand	Black Sandy Organic Silt	Dark Brown Silty Sand with Organics	Brown Medium to Fine Sand with Silt	Dark Brown Silty Sand with Organics	Brown Medium to Fine Sand with Silt, Organics	Black Silty Sand With Organics

Notes:
[1] = Derived from sieve analyses.
Includes data collected in June 1994 (Site 1 Investigation) and December 1995 Data (Site 41 Investigation)

Table 10-2-2
Wetland 3 Phase III
Sediment Physical Parameters

Parameter	041M030201	041M030701
TOC (%)	10.0000	1.2000
Grain Size Analysis (percent of composition[1])		
Fine Gravel	4.2000	1.9000
Coarse Sand	4.7000	0.9000
Medium Sand	27.4000	16.9000
Fine Sand	30.8000	66.3000
Silt and Clay	32.9000	14.0000

Notes:
[1] = Derived from sieve analyses.

Table 10-2-3
Wetland 3 Phase II
Surface Water Physical Parameters

Parameter	041W030101	041W030201	041W030301	041W030401
Hardness as CaCO3	75.6	90.9	63.6	75.9
pH	6.41	5.78	5.99	5.96
Specific Conductivity (mS/cm)	0.257	0.44	0.404	0.261
Turbidity (NTU)	12	470	690	3
Salinity (%)	0	0.01	0.01	0.01

Notes:
mg/L = Milligrams per liter
MS/cm = Millisiemens per centimeter

NTU = Nephelometric turbidity units
% = Percent

Table 10-2-4
Wetland 3 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	13,610.0	1	10	10	426.0	25,600.0	4,520.0	041M030701
Antimony	4.430	0	3	10	0.230	2.40	1.630	041M030201
Arsenic	6.620	3	9	10	0.560	35.50	8.70	041M030301
Barium	14.0	4	10	10	1.60	438.0	53.20	041M030701
Cadmium	1.80	5	7	10	0.520	72.70	8.90	041M030701
Calcium	10,756.670	2	10	10	350.0	31,800.0	7,330.0	041M030101
Chromium	39.370	1	10	10	1.50	196.0	26.10	041M030701
Cobalt	2.80	0	1	10	2.50	2.50	0.722	041M030201
Copper	19.50	1	5	10	2.20	68.80	10.50	041M030701
Cyanide (CN)	5.220	0	2	10	1.50	5.10	1.20	041M030701
Iron	11,911.670	7	10	10	1,940.0	386,000.0	60,000.0	041M030701
Lead	82.470	1	10	10	2.40	101.0	20.60	041M030201
Magnesium	7,513.330	0	9	10	23.20	1,420.0	248.0	041M030701
Manganese	37.970	4	10	10	2.30	1,270.0	152.0	041M030701
Nickel	9.280	1	1	10	0.780	0.780	3.220	041M030401
Potassium	1,628.670	0	7	10	10.90	468.0	176.0	041M030701
Selenium	3.450	0	3	10	0.440	2.0	0.658	041M030201
Sodium	18,993.330	0	6	10	4.50	291.0	75.90	041M030701
Vanadium	28.670	1	10	10	1.20	160.0	21.20	041M030701
Zinc	36.730	1	10	10	1.20	297.0	37.40	041M030701
PAHs (g/kg)								
Acenaphthene	N/A	0	1	10	98.0	98.0	98.20	041M030301
Benzo(a)anthracene	N/A	0	1	10	23.0	23.0	114.0	041M030101
Benzo(a)pyrene	N/A	0	2	10	48.0	180.0	126.0	041M030701
Chrysene	N/A	0	1	10	32.0	32.0	115.0	041M030101
Fluoranthene	N/A	0	1	10	46.0	46.0	117.0	041M030101
Fluorene	N/A	0	1	10	95.0	95.0	97.90	041M030301
Naphthalene	N/A	0	1	10	160.0	160.0	126.0	041M030301
Phenanthrene	N/A	0	1	10	24.0	24.0	114.0	041M030101
Pyrene	N/A	0	1	10	43.0	43.0	116.0	041M030101
Total PAHs	N/A	0	3	10	335.0	1,113.0	1,480.0	041M030701
Pesticides and PCBs (g/kg)								
Aroclor-1260	N/A	0	1	10	350.0	350.0	52.40	041M030201
Total PCBs	N/A	0	1	10	402.50	402.50	180.0	041M030201
Aldrin	N/A	0	3	10	0.230	1.0	1.0	041M030201
Dieldrin	N/A	0	1	10	6.0	6.0	2.340	041M030201
Endosulfan sulfate	N/A	0	2	10	1.50	1.70	2.020	041M030701
alpha-Chlordane	N/A	0	8	10	0.170	2.20	0.609	001M000303

Table 10-2-4
Wetland 3 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Pesticides and PCBs (g/kg) - cont.								
Total Chlordane	N/A	0	8	10	0.280	7.70	1.650	001M000303
Endrin	N/A	0	4	10	0.530	1.80	1.940	041M030301
Endrin ketone	N/A	0	1	10	1.40	1.40	1.90	041M030501
Total Endrin	N/A	0	4	10	1.380	5.230	5.660	001M000301
alpha-BHC	N/A	0	3	10	0.190	1.20	1.030	041M030501
beta-BHC	N/A	0	1	10	0.70	0.70	0.918	041M030301
delta-BHC	N/A	0	2	10	0.180	0.250	0.882	041M030101
Total BHC	N/A	0	5	10	0.198	1.280	3.680	041M030501
4,4'-DDD	50.0	1	10	10	1.30	400.0	49.10	001M000303
4,4'-DDE	40.0	1	7	10	0.840	120.0	15.30	001M000303
4,4'-DDT	20.0	1	9	10	0.320	220.0	24.40	001M000303
Total DDT	110.0	1	10	10	2.620	740.0	88.80	001M000303
SVOCs (g/kg)								
1,2-Dichlorobenzene	N/A	0	1	10	410.0	410.0	411.0	041M030201
1,4-Dichlorobenzene	N/A	0	4	10	58.0	1,400.0	581.0	041M030301
Benzo(b)fluoranthene	N/A	0	1	10	85.0	85.0	121.0	041M030101
Benzo(g,h,i)perylene	N/A	0	1	10	46.0	46.0	117.0	041M030101
Benzo(k)fluoranthene	N/A	0	1	10	27.0	27.0	115.0	041M030101
bis(2-Ethylhexyl)phthalate (BEHF	N/A	0	4	10	76.0	270.0	342.0	041M030701
Butylbenzylphthalate	N/A	0	1	10	23.0	23.0	466.0	041M030101
Diethylphthalate	N/A	0	1	10	47.0	47.0	481.0	041M030301
Di-n-butylphthalate	N/A	0	2	10	36.0	77.0	467.0	041M030301
Di-n-octylphthalate	N/A	0	2	10	45.0	45.0	461.0	041M030601
Indeno(1,2,3-cd)pyrene	N/A	0	1	10	31.0	31.0	115.0	041M030101
Phenol	N/A	0	1	10	55.0	55.0	502.0	001M000301
VOCs (g/kg)								
2-Butanone (MEK)	N/A	0	1	10	180.0	180.0	39.50	041M030701
Acetone	N/A	0	1	10	1,100.0	1,100.0	223.0	041M030701
Benzene	N/A	0	2	10	18.0	34.0	22.40	041M030201
Chlorobenzene	N/A	0	6	10	2.0	620.0	121.0	041M030301
Toluene	N/A	0	1	10	2.0	2.0	21.80	041M030701

Notes:
g/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
N/A = Not Applicable

Table 10-2-5
Wetland 3 Phase III
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
Metals (mg/kg)								
Aluminum	13,610.0	0	2	2	1,630.0	2,950.0	2,290.0	041M030201
Arsenic	6.620	1	2	2	4.20	14.60	9.40	041M030201
Barium	14.0	2	2	2	18.70	87.0	52.90	041M030201
Cadmium	1.80	1	1	2	9.30	9.30	5.150	041M030701
Calcium	10,756.670	0	2	2	953.0	5,980.0	3,470.0	041M030201
Chromium	39.370	0	2	2	12.10	19.0	15.60	041M030701
Cobalt	2.80	0	1	2	0.570	0.570	0.448	041M030701
Copper	19.50	0	1	2	4.0	4.0	2.50	041M030701
Cyanide (CN)	5.220	0	1	2	2.60	2.60	2.050	041M030701
Iron	11,911.670	2	2	2	67,100.0	246,000.0	157,000.0	041M030201
Lead	82.470	0	2	2	20.60	35.60	28.10	041M030701
Magnesium	7,513.330	0	2	2	70.50	150.0	110.0	041M030201
Manganese	37.970	2	2	2	42.60	236.0	139.0	041M030201
Mercury	0.550	0	2	2	0.060	0.10	0.080	041M030201
Nickel	9.280	0	1	2	3.10	3.10	1.90	041M030701
Potassium	1,628.670	0	2	2	35.0	56.80	45.90	041M030201
Selenium	3.450	1	2	2	2.0	5.40	3.70	041M030201
Silver	2.10	0	1	2	0.420	0.420	0.285	041M030701
Sodium	18,993.330	0	2	2	16.30	56.80	36.60	041M030201
Vanadium	28.670	0	2	2	6.40	13.50	9.950	041M030201
Zinc	36.730	2	2	2	45.80	234.0	140.0	041M030701
Pesticides and PCBs (g/kg)								
Endosulfan sulfate	N/A	0	1	2	7.20	7.20	7.60	041M030701
gamma-Chlordane	N/A	0	1	2	0.740	0.740	2.50	041M030701
Total Chlordane	N/A	0	1	2	2.540	2.540	5.520	041M030701
Endrin	N/A	0	1	2	2.80	2.80	3.150	041M030201
Total Endrin	N/A	0	1	2	18.80	18.80	14.70	041M030201
4,4'-DDD	50.0	0	2	2	14.0	49.0	31.50	041M030701
4,4'-DDE	40.0	0	1	2	11.0	11.0	9.50	041M030701
4,4'-DDT	20.0	0	2	2	3.70	9.30	6.50	041M030701
Total DDT	110.0	0	2	2	25.70	69.30	47.50	041M030701
SVOCs (g/kg)								
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	1	2	500.0	500.0	650.0	041M030701
VOCs (g/kg)								
2-Butanone (MEK)	N/A	0	2	2	38.0	120.0	79.0	041M030201
Acetone	N/A	0	2	2	240.0	770.0	505.0	041M030201
Carbon disulfide	N/A	0	1	2	17.0	17.0	11.30	041M030201

Notes:
g/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
N/A = Not Applicable

Table 10-2-6
Wetland 3 Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
Metals (g/L)								
Aluminum	1,090	1	7	7	98.6	2,150.0	558.0	041W030201
Antimony	4.0	3	2	7	3.0	3.3	3.15	041W030201
Arsenic	2.7	3	4	7	2.7	48.9	18.0	041W030301
Barium	3.68	7	7	7	27.6	56.8	37.6	041W030301
Cadmium	3.0	2	2	7	3.4	3.8	3.6	041W030301
Calcium	7,675.0	7	7	7	22,900.0	32,600.0	27,800.0	041W030201
Chromium	8.0	2	2	7	8.7	9.3	9.0	041W030301
Copper	4.0	2	2	7	4.7	9.6	7.15	041W030301
Iron	2,360.0	7	7	7	7,810.0	176,000.0	42,800.0	041W030301
Lead	3.2	2	3	7	1.9	20.3	9.8	041W030201
Magnesium	20,260.0	0	7	7	1,540.0	2,320.0	2,170.0	001W000302
Manganese	13.2	7	7	7	127.0	265.0	167.0	041W030201
Potassium	6,995.0	0	7	7	1,380.0	1,950.0	1,630.0	001W000301
Sodium	182,200.0	0	7	7	5,770.0	7,420.0	6,520.0	001W000303
Vanadium	4.7	2	4	7	2.2	11.1	6.13	041W030301
Zinc	5.53	1	1	7	10.4	10.4	10.4	041W030201
Pesticides (g/L)								
Endrin ketone	N/A	0	1	7	0.25	0.25	0.25	041W030201
Total Endrin	N/A	0	1	7	0.25	0.25	0.25	041W030201
Aroclor-1260	N/A	0	1	7	0.5	0.5	0.5	041W030201
Total PCB	N/A	0	1	7	0.5	0.5	0.5	041W030201
SVOCs (g/L)								
1,4-Dichlorobenzene	N/A	0	6	7	2.0	10.0	3.9	041W030301
Naphthalene	N/A	0	1	7	1.0	1.0	1.0	041W030401
Total PAH	N/A	0	1	7	7.0	7.0	7.0	041W030401
1,2-Dichlorobenzene	N/A	0	1	7	1.0	1.0	1.0	041W030301
VOCs (g/L)								
Benzene	N/A	0	5	7	1.0	3.0	1.8	041W030401
Chlorobenzene	N/A	0	6	7	3.0	30.0	12.2	041W030301
cis-1,2-Dichloroethene	N/A	0	1	4	1.0	1.0	1.0	041W030401
Methylene chloride	N/A	0	2	7	120.0	1200.0	660.0	041W030101

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 10-2-7
Wetland 3 Phase III
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Range of Detections: Average Detection	Maximum Detection Location
Metals (g/L)								
Aluminum	1090.25	0	1	1	59.1	59.1	59.1	041W030101
Antimony	4.0	0	1	1	2.6	2.6	2.6	041W030101
Barium	3.68	1	1	1	37.2	37.2	37.2	041W030101
Calcium	7,675.0	1	1	1	34,000.0	34,000.0	34,000.0	041W030101
Iron	2,360.0	1	1	1	19,600.0	19,600.0	19,600.0	041W030101
Magnesium	20,260.0	0	1	1	2,670.0	2,670.0	2,670.0	041W030101
Manganese	13.2	1	1	1	231.0	231.0	231.0	041W030101
Potassium	6,995.0	0	1	1	1,730.0	1,730.0	1,730.0	041W030101
Sodium	182,200.0	0	1	1	7,570.0	7,570.0	7,570.0	041W030101
VOCs (g/L)								
Acetone	N/A	0	1	1	28.0	28.0	28.0	041W030101
Chlorobenzene	N/A	0	1	1	0.82	0.82	0.82	041W030101

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 10-2-8
Wetland 3 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Min Det.	Max Det.	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	10	10			426	25,600	041M030701	25,600			N/A		Yes	No SV
Antimony	3	10	0.065	4.4	0.23	2.4	041M030201	2.4	J	12	2	0.2	No	Max Detect < SV
Arsenic	**9**	**10**	**0.37**	**0.37**	**0.56**	**35.5**	**041M030301**	**35.5**		**7.24**	**1, 2**	**4.9**	**Yes**	**Max Detect > SV**
Barium	10	10			1.6	438	041M030701	438			N/A		Yes	No SV
Beryllium	0	10	0.025	0.8			ND	0.8	U		N/A		Yes	No SV
Cadmium	**7**	**10**	**0.095**	**0.495**	**0.52**	**72.7**	**041M030701**	**72.7**		**0.676**	**1**	**108**	**Yes**	**Max Detect > SV**
Calcium	10	10			350	31,800	041M030101	31,800			N/A		Yes	No SV
Chromium	**10**	**10**			**1.5**	**196**	**041M030701**	**196**		**52.3**	**1, 2**	**3.75**	**Yes**	**Max Detect > SV**
Cobalt	1	10	0.08	2.35	2.5	2.5	041M030201	2.5	J		N/A		Yes	No SV
Copper	**5**	**10**	**0.43**	**1.55**	**2.2**	**68.8**	**041M030701**	**68.8**		**18.7**	**1, 2**	**3.68**	**Yes**	**Max Detect > SV**
Cyanide (CN)	2	10	0.3	2.6	1.5	5.1	041M030701	5.1	J		N/A		Yes	No SV
Iron	10	10			1,940	386,000	041M030701	386,000			N/A		Yes	No SV
Lead	**10**	**10**			**2.4**	**101**	**041M030201**	**101**	**J**	**30.2**	**1, 2**	**3.34**	**Yes**	**Max Detect > SV**
Magnesium	9	10	19.9	19.9	23.2	1,420	041M030701	1,420	J		N/A		Yes	No SV
Manganese	10	10			2.3	1,270	041M030701	1,270	J		N/A		Yes	No SV
Mercury	0	10	0.025	0.235			ND	0.235	U	0.13	1, 2	1.81	Yes	Max SQL> SV
Nickel	1	10	0.325	9.3	0.78	0.78	041M030401	0.78	J	15.9	1, 2	0.05	No	Max Detect < SV
Potassium	7	10	337	371	10.9	468	041M030701	468	J		N/A		Yes	No SV
Selenium	3	10	0.08	0.55	0.44	2	041M030201	2	J		N/A		Yes	No SV
Silver	0	10	0.11	3.1			ND	3.1	UJ	0.733	1	4.23	Yes	Max SQL> SV
Sodium	6	10	1.25	49	4.5	291	041M030701	291	J		N/A		Yes	No SV
Thallium	0	10	0.08	0.8			ND	0.8	UJ		N/A		Yes	No SV
Vanadium	10	10			1.2	160	041M030701	160			N/A		Yes	No SV
Zinc	**10**	**10**			**1.2**	**297**	**041M030701**	**297**		**124**	**1, 2**	**2.4**	**Yes**	**Max Detect > SV**
PAHs (g/kg)														
2-Methylnaphthalene	0	10	20	240			ND	240	U	20.2	1	11.9	No	TOC normalized PAHs < TEC
Acenaphthene	1	10	9.5	240	98	98	041M030301	98		6.71	1	14.6	No	TOC normalized PAHs < TEC
Acenaphthylene	0	10	20	240			ND	240	U	5.87	1	40.9	No	TOC normalized PAHs < TEC
Anthracene	0	10	20	240			ND	240	U	46.9	1	5.12	No	TOC normalized PAHs < TEC
Benzo(a)anthracene	1	10	23	240	23	23	041M030101	23	J	74.8	1	0.31	No	Max Detect < SV
Benzo(a)pyrene	2	10	23	240	48	180	041M030701	180		88.8	1	2.03	No	TOC normalized PAHs < TEC
Chrysene	1	10	23	240	32	32	041M030101	32	J	108	1	0.30	No	Max Detect < SV
Dibenz(a,h)anthracene	0	10	20	240			ND	240	U	6.22	1	38.6	No	TOC normalized PAHs < TEC
Fluoranthene	1	10	23	240	46	46	041M030101	46		113	1	0.41	No	Max Detect < SV
Fluorene	1	10	9.5	240	95	95	041M030301	95		21.2	1	4.48	No	TOC normalized PAHs < TEC
Naphthalene	1	10	20	240	160	160	041M030301	160		34.6	1	4.62	No	TOC normalized PAHs < TEC
Phenanthrene	1	10	23	240	24	24	041M030101	24	J	86.7	1	0.28	No	Max Detect < SV
Pyrene	1	10	23	240	43	43	041M030101	43		153	1	0.28	No	Max Detect < SV
Total PAHs	3	10	276	3,120	335	1,110	041M030701	1,110		1,684	1, 2	0.66	No	Max Detect < SV
TOC Normalized PAHs	3	10	7.43	652.72	15.06	41.1	041M030101	41.1		290	3	0.14	No	Max Detect < SV
PCBs (g/kg)														
Aroclor-1016	0	10	1.2	110			ND	110	U	21.6	N/A	5.09	Yes	Max SQL> SV
Aroclor-1221	0	10	2.3	220			ND	220	U	67	2	3.28	Yes	Max SQL> SV
Aroclor-1232	0	10	1.2	110			ND	110	U	21.6	N/A	5.09	Yes	Max SQL> SV
Aroclor-1242	0	10	1.2	110			ND	110	U	21.6	N/A	5.09	Yes	Max SQL> SV
Aroclor-1248	0	10	1.2	110			ND	110	U	21.6	N/A	5.09	Yes	Max SQL> SV
Aroclor-1254	0	10	1.2	110			ND	110	U	21.6	N/A	5.09	Yes	Max SQL> SV
Aroclor-1260	**1**	**10**	**1.2**	**110**	**350**	**350**	**041M030201**	**350**	**DJ**	**21.6**	**N/A**	**16.2**	**Yes**	**Max Detect > SV**
Total PCBs	**1**	**10**	**9.5**	**880**	**403**	**403**	**041M030201**	**403**		**21.6**	**1**	**18.6**	**Yes**	**Max Detect > SV**
Pesticides (g/kg)														
Aldrin	3	10	0.0065	5.5	0.23	1	041M030201	1	J		N/A		Yes	No SV
Dieldrin	**1**	**10**	**0.12**	**11**	**6**	**6**	**041M030201**	**6**	**J**	**0.716**	**1**	**8.38**	**Yes**	**Max Detect > SV**
Endosulfan I	0	10	0.006	5.5			ND	5.5	U		N/A		Yes	No SV
Endosulfan II	0	10	0.12	11			ND	11	U		N/A		Yes	No SV
Endosulfan sulfate	2	10	0.12	11	1.5	1.7	041M030701	1.7	J		N/A		Yes	No SV
Heptachlor	0	10	0.006	5.5			ND	5.5	U		N/A		Yes	No SV
Heptachlor epoxide	0	10	0.006	5.5			ND	5.5	U		N/A		Yes	No SV
Methoxychlor	0	10	0.6	55			ND	55	U		N/A		Yes	No SV
Toxaphene	0	10	10	550			ND	550	U		N/A		Yes	No SV
alpha-Chlordane	**8**	**10**	**0.011**	**0.0265**	**0.17**	**2.2**	**001M000303**	**2.2**	**J**	**1.7**	**1**	**1.29**	**Yes**	**Max Detect > SV**

Table 10-2-8
Wetland 3 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Min Det.	Max Det.	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Pesticides (g/kg) - cont.														
gamma-Chlordane	**3**	**10**	**0.011**	**5.5**	**0.11**	**1.7**	**041M030201**	**1.7**	**J**	**1.7**	**1**	**1**	**Yes**	**Max Detect > SV**
Total Chlordane	**8**	**10**	**0.022**	**0.053**	**0.28**	**7.7**	**001M000303**	**7.7**		**1.7**	**1**	**4.53**	**Yes**	**Max Detect > SV**
Endrin	4	10	0.12	11	0.53	1.8	041M030301	1.8	J	3.3	2	0.55	No	Max Detect < SV
Endrin aldehyde	0	10	0.12	11			ND	11	U	3.3	2	3.33	Yes	Max SQL> SV
Endrin ketone	1	10	0.12	11	1.4	1.4	041M030501	1.4	J	3.3	2	0.42	No	Max Detect < SV
Total Endrin	**4**	**10**	**0.36**	**33**	**1.38**	**5.23**	**001M000301**	**5.23**		**3.3**	**2**	**1.58**	**Yes**	**Max Detect > SV**
alpha-BHC	3	10	0.006	5.5	0.19	1.2	041M030601	1.2	J		N/A		Yes	No SV
beta-BHC	**1**	**10**	**0.006**	**5.5**	**0.7**	**0.7**	**041M030301**	**0.7**	**J**	**0.32**	**N/A**	**2.19**	**Yes**	**Max Detect > SV**
delta-BHC	2	10	0.0065	5.5	0.18	0.25	041M030401	0.25	J	0.32	N/A	0.78	No	Max Detect < SV
gamma-BHC (Lindane)	0	10	0.006	5.5			ND	5.5	U	0.32	1	17.2	Yes	Max SQL> SV
Total BHC	**5**	**10**	**0.088**	**22**	**0.198**	**1.28**	**041M030601**	**1.28**		**0.32**	**2**	**4**	**Yes**	**Max Detect > SV**
4,4'-DDD	**10**	**10**			**1.3**	**400**	**001M000303**	**400**	**J**	**1.22**	**1**	**328**	**Yes**	**Max Detect > SV**
4,4'-DDE	**7**	**10**	**0.44**	**0.75**	**0.84**	**120**	**001M000303**	**120**	**J**	**2.07**	**1**	**58**	**Yes**	**Max Detect > SV**
4,4'-DDT	**9**	**10**	**0.55**	**0.55**	**0.32**	**220**	**001M000303**	**220**		**1.19**	**1**	**185**	**Yes**	**Max Detect > SV**
Total DDT	**10**	**10**			**2.62**	**740**	**001M000303**	**740**		**3.3**	**2**	**224**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
1,2-Dichlorobenzene	1	10	200	1,050	410	410	041M030201	410	J		N/A		Yes	No SV
1,3-Dichlorobenzene	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
1,4-Dichlorobenzene	4	10	200	1,050	58	1400	041M030301	1,400			N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	10	480	3,600			ND	3,600	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	10	480	3,600			ND	3,600	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
2-Chloronaphthalene	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
2-Chlorophenol	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	10	480	3,600			ND	3,600	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
2-Nitroaniline	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
2-Nitrophenol	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
3-Nitroaniline	0	10	480	3,600			ND	3,600	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
4-Chloroaniline	0	7	215	1,050			ND	1,050	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
4-Nitroaniline	0	10	480	3,600			ND	3,600	U		N/A		Yes	No SV
4-Nitrophenol	0	10	480	3,600			ND	3,600	U		N/A		Yes	No SV
Benzo(b)fluoranthene	1	10	23	240	85	85	041M030101	85			N/A		No	TOC normalized PAHs < TEC
Benzo(g,h,i)perylene	1	10	23	240	46	46	041M030101	46			N/A		No	TOC normalized PAHs < TEC
Benzo(k)fluoranthene	1	10	23	240	27	27	041M030101	27	J		N/A		No	TOC normalized PAHs < TEC
bis(2-Chloroethoxy)methane	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	10	20	240			ND	240	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**4**	**10**	**190**	**1,500**	**76**	**270**	**041M030701**	**270**	**J**	**182**	**1, 2**	**1.48**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	1	10	27	1,500	23	23	041M030101	23	J	182	1, 2	0.13	No	Max Detect < SV
Carbazole	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
Dibenzofuran	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
Diethylphthalate	1	10	200	1,500	47	47	041M030301	47	J	182	1, 2	0.26	No	Max Detect < SV
Dimethylphthalate	0	10	200	1,500			ND	1,500	U	182	1, 2	8.24	Yes	Max SQL > SV
Di-n-butylphthalate	2	10	215	1,500	36	77	041M030301	77	J	182	1, 2	0.42	No	Max Detect < SV
Di-n-octylphthalate	2	10	200	1,500	45	45	041M030601	45	J	182	1, 2	0.25	No	Max Detect < SV
Hexachlorobenzene	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
Hexachlorobutadiene	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	10	200	1,500			ND	1,500	UJ		N/A		Yes	No SV

Table 10-2-8
Wetland 3 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Min Det.	Max Det.	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
Hexachloroethane	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	1	10	23	240	31	31	041M030101	31	J		N/A		No	TOC normalized PAHs < TEC
Isophorone	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
Nitrobenzene	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	10	20	240			ND	240	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	10	200	1,500			ND	1,500	U		N/A		Yes	No SV
Pentachlorophenol	0	10	480	3,600			ND	3,600	U		N/A		Yes	No SV
Phenol	1	10	200	1,500	55	55	001M000301	55	J		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
1,1-Dichloroethane	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
1,1-Dichloroethene	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
1,2-Dichloroethane	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
1,2-Dichloropropane	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
2-Butanone (MEK)	1	10	6.5	100	180	180	041M030701	180			N/A		Yes	No SV
2-Hexanone	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Acetone	1	10	7	800	1,100	1,100	041M030701	1,100	J		N/A		Yes	No SV
Benzene	2	10	6.5	100	18	34	041M030201	34	J		N/A		Yes	No SV
Bromodichloromethane	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Bromoform	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Bromomethane	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Carbon disulfide	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Carbon tetrachloride	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Chlorobenzene	6	10	6.5	100	2	620	041M030301	620			N/A		Yes	No SV
Chloroethane	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Chloroform	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Chloromethane	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Dibromochloromethane	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Ethylbenzene	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Methylene chloride	0	10	4	100			ND	100	U		N/A		Yes	No SV
Styrene	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Tetrachloroethene	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Toluene	1	10	6.5	100	2	2	041M030701	2	J		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Trichloroethene	0	10	6.5	100			ND	100	U		N/A		Yes	No SV
Vinyl chloride	0	10	2	30			ND	30	U		N/A		Yes	No SV
Xylene (Total)	0	10	6.5	100			ND	100	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 10-2-9
Wetland 3 Phase II
Sediment COPCs Retained after Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	Aldrin	1,2-Dichlorobenzene	2-Butanone (MEK)
Arsenic	Dieldrin	1,4-Dichlorobenzene	Acetone
Barium	Endosulfan sulfate	bis(2-Ethylhexyl)phthalate (BEHP)	Benzene
Cadmium	alpha-Chlordane	Phenol	Chlorobenzene
Calcium	gamma-Chlordane		Toluene
Chromium	Total Chlordane		
Cobalt	Total Endrin		
Copper	alpha-BHC		
Cyanide (CN)	beta-BHC		
Iron	Total BHC		
Lead	4,4'-DDD		
Magnesium	4,4'-DDE		
Manganese	4,4'-DDT		
Potassium	Total DDT		
Selenium	Aroclor-1260		
Sodium	Total PCBs		
Vanadium			
Zinc			
		Not Detected Parameters	
Beryllium	Endosulfan I	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Thallium	Endosulfan II	1,3-Dichlorobenzene	1,1,2,2-Tetrachloroethane
Mercury	Endrin aldehyde	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1,2-Trichloroethane
Silver	Heptachlor	2,4,5-Trichlorophenol	1,1-Dichloroethane
	Heptachlor epoxide	2,4,6-Trichlorophenol	1,1-Dichloroethene
	Methoxychlor	2,4-Dichlorophenol	1,2-Dichloroethane
	Toxaphene	2,4-Dimethylphenol	1,2-Dichloroethene (total)
	gamma-BHC	2,4-Dinitrophenol	1,2-Dichloropropane
	alpha-BHC	2,4-Dinitrotoluene	2-Hexanone
	Aroclor-1016	2,6-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
	Aroclor-1221	2-Chloronaphthalene	Bromodichloromethane
	Aroclor-1232	2-Chlorophenol	Bromoform
	Aroclor-1242	2-Methyl-4,6-Dinitrophenol	Bromomethane
	Aroclor-1248	2-Methylphenol (o-Cresol)	Carbon disulfide
	Aroclor-1254	2-Nitroaniline	Carbon tetrachloride
		2-Nitrophenol	Chloroethane
		3,3'-Dichlorobenzidine	Chloroform
		3-Nitroaniline	Chloromethane
		4-Bromophenyl-phenylether	cis-1,3-Dichloropropene
		4-Chloro-3-methylphenol	Dibromochloromethane
		4-Chloroaniline	Ethylbenzene
		4-Chlorophenylphenyl ether	Methylene chloride
		4-Methylphenol (p-Cresol)	Styrene
		4-Nitroaniline	Tetrachloroethene
		4-Nitrophenol	trans-1,3-Dichloropropene
		bis(2-Chloroethoxy)methane	Trichloroethene
		bis(2-Chloroethyl)ether	Vinyl chloride
		Carbazole	Xylene (Total)
		Dibenzofuran	
		Dimethylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	

Table 10-2-10
Wetland 3 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	10	10				4,520	426	25,600	25,600		041M030701			NA					0	13610	1	Yes	EPC > RC and no RV
Arsenic	9	10	0.37	0.37	0.37	8.7	0.56	35.5	35.5		041M030301	7.24	41.6	PEL	4.9	1.2	0.85	0.21	0	6.62	3	No	EPC > RC, but < RV
Barium	10	10				53.2	1.6	438	438		041M030701			NA					0	14	4	Yes	EPC > RC and no RV
Beryllium	0	10	0.174	0.025	0.8	0.174			0.8	U	ND			NA					0	0.84	0	No	EPC < RC
Cadmium	**7**	**10**	**0.347**	**0.095**	**0.495**	**8.9**	**0.52**	**72.7**	**72.7**		**041M030701**	**0.676**	**4.21**	**PEL**	**108**	**13.2**	**17.3**	**2.11**	**2**	**1.8**	**5**	**Yes**	**EPC > RV and RC**
Calcium	10	10				7,330	350	31,800	31,800		041M030101			NA					0	10756.67	2	No	Essential Nutrient
Chromium	**10**	**10**				**26.1**	**1.5**	**196**	**196**		**041M030701**	**52.3**	**160**	**PEL**	**3.75**	**0.50**	**1.23**	**0.16**	**1**	**39.37**	**1**	**Yes**	**EPC > RV and RC**
Cobalt	1	10	0.525	0.08	2.35	0.722	2.5	2.5	2.5	J	041M030201			NA					0	2.8	0	No	EPC < RC
Copper	5	10	1.04	0.43	1.55	10.5	2.2	68.8	68.8		041M030701	18.7	108	PEL	3.68	0.56	0.64	0.10	0	19.5	1	No	EPC > RC, but < RV
Cyanide	2	10	0.67	0.3	2.6	1.2	1.5	5.1	5.1	J	041M030701			NA					0	5.22	0	No	EPC < RC
Iron	10	10				60,000	1,940	386,000	386,000		041M030701			NA					0	11911.67	7	Yes	EPC > RC and no RV
Lead	10	10				20.6	2.4	101	101	J	041M030201	30.2	112	PEL	3.34	0.68	0.90	0.18	0	82.47	1	No	EPC > RC, but < RV
Magnesium	9	10	19.9	19.9	19.9	248	23.2	1,420	1,420	J	041M030701			NA					0	7513.33	0	No	EPC < RC
Manganese	10	10				152	2.3	1,270	1,270	J	041M030701			NA					0	37.97	4	Yes	EPC > RC and no RV
Mercury	0	10	0.0755	0.025	0.235	0.0755			0.235	U	ND	0.13	0.696	PEL	1.81	0.581	0.338	0.108	0	0.545	10	No	Parameter Not Detected; Max SQL > RV
Potassium	7	10	359	337	371	176	10.9	468	468	J	041M030701			NA					0	1628.67	0	No	EPC < RC
Selenium	3	10	0.334	0.08	0.55	0.658	0.44	2	2	J	041M030201			NA					0	3.45	0	No	EPC < RC
Silver	0	10	0.673	0.11	3.1				3.1	UJ	ND	0.733	1.77	PEL	4.23	0.919	1.75	0.381	0	2.1	0	No	Parameter Not Detected; Max SQL > RV
Sodium	6	10	36.5	1.25	49	75.9	4.5	291	291	J	041M030701			NA					0	18993.33	0	No	EPC < RC
Thallium	0	10	0.337	0.08	0.8	0.337			0.8	UJ	ND			NA					0	1.57	0	No	EPC < RC
Vanadium	10	10				21.2	1.2	160	160		041M030701			NA					0	28.67	1	Yes	EPC > RC and no RV
Zinc	**10**	**10**				**37.4**	**1.2**	**297**	**297**		**041M030701**	**124**	**271**	**PEL**	**2.4**	**0.30**	**1.1**	**0.14**	**1**	**36.73**	**1**	**Yes**	**EPC > RV and RC**
PCBs (g/kg)																							
Aroclor-1016	0	10	18.2	1.2	110	18.2			110	U	ND	21.6	189	PEL	5.09	0.84	0.58	0.10	0		0	No	RV HQ <1 and no RC
Aroclor-1221	0	10	36.3	2.3	220	36.3			220	U	ND	67	189	PEL	3.28	0.54	1.16	0.19	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1232	0	10	18.2	1.2	110	18.2			110	U	ND	21.6	189	PEL	5.09	0.84	0.58	0.10	0		0	No	RV HQ <1 and no RC
Aroclor-1242	0	10	18.2	1.2	110	18.2			110	U	ND	21.6	189	PEL	5.09	0.84	0.58	0.10	0		0	No	RV HQ <1 and no RC
Aroclor-1248	0	10	18.2	1.2	110	18.2			110	U	ND	21.6	189	PEL	5.09	0.84	0.58	0.10	0		0	No	RV HQ <1 and no RC
Aroclor-1254	0	10	18.2	1.2	110	18.2			110	U	ND	21.6	189	PEL	5.09	0.84	0.58	0.10	0		0	No	RV HQ <1 and no RC
Aroclor-1260	**1**	**10**	**19.3**	**1.2**	**110**	**52.4**	**350**	**350**	**350**	**DJ**	**041M030201**	**21.6**	**189**	**PEL**	**16.2**	**2.43**	**1.85**	**0.28**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Total PCBs	**1**	**10**	**155**	**9.5**	**880**	**180**	**403**	**403**	**403**		**041M030201**	**21.6**	**189**	**PEL**	**18.6**	**8.31**	**2.13**	**0.95**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Pesticides (g/kg)																							
Aldrin	3	10	1.16	0.0065	5.5	1	0.23	1	1	J	041M030201			NA					0		0	Yes	No SV, no RV, and no RC
Dieldrin	**1**	**10**	**1.93**	**0.12**	**11**	**2.34**	**6**	**6**	**6**	**J**	**041M030201**	**0.716**	**4.3**	**PEL**	**8.38**	**3.27**	**1.4**	**0.544**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Endosulfan I	0	10	0.897	0.006	5.5	0.897			5.5	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	10	1.82	0.12	11	1.82			11	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	2	10	2.12	0.12	11	2.02	1.5	1.7	1.7	J	041M030701			NA					0		0	Yes	No SV, no RV, and no RC
Heptachlor	0	10	0.849	0.006	5.5	0.849			5.5	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	10	0.849	0.006	5.5	0.849			5.5	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	10	9.14	0.6	55	9.14			55	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	10	98.8	10	550	98.8			550	U	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	8	10	0.0187	0.011	0.0265	0.609	0.17	2.2	2.2	J	001M000303	1.7	4.79	PEL	1.29	0.36	0.46	0.13	0		0	No	RV HQ <1 and no RC
gamma-Chlordane	3	10	1.16	0.011	5.5	1.05	0.11	1.7	1.7	J	041M030201	1.7	4.79	PEL	1	0.62	0.36	0.22	0		0	No	RV HQ <1 and no RC
Total Chlordane	**8**	**10**	**0.0375**	**0.022**	**0.053**	**1.65**	**0.28**	**7.7**	**7.7**		**001M000303**	**1.7**	**4.79**	**PEL**	**4.53**	**0.97**	**1.61**	**0.35**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Endrin	4	10	2.47	0.12	11	1.94	0.53	1.8	1.8	J	041M030301	3.3		NA	0.55	0.59			0		0	Yes	No RV or RC and EPC > SV
Endrin aldehyde	0	10	1.82	0.12	11	1.82			11	U	ND	3.3		NA	3.33	0.55			0		0	No	Parameter Not Detected
Endrin ketone	1	10	1.96	0.12	11	1.9	1.4	1.4	1.4	J	041M030501	3.3		NA	0.42	0.58			0		0	Yes	No RV or RC and EPC > SV
Total Endrin	4	10	7.42	0.36	33	5.66	1.38	5.23	5.23		001M000301	3.3		NA	1.58	1.72			0		0	Yes	No RV or RC and EPC > SV
alpha-BHC	**3**	**10**	**1.21**	**0.006**	**5.5**	**1.03**	**0.19**	**1.2**	**1.2**	**J**	**041M030601**		**0.99**	**PEL**			**1.21**	**1.04**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
beta-BHC	1	10	0.942	0.006	5.5	0.918	0.7	0.7	0.7	J	041M030301	0.32	0.99	PEL	2.19	2.87	0.71	0.93	0		0	No	RV HQ <1 and no RC
delta-BHC	2	10	1.05	0.0065	5.5	0.882	0.18	0.25	0.25	J	041M030401	0.32	0.99	PEL	0.78	2.75	0.25	0.89	0		0	No	RV HQ <1 and no RC
gamma-BHC (Lindane)	0	10	0.849	0.006	5.5	0.849			5.5	U	ND	0.32	0.99	PEL	17.2	2.65	5.56	0.86	0		0	No	Parameter Not Detected; Max SQL > RV
Total BHC	**5**	**10**	**6.67**	**0.088**	**22**	**3.68**	**0.198**	**1.28**	**1.28**		**041M030601**	**0.32**	**0.99**	**PEL**	**4**	**11.5**	**1.29**	**3.71**	**2**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	**10**	**10**				**49.1**	**1.3**	**400**	**400**	**J**	**001M000303**	**1.22**	**7.81**	**PEL**	**328**	**40.3**	**51.2**	**6.29**	**4**	**50**	**1**	**Yes**	**EPC > RV and RC**
4,4'-DDE	7	10	0.58	0.44	0.75	15.3	0.84	120	120	J	001M000303	2.07	374	PEL	58	7.39	0.32	0.04	0	40	1	No	EPC > RC, but < RV
4,4'-DDT	**9**	**10**	**0.55**	**0.55**	**0.55**	**24.4**	**0.32**	**220**	**220**		**001M000303**	**1.19**	**4.77**	**PEL**	**185**	**20.5**	**46.1**	**5.12**	**3**	**20**	**1**	**Yes**	**EPC > RV and RC**
Total DDT	**10**	**10**				**88.8**	**2.62**	**740**	**740**		**001M000303**	**3.3**	**51.7**	**PEL**	**224**	**26.9**	**14.3**	**1.72**	**1**	**110**	**1**	**Yes**	**EPC > RV and RC**
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	1	10	411	200	1,050	411	410	410	410	J	041M030201			NA					0		0	Yes	No SV, no RV, and no RC
1,3-Dichlorobenzene	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	4	10	465	200	1,050	581	58	1,400	1,400		041M030301			NA					0		0	Yes	No SV, no RV, and no RC
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	10	1,250	480	3,600	1,250			3,600	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	10	1,250	480	3,600	1,250			3,600	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	10	520	200	1500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	10	520	200	1500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	10	1,250	480	3,600	1,250			3,600	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	10	616	200	1,500	616			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	10	1,250	480	3,600	1,250			3,600	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	7	437	215	1,050	437			1,050	U	ND			NA					0		0	No	Parameter Not Detected

Table 10-2-10
Wetland 3 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
4-Chlorophenylphenyl ether	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	10	1,250	480	3,600	1,250			3,600	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	10	1,250	480	3,600	1,250			3,600	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	10	114	20	240	114			240	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	4	10	463	190	1,500	342	76	270	270	J	041M030701	182	2647	PEL	1.48	1.88	0.10	0.13	0		0	No	RV HQ <1 and no RC
Carbazole	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Dimethylphthalate	0	10	520	200	1,500	520			1,500	U	ND	182	2647	PEL	8.24	2.85	0.57	0.20	0		0	No	RV HQ <1 and no RC
Hexachlorobenzene	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	10	520	200	1,500	520			1,500	UJ	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	10	114	20	240	114			240	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	10	520	200	1,500	520			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	10	1,250	480	3,600	1,250			3,600	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	1	10	551	200	1,500	502	55	55	55	J	001M000301			NA					0		0	Yes	No SV, no RV, and no RC
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	1	10	23.9	6.5	100	39.5	180	180	180		041M030701			NA					0		0	Yes	No SV, no RV, and no RC
2-Hexanone	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	1	10	125	7	800	223	1,100	1,100	1,100	J	041M030701			NA					0		0	Yes	No SV, no RV, and no RC
Benzene	2	10	21.6	6.5	100	22.4	18	34	34	J	041M030201			NA					0		0	Yes	No SV, no RV, and no RC
Bromodichloromethane	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	6	10	30.1	6.5	100	121	2	620	620		041M030301			NA					0		0	Yes	No SV, no RV, and no RC
Chloroethane	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	10	25.7	4	100	25.7			100	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	1	10	23.9	6.5	100	21.8	2	2	2	J	041M030701			NA					0		0	Yes	No SV, no RV, and no RC
trans-1,3-Dichloropropene	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	10	8.75	2	30	8.75			30	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	10	24.4	6.5	100	24.4			100	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening Value (detailed explanation for SVs provided in Section 8).
RV = Refinement Value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable Effects Level.

N/R = No Refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 10-2-11
Wetland 3 Phase II
Sediment COPCs Retained after Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	Aldrin	1,2-Dichlorobenzene	None
Barium	Dieldrin	1,4-Dichlorobenzene	
Cadmium	Endosulfan sulfate	Phenol	
Chromium	Total Chlordane		
Iron	Endrin		
Manganese	Endrin ketone		
Vanadium	Total Endrin		
Zinc	alpha-BHC		
	Total BHC		
	4,4'-DDD		
	4,4'-DDT		
	Total DDT		
	Aroclor-1260		
	Total PCBs		

Table 10-2-12
Wetland 3 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
001M000301	6/28/1994	mg/kg	1.6	J	Arsenic	8.2	70	0.02
001M000301	6/28/1994	mg/kg	2.2		Cadmium	1.2	9.6	0.23
001M000301	6/28/1994	mg/kg	16.9		Chromium	81	370	0.05
001M000301	6/28/1994	mg/kg	6.2		Copper	34	270	0.02
001M000301	6/28/1994	mg/kg	36.3	J	Lead	46.7	218	0.17
001M000301	6/28/1994	mg/kg	0.07	U	Mercury	0.15	0.71	0.10
001M000301	6/28/1994	mg/kg	5.75	U	Nickel	20.9	51.6	0.11
001M000301	6/28/1994	mg/kg	0.6	U	Silver	1	3.7	0.16
001M000301	6/28/1994	mg/kg	15.8		Zinc	150	410	0.04
001M000301	6/28/1994	g/kg	3.4	J	4,4'-DDE	2.2	27	0.13
001M000301	6/28/1994	g/kg	9.9		4,4'-DDT	1.58	46.1	0.21
001M000301	6/28/1994	g/kg	189	U	Total PCBs	22.7	180	1.05
001M000301	6/28/1994	g/kg	235	U	2-Methylnaphthalene	70	670	0.35
001M000301	6/28/1994	g/kg	235	U	Acenaphthene	16	500	0.47
001M000301	6/28/1994	g/kg	235	U	Acenaphthylene	44	640	0.37
001M000301	6/28/1994	g/kg	235	U	Anthracene	85.3	1,100	0.21
001M000301	6/28/1994	g/kg	235	U	Benzo(a)anthracene	261	1,600	0.15
001M000301	6/28/1994	g/kg	235	U	Benzo(a)pyrene	430	1,600	0.15
001M000301	6/28/1994	g/kg	235	U	Chrysene	384	2,800	0.08
001M000301	6/28/1994	g/kg	235	U	Dibenz(a,h)anthracene	63.4	260	0.90
001M000301	6/28/1994	g/kg	235	U	Fluoranthene	600	5,100	0.05
001M000301	6/28/1994	g/kg	235	U	Fluorene	19	540	0.44
001M000301	6/28/1994	g/kg	235	U	Naphthalene	160	2,100	0.11
001M000301	6/28/1994	g/kg	235	U	Phenanthrene	240	1,500	0.16
001M000301	6/28/1994	g/kg	235	U	Pyrene	665	2,600	0.09
001M000301	6/28/1994				ERM Quotient Sum			5.81
001M000301	6/28/1994				Mean ERM Quotient			0.23
001M000301	6/28/1994				Mean ERM Quotient without ND			0.03
001M000301	6/28/1994				Mean ERM Quotient Category			2
001M000302	6/28/1994	mg/kg	1.6	J	Arsenic	8.2	70	0.02
001M000302	6/28/1994	mg/kg	0.495	U	Cadmium	1.2	9.6	0.05
001M000302	6/28/1994	mg/kg	2.4		Chromium	81	370	0.01
001M000302	6/28/1994	mg/kg	1.55	U	Copper	34	270	0.01
001M000302	6/28/1994	mg/kg	5.5	J	Lead	46.7	218	0.03
001M000302	6/28/1994	mg/kg	0.075	U	Mercury	0.15	0.71	0.11
001M000302	6/28/1994	mg/kg	5.8	U	Nickel	20.9	51.6	0.11
001M000302	6/28/1994	mg/kg	0.6	U	Silver	1	3.7	0.16
001M000302	6/28/1994	mg/kg	6		Zinc	150	410	0.01
001M000302	6/28/1994	g/kg	2.5	J	4,4'-DDE	2.2	27	0.09
001M000302	6/28/1994	g/kg	1.3	J	4,4'-DDT	1.58	46.1	0.03
001M000302	6/28/1994	g/kg	192.5	U	Total PCBs	22.7	180	1.07
001M000302	6/28/1994	g/kg	240	U	2-Methylnaphthalene	70	670	0.36
001M000302	6/28/1994	g/kg	240	U	Acenaphthene	16	500	0.48
001M000302	6/28/1994	g/kg	240	U	Acenaphthylene	44	640	0.38
001M000302	6/28/1994	g/kg	240	U	Anthracene	85.3	1,100	0.22
001M000302	6/28/1994	g/kg	240	U	Benzo(a)anthracene	261	1,600	0.15
001M000302	6/28/1994	g/kg	240	U	Benzo(a)pyrene	430	1,600	0.15
001M000302	6/28/1994	g/kg	240	U	Chrysene	384	2,800	0.09
001M000302	6/28/1994	g/kg	240	U	Dibenz(a,h)anthracene	63.4	260	0.92
001M000302	6/28/1994	g/kg	240	U	Fluoranthene	600	5,100	0.05
001M000302	6/28/1994	g/kg	240	U	Fluorene	19	540	0.44
001M000302	6/28/1994	g/kg	240	U	Naphthalene	160	2,100	0.11
001M000302	6/28/1994	g/kg	240	U	Phenanthrene	240	1,500	0.16
001M000302	6/28/1994	g/kg	240	U	Pyrene	665	2,600	0.09
001M000302	6/28/1994				ERM Quotient Sum			5.30
001M000302	6/28/1994				Mean ERM Quotient			0.21
001M000302	6/28/1994				Mean ERM Quotient without ND			0.01
001M000302	6/28/1994				Mean ERM Quotient Category			2
001M000303	6/28/1994	mg/kg	0.37	UJ	Arsenic	8.2	70	0.01
001M000303	6/28/1994	mg/kg	0.45	U	Cadmium	1.2	9.6	0.05
001M000303	6/28/1994	mg/kg	1.6		Chromium	81	370	0.00
001M000303	6/28/1994	mg/kg	1.4	U	Copper	34	270	0.01
001M000303	6/28/1994	mg/kg	7.2	J	Lead	46.7	218	0.03
001M000303	6/28/1994	mg/kg	0.065	U	Mercury	0.15	0.71	0.09
001M000303	6/28/1994	mg/kg	5.25	U	Nickel	20.9	51.6	0.10
001M000303	6/28/1994	mg/kg	0.55	U	Silver	1	3.7	0.15
001M000303	6/28/1994	mg/kg	4		Zinc	150	410	0.01
001M000303	**6/28/1994**	**g/kg**	**120**	**J**	**4,4'-DDE**	**2.2**	**27**	**4.44**
001M000303	**6/28/1994**	**g/kg**	**220**		**4,4'-DDT**	**1.58**	**46.1**	**4.77**
001M000303	6/28/1994	g/kg	880	U	Total PCBs	22.7	180	4.89
001M000303	6/28/1994	g/kg	215	U	2-Methylnaphthalene	70	670	0.32
001M000303	6/28/1994	g/kg	215	U	Acenaphthene	16	500	0.43
001M000303	6/28/1994	g/kg	215	U	Acenaphthylene	44	640	0.34
001M000303	6/28/1994	g/kg	215	U	Anthracene	85.3	1,100	0.20
001M000303	6/28/1994	g/kg	215	U	Benzo(a)anthracene	261	1,600	0.13
001M000303	6/28/1994	g/kg	215	U	Benzo(a)pyrene	430	1,600	0.13
001M000303	6/28/1994	g/kg	215	U	Chrysene	384	2,800	0.08
001M000303	6/28/1994	g/kg	215	U	Dibenz(a,h)anthracene	63.4	260	0.83
001M000303	6/28/1994	g/kg	215	U	Fluoranthene	600	5,100	0.04
001M000303	6/28/1994	g/kg	215	U	Fluorene	19	540	0.40
001M000303	6/28/1994	g/kg	215	U	Naphthalene	160	2,100	0.10
001M000303	6/28/1994	g/kg	215	U	Phenanthrene	240	1,500	0.14
001M000303	6/28/1994	g/kg	215	U	Pyrene	665	2,600	0.08
001M000303	6/28/1994				ERM Quotient Sum			17.78
001M000303	6/28/1994				Mean ERM Quotient			0.71
001M000303	6/28/1994				Mean ERM Quotient without ND			0.37
001M000303	6/28/1994				Mean ERM Quotient Category			2
041M030101	12/1/1995	mg/kg	1.8		Arsenic	8.2	70	0.03
041M030101	12/1/1995	mg/kg	0.52	J	Cadmium	1.2	9.6	0.05
041M030101	12/1/1995	mg/kg	4.5		Chromium	81	370	0.01
041M030101	12/1/1995	mg/kg	2.2	J	Copper	34	270	0.01
041M030101	12/1/1995	mg/kg	12.6	J	Lead	46.7	218	0.06
041M030101	12/1/1995	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M030101	12/1/1995	mg/kg	0.395	U	Nickel	20.9	51.6	0.01
041M030101	12/1/1995	mg/kg	0.13	UJ	Silver	1	3.7	0.04
041M030101	12/1/1995	mg/kg	6.4	J	Zinc	150	410	0.02
041M030101	12/1/1995	g/kg	21	DJ	4,4'-DDE	2.2	27	0.78
041M030101	12/1/1995	g/kg	7.5	DJ	4,4'-DDT	1.58	46.1	0.16
041M030101	12/1/1995	g/kg	15.9	U	Total PCBs	22.7	180	0.09
041M030101	12/1/1995	g/kg	20	U	2-Methylnaphthalene	70	670	0.03
041M030101	12/1/1995	g/kg	9.5	U	Acenaphthene	16	500	0.02

Table 10-2-12
Wetland 3 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M030101	12/1/1995	g/kg	20	U	Acenaphthylene	44	640	0.03
041M030101	12/1/1995	g/kg	20	U	Anthracene	85.3	1,100	0.02
041M030101	12/1/1995	g/kg	23	J	Benzo(a)anthracene	261	1,600	0.01
041M030101	12/1/1995	g/kg	48		Benzo(a)pyrene	430	1,600	0.03
041M030101	12/1/1995	g/kg	32	J	Chrysene	384	2,800	0.01
041M030101	12/1/1995	g/kg	20	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M030101	12/1/1995	g/kg	46		Fluoranthene	600	5,100	0.01
041M030101	12/1/1995	g/kg	9.5	U	Fluorene	19	540	0.02
041M030101	12/1/1995	g/kg	20	U	Naphthalene	160	2,100	0.01
041M030101	12/1/1995	g/kg	24	J	Phenanthrene	240	1,500	0.02
041M030101	12/1/1995	g/kg	43		Pyrene	665	2,600	0.02
041M030101	12/1/1995				ERM Quotient Sum			1.59
041M030101	12/1/1995				Mean ERM Quotient			0.06
041M030101	12/1/1995				Mean ERM Quotient without ND			0.05
041M030101	12/1/1995				Mean ERM Quotient Category			2
041M030201	12/1/1995	mg/kg	12.8		Arsenic	8.2	70	0.18
041M030201	12/1/1995	mg/kg	5.8	J	Cadmium	1.2	9.6	0.60
041M030201	12/1/1995	mg/kg	20.8		Chromium	81	370	0.06
041M030201	12/1/1995	mg/kg	17.8		Copper	34	270	0.07
041M030201	12/1/1995	mg/kg	101	J	Lead	46.7	218	0.46
041M030201	12/1/1995	mg/kg	3.2	U	Nickel	20.9	51.6	0.06
041M030201	12/1/1995	mg/kg	1.05	UJ	Silver	1	3.7	0.28
041M030201	12/1/1995	mg/kg	32.4	J	Zinc	150	410	0.08
041M030201	12/1/1995	g/kg	0.75	U	4,4'-DDE	2.2	27	0.03
041M030201	12/1/1995	g/kg	1.4	J	4,4'-DDT	1.58	46.1	0.03
041M030201	**12/1/1995**	**g/kg**	**402.5**		**Total PCBs**	**22.7**	**180**	**2.24**
041M030201	12/1/1995	g/kg	150	U	2-Methylnaphthalene	70	670	0.22
041M030201	12/1/1995	g/kg	70	U	Acenaphthene	16	500	0.14
041M030201	12/1/1995	g/kg	150	U	Acenaphthylene	44	640	0.23
041M030201	12/1/1995	g/kg	150	U	Anthracene	85.3	1,100	0.14
041M030201	12/1/1995	g/kg	150	U	Benzo(a)anthracene	261	1,600	0.09
041M030201	12/1/1995	g/kg	150	U	Benzo(a)pyrene	430	1,600	0.09
041M030201	12/1/1995	g/kg	150	U	Chrysene	384	2,800	0.05
041M030201	12/1/1995	g/kg	150	U	Dibenz(a,h)anthracene	63.4	260	0.58
041M030201	12/1/1995	g/kg	150	U	Fluoranthene	600	5,100	0.03
041M030201	12/1/1995	g/kg	70	U	Fluorene	19	540	0.13
041M030201	12/1/1995	g/kg	150	U	Naphthalene	160	2,100	0.07
041M030201	12/1/1995	g/kg	150	U	Phenanthrene	240	1,500	0.10
041M030201	12/1/1995	g/kg	150	U	Pyrene	665	2,600	0.06
041M030201	12/1/1995				ERM Quotient Sum			6.36
041M030201	12/1/1995				Mean ERM Quotient			0.25
041M030201	12/1/1995				Mean ERM Quotient without ND			0.15
041M030201	12/1/1995				Mean ERM Quotient Category			2
041M030301	12/4/1995	mg/kg	35.5		Arsenic	8.2	70	0.51
041M030301	12/4/1995	mg/kg	2.9		Cadmium	1.2	9.6	0.30
041M030301	12/4/1995	mg/kg	7.3		Chromium	81	370	0.02
041M030301	12/4/1995	mg/kg	4.6		Copper	34	270	0.02
041M030301	12/4/1995	mg/kg	11.5		Lead	46.7	218	0.05
041M030301	12/4/1995	mg/kg	0.075	U	Mercury	0.15	0.71	0.11
041M030301	12/4/1995	mg/kg	0.95	U	Nickel	20.9	51.6	0.02
041M030301	12/4/1995	mg/kg	0.315	UJ	Silver	1	3.7	0.09
041M030301	12/4/1995	mg/kg	3.4		Zinc	150	410	0.01
041M030301	12/4/1995	g/kg	0.84	J	4,4'-DDE	2.2	27	0.03
041M030301	12/4/1995	g/kg	0.48	J	4,4'-DDT	1.58	46.1	0.01
041M030301	12/4/1995	g/kg	17.85	U	Total PCBs	22.7	180	0.10
041M030301	12/4/1995	g/kg	43.5	U	2-Methylnaphthalene	70	670	0.06
041M030301	12/4/1995	g/kg	98		Acenaphthene	16	500	0.20
041M030301	12/4/1995	g/kg	43.5	U	Acenaphthylene	44	640	0.07
041M030301	12/4/1995	g/kg	43.5	U	Anthracene	85.3	1,100	0.04
041M030301	12/4/1995	g/kg	43.5	U	Benzo(a)anthracene	261	1,600	0.03
041M030301	12/4/1995	g/kg	43.5	U	Benzo(a)pyrene	430	1,600	0.03
041M030301	12/4/1995	g/kg	43.5	U	Chrysene	384	2,800	0.02
041M030301	12/4/1995	g/kg	43.5	U	Dibenz(a,h)anthracene	63.4	260	0.17
041M030301	12/4/1995	g/kg	43.5	U	Fluoranthene	600	5,100	0.01
041M030301	12/4/1995	g/kg	95		Fluorene	19	540	0.18
041M030301	12/4/1995	g/kg	160		Naphthalene	160	2,100	0.08
041M030301	12/4/1995	g/kg	43.5	U	Phenanthrene	240	1,500	0.03
041M030301	12/4/1995	g/kg	43.5	U	Pyrene	665	2,600	0.02
041M030301	12/4/1995				ERM Quotient Sum			2.17
041M030301	12/4/1995				Mean ERM Quotient			0.09
041M030301	12/4/1995				Mean ERM Quotient without ND			0.06
041M030301	12/4/1995				Mean ERM Quotient Category			2
041M030401	12/4/1995	mg/kg	0.56	J	Arsenic	8.2	70	0.01
041M030401	12/4/1995	mg/kg	0.095	U	Cadmium	1.2	9.6	0.01
041M030401	12/4/1995	mg/kg	1.5		Chromium	81	370	0.00
041M030401	12/4/1995	mg/kg	0.43	U	Copper	34	270	0.00
041M030401	12/4/1995	mg/kg	2.9		Lead	46.7	218	0.01
041M030401	12/4/1995	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M030401	12/4/1995	mg/kg	0.78	J	Nickel	20.9	51.6	0.02
041M030401	12/4/1995	mg/kg	0.13	UJ	Silver	1	3.7	0.04
041M030401	12/4/1995	mg/kg	1.7		Zinc	150	410	0.00
041M030401	12/4/1995	g/kg	0.32	J	4,4'-DDT	1.58	46.1	0.01
041M030401	12/4/1995	g/kg	9.5	U	Total PCBs	22.7	180	0.05
041M030401	12/4/1995	g/kg	23	U	2-Methylnaphthalene	70	670	0.03
041M030401	12/4/1995	g/kg	11.5	U	Acenaphthene	16	500	0.02
041M030401	12/4/1995	g/kg	23	U	Acenaphthylene	44	640	0.04
041M030401	12/4/1995	g/kg	23	U	Anthracene	85.3	1,100	0.02
041M030401	12/4/1995	g/kg	23	U	Benzo(a)anthracene	261	1,600	0.01
041M030401	12/4/1995	g/kg	23	U	Benzo(a)pyrene	430	1,600	0.01
041M030401	12/4/1995	g/kg	23	U	Chrysene	384	2,800	0.01
041M030401	12/4/1995	g/kg	23	U	Dibenz(a,h)anthracene	63.4	260	0.09
041M030401	12/4/1995	g/kg	23	U	Fluoranthene	600	5,100	0.00
041M030401	12/4/1995	g/kg	11.5	U	Fluorene	19	540	0.02
041M030401	12/4/1995	g/kg	23	U	Naphthalene	160	2,100	0.01
041M030401	12/4/1995	g/kg	23	U	Phenanthrene	240	1,500	0.02
041M030401	12/4/1995	g/kg	23	U	Pyrene	665	2,600	0.01
041M030401	12/4/1995				ERM Quotient Sum			0.53
041M030401	12/4/1995				Mean ERM Quotient			0.02
041M030401	12/4/1995				Mean ERM Quotient without ND			0.00
041M030401	12/4/1995				Mean ERM Quotient Category			1

Table 10-2-12
Wetland 3 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M030501	12/4/1995	mg/kg	3.5		Arsenic	8.2	70	0.05
041M030501	12/4/1995	mg/kg	2		Cadmium	1.2	9.6	0.21
041M030501	12/4/1995	mg/kg	5.3		Chromium	81	370	0.01
041M030501	12/4/1995	mg/kg	0.95	U	Copper	34	270	0.00
041M030501	12/4/1995	mg/kg	2.4		Lead	46.7	218	0.01
041M030501	12/4/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M030501	12/4/1995	mg/kg	0.325	U	Nickel	20.9	51.6	0.01
041M030501	12/4/1995	mg/kg	0.11	UJ	Silver	1	3.7	0.03
041M030501	12/4/1995	mg/kg	1.2		Zinc	150	410	0.00
041M030501	12/4/1995	g/kg	0.55	U	4,4'-DDE	2.2	27	0.02
041M030501	12/4/1995	g/kg	0.55	U	4,4'-DDT	1.58	46.1	0.01
041M030501	12/4/1995	g/kg	43	U	Total PCBs	22.7	180	0.24
041M030501	12/4/1995	g/kg	105	U	2-Methylnaphthalene	70	670	0.16
041M030501	12/4/1995	g/kg	50	U	Acenaphthene	16	500	0.10
041M030501	12/4/1995	g/kg	105	U	Acenaphthylene	44	640	0.16
041M030501	12/4/1995	g/kg	105	U	Anthracene	85.3	1,100	0.10
041M030501	12/4/1995	g/kg	105	U	Benzo(a)anthracene	261	1,600	0.07
041M030501	12/4/1995	g/kg	105	U	Benzo(a)pyrene	430	1,600	0.07
041M030501	12/4/1995	g/kg	105	U	Chrysene	384	2,800	0.04
041M030501	12/4/1995	g/kg	105	U	Dibenz(a,h)anthracene	63.4	260	0.40
041M030501	12/4/1995	g/kg	105	U	Fluoranthene	600	5,100	0.02
041M030501	12/4/1995	g/kg	50	U	Fluorene	19	540	0.09
041M030501	12/4/1995	g/kg	105	U	Naphthalene	160	2,100	0.05
041M030501	12/4/1995	g/kg	105	U	Phenanthrene	240	1,500	0.07
041M030501	12/4/1995	g/kg	105	U	Pyrene	665	2,600	0.04
041M030501	12/4/1995				ERM Quotient Sum			1.99
041M030501	12/4/1995				Mean ERM Quotient			0.08
041M030501	12/4/1995				Mean ERM Quotient without ND			0.01
041M030501	12/4/1995				Mean ERM Quotient Category			2
041M030601	12/4/1995	mg/kg	2.2		Arsenic	8.2	70	0.03
041M030601	12/4/1995	mg/kg	1.8		Cadmium	1.2	9.6	0.19
041M030601	12/4/1995	mg/kg	4.9		Chromium	81	370	0.01
041M030601	12/4/1995	mg/kg	0.85	U	Copper	34	270	0.00
041M030601	12/4/1995	mg/kg	8		Lead	46.7	218	0.04
041M030601	12/4/1995	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M030601	12/4/1995	mg/kg	0.455	U	Nickel	20.9	51.6	0.01
041M030601	12/4/1995	mg/kg	0.15	UJ	Silver	1	3.7	0.04
041M030601	12/4/1995	mg/kg	6.3		Zinc	150	410	0.02
041M030601	12/4/1995	g/kg	2.5	J	4,4'-DDE	2.2	27	0.09
041M030601	12/4/1995	g/kg	1.9	J	4,4'-DDT	1.58	46.1	0.04
041M030601	12/4/1995	g/kg	9.95	U	Total PCBs	22.7	180	0.06
041M030601	12/4/1995	g/kg	24	U	2-Methylnaphthalene	70	670	0.04
041M030601	12/4/1995	g/kg	24	U	Acenaphthylene	44	640	0.04
041M030601	12/4/1995	g/kg	24	U	Anthracene	85.3	1,100	0.02
041M030601	12/4/1995	g/kg	24	U	Benzo(a)anthracene	261	1,600	0.02
041M030601	12/4/1995	g/kg	24	U	Benzo(a)pyrene	430	1,600	0.02
041M030601	12/4/1995	g/kg	24	U	Chrysene	384	2,800	0.01
041M030601	12/4/1995	g/kg	24	U	Dibenz(a,h)anthracene	63.4	260	0.09
041M030601	12/4/1995	g/kg	24	U	Fluoranthene	600	5,100	0.00
041M030601	12/4/1995	g/kg	11.5	U	Fluorene	19	540	0.02
041M030601	12/4/1995	g/kg	24	U	Naphthalene	160	2,100	0.01
041M030601	12/4/1995	g/kg	24	U	Phenanthrene	240	1,500	0.02
041M030601	12/4/1995	g/kg	24	U	Pyrene	665	2,600	0.01
041M030601	12/4/1995				ERM Quotient Sum			0.88
041M030601	12/4/1995				Mean ERM Quotient			0.04
041M030601	12/4/1995				Mean ERM Quotient without ND			0.02
041M030601	12/4/1995				Mean ERM Quotient Category			2
041M030701	12/4/1995	mg/kg	27.1		Arsenic	8.2	70	0.39
041M030701	**12/4/1995**	**mg/kg**	**72.7**		**Cadmium**	**1.2**	**9.6**	**7.57**
041M030701	12/4/1995	mg/kg	196		Chromium	81	370	0.53
041M030701	12/4/1995	mg/kg	68.8		Copper	34	270	0.25
041M030701	12/4/1995	mg/kg	18.7		Lead	46.7	218	0.09
041M030701	12/4/1995	mg/kg	0.12	U	Mercury	0.15	0.71	0.17
041M030701	12/4/1995	mg/kg	9.3	U	Nickel	20.9	51.6	0.18
041M030701	12/4/1995	mg/kg	3.1	UJ	Silver	1	3.7	0.84
041M030701	12/4/1995	mg/kg	297		Zinc	150	410	0.72
041M030701	12/4/1995	g/kg	0.44	U	4,4'-DDE	2.2	27	0.02
041M030701	12/4/1995	g/kg	0.94	J	4,4'-DDT	1.58	46.1	0.02
041M030701	12/4/1995	g/kg	34.9	U	Total PCBs	22.7	180	0.19
041M030701	12/4/1995	g/kg	85	U	2-Methylnaphthalene	70	670	0.13
041M030701	12/4/1995	g/kg	41.5	U	Acenaphthene	16	500	0.08
041M030701	12/4/1995	g/kg	85	U	Acenaphthylene	44	640	0.13
041M030701	12/4/1995	g/kg	85	U	Anthracene	85.3	1,100	0.08
041M030701	12/4/1995	g/kg	85	U	Benzo(a)anthracene	261	1,600	0.05
041M030701	12/4/1995	g/kg	180		Benzo(a)pyrene	430	1,600	0.11
041M030701	12/4/1995	g/kg	85	U	Chrysene	384	2,800	0.03
041M030701	12/4/1995	g/kg	85	U	Dibenz(a,h)anthracene	63.4	260	0.33
041M030701	12/4/1995	g/kg	85	U	Fluoranthene	600	5,100	0.02
041M030701	12/4/1995	g/kg	41.5	U	Fluorene	19	540	0.08
041M030701	12/4/1995	g/kg	85	U	Naphthalene	160	2,100	0.04
041M030701	12/4/1995	g/kg	85	U	Phenanthrene	240	1,500	0.06
041M030701	12/4/1995	g/kg	85	U	Pyrene	665	2,600	0.03
041M030701	12/4/1995				ERM Quotient Sum			12.14
041M030701	12/4/1995				Mean ERM Quotient			0.49
041M030701	12/4/1995				Mean ERM Quotient without ND			0.39
041M030701	12/4/1995				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 10-2-13
Wetland 3 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	**7**	**7**				**558**	**98.6**	**2,150**	**041W030201**	**2,150**		**13**	**FDEP**	**165**	**Yes**	**Max Detect > SV**
Antimony	2	7	17.2	1	27.95	13.2	3	3.3	041W030201	3.3	J	160	EPA	0.02	No	Max Detect < SV
Arsenic	4	7	1.4	1.4	1.4	10.9	2.7	48.9	041W030301	48.9		50	FDEP	0.98	No	Max Detect < SV
Barium	7	7				37.6	27.6	56.8	041W030301	56.8	J		NA		Yes	No SV
Beryllium	0	7	0.393	0.25	0.5	0.393			ND	0.5	U	0.13	FDEP	3.85	Yes	Max SQL > SV
Cadmium	**2**	**7**	**1.98**	**1.5**	**2.3**	**2.44**	**3.4**	**3.8**	**041W030301**	**3.8**	**J**	**0.66**	**EPA**	**5.76**	**Yes**	**Max Detect > SV**
Calcium	7	7				27,800	22,900	32,600	041W030201	32,600			NA		Yes	No SV
Chromium	2	7	4.36	4	4.6	5.69	8.7	9.3	041W030301	9.3	J	11	EPA	0.85	No	Max Detect < SV
Cobalt	0	7	2.42	1.5	3.65	2.42			ND	3.65	U		NA		Yes	No SV
Copper	**2**	**7**	**2.15**	**2**	**2.25**	**3.58**	**4.7**	**9.6**	**041W030301**	**9.6**	**J**	**6.54**	**EPA**	**1.47**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	7	3.57	2.5	5	3.57			ND	5	U	5.2	EPA	0.96	No	Max SQL< SV
Iron	7	7				42,800	7,810	176,000	041W030301	176,000			NA		Yes	No SV
Lead	**3**	**7**	**0.65**	**0.5**	**0.8**	**4.56**	**1.9**	**20.3**	**041W030201**	**20.3**		**1.32**	**EPA**	**15.4**	**Yes**	**Max Detect > SV**
Magnesium	7	7				2,170	1,540	2,320	001W000302	2320			NA		Yes	No SV
Manganese	7	7				167	127	265	041W030201	265			NA		Yes	No SV
Mercury	0	7	0.08	0.065	0.1	0.08			ND	0.1	U	0.012	EPA	8.33	Yes	Max SQL > SV
Nickel	0	7	6.94	6	8.2	6.94			ND	8.2	U	87.71	EPA	0.09	No	Max SQL< SV
Potassium	7	7				1,630	1,380	1,950	001W000301	1,950			NA		Yes	No SV
Selenium	0	7	1.69	1.5	1.95	1.69			ND	1.95	UJ	5	EPA	0.39	No	Max SQL< SV
Silver	0	7	1.91	1.8	2	1.91			ND	2	U	0.012	EPA	167	Yes	Max SQL > SV
Sodium	7	7				6,520	5,770	7,420	001W000303	7,420			NA		Yes	No SV
Thallium	0	7	3.99	1.5	18	3.99			ND	18	UJ	4	EPA	4.5	Yes	Max SQL > SV
Vanadium	4	7	1.8	1	2.2	4.27	2.2	11.1	041W030301	11.1	J		NA		Yes	No SV
Zinc	1	7	3.05	1.5	4.6	4.1	10.4	10.4	041W030201	10.4	J	58.91	EPA	0.18	No	Max Detect < SV
Pesticides (g/L)																
Aldrin	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.056	EPA	0.45	No	Max SQL< SV
Endosulfan II	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	6.58	Yes	Max SQL > SV
Heptachlor epoxide	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	6	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	11.6	Yes	Max SQL > SV
Endrin	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	**1**	**7**	**0.05**	**0.05**	**0.05**	**0.0786**	**0.25**	**0.25**	**041W030201**	**0.25**	**J**	**0.0023**	**EPA**	**109**	**Yes**	**Max Detect > SV**
Total Endrin	1	7	0.15	0.15	0.15	0.164	0.25	0.25	041W030201	0.25			NA		Yes	No SV
alpha-BHC	0	6	0.025	0.025	0.025	0.025			ND	0.025	UJ		NA		Yes	No SV
beta-BHC	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	6	0.025	0.025	0.025	0.025			ND	0.025	UJ		NA		Yes	No SV
gamma-BHC (Lindane)	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	No	Max SQL< SV
Total BHC	0	6	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	6	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	6	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Table 10-2-13
Wetland 3 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
PCBs (g/L) - cont.																
Aroclor-1248	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	**1**	**7**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**041W030201**	**0.5**	**J**	**0.014**	**EPA**	**35.7**	**Yes**	**Max Detect > SV**
Total PCB	1	7	4	4	4	3.5	0.5	0.5	041W030201	0.5			NA		Yes	No SV
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	3	5	5	5	5			ND	5	U	15.8	EPA	0.32	No	Max SQL< SV
1,3-Dichlorobenzene	0	3	5	5	5	5			ND	5	U		NA		Yes	No SV
1,4-Dichlorobenzene	2	3	5	5	5	3	2	2	001W000302	2	J	3	FDEP	0.67	No	Max Detect < SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	7	11.1	10	12.5	11.1			ND	12.5	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	7	11.1	10	12.5	11.1			ND	12.5	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
2-Chloronaphthalene	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
2-Chlorophenol	0	7	3.57	2.5	5	3.57			ND	5	U	43.8	EPA	0.11	No	Max SQL< SV
2-Methyl-4,6-Dinitrophenol	0	7	11.1	10	12.5	11.1			ND	12.5	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
2-Nitroaniline	0	7	6.79	2.5	12.5	6.79			ND	12.5	U		NA		Yes	No SV
2-Nitrophenol	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
3-Nitroaniline	0	7	11.1	10	12.5	11.1			ND	12.5	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
4-Chloroaniline	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
4-Nitroaniline	0	7	11.1	10	12.5	11.1			ND	12.5	U		NA		Yes	No SV
4-Nitrophenol	0	7	11.1	10	12.5	11.1			ND	12.5	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	7	2.36	1.5	3	2.36			ND	3	U	0.3	EPA	10	Yes	Max SQL > SV
Butylbenzylphthalate	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
Carbazole	0	3	5	5	5	5			ND	5	U		NA		Yes	No SV
Dibenzofuran	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
Diethylphthalate	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
Dimethylphthalate	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
Di-n-butylphthalate	0	7	3.57	2.5	5	3.57			ND	5	U	9.4	EPA	0.53	No	Max SQL< SV
Di-n-octylphthalate	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
Hexachlorobenzene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Hexachlorobutadiene	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
Hexachloroethane	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Isophorone	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV

Table 10-2-13
Wetland 3 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L) - cont.																
Nitrobenzene	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
Pentachlorophenol	0	7	6.79	2.5	12.5	6.79			ND	12.5	U		NA		Yes	No SV
Phenol	0	7	3.57	2.5	5	3.57			ND	5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Acenaphthene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Acenaphthylene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Anthracene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Benzo(a)anthracene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Benzo(a)pyrene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Chrysene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Fluoranthene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Fluorene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Naphthalene	1	7	2.75	0.5	5	2.5	1	1	041W030401	1		26	FDEP	0.04	No	Max Detect < SV
Phenanthrene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Pyrene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Total PAH	1	7	35.8	6.5	65	31.6	7	7	041W030401	7			NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	0	7	2.43	0.5	5	2.43			ND	5	U	270	FDEP	0.02	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
1,1-Dichloroethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
1,1-Dichloroethene	0	7	2.43	0.5	5	2.43			ND	5	U	3.2	FDEP	1.56	Yes	Max SQL > SV
1,2-Dibromo-3-Chloropropane	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	1	4	0.5	0.5	0.5	0.625	1	1	041W030301	1		15.8	EPA	0.06	No	Max Detect < SV
1,2-Dichloroethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
1,2-Dichloroethene (total)	0	3	5	5	5	5			ND	5	U		NA		Yes	No SV
1,2-Dichloropropane	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	**4**	**4**				**5**	**2**	**10**	**041W030301**	**10**		**3**	**FDEP**	**3.33**	**Yes**	**Max Detect > SV**
2-Butanone (MEK)	0	3	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Hexanone	0	5	4	2.5	5	4			ND	5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	5	4	2.5	5	4			ND	5	U		NA		Yes	No SV
Acetone	0	4	5.63	5	7.5	5.63			ND	7.5	U		NA		Yes	No SV
Benzene	5	7	2.75	0.5	5	2.07	1	3	041W030401	3		53	EPA	0.06	No	Max Detect < SV
Bromochloromethane	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Bromoform	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Bromomethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Carbon disulfide	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Carbon tetrachloride	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Chlorobenzene	**6**	**7**	**5**	**5**	**5**	**11.1**	**3**	**30**	**041W030301**	**30**	**D**	**17**	**FDEP**	**1.76**	**Yes**	**Max Detect > SV**
Chloroethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Chloroform	0	7	2.43	0.5	5	2.43			ND	5	U	289	EPA	0.02	No	Max SQL< SV
Chloromethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
cis-1,2-Dichloroethene	1	4	0.5	0.5	0.5	0.625	1	1	041W030401	1			NA		Yes	No SV
cis-1,3-Dichloropropene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Dibromochloromethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Ethylbenzene	0	7	2.43	0.5	5	2.43			ND	5	U	453	EPA	0.01	No	Max SQL< SV
Methylene chloride	2	7	3.8	1.5	5	191	120	1,200	041W030101	1,200	D	1,580	FDEP	0.76	No	Max Detect < SV

Table 10-2-13
Wetland 3 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
VOCs (g/L) - cont.																
Styrene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Tetrachloroethene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Toluene	0	7	2.43	0.5	5	2.43			ND	5	U	175	EPA	0.03	No	Max SQL< SV
trans-1,2-Dichloroethene	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Trichloroethene	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Vinyl chloride	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV
Xylene (Total)	0	7	2.43	0.5	5	2.43			ND	5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one-half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 10-2-14
Wetland 3 Phase II
Surface Water COPCs Retained after Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	Endrin ketone	Total PAH	1,4-Dichlorobenzene
Barium	Total Endrin		Chlorobenzene
Cadmium	Aroclor-1260		cis-1,2-Dichloroethene
Calcium	Total PCB		
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Potassium			
Sodium			
Vanadium			
		Not Detected Parameters	
Beryllium	4,4'-DDD	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Cobalt	4,4'-DDE	1,3-Dichlorobenzene	1,1,2-Trichloroethane
Mercury	4,4'-DDT	2,2'-oxybis(1-Chloropropane)/bis(2-chlor	1,1-Dichloroethane
Silver	Aldrin	2,4,5-Trichlorophenol	1,1-Dichloroethene
Thallium	alpha-BHC	2,4,6-Trichlorophenol	1,2-Dibromo-3-Chloropropane
	alpha-Chlordane	2,4-Dichlorophenol	1,2-Dibromoethane
	Aroclor-1016	2,4-Dimethylphenol	1,2-Dichloroethane
	Aroclor-1221	2,4-Dinitrophenol	1,2-Dichloroethene (total)
	Aroclor-1232	2,4-Dinitrotoluene	1,2-Dichloropropane
	Aroclor-1242	2,6-Dinitrotoluene	1,3-Dichlorobenzene
	Aroclor-1248	2-Chloronaphthalene	2-Butanone (MEK)
	Aroclor-1254	2-Methyl-4,6-Dinitrophenol	2-Hexanone
	beta-BHC	2-Methylnaphthalene	4-Methyl-2-Pentanone (MIBK)
	delta-BHC	2-Methylphenol (o-Cresol)	Acetone
	Dieldrin	2-Nitroaniline	Bromochloromethane
	Endosulfan II	2-Nitrophenol	Bromodichloromethane
	Endosulfan sulfate	3,3'-Dichlorobenzidine	Bromoform
	Endrin	3-Nitroaniline	Bromomethane
	Endrin aldehyde	4-Bromophenyl-phenylether	Carbon disulfide
	gamma-Chlordane	4-Chloro-3-methylphenol	Carbon tetrachloride
	Heptachlor	4-Chloroaniline	Chloroethane
	Heptachlor epoxide	4-Chlorophenylphenyl ether	Chloromethane
	Methoxychlor	4-Methylphenol (p-Cresol)	cis-1,3-Dichloropropene
	Total BHC	4-Nitroaniline	Dibromochloromethane
	Total Chlordane	4-Nitrophenol	Styrene
	Total DDT	Acenaphthene	Tetrachloroethene
	Toxaphene	Acenaphthylene	trans-1,2-Dichloroethene
		Anthracene	trans-1,3-Dichloropropene
		Benzo(a)anthracene	Trichloroethene
		Benzo(a)pyrene	Vinyl chloride
		Benzo(b)fluoranthene	Xylene (Total)
		Benzo(g,h,i)perylene	
		Benzo(k)fluoranthene	
		bis(2-Chloroethoxy)methane	
		bis(2-Chloroethyl)ether	
		bis(2-Ethylhexyl)phthalate (BEHP)	
		Butylbenzylphthalate	
		Carbazole	
		Chrysene	
		Dibenz(a,h)anthracene	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Fluoranthene	

Table 10-2-14
Wetland 3 Phase II
Surface Water COPCs Retained after Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Not Detected Parameters - cont.	
		Fluorene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenanthrene	
		Phenol	
		Pyrene	

Table 10-2-15
Wetland 3 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Metals (g/L)																			
Aluminum	**7**	**7**				**558**	**98.6**	**2,150**	**041W030201**	**2,150**		**13**	**FDEP**	**165.38**	**42.9**	**1,090**	**1**	**Yes**	**Max Result > Ref. Conc.**
Barium	7	7				37.6	27.6	56.8	041W030301	56.8	J		NA			3.68	7	Yes	Max Result > Ref. Conc.
Beryllium	0	7	0.393	0.25	0.5	0.393			ND	0.5	U	0.13	FDEP	4	3.02	1	0	No	Parameter Not Detected
Cadmium	**2**	**7**	**1.98**	**1.5**	**2.3**	**2.44**	**3.4**	**3.8**	**041W030301**	**3.8**	**J**	**0.66**	**EPA**	**6**	**3.7**	**3**	**2**	**Yes**	**Max Result > Ref. Conc.**
Calcium	7	7				27,800	22,900	32,600	041W030201	32,600			NA			7,675	7	No	Essential Nutrient
Cobalt	0	7	2.42	1.5	3.65	2.42			ND	3.65	U		NA			3	0	No	Parameter Not Detected
Copper	**2**	**7**	**2.15**	**2**	**2.25**	**3.58**	**4.7**	**9.6**	**041W030301**	**9.6**	**J**	**6.54**	**EPA**	**1.47**	**1.47**	**4**	**2**	**Yes**	**Max Result > Ref. Conc.**
Iron	7	7				42,800	7,810	176,000	041W030301	176,000			NA			2,360	7	Yes	Max Result > Ref. Conc.
Lead	**3**	**7**	**0.65**	**0.5**	**0.8**	**4.56**	**1.9**	**20.3**	**041W030201**	**20.3**		**1.32**	**EPA**	**15.38**	**3.45**	**3.2**	**2**	**Yes**	**Max Result > Ref. Conc.**
Magnesium	7	7				2,170	1,540	2,320	001W000302	2,320			NA			20,260	0	No	Max Result < Ref. Conc.
Manganese	7	7				167	127	265	041W030201	265			NA			13.2	7	Yes	Max Result > Ref. Conc.
Mercury	0	7	0.08	0.065	0.1	0.08			ND	0.1	U	0.012	EPA	8.33	6.67	0.13	0	No	Parameter Not Detected
Potassium	7	7				1,630	1,380	1,950	001W000301	1,950			NA			6,995	0	No	Max Result < Ref. Conc.
Silver	0	7	1.91	1.8	2	1.91			ND	2	U	0.012	EPA	167	160	4	0	No	Parameter Not Detected
Thallium	0	7	3.99	1.5	18	3.99			ND	18	UJ	4	EPA	4.5	1.00	4.2	0	No	Parameter Not Detected
Sodium	7	7				6,520	5,770	7,420	001W000303	7,420			NA			182,200	0	No	Max Result < Ref. Conc.
Vanadium	4	7	1.8	1	2.2	4.27	2.2	11.1	041W030301	11.1	J		NA			4.7	2	Yes	Max Result > Ref. Conc.
Pesticides (g/L)																			
Aldrin	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Dieldrin	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan II	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan sulfate	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Heptachlor	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	7	6.58		0	No	Parameter Not Detected
Heptachlor epoxide	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	No	Parameter Not Detected
Methoxychlor	0	6	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	No	Parameter Not Detected
Toxaphene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
alpha-Chlordane	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
gamma-Chlordane	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Total Chlordane	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	12	11.6		0	No	Parameter Not Detected
Endrin	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin aldehyde	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin ketone	**1**	**7**	**0.05**	**0.05**	**0.05**	**0.0786**	**0.25**	**0.25**	**041W030201**	**0.25**	**J**	**0.0023**	**EPA**	**109**	**34.2**		**0**	**Yes**	**Max Detect > SV**
Total Endrin	1	7	0.15	0.15	0.15	0.164	0.25	0.25	041W030201	0.25			NA				0	Yes	No SV
alpha-BHC	0	6	0.025	0.025	0.025	0.025			ND	0.025	UJ		NA				0	No	Parameter Not Detected
beta-BHC	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
delta-BHC	0	6	0.025	0.025	0.025	0.025			ND	0.025	UJ		NA				0	No	Parameter Not Detected
gamma-BHC (Lindane)	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	0.31		0	No	Parameter Not Detected
Total BHC	0	6	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	No	Parameter Not Detected
4,4'-DDD	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	No	Parameter Not Detected
4,4'-DDE	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	No	Parameter Not Detected
4,4'-DDT	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85	84.7		0	No	Parameter Not Detected
Total DDT	0	6	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
PCBs (g/L)																			
Aroclor-1016	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1221	0	6	1	1	1	1			ND	1	U		NA				0	No	Parameter Not Detected
Aroclor-1232	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1242	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1248	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1254	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1260	**1**	**7**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**041W030201**	**0.5**	**J**	**0.014**	**EPA**	**36**	**35.7**		**0**	**Yes**	**Max Detect > SV**
Total PCB	1	7	4	4	4	3.5	0.5	0.5	041W030201	0.5			NA				0	Yes	No SV
SVOCs (g/L)																			
1,2,4-Trichlorobenzene	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	3	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-ch	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	7	11.1	10	12.5	11.1			ND	12.5	U		NA				0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
2,4-Dichlorophenol	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
2,4-Dimethylphenol	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
2,4-Dinitrophenol	0	7	11.1	10	12.5	11.1			ND	12.5	U		NA				0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
2-Chloronaphthalene	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	7	11.1	10	12.5	11.1			ND	12.5	U		NA				0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
2-Nitroaniline	0	7	6.79	2.5	12.5	6.79			ND	12.5	U		NA				0	No	Parameter Not Detected
2-Nitrophenol	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
3-Nitroaniline	0	7	11.1	10	12.5	11.1			ND	12.5	U		NA				0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected

Table 10-2-15
Wetland 3 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
SVOCs (g/L) - cont.																			
4-Chloro-3-methylphenol	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
4-Chloroaniline	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
4-Nitroaniline	0	7	11.1	10	12.5	11.1			ND	12.5	U		NA				0	No	Parameter Not Detected
4-Nitrophenol	0	7	11.1	10	12.5	11.1			ND	12.5	U		NA				0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	7	2.36	1.5	3	2.36			ND	3	U	0.3	EPA	10	7.86		0	No	Parameter Not Detected
Butylbenzylphthalate	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
Carbazole	0	3	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Dibenzofuran	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
Diethylphthalate	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
Dimethylphthalate	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
Di-n-octylphthalate	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
Hexachlorobenzene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Hexachlorobutadiene	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
Hexachloroethane	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Isophorone	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
Nitrobenzene	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
Pentachlorophenol	0	7	6.79	2.5	12.5	6.79			ND	12.5	U		NA				0	No	Parameter Not Detected
Phenol	0	7	3.57	2.5	5	3.57			ND	5	U		NA				0	No	Parameter Not Detected
PAHs (g/L)																			
2-Methylnaphthalene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Acenaphthene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Acenaphthylene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Anthracene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Benzo(a)anthracene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Benzo(a)pyrene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Chrysene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Fluoranthene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Fluorene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Phenanthrene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Pyrene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Total PAH	1	7	35.8	6.5	65	31.6	7	7	041W030401	7			NA				0	Yes	No SV
VOCs (g/L)																			
1,1,2,2-Tetrachloroethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
1,1-Dichloroethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
1,2-Dibromo-3-Chloropropane	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dibromoethane	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dichloroethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	3	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
1,2-Dichloropropane	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,4-Dichlorobenzene	**4**	**4**				**5**	**2**	**10**	**041W030301**	**10**		**3**	**FDEP**	**3.33**	**1.67**		**0**	**Yes**	**Max Detect > SV**
2-Butanone (MEK)	0	3	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
2-Hexanone	0	5	4	2.5	5	4			ND	5	U		NA				0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	5	4	2.5	5	4			ND	5	U		NA				0	No	Parameter Not Detected
Acetone	0	4	5.63	5	7.5	5.63			ND	7.5	U		NA				0	No	Parameter Not Detected
Bromochloromethane	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromodichloromethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Bromoform	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Bromomethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Carbon disulfide	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Carbon tetrachloride	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Chlorobenzene	**6**	**7**	**5**	**5**	**5**	**11.1**	**3**	**30**	**041W030301**	**30**	**D**	**17**	**FDEP**	**2**	**1.76**		**0**	**Yes**	**Max Detect > SV**
Chloroethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Chloromethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
cis-1,2-Dichloroethene	1	4	0.5	0.5	0.5	0.625	1	1	041W030401	1			NA				0	Yes	No SV
cis-1,3-Dichloropropene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Dibromochloromethane	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Styrene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Tetrachloroethene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Trichloroethene	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected

Table 10-2-15
Wetland 3 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
VOCs (g/L) - cont.																			
Vinyl chloride	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected
Xylene (Total)	0	7	2.43	0.5	5	2.43			ND	5	U		NA				0	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL

UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not applicable.
Average result calculations include summing detections and one half the detection parameters. As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 10-2-16
Wetland 3 Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	Aroclor-1260	Total PAHs	1,4-Dichlorobenzene
Iron	Endrin ketone		Chlorobenzene
Lead	Total Endrin		cis-1,2-Dichloroethene
Manganese	Total PCBs		
Barium			
Cadmium			
Copper			
Vanadium			

Table 10-2-17
Wetland 3 Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	2	2			1,630	2,950	041M030201	2,950			N/A		Yes	No SV
Antimony	0	2	1.05	2.45			ND	2.45	UJ	12	2	0.20	No	Max SQL< SV
Arsenic	**2**	**2**			**4.2**	**14.6**	**041M030201**	**14.6**		**7.24**	**1, 2**	**2.02**	**Yes**	**Max Detect > SV**
Barium	2	2			18.7	87	041M030201	87			N/A		Yes	No SV
Beryllium	0	2	0.03	0.075			ND	0.075	U		N/A		Yes	No SV
Cadmium	**1**	**2**	**1**	**1**	**9.3**	**9.3**	**041M030701**	**9.3**		**0.676**	**1**	**13.8**	**Yes**	**Max Detect > SV**
Calcium	2	2			953	5,980	041M030201	5,980			N/A		Yes	No SV
Chromium	2	2			12.1	19	041M030701	19		52.3	1, 2	0.36	No	Max Detect < SV
Cobalt	1	2	0.325	0.325	0.57	0.57	041M030701	0.57	J		N/A		Yes	No SV
Copper	1	2	1	1	4	4	041M030701	4		18.7	1, 2	0.21	No	Max Detect < SV
Cyanide (CN)	1	2	1.5	1.5	2.6	2.6	041M030701	2.6	J		N/A		Yes	No SV
Iron	2	2			67,100	246,000	041M030201	246,000			N/A		Yes	No SV
Lead	**2**	**2**			**20.6**	**35.6**	**041M030701**	**36**		**30.2**	**1, 2**	**1.18**	**Yes**	**Max Detect > SV**
Magnesium	2	2			70.5	150	041M030201	150	J		N/A		Yes	No SV
Manganese	2	2			42.6	236	041M030201	236			N/A		Yes	No SV
Mercury	2	2			0.06	0.1	041M030201	0.1	J	0.13	1, 2	0.77	No	Max Detect < SV
Nickel	1	2	0.7	0.7	3.1	3.1	041M030701	3.1		15.9	1, 2	0.20	No	Max Detect < SV
Potassium	2	2			35	56.8	041M030201	56.8	J		N/A		Yes	No SV
Selenium	2	2			2	5.4	041M030201	5.4			N/A		Yes	No SV
Silver	1	2	0.15	0.15	0.42	0.42	041M030701	0.42	J	0.733	1	0.57	No	Max Detect < SV
Sodium	2	2			16.3	56.8	041M030201	56.8	J		N/A		Yes	No SV
Thallium	0	2	0.41	1			ND	1	U		N/A		Yes	No SV
Vanadium	2	2			6.4	13.5	041M030201	13.5			N/A		Yes	No SV
Zinc	**2**	**2**			**45.8**	**234**	**041M030701**	**234**		**124**	**1, 2**	**1.89**	**Yes**	**Max Detect > SV**
PAHs (µg/kg)														
2-Methylnaphthalene	0	2	350	800			ND	800	U	20.2	1	39.6	Yes	Max SQL > SV
Acenaphthene	0	2	350	800			ND	800	U	6.71	1	119	Yes	Max SQL > SV
Acenaphthylene	0	2	350	800			ND	800	U	5.87	1	136	Yes	Max SQL > SV
Anthracene	0	2	350	800			ND	800	U	46.9	1	17.1	Yes	Max SQL > SV
Benzo(a)anthracene	0	2	350	800			ND	800	U	74.8	1	10.7	Yes	Max SQL > SV
Benzo(a)pyrene	0	2	350	800			ND	800	U	88.8	1	9.01	Yes	Max SQL > SV
Chrysene	0	2	350	800			ND	800	U	108	1	7.41	Yes	Max SQL > SV
Dibenz(a,h)anthracene	0	2	350	800			ND	800	U	6.22	1	129	Yes	Max SQL > SV
Fluoranthene	0	2	350	800			ND	800	U	113	1	7.08	Yes	Max SQL > SV
Fluorene	0	2	350	800			ND	800	U	21.2	1	37.7	Yes	Max SQL > SV
Naphthalene	0	2	350	800			ND	800	U	34.6	1	23.1	Yes	Max SQL > SV
Phenanthrene	0	2	350	800			ND	800	U	86.7	1	9.23	Yes	Max SQL > SV
Pyrene	0	2	350	800			ND	800	U	153	1	5.23	Yes	Max SQL > SV
Total PAHs	0	2	4,550	10,400			ND	10,400	U	1,684	1, 2	6.18	Yes	Max SQL > SV
TOC Normalized PAHs	0	2	104	379.17			ND	379.17	U	290	3	1.31	Yes	Max SQL> SV
PCBs (µg/kg)														
Aroclor-1016	0	2	35	80			ND	80	U	21.6	N/A	3.7	Yes	Max SQL > SV
Aroclor-1221	0	2	70	170			ND	170	U	67	2	2.54	Yes	Max SQL > SV
Aroclor-1232	0	2	35	80			ND	80	U	21.6	N/A	3.7	Yes	Max SQL > SV
Aroclor-1242	0	2	35	80			ND	80	U	21.6	N/A	3.7	Yes	Max SQL > SV
Aroclor-1248	0	2	35	80			ND	80	U	21.6	N/A	3.7	Yes	Max SQL > SV
Aroclor-1254	0	2	35	80			ND	80	U	21.6	N/A	3.7	Yes	Max SQL > SV
Aroclor-1260	0	2	35	80			ND	80	U	21.6	N/A	3.7	Yes	Max SQL > SV
Total PCBs	0	2	280	650			ND	650	U	21.6	1	30.1	Yes	Max SQL > SV
Pesticides (µg/kg)														
Aldrin	0	2	1.8	4.25			ND	4.25	U		N/A		Yes	No SV
Dieldrin	0	2	2.05	8			ND	8	U	0.716	1	11.2	Yes	Max SQL > SV
Endosulfan I	0	2	1.8	4.25			ND	4.25	U		N/A		Yes	No SV
Endosulfan II	0	2	3.5	8			ND	8	U		N/A		Yes	No SV
Endosulfan sulfate	1	2	8	8	7.2	7.2	041M030701	7.2	J		N/A		Yes	No SV
Heptachlor	0	2	1.8	4.25			ND	4.25	U		N/A		Yes	No SV
Heptachlor epoxide	0	2	1.8	4.25			ND	4.25	U		N/A		Yes	No SV
Methoxychlor	0	2	3.2	18			ND	18	U		N/A		Yes	No SV
Toxaphene	0	2	180	425			ND	425	U		N/A		Yes	No SV
alpha-Chlordane	0	2	1.8	4.25			ND	4.25	U	1.7	1	2.5	Yes	Max SQL > SV

Table 10-2-17
Wetland 3 Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Pesticides (µg/kg) cont.														
gamma-Chlordane	1	2	4.25	4.25	0.74	0.74	041M030701	0.74	J	1.7	1	0.44	No	Max Detect < SV
Total Chlordane	**1**	**2**	**8.5**	**8.5**	**2.54**	**2.54**	**041M030701**	**2.54**		**1.7**	**1**	**1.49**	**Yes**	**Max Detect > SV**
Endrin	1	2	3.5	3.5	2.8	2.8	041M030201	2.8	J	3.3	2	0.85	No	Max Detect < SV
Endrin aldehyde	0	2	3.5	8			ND	8	U	3.3	2	2.42	Yes	Max SQL > SV
Endrin ketone	0	2	3.5	8			ND	8	U	3.3	2	2.42	Yes	Max SQL > SV
Total Endrin	**1**	**2**	**10.5**	**10.5**	**18.8**	**18.8**	**041M030201**	**18.8**		**3.3**	**2**	**5.7**	**Yes**	**Max Detect > SV**
alpha-BHC	0	2	1.8	4.25			ND	4.25	U		N/A		Yes	No SV
beta-BHC	0	2	1.8	4.25			ND	4.25	U	0.32	N/A	13.3	Yes	Max SQL > SV
delta-BHC	0	2	1.8	4.25			ND	4.25	U	0.32	N/A	13.3	Yes	Max SQL > SV
gamma-BHC (Lindane)	0	2	1.8	2.35			ND	2.35	U	0.32	1	7.34	Yes	Max SQL > SV
Total BHC	0	2	7.2	15.1			ND	15.1	U	0.32	2	47.2	Yes	Max SQL > SV
4,4'-DDD	**2**	**2**			**14**	**49**	**041M030701**	**49**		**1.22**	**1**	**40.2**	**Yes**	**Max Detect > SV**
4,4'-DDE	**1**	**2**	**8**	**8**	**11**	**11**	**041M030701**	**11**		**2.07**	**1**	**5.31**	**Yes**	**Max Detect > SV**
4,4'-DDT	**2**	**2**			**3.7**	**9.3**	**041M030701**	**9.3**		**1.19**	**1**	**7.82**	**Yes**	**Max Detect > SV**
Total DDT	**2**	**2**			**25.7**	**69.3**	**041M030701**	**69.3**		**3.3**	**2**	**21**	**Yes**	**Max Detect > SV**
SVOCs (µg/kg)														
1,2,4-Trichlorobenzene	0	2	350	800			ND	800	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	2	350	800			ND	800	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	2	350	800			ND	800	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	2	350	800			ND	800	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	2	350	800			ND	800	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	2	350	800			ND	800	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	2	350	800			ND	800	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	2	350	800			ND	800	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	2	350	800			ND	800	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	2	850	2,000			ND	2,000	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	2	350	800			ND	800	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	2	350	800			ND	800	U		N/A		Yes	No SV
2-Chloronaphthalene	0	2	350	800			ND	800	U		N/A		Yes	No SV
2-Chlorophenol	0	2	350	800			ND	800	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	2	850	2,000			ND	2,000	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	2	350	800			ND	800	U		N/A		Yes	No SV
2-Nitroaniline	0	2	850	2,000			ND	2,000	U		N/A		Yes	No SV
2-Nitrophenol	0	2	350	800			ND	800	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	2	700	1,650			ND	1,650	U		N/A		Yes	No SV
3-Methylphenol/4-Methylphenol	0	2	350	800			ND	800	U				Yes	No SV
3-Nitroaniline	0	2	850	2,000			ND	2,000	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	2	350	800			ND	800	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	2	350	800			ND	800	U		N/A		Yes	No SV
4-Chloroaniline	0	2	350	800			ND	800	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	2	350	800			ND	800	U		N/A		Yes	No SV
4-Nitroaniline	0	2	850	2,000			ND	2,000	U		N/A		Yes	No SV
4-Nitrophenol	0	2	850	2,000			ND	2,000	U		N/A		Yes	No SV
Benzo(b)fluoranthene	0	2	350	800			ND	800	U		N/A		Yes	No SV
Benzo(g,h,i)perylene	0	2	350	800			ND	800	U		N/A		Yes	No SV
Benzo(k)fluoranthene	0	2	350	800			ND	800	U		N/A		Yes	No SV
bis(2-Chloroethoxy)methane	0	2	350	800			ND	800	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	2	350	800			ND	800	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**1**	**2**	**800**	**800**	**500**	**500**	**041M030701**	**500**	**J**	**182**	**1, 2**	**2.75**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	0	2	350	800			ND	800	U	182	1, 2	4.4	Yes	Max SQL > SV
Carbazole	0	2	350	800			ND	800	U		N/A		Yes	No SV
Dibenzofuran	0	2	350	800			ND	800	U		N/A		Yes	No SV
Diethylphthalate	0	2	350	800			ND	800	U	182	1, 2	4.4	Yes	Max SQL > SV
Dimethylphthalate	0	2	350	800			ND	800	U	182	1, 2	4.4	Yes	Max SQL > SV
Di-n-butylphthalate	0	2	350	800			ND	800	U	182	1, 2	4.4	Yes	Max SQL > SV
Di-n-octylphthalate	0	2	350	800			ND	800	U	182	1, 2	4.4	Yes	Max SQL > SV
Hexachlorobenzene	0	2	350	800			ND	800	U		N/A		Yes	No SV
Hexachlorobutadiene	0	2	350	800			ND	800	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	2	350	800			ND	800	U		N/A		Yes	No SV
Hexachloroethane	0	2	350	800			ND	800	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	2	350	800			ND	800	U		N/A		Yes	No SV
Isophorone	0	2	350	800			ND	800	U		N/A		Yes	No SV
Nitrobenzene	0	2	350	800			ND	800	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	2	350	800			ND	800	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	2	350	800			ND	800	U		N/A		Yes	No SV
Pentachlorophenol	0	2	850	2,000			ND	2,000	U		N/A		Yes	No SV
Phenol	0	2	350	800			ND	800	U		N/A		Yes	No SV

Table 10-2-17
Wetland 3 Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
VOCs (µg/kg)														
1,1,1-Trichloroethane	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
1,1-Dichloroethane	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
1,2-Dichloropropane	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
2-Butanone (MEK)	2	2			38	120	041M030201	120			N/A		Yes	No SV
2-Hexanone	0	2	10.5	25			ND	25	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	2	10.5	25			ND	25	U		N/A		Yes	No SV
Acetone	2	2			240	770	041M030201	770	J		N/A		Yes	No SV
Benzene	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Bromodichloromethane	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Bromoform	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Bromomethane	0	2	10.5	25			ND	25	U		N/A		Yes	No SV
Carbon disulfide	1	2	5.5	5.5	17	17	041M030201	17	J		N/A		Yes	No SV
Carbon tetrachloride	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Chlorobenzene	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Chloroethane	0	2	10.5	25			ND	25	U		N/A		Yes	No SV
Chloroform	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Chloromethane	0	2	10.5	25			ND	25	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Dibromochloromethane	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Ethylbenzene	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Methylene chloride	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Styrene	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Tetrachloroethene	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Toluene	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Trichloroethene	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV
Vinyl chloride	0	2	10.5	25			ND	25	U		N/A		Yes	No SV
Xylene (Total)	0	2	5.5	12.5			ND	12.5	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 10-2-18
Wetland 3 Phase III
Sediment COPCs Retained after Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDD	bis(2-Ethylhexyl)phthalate (BEHP)	2-Butanone (MEK)
Arsenic	4,4'-DDE		Acetone
Barium	4,4'-DDT		Carbon disulfide
Cadmium	Endosulfan sulfate		
Calcium	Total Chlordane		
Cobalt	Total DDT		
Cyanide (CN)	Total Endrin		
Iron			
Lead			
Magnesium			
Manganese			
Potassium			
Selenium			
Sodium			
Vanadium			
Zinc			
		Not Detected Parameters	
Beryllium	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Thallium	alpha-BHC	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
	alpha-Chlordane	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	beta-BHC	1,4-Dichlorobenzene	1,1-Dichloroethane
	delta-BHC	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Dieldrin	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Endosulfan I	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
	Endosulfan II	2,4-Dichlorophenol	1,2-Dichloropropane
	Endrin aldehyde	2,4-Dimethylphenol	2-Hexanone
	Endrin ketone	2,4-Dinitrophenol	4-Methyl-2-Pentanone (MIBK)
	gamma-BHC (Lindane)	2,4-Dinitrotoluene	Benzene
	Heptachlor	2,6-Dinitrotoluene	Bromodichloromethane
	Heptachlor epoxide	2-Chloronaphthalene	Bromoform
	Methoxychlor	2-Chlorophenol	Bromomethane
	Total BHC	2-Methyl-4,6-Dinitrophenol	Carbon tetrachloride
	Toxaphene	2-Methylnaphthalene	Chlorobenzene
	Aroclor-1016	2-Methylphenol (o-Cresol)	Chloroethane
	Aroclor-1221	2-Nitroaniline	Chloroform
	Aroclor-1232	2-Nitrophenol	Chloromethane
	Aroclor-1242	3,3'-Dichlorobenzidine	cis-1,3-Dichloropropene
	Aroclor-1248	3-Methylphenol/4-Methylphenol	Dibromochloromethane
	Aroclor-1254	3-Nitroaniline	Ethylbenzene
	Aroclor-1260	4-Bromophenyl-phenylether	Methylene chloride
	Total PCBs	4-Chloro-3-methylphenol	Styrene
		4-Chloroaniline	Tetrachloroethene
		4-Chlorophenylphenyl ether	Toluene
		4-Nitroaniline	trans-1,3-Dichloropropene
		4-Nitrophenol	Trichloroethene
		Acenaphthene	Vinyl chloride
		Acenaphthylene	Xylene (Total)
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Benzo(b)fluoranthene	
		Benzo(g,h,i)perylene	
		Benzo(k)fluoranthene	
		bis(2-Chloroethoxy)methane	
		bis(2-Chloroethyl)ether	
		Butylbenzylphthalate	
		Carbazole	
		Chrysene	
		Dibenz(a,h)anthracene	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		Fluoranthene	
		Fluorene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Naphthalene	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenanthrene	
		Phenol	
		Pyrene	
		TOC Normalized PAHs	
		Total PAHs	

Table 10-2-19
Wetland 3 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	2	2				2,290	1,630	2,950	2,950		041M030201			NA					0	13,610	0	No	EPC < RC
Arsenic	2	2				9.4	4.2	14.6	14.6		041M030201	7.24	41.6	PEL	2.02	1.3	0.35	0.23	0	6.62	1	No	EPC > RC, but < RV
Barium	2	2				52.9	18.7	87	87		041M030201			NA					0	14	2	Yes	EPC > RC and no RV
Beryllium	0	2	0.0525	0.03	0.075	0.0525			0.075	U	ND			NA					0	0.84	0	No	Parameter Not Detected
Cadmium	**1**	**2**	**1**	**1**	**1**	**5.15**	**9.3**	**9.3**	**9.3**		**041M030701**	**0.68**	**4.21**	**PEL**	**13.8**	**7.62**	**2.21**	**1.22**	**1**	**1.8**	**1**	**Yes**	**EPC > RV and RC**
Calcium	2	2				3470	953	5,980	5,980		041M030201			NA					0	10,756.67	0	No	EPC < RC
Cobalt	1	2	0.325	0.325	0.325	0.448	0.57	0.57	0.57	J	041M030701			NA					0	2.8	0	No	EPC < RC
Cyanide (CN)	1	2	1.5	1.5	1.5	2.05	2.6	2.6	2.6	J	041M030701			NA					0	5.22	0	No	EPC < RC
Iron	2	2				157,000	67,100	246,000	246,000		041M030201			NA					0	11,911.67	2	Yes	EPC > RC and no RV
Lead	2	2				28.1	20.6	35.6	35.6		041M030701	30.2	112	PEL	1.18	0.93	0.32	0.25	0	82.47	0	No	EPC < RC and RV
Magnesium	2	2				110	70.5	150	150	J	041M030201			NA					0	7,513.33	0	No	EPC < RC
Manganese	2	2				139	42.6	236	236		041M030201			NA					0	37.97	2	Yes	EPC > RC and no RV
Potassium	2	2				45.9	35	56.8	56.8	J	041M030201			NA					0	1,628.67	0	No	EPC < RC
Selenium	2	2				3.7	2	5.4	5.4		041M030201			NA					0	3.45	1	Yes	EPC > RC and no RV
Sodium	2	2				36.6	16.3	56.8	56.8	J	041M030201			NA					0	18,993.33	0	No	EPC < RC
Thallium	0	2	0.705	0.41	1	0.705			1	U	ND			NA					0	1.57	0	No	Parameter Not Detected
Vanadium	2	2				9.95	6.4	13.5	13.5		041M030201			NA					0	28.67	0	No	EPC < RC
Zinc	2	2				140	45.8	234	234		041M030701	124	271	PEL	1.89	1.13	0.86	0.52	0	36.73	2	No	EPC > RC, but < RV
PAHs (g/kg)																							
2-Methylnaphthalene	0	2	575	350	800	575			800	U	ND	20.2	201	PEL	39.6	28.5	3.98	2.86	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthene	0	2	575	350	800	575			800	U	ND	6.71	88.9	PEL	119	85.7	9	6.47	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthylene	0	2	575	350	800	575			800	U	ND	5.87	128	PEL	136	98	6.25	4.49	0		0	No	Parameter Not Detected; Max SQL > RV
Anthracene	0	2	575	350	800	575			800	U	ND	46.9	245	PEL	17.1	12.3	3.27	2.35	0		0	No	Parameter Not Detected; Max SQL > RV
Benzo(a)anthracene	0	2	575	350	800	575			800	U	ND	74.8	693	PEL	10.7	7.69	1.15	0.83	0		0	No	Parameter Not Detected; Max SQL > RV
Benzo(a)pyrene	0	2	575	350	800	575			800	U	ND	88.8	763	PEL	9.01	6.48	1.05	0.75	0		0	No	Parameter Not Detected; Max SQL > RV
Chrysene	0	2	575	350	800	575			800	U	ND	108	846	PEL	7.41	5.32	0.95	0.68	0		0	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	2	575	350	800	575			800	U	ND	6.22	135	PEL	129	92.4	5.93	4.26	0		0	No	Parameter Not Detected; Max SQL > RV
Fluoranthene	0	2	575	350	800	575			800	U	ND	113	1494	PEL	7.08	5.09	0.54	0.39	0		0	No	Parameter Not Detected
Fluorene	0	2	575	350	800	575			800	U	ND	21.2	144	PEL	37.7	27.1	5.56	3.99	0		0	No	Parameter Not Detected; Max SQL > RV
Naphthalene	0	2	575	350	800	575			800	U	ND	34.6	391	PEL	23.1	16.6	2.05	1.47	0		0	No	Parameter Not Detected; Max SQL > RV
Phenanthrene	0	2	575	350	800	575			800	U	ND	86.7	544	PEL	9.23	6.63	1.47	1.06	0		0	No	Parameter Not Detected; Max SQL > RV
Pyrene	0	2	575	350	800	575			800	U	ND	153	1398	PEL	5.23	3.76	0.57	0.41	0		0	No	Parameter Not Detected
Total PAHs	0	2	7,480	4,550	10,400	7,480			10,400	U	ND	1684	16770	PEL	6.18	4.44	0.62	0.45	0		0	No	Parameter Not Detected
TOC Normalized PAHs	0	2	241.58	104	379.17	241.58			379.17	U	ND	290	1800	MEC	1.31	0.833	0.211	0.134	0		0	No	RV HQ <1 and no RC
PCBs (g/kg)																							
Aroclor-1016	0	2	57.5	35	80	57.5			80	U	ND	21.6	189	PEL	3.7	2.66	0.42	0.30	0		0	No	Parameter Not Detected
Aroclor-1221	0	2	120	70	170	120			170	U	ND	67	189	PEL	2.54	1.79	0.90	0.64	0		0	No	Parameter Not Detected
Aroclor-1232	0	2	57.5	35	80	57.5			80	U	ND	21.6	189	PEL	3.7	2.66	0.42	0.30	0		0	No	Parameter Not Detected
Aroclor-1242	0	2	57.5	35	80	57.5			80	U	ND	21.6	189	PEL	3.7	2.66	0.42	0.30	0		0	No	Parameter Not Detected
Aroclor-1248	0	2	57.5	35	80	57.5			80	U	ND	21.6	189	PEL	3.7	2.66	0.42	0.30	0		0	No	Parameter Not Detected
Aroclor-1254	0	2	57.5	35	80	57.5			80	U	ND	21.6	189	PEL	3.7	2.66	0.42	0.30	0		0	No	Parameter Not Detected
Aroclor-1260	0	2	57.5	35	80	57.5			80	U	ND	21.6	189	PEL	3.7	2.66	0.42	0.30	0		0	No	Parameter Not Detected
Total PCBs	0	2	465	280	650	465			650	U	ND	21.6	189	PEL	30.1	21.5	3.44	2.46	0		0	No	Parameter Not Detected; Max SQL > RV
Pesticides (g/kg)																							
Aldrin	0	2	3.02	1.8	4.25	3.02			4.25	U	ND			NA					0		0	No	Parameter Not Detected
Dieldrin	0	2	5.03	2.05	8	5.03			8	U	ND	0.72	4.3	PEL	11.2	7.02	1.86	1.17	0		0	No	Parameter Not Detected; Max SQL > RV
Endosulfan I	0	2	3.02	1.8	4.25	3.02			4.25	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	2	5.75	3.5	8	5.75			8	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	1	2	8	8	8	7.6	7.2	7.2	7.2	J	041M030701			NA					0		0	Yes	No SV, no RV, and no RC
Heptachlor	0	2	3.02	1.8	4.25	3.02			4.25	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	2	3.02	1.8	4.25	3.02			4.25	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	2	10.6	3.2	18	10.6			18	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	2	303	180	425	303			425	U	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	0	2	3.02	1.8	4.25	3.02			4.25	U	ND	1.7	4.79	PEL	2.5	1.78	0.89	0.63	0		0	No	Parameter Not Detected
gamma-Chlordane	1	2	4.25	4.25	4.25	2.5	0.74	0.74	0.74	J	041M030701	1.7	4.79	PEL	0.44	1.47	0.15	0.52	0		0	No	RV HQ <1 and no RC
Total Chlordane	1	2	8.5	8.5	8.5	5.52	2.54	2.54	2.54		041M030701	1.7	4.79	PEL	1.49	3.25	0.53	1.15	0		0	No	RV HQ <1 and no RC
Endrin aldehyde	0	2	5.75	3.5	8	5.75			8	U	ND	3.3		NA	2.42	1.74			0		0	No	Parameter Not Detected
Endrin ketone	0	2	5.75	3.5	8	5.75			8	U	ND	3.3		NA	2.42	1.74			0		0	No	Parameter Not Detected
Total Endrin	1	2	10.5	10.5	10.5	14.7	18.8	18.8	18.8		041M030201	3.3		NA	5.7	4.44			0		0	Yes	No RV or RC and EPC > SV
alpha-BHC	0	2	3.02	1.8	4.25	3.02			4.25	U	ND		0.99	PEL			4.29	3.06	0		0	No	Parameter Not Detected; Max SQL > RV
beta-BHC	0	2	3.02	1.8	4.25	3.02			4.25	U	ND	0.32	0.99	PEL	13.3	9.45	4.29	3.06	0		0	No	Parameter Not Detected; Max SQL > RV
delta-BHC	0	2	3.02	1.8	4.25	3.02			4.25	U	ND	0.32	0.99	PEL	13.3	9.45	4.29	3.06	0		0	No	Parameter Not Detected; Max SQL > RV
gamma-BHC (Lindane)	0	2	2.08	1.8	2.35	2.08			2.35	U	ND	0.32	0.99	PEL	7.34	6.48	2.37	2.1	0		0	No	Parameter Not Detected; Max SQL > RV
Total BHC	0	2	11.2	7.2	15.1	11.2			15.1	U	ND	0.32	0.99	PEL	47.2	34.8	15.3	11.3	0		0	No	Parameter Not Detected; Max SQL > RV
4,4'-DDD	**2**	**2**				**31.5**	**14**	**49**	**49**		**041M030701**	**1.22**	**7.81**	**PEL**	**40.2**	**25.8**	**6.27**	**4.03**	**2**	**50**	**0**	**No**	**EPC > RV, but < RC**
4,4'-DDE	1	2	8	8	8	9.5	11	11	11		041M030701	2.07	374	PEL	5.31	4.59	0.03	0.03	0	40	0	No	EPC < RC and RV
4,4'-DDT	**2**	**2**				**6.5**	**3.7**	**9.3**	**9.3**		**041M030701**	**1.19**	**4.77**	**PEL**	**7.82**	**5.46**	**1.95**	**1.36**	**1**	**20**	**0**	**No**	**EPC > RV, but < RC**
Total DDT	**2**	**2**				**47.5**	**25.7**	**69.3**	**69.3**		**041M030701**	**3.3**	**51.7**	**PEL**	**21**	**14.4**	**1.34**	**0.92**	**1**	**110**	**0**	**No**	**EPC > RV, but < RC**
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	2	1,430	850	2,000	1,430			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	2	1,430	850	2,000	1,430			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	2	1,430	850	2,000	1,430			2,000	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected

Table 10-2-19
Wetland 3 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
3,3'-Dichlorobenzidine	0	2	1,180	700	1,650	1,180			1,650	U	ND			NA					0		0	No	Parameter Not Detected
3-Methylphenol/4-Methylphenol	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	2	1,430	850	2,000	1430			2,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	2	1,430	850	2,000	1430			2,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	2	1,430	850	2,000	1430			2,000	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	1	2	800	800	800	650	500	500	500	J	041M030701	182	2647	PEL	2.75	3.57	0.19	0.25	0		0	No	RV HQ <1 and no RC
Butylbenzylphthalate	0	2	575	350	800	575			800	U	ND	182	2647	PEL	4.4	3.16	0.30	0.22	0		0	No	Parameter Not Detected
Carbazole	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	0	2	575	350	800	575			800	U	ND	182	2647	PEL	4.4	3.16	0.30	0.22	0		0	No	Parameter Not Detected
Dimethylphthalate	0	2	575	350	800	575			800	U	ND	182	2647	PEL	4.4	3.16	0.30	0.22	0		0	No	Parameter Not Detected
Di-n-butylphthalate	0	2	575	350	800	575			800	U	ND	182	2647	PEL	4.4	3.16	0.30	0.22	0		0	No	Parameter Not Detected
Di-n-octylphthalate	0	2	575	350	800	575			800	U	ND	182	2647	PEL	4.4	3.16	0.30	0.22	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	2	1,430	850	2,000	1,430			2,000	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	2	575	350	800	575			800	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	2	2				79	38	120	120		041M030201			NA					0		0	Yes	No SV, no RV, and no RC
2-Hexanone	0	2	17.8	10.5	25	17.8			25	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	2	17.8	10.5	25	17.8			25	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	2	2				505	240	770	770	J	041M030201			NA					0		0	Yes	No SV, no RV, and no RC
Benzene	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	2	17.8	10.5	25	17.8			25	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	1	2	5.5	5.5	5.5	11.3	17	17	17	J	041M030201			NA					0		0	Yes	No SV, no RV, and no RC
Carbon tetrachloride	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroethane	0	2	17.8	10.5	25	17.8			25	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	2	17.8	10.5	25	17.8			25	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	2	17.8	10.5	25	17.8			25	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	2	9	5.5	12.5	9			12.5	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 10-2-20
Wetland 3 Phase III
Sediment COPCs Retained after Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Barium	Endosulfan sulfate	None	Carbon Disulfide
Cadmium	Total Endrin		
Iron			
Manganese			
Selenium			

Table 10-2-21
Wetland 3 Phase III
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M030201	8/27/1997	mg/kg	14.6		Arsenic	8.2	70	0.21
041M030201	8/27/1997	mg/kg	1	UJ	Cadmium	1.2	9.6	0.10
041M030201	8/27/1997	mg/kg	12.1		Chromium	81	370	0.03
041M030201	8/27/1997	mg/kg	1	U	Copper	34	270	0.00
041M030201	8/27/1997	mg/kg	20.6		Lead	46.7	218	0.09
041M030201	8/27/1997	mg/kg	0.1	J	Mercury	0.15	0.71	0.14
041M030201	8/27/1997	mg/kg	0.7	U	Nickel	20.9	51.6	0.01
041M030201	8/27/1997	mg/kg	0.15	UJ	Silver	1	3.7	0.04
041M030201	8/27/1997	mg/kg	45.8		Zinc	150	410	0.11
041M030201	8/27/1997	g/kg	8	U	4,4'-DDE	2.2	27	0.30
041M030201	8/27/1997	g/kg	3.7	J	4,4'-DDT	1.58	46.1	0.08
041M030201	8/27/1997	g/kg	650	U	Total PCBs	22.7	180	3.61
041M030201	8/27/1997	g/kg	800	U	2-Methylnaphthalene	70	670	1.19
041M030201	8/27/1997	g/kg	800	U	Acenaphthene	16	500	1.60
041M030201	8/27/1997	g/kg	800	U	Acenaphthylene	44	640	1.25
041M030201	8/27/1997	g/kg	800	U	Anthracene	85.3	1,100	0.73
041M030201	8/27/1997	g/kg	800	U	Benzo(a)anthracene	261	1,600	0.50
041M030201	8/27/1997	g/kg	800	U	Benzo(a)pyrene	430	1,600	0.50
041M030201	8/27/1997	g/kg	800	U	Chrysene	384	2,800	0.29
041M030201	8/27/1997	g/kg	800	U	Dibenz(a,h)anthracene	63.4	260	3.08
041M030201	8/27/1997	g/kg	800	U	Fluoranthene	600	5,100	0.16
041M030201	8/27/1997	g/kg	800	U	Fluorene	19	540	1.48
041M030201	8/27/1997	g/kg	800	U	Naphthalene	160	2,100	0.38
041M030201	8/27/1997	g/kg	800	U	Phenanthrene	240	1,500	0.53
041M030201	8/27/1997	g/kg	800	U	Pyrene	665	2,600	0.31
041M030201	8/27/1997				ERM Quotient Sum			16.73
041M030201	8/27/1997				Mean ERM Quotient			0.67
041M030201	8/27/1997				Mean ERM Quotient without ND			0.03
041M030201	8/27/1997				Mean ERM Quotient Category			2
041M030701	8/27/1997	mg/kg	4.2	J	Arsenic	8.2	70	0.06
041M030701	8/27/1997	mg/kg	9.3		Cadmium	1.2	9.6	0.97
041M030701	8/27/1997	mg/kg	19		Chromium	81	370	0.05
041M030701	8/27/1997	mg/kg	4		Copper	34	270	0.01
041M030701	8/27/1997	mg/kg	35.6		Lead	46.7	218	0.16
041M030701	8/27/1997	mg/kg	0.06	J	Mercury	0.15	0.71	0.08
041M030701	8/27/1997	mg/kg	3.1		Nickel	20.9	51.6	0.06
041M030701	8/27/1997	mg/kg	0.42	J	Silver	1	3.7	0.11
041M030701	8/27/1997	mg/kg	234		Zinc	150	410	0.57
041M030701	8/27/1997	g/kg	11		4,4'-DDE	2.2	27	0.41
041M030701	8/27/1997	g/kg	9.3		4,4'-DDT	1.58	46.1	0.20
041M030701	8/27/1997	g/kg	280	U	Total PCBs	22.7	180	1.56
041M030701	8/27/1997	g/kg	350	U	2-Methylnaphthalene	70	670	0.52
041M030701	8/27/1997	g/kg	350	U	Acenaphthene	16	500	0.70
041M030701	8/27/1997	g/kg	350	U	Acenaphthylene	44	640	0.55
041M030701	8/27/1997	g/kg	350	U	Anthracene	85.3	1,100	0.32
041M030701	8/27/1997	g/kg	350	U	Benzo(a)anthracene	261	1,600	0.22
041M030701	8/27/1997	g/kg	350	U	Benzo(a)pyrene	430	1,600	0.22
041M030701	8/27/1997	g/kg	350	U	Chrysene	384	2,800	0.13
041M030701	8/27/1997	g/kg	350	U	Dibenz(a,h)anthracene	63.4	260	1.35
041M030701	8/27/1997	g/kg	350	U	Fluoranthene	600	5,100	0.07
041M030701	8/27/1997	g/kg	350	U	Fluorene	19	540	0.65
041M030701	8/27/1997	g/kg	350	U	Naphthalene	160	2,100	0.17

Table 10-2-21
Wetland 3 Phase III
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M030701	8/27/1997	g/kg	350	U	Phenanthrene	240	1,500	0.23
041M030701	8/27/1997	g/kg	350	U	Pyrene	665	2,600	0.13
041M030701	8/27/1997				ERM Quotient Sum			9.50
041M030701	8/27/1997				Mean ERM Quotient			0.38
041M030701	8/27/1997				Mean ERM Quotient without ND			0.11
041M030701	8/27/1997				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 10-2-22
Wetland 3 Phase III
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	**1**	**1**				**59.1**	**59.1**	**59.1**	**041W030101**	**59.1**	**J**	**13**	**FDEP**	**4.55**	**Yes**	**Max Detect > SV**
Antimony	1	1				2.6	2.6	2.6	041W030101	2.6	J	160	EPA	0.02	No	Max Detect < SV
Arsenic	0	1	1.1	1.1	1.1	1.1			ND	1.1	UJ	50	FDEP	0.02	No	Max SQL< SV
Barium	1	1				37.2	37.2	37.2	041W030101	37.2			NA		Yes	No SV
Beryllium	0	1	0.115	0.115	0.115	0.115			ND	0.115	U	0.13	FDEP	0.89	No	Max SQL< SV
Cadmium	0	1	0.29	0.29	0.29	0.29			ND	0.29	U	0.66	EPA	0.44	No	Max SQL< SV
Calcium	1	1				34,000	34,000	34,000	041W030101	34,000			NA		Yes	No SV
Chromium	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ	11	EPA	0.05	No	Max SQL< SV
Cobalt	0	1	0.265	0.265	0.265	0.265			ND	0.265	UJ		NA		Yes	No SV
Copper	0	1	0.85	0.85	0.85	0.85			ND	0.85	U	6.54	EPA	0.13	No	Max SQL< SV
Cyanide (CN)	0	1	0.7	0.7	0.7	0.7			ND	0.7	UJ	5.2	EPA	0.14	No	Max SQL< SV
Iron	1	1				19,600	19,600	19,600	041W030101	19,600			NA		Yes	No SV
Lead	0	1	0.6	0.6	0.6	0.6			ND	0.6	U	1.32	EPA	0.46	No	Max SQL< SV
Magnesium	1	1				2,670	2,670	2,670	041W030101	2,670			NA		Yes	No SV
Manganese	1	1				231	231	231	041W030101	231			NA		Yes	No SV
Mercury	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.012	EPA	2.08	Yes	Max SQL > SV
Nickel	0	1	0.6	0.6	0.6	0.6			ND	0.6	U	87.71	EPA	0.01	No	Max SQL< SV
Potassium	1	1				1,730	1,730	1,730	041W030101	1,730			NA		Yes	No SV
Selenium	0	1	1.3	1.3	1.3	1.3			ND	1.3	U	5	EPA	0.26	No	Max SQL< SV
Silver	0	1	0.015	0.015	0.015	0.015			ND	0.015	U	0.012	EPA	1.25	Yes	Max SQL > SV
Sodium	1	1				7,570	7,570	7,570	041W030101	7,570			NA		Yes	No SV
Thallium	0	1	0.6	0.6	0.6	0.6			ND	0.6	U	4	EPA	0.15	No	Max SQL< SV
Vanadium	0	1	0.385	0.385	0.385	0.385			ND	0.385	UJ		NA		Yes	No SV
Zinc	0	1	1.85	1.85	1.85	1.85			ND	1.85	U	58.91	EPA	0.03	No	Max SQL< SV
Pesticides (g/L)																
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.056	EPA	0.45	No	Max SQL< SV
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	6.58	Yes	Max SQL > SV
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	11.6	Yes	Max SQL > SV
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	No	Max SQL< SV
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	35.7	Yes	Max SQL > SV
Total PCB	0	1	4	4	4	4			ND	4	U		NA		Yes	No SV

Table 10-2-22
Wetland 3 Phase III
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	1	5	5	5	5			ND	5	U	15.8	EPA	0.32	No	Max SQL< SV
1,3-Dichlorobenzene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	1	5	5	5	5			ND	5	U	3	FDEP	1.67	Yes	Max SQL > SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	UJ		NA		Yes	No SV
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	43.8	EPA	0.06	No	Max SQL< SV
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	UJ		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
3-Methylphenol/4-Methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Nitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	0.3	EPA	8.33	Yes	Max SQL > SV
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Carbazole	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Di-n-butylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	9.4	EPA	0.27	No	Max SQL< SV
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pentachlorophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Acenaphthene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Acenaphthylene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Anthracene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzo(a)anthracene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzo(a)pyrene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Chrysene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV

Table 10-2-22
Wetland 3 Phase III
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
PAHs (g/L) - cont.																
Fluoranthene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Fluorene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Naphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	26	FDEP	0.10	No	Max SQL< SV
Phenanthrene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pyrene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Total PAH	0	1	32.5	32.5	32.5	32.5			ND	32.5	U		NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	270	FDEP	0.00	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.16	No	Max SQL< SV
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloroethene (total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
2-Butanone (MEK)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Hexanone	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Acetone	1	1				28	28	28	041W030101	28			NA		Yes	No SV
Benzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	53	EPA	0.01	No	Max SQL< SV
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	1	1				0.82	0.82	0.82	041W030101	0.82	J	17	FDEP	0.05	No	Max Detect < SV
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	289	EPA	0.00	No	Max SQL< SV
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	453	EPA	0.00	No	Max SQL< SV
Methylene chloride	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	1580	FDEP	0.00	No	Max SQL< SV
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	175	EPA	0.00	No	Max SQL< SV
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Vinyl chloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 10-2-23
Wetland 3 Phase III
Surface Water COPCs Retained after Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	None	Acetone
Barium			
Calcium			
Iron			
Magnesium			
Manganese			
Potassium			
Sodium			
		Not Detected Parameters	
Cobalt	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Mercury	Dieldrin	1,3-Dichlorobenzene	1,1,2-Trichloroethane
Silver	Endosulfan II	1,4-Dichlorobenzene	1,1-Dichloroethane
Vanadium	Endosulfan sulfate	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,2-Dichloroethane
	Heptachlor	2,4,5-Trichlorophenol	1,2-Dichloroethene (total)
	Heptachlor epoxide	2,4,6-Trichlorophenol	1,2-Dichloropropane
	Methoxychlor	2,4-Dichlorophenol	2-Butanone (MEK)
	Toxaphene	2,4-Dimethylphenol	2-Hexanone
	alpha-Chlordane	2,4-Dinitrophenol	4-Methyl-2-Pentanone (MIBK)
	gamma-Chlordane	2,4-Dinitrotoluene	Bromodichloromethane
	Total Chlordane	2,6-Dinitrotoluene	Bromoform
	Endrin	2-Chloronaphthalene	Bromomethane
	Endrin aldehyde	2-Methyl-4,6-Dinitrophenol	Carbon disulfide
	Endrin ketone	2-Methylphenol (o-Cresol)	Carbon tetrachloride
	Total Endrin	2-Nitroaniline	Chloroethane
	alpha-BHC	2-Nitrophenol	Chloromethane
	beta-BHC	3,3'-Dichlorobenzidine	cis-1,3-Dichloropropene
	delta-BHC	3-Methylphenol/4-Methylphenol	Dibromochloromethane
	Total BHC	3-Nitroaniline	Styrene
	4,4'-DDD	4-Bromophenyl-phenylether	Tetrachloroethene
	4,4'-DDE	4-Chloro-3-methylphenol	trans-1,3-Dichloropropene
	4,4'-DDT	4-Chloroaniline	Trichloroethene
	Total DDT	4-Chlorophenylphenyl ether	Vinyl chloride
	Aroclor-1016	4-Nitroaniline	Xylene (Total)
	Aroclor-1221	4-Nitrophenol	
	Aroclor-1232	Benzo(b)fluoranthene	
	Aroclor-1242	Benzo(g,h,i)perylene	
	Aroclor-1248	Benzo(k)fluoranthene	
	Aroclor-1254	bis(2-Chloroethoxy)methane	
	Aroclor-1260	bis(2-Chloroethyl)ether	
	Total PCBs	bis(2-Ethylhexyl)phthalate (BEHP)	
		Butylbenzylphthalate	
		Carbazole	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 10-2-23
Wetland 3 Phase III
Surface Water COPCs Retained after Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Not Detected Parameters - cont.	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 10-2-24
Wetland 3 Phase III
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
Metals (g/L)																				
Aluminum	**1**	**1**				**59.1**	**59.1**	**59.1**	**041W030101**	**59.1**	**J**	**13**	**FDEP**	**5**	**4.55**	**1,090.25**	**0**	**1**	**No**	**Max Result < Ref. Conc.**
Barium	1	1				37.2	37.2	37.2	041W030101	37.2			NA			3.68	1	1	Yes	Max Result > Ref. Conc.
Calcium	1	1				34,000	34,000	34,000	041W030101	34,000			NA			7,675	1	1	No	Essential Nutrient
Cobalt	0	1	0.265	0.265	0.265	0.265			ND	0.265	UJ		NA			3	0	1	No	Parameter Not Detected
Iron	1	1				19,600	19,600	19,600	041W030101	19,600			NA			2,360	1	1	Yes	Max Result > Ref. Conc.
Magnesium	1	1				2,670	2,670	2,670	041W030101	2,670			NA			20,260	0	1	No	Max Result < Ref. Conc.
Manganese	1	1				231	231	231	041W030101	231			NA			13.2	1	1	Yes	Max Result > Ref. Conc.
Mercury	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.012	EPA	2.08	2.08	0.13	0	1	No	Parameter Not Detected
Potassium	1	1				1,730	1,730	1,730	041W030101	1,730			NA			6995	0	1	No	Max Result < Ref. Conc.
Silver	0	1	0.015	0.015	0.015	0.015			ND	0.015	U	0.012	EPA	1.25	1.25	4	0	1	No	Parameter Not Detected
Sodium	1	1				7,570	7,570	7,570	041W030101	7,570			NA			182,200	0	1	No	Max Result < Ref. Conc.
Vanadium	0	1	0.385	0.385	0.385	0.385			ND	0.385	UJ		NA			4.7	0	1	No	Parameter Not Detected
Pesticides (g/L)																				
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	7	6.58		0	1	No	Parameter Not Detected
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	1	No	Parameter Not Detected
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	1	No	Parameter Not Detected
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	12	11.6		0	1	No	Parameter Not Detected
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.74	21.7		0	1	No	Parameter Not Detected
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	1	No	Parameter Not Detected
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
gamma-BHC (Lindane)	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	0.31		0	1	No	Parameter Not Detected
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	1	No	Parameter Not Detected
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	1	No	Parameter Not Detected
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	1	No	Parameter Not Detected
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85	84.7		0	1	No	Parameter Not Detected
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	1	No	Parameter Not Detected
PCBs (g/L)																				
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA				0	1	No	Parameter Not Detected
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	36	35.7		0	1	No	Parameter Not Detected
Total PCB	0	1	4	4	4	4			ND	4	U		NA				0	1	No	Parameter Not Detected
SVOCs (g/L)																				
1,2,4-Trichlorobenzene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
1,4-Dichlorobenzene	0	1	5	5	5	5			ND	5	U	3	FDEP	2	1.67		0	1	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	UJ		NA				0	1	No	Parameter Not Detected
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	UJ		NA				0	1	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
3-Methylphenol/4-Methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
3-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
4-Nitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
Benzo(b)fluoranthene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Benzo(k)fluoranthene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected

Table 10-2-24
Wetland 3 Phase III
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
SVOCs (g/L) - cont.																				
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	0.3	EPA	8.33	8.33		0	1	No	Parameter Not Detected
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Carbazole	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Hexachlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Pentachlorophenol	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
PAHs (g/L)																				
2-Methylnaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Acenaphthene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Acenaphthylene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Anthracene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Benzo(a)anthracene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Benzo(a)pyrene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Chrysene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Fluoranthene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Fluorene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Naphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	26	FDEP	0.10	0.10		0	1	No	Parameter Not Detected
Phenanthrene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Pyrene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Total PAH	0	1	32.5	32.5	32.5	32.5			ND	32.5	U		NA				0	1	No	Parameter Not Detected
VOCs (g/L)																				
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,1-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
2-Butanone (MEK)	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2-Hexanone	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Acetone	1	1				28	28	28	041W030101	28			NA				0	1	Yes	No SV
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Trichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Vinyl chloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Xylene (Total)	0	1	1	1	1	1			ND	1	U		NA				0	1	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL

UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not applicable.
Average result calculations include summing detections and one half the detection limits for not detecte parameters. As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 10-2-25
Wetland 3 Phase III
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Iron	None	None	Acetone
Manganese			
Barium			

Table 10-2-26
Wetland 3 Phase II
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	4.3E+02	=	2.6E+04	=	MG/KG	041M030701	10 / 10	NAV	4.5E+03	1.0E-03	3	5.12E-06	2.56E-06	8.10E-05	5.42E-05
7440382	Arsenic	C	5.6E-01	J	3.6E+01	=	MG/KG	041M030301	9 / 10	N/A / 7.4E-01	8.7E+00	3.0E-02	2	2.13E-07	1.07E-07	4.82E-07	8.05E-07
7440393	Barium	N	1.6E+00	=	4.4E+02	=	MG/KG	041M030701	10 / 10	NAV	5.3E+01	1.0E-03	3	8.76E-08	4.38E-08	1.39E-06	9.27E-07
7440439	Cadmium	N	5.2E-01	J	7.3E+01	=	MG/KG	041M030701	7 / 10	1.9E-01 / 9.9E-01	8.9E+00	1.0E-03	3	1.45E-08	7.27E-09	2.30E-07	1.54E-07
7440473	Chromium	N	1.5E+00	=	2.0E+02	=	MG/KG	041M030701	10 / 10	NAV	2.6E+01	1.0E-03	3	3.92E-08	1.96E-08	6.21E-07	4.15E-07
7440484	Cobalt	C	N/A	N/A	2.5E+00	J	MG/KG	041M030201	1 / 10	1.6E-01 / 4.7E+00	7.2E-01	1.0E-03	3	5.00E-10	2.50E-10	1.13E-09	1.89E-09
7440508	Copper	N	2.2E+00	J	6.9E+01	=	MG/KG	041M030701	5 / 10	8.6E-01 / 3.1E+00	1.0E+01	1.0E-03	3	1.38E-08	6.88E-09	2.18E-07	1.46E-07
57125	Cyanide (CN)	N	1.5E+00	=	5.1E+00	J	MG/KG	041M030701	2 / 10	6.0E-01 / 5.2E+00	1.2E+00	1.0E-01	2	1.02E-07	5.10E-08	1.61E-06	1.08E-06
7439896	Iron	N	1.9E+03	J	3.9E+05	=	MG/KG	041M030701	10 / 10	NAV	6.0E+04	1.0E-03	3	7.72E-05	3.86E-05	1.22E-03	8.17E-04
7439921	Lead	N	2.4E+00	=	1.0E+02	J	MG/KG	041M030201	10 / 10	NAV	2.1E+01	1.0E-03	3	2.02E-08	1.01E-08	3.20E-07	2.14E-07
7439965	Manganese	N	2.3E+00	=	1.3E+03	J	MG/KG	041M030701	10 / 10	NAV	1.5E+02	1.0E-03	3	2.54E-07	1.27E-07	4.02E-06	2.69E-06
7782492	Selenium	N	4.4E-01	J	2.0E+00	J	MG/KG	041M030201	3 / 10	1.6E-01 / 1.1E+00	6.6E-01	1.0E-03	3	4.00E-10	2.00E-10	6.33E-09	4.23E-09
7440622	Vanadium	N	1.2E+00	J	1.6E+02	=	MG/KG	041M030701	10 / 10	NAV	2.1E+01	1.0E-03	3	3.20E-08	1.60E-08	5.07E-07	3.39E-07
7440666	Zinc	N	1.2E+00	=	3.0E+02	=	MG/KG	041M030701	10 / 10	NAV	3.7E+01	1.0E-03	3	5.94E-08	2.97E-08	9.40E-07	6.29E-07
72548	4,4'-DDD	C	1.3E-03	J	4.0E-01	J	MG/KG	001M000303	10 / 10	NAV	4.9E-02	3.0E-02	1	2.40E-09	1.20E-09	5.43E-09	9.07E-09
72559	4,4'-DDE	C	8.4E-04	J	1.2E-01	J	MG/KG	001M000303	7 / 10	8.8E-04 / 1.5E-03	1.5E-02	3.0E-02	1	7.20E-10	3.60E-10	1.63E-09	2.72E-09
50293	4,4'-DDT	C	3.2E-04	J	2.2E-01	=	MG/KG	001M000303	9 / 10	N/A / 1.1E-03	2.4E-02	3.0E-02	1	1.32E-09	6.60E-10	2.98E-09	4.99E-09
309002	Aldrin	C	2.3E-04	J	1.0E-03	J	MG/KG	041M030201	3 / 10	1.3E-05 / 1.1E-02	1.0E-03	1.0E-01	2	2.00E-11	1.00E-11	4.52E-11	7.56E-11
319846	alpha-BHC	C	1.9E-04	J	1.2E-03	J	MG/KG	041M030501	3 / 10	1.2E-05 / 1.1E-02	1.0E-03	4.0E-02	2	9.60E-12	4.80E-12	2.17E-11	3.63E-11
5103719	alpha-Chlordane	C	1.7E-04	J	2.2E-03	J	MG/KG	001M000303	8 / 10	2.2E-05 / 5.3E-05	6.1E-04	4.0E-02	2	1.76E-11	8.80E-12	3.98E-11	6.65E-11
11096825	Aroclor-1260	C	N/A	N/A	3.5E-01	DJ	MG/KG	041M030201	1 / 10	2.4E-03 / 2.2E-01	5.2E-02	1.4E-02	3	9.66E-10	4.83E-10	2.18E-09	3.65E-09
319857	beta-BHC	C	N/A	N/A	7.0E-04	J	MG/KG	041M030301	1 / 10	1.2E-05 / 1.1E-02	9.2E-04	4.0E-02	2	5.60E-12	2.80E-12	1.27E-11	2.12E-11
319868	delta-BHC	C	1.8E-04	J	2.5E-04	J	MG/KG	041M030101	2 / 10	1.3E-05 / 1.1E-02	8.8E-04	4.0E-02	2	2.00E-12	1.00E-12	4.52E-12	7.56E-12
60571	Dieldrin	C	N/A	N/A	6.0E-03	J	MG/KG	041M030201	1 / 10	2.4E-04 / 2.2E-02	2.3E-03	1.0E-01	2	1.20E-10	6.00E-11	2.71E-10	4.54E-10
1031078	Endosulfan sulfate	N	1.5E-03	J	1.7E-03	J	MG/KG	041M030701	2 / 10	2.4E-04 / 2.2E-02	2.0E-03	1.0E-01	2	3.40E-11	1.70E-11	5.38E-10	3.60E-10
72208	Endrin	N	5.3E-04	J	1.8E-03	J	MG/KG	041M030301	4 / 10	2.4E-04 / 2.2E-02	1.9E-03	1.0E-01	2	3.60E-11	1.80E-11	5.70E-10	3.81E-10
53494705	Endrin ketone	N	N/A	N/A	1.4E-03	J	MG/KG	041M030501	1 / 10	2.4E-04 / 2.2E-02	1.9E-03	1.0E-01	2	2.80E-11	1.40E-11	4.43E-10	2.96E-10
57749	gamma-Chlordane	C	1.1E-04	=	1.7E-03	J	MG/KG	041M030201	3 / 10	2.2E-05 / 1.1E-02	1.0E-03	4.0E-02	2	1.36E-11	6.80E-12	3.08E-11	5.14E-11
95501	1,2-Dichlorobenzene	C	N/A	N/A	4.1E-01	J	MG/KG	041M030201	1 / 10	4.0E-01 / 2.1E+00	4.1E-01	1.0E-02	3	8.20E-10	4.10E-10	1.85E-09	3.10E-09
106467	1,4-Dichlorobenzene	C	5.8E-02	J	1.4E+00	J	MG/KG	041M030201	4 / 10	4.0E-01 / 2.1E+00	5.8E-01	1.0E-02	3	2.80E-09	1.40E-09	6.33E-09	1.06E-08
83329	Acenaphthene	N	N/A	N/A	9.8E-02	=	MG/KG	041M030301	1 / 10	1.9E-02 / 4.8E-01	9.8E-02	1.0E-02	3	1.96E-10	9.80E-11	3.10E-09	2.07E-09
56553	Benzo(a)anthracene	C	N/A	N/A	2.3E-02	J	MG/KG	041M030101	1 / 10	4.6E-02 / 4.8E-01	1.1E-01	1.3E-01	2	5.98E-10	2.99E-10	1.35E-09	2.26E-09
50328	Benzo(a)pyrene	C	4.8E-02	=	1.8E-01	=	MG/KG	041M030701	2 / 10	4.6E-02 / 4.8E-01	1.3E-01	1.3E-01	2	4.68E-09	2.34E-09	1.06E-08	1.77E-08
205992	Benzo(b)fluoranthene	C	N/A	N/A	8.5E-02	=	MG/KG	041M030101	1 / 10	4.6E-02 / 4.8E-01	1.2E-01	1.3E-01	2	2.21E-09	1.11E-09	5.00E-09	8.35E-09
191242	Benzo(g,h,i)perylene	C	N/A	N/A	4.6E-02	=	MG/KG	041M030101	1 / 10	4.6E-02 / 4.8E-01	1.2E-01	1.3E-01	2	1.20E-09	5.98E-10	2.70E-09	4.52E-09
207089	Benzo(k)fluoranthene	C	N/A	N/A	2.7E-02	J	MG/KG	041M030101	1 / 10	4.6E-02 / 4.8E-01	1.1E-01	1.3E-01	2	7.02E-10	3.51E-10	1.59E-09	2.65E-09
117817	bis(2-Ethylhexyl)phthalate (BEHP)	C	7.6E-02	J	2.7E-01	J	MG/KG	041M030701	4 / 10	3.8E-01 / 3.0E+00	3.4E-01	1.0E-01	1	5.40E-09	2.70E-09	1.22E-08	2.04E-08
85687	Butylbenzylphthalate	N	N/A	N/A	2.3E-02	J	MG/KG	041M030101	1 / 10	5.4E-02 / 3.0E+00	4.7E-01	1.0E-01	2	4.60E-10	2.30E-10	7.28E-09	4.87E-09
218019	Chrysene	C	N/A	N/A	3.2E-02	J	MG/KG	041M030101	1 / 10	4.6E-02 / 4.8E-01	1.2E-01	1.3E-01	2	8.32E-10	4.16E-10	1.88E-09	3.14E-09
84742	Di-n-butylphthalate	N	3.6E-02	J	7.7E-02	J	MG/KG	041M030301	2 / 10	4.3E-01 / 3.0E+00	4.7E-01	1.0E-01	2	1.54E-09	7.70E-10	2.44E-08	1.63E-08
117840	Di-n-octylphthalate	N	4.5E-02	J	4.5E-02	J	MG/KG	041M030601	2 / 10	4.0E-01 / 3.0E+00	4.6E-01	1.0E-01	2	9.00E-10	4.50E-10	1.42E-08	9.52E-09
84662	Diethylphthalate	N	N/A	N/A	4.7E-02	J	MG/KG	041M030301	1 / 10	4.0E-01 / 3.0E+00	4.8E-01	1.0E-01	2	9.40E-10	4.70E-10	1.49E-08	9.95E-09
206440	Fluoranthene	N	N/A	N/A	4.6E-02	=	MG/KG	041M030101	1 / 10	4.6E-02 / 4.8E-01	1.2E-01	1.3E-01	2	1.20E-09	5.98E-10	1.89E-08	1.27E-08
86737	Fluorene	N	N/A	N/A	9.5E-02	=	MG/KG	041M030301	1 / 10	1.9E-02 / 4.8E-01	9.8E-02	1.0E-02	3	1.90E-10	9.50E-11	3.01E-09	2.01E-09
193395	Indeno(1,2,3-cd)pyrene	C	N/A	N/A	3.1E-02	J	MG/KG	041M030101	1 / 10	4.6E-02 / 4.8E-01	1.2E-01	1.3E-01	2	8.06E-10	4.03E-10	1.82E-09	3.05E-09
91203	Naphthalene	N	N/A	N/A	1.6E-01	=	MG/KG	041M030301	1 / 10	4.0E-02 / 4.8E-01	1.3E-01	1.0E-02	3	3.20E-10	1.60E-10	5.07E-09	3.39E-09
85018	Phenanthrene	N	N/A	N/A	2.4E-02	J	MG/KG	041M030101	1 / 10	4.6E-02 / 4.8E-01	1.1E-01	1.0E-02	3	4.80E-11	2.40E-11	7.60E-10	5.08E-10
108952	Phenol	N	N/A	N/A	5.5E-02	J	MG/KG	001M000301	1 / 10	4.0E-01 / 3.0E+00	5.0E-01	1.0E-02	3	1.10E-10	5.50E-11	1.74E-09	1.16E-09
129000	Pyrene	N	N/A	N/A	4.3E-02	=	MG/KG	041M030101	1 / 10	4.6E-02 / 4.8E-01	1.2E-01	1.0E-02	3	8.60E-11	4.30E-11	1.36E-09	9.10E-10
78933	2-Butanone (MEK)	N	N/A	N/A	1.8E-01	=	MG/KG	041M030701	1 / 10	1.3E-02 / 2.0E-01	4.0E-02	1.0E-02	3	3.60E-10	1.80E-10	5.70E-09	3.81E-09

Table 10-2-26
Wetland 3 Phase II
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
67641	Acetone	N	N/A	N/A	1.1E+00	J	MG/KG	041M030701	1 / 10	1.4E-02 / 1.6E+00	2.2E-01	1.0E-02	3	2.20E-09	1.10E-09	3.48E-08	2.33E-08
71432	Benzene	C	1.8E-02	J	3.4E-02	J	MG/KG	041M030201	2 / 10	1.3E-02 / 2.0E-01	2.2E-02	1.0E-02	3	6.80E-11	3.40E-11	1.54E-10	2.57E-10
85018	Chlorobenzene	N	2.0E-03	J	6.2E-01	=	MG/KG	041M030301	6 / 10	1.3E-02 / 2.0E-01	1.2E-01	1.0E-02	3	1.24E-09	6.20E-10	1.96E-08	1.31E-08
129000	Toluene	N	N/A	N/A	2.0E-03	J	MG/KG	041M030701	1 / 10	1.3E-02 / 2.0E-01	2.2E-02	1.0E-02	3	4.00E-12	2.00E-12	6.33E-11	4.23E-11

Equation for sediment risk:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Equation for DA_{event} for sediment contact:

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

Where:

C_{sd} = Chemical concentration in sediment (mg/kg).
CF = Conversion factor (10^{-6} kg/mg).
AF = Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;
(2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Table 10-2-27
Wetland 3 Phase II
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABSGI	ABSGISource	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser Dermal Hazard Quotient	Child Trespasser Dermal Cancer Risk	Maintenance Worker Dermal Hazard Quotient	Maintenance Worker Dermal Cancer Risk
Adult Maintenance Worker	Aluminum	N	2.6E+04	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	8.1E-04	N/A	5.4E-04	N/A
	Arsenic	C	3.6E+01	3.0E-04	1.5E+00	4.1E-01	3	1.2E-04	3.7E+00	3.9E-03	**1.8E-06**	6.5E-03	**2.9E-06**
	Barium	N	4.4E+02	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	2.8E-04	N/A	1.9E-04	N/A
	Cadmium	N	7.3E+01	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	1.8E-02	N/A	1.2E-02	N/A
	Chromium	N	2.0E+02	N/A	N/A	2.5E-02	1	N/A	N/A	N/A	N/A	N/A	N/A
	Cobalt	C	2.5E+00	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	7.1E-08	N/A	1.2E-07	N/A
	Copper	N	6.9E+01	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	1.8E-05	N/A	1.2E-05	N/A
	Cyanide (CN)	N	5.1E+00	2.0E-02	N/A	1.7E-01	3	3.4E-03	N/A	4.7E-04	N/A	3.2E-04	N/A
	Iron	N	3.9E+05	3.0E-01	N/A	1.5E-01	3	4.5E-02	N/A	2.7E-02	N/A	1.8E-02	N/A
	Lead	N	1.0E+02	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.3E+03	2.4E-02	N/A	4.0E-02	1, 3	9.6E-04	N/A	4.2E-03	N/A	2.8E-03	N/A
	Selenium	N	2.0E+00	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	2.3E-06	N/A	1.5E-06	N/A
	Vanadium	N	1.6E+02	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	2.8E-03	N/A	1.9E-03	N/A
	Zinc	N	3.0E+02	3.0E-01	N/A	2.0E-01	3, 4	6.0E-02	N/A	1.6E-05	N/A	1.0E-05	N/A
	4,4'-DDD	C	4.0E-01	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	4.3E-08	N/A	7.3E-08
	4,4'-DDE	C	1.2E-01	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	1.8E-08	N/A	3.1E-08
	4,4'-DDT	C	2.2E-01	5.0E-04	3.4E-01	3.0E-02	2	1.5E-05	1.1E+01	2.0E-04	3.4E-08	3.3E-04	5.7E-08
	Aldrin	C	1.0E-03	3.0E-05	1.7E+01	1.3E-02	3	4.0E-07	1.3E+03	1.1E-04	5.8E-08	1.9E-04	9.7E-08
	alpha-BHC	C	1.2E-03	5.0E-04	6.3E+00	1.4E-02	3	7.1E-06	4.4E+02	3.1E-06	9.6E-09	5.1E-06	1.6E-08
	alpha-Chlordane	C	2.2E-03	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	9.9E-08	1.7E-11	1.7E-07	2.9E-11
	Aroclor-1260	C	3.5E-01	N/A	2.0E+00	1.4E-01	2	N/A	1.4E+01	N/A	3.1E-08	N/A	5.2E-08
	beta-BHC	C	7.0E-04	2.0E-04	1.8E+00	1.4E-02	3	2.8E-06	1.3E+02	4.5E-06	1.6E-09	7.5E-06	2.7E-09
	delta-BHC	C	2.5E-04	5.0E-04	6.3E+00	1.4E-02	3	7.1E-06	4.4E+02	6.4E-07	2.0E-09	1.1E-06	3.4E-09
	Dieldrin	C	6.0E-03	5.0E-05	1.6E+01	5.0E-01	3	2.5E-05	3.2E+01	1.1E-05	8.7E-09	1.8E-05	1.5E-08
	Endosulfan sulfate	N	1.7E-03	6.0E-03	N/A	5.0E-01	3	3.0E-03	N/A	1.8E-07	N/A	1.2E-07	N/A
	Endrin	N	1.8E-03	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	1.5E-04	N/A	1.0E-04	N/A
	Endrin ketone	N	1.4E-03	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	1.2E-04	N/A	7.9E-05	N/A
	gamma-Chlordane	C	1.7E-03	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	7.7E-08	1.3E-11	1.3E-07	2.2E-11
	1,2-Dichlorobenzene	C	4.1E-01	9.0E-02	N/A	8.0E-01	3	7.2E-02	N/A	2.6E-08	N/A	4.3E-08	N/A
	1,4-Dichlorobenzene	C	1.4E+00	3.0E-02	2.4E-02	9.0E-01	3	2.7E-02	2.7E-02	2.3E-07	1.7E-10	3.9E-07	2.8E-10
	Acenaphthene	N	9.8E-02	6.0E-02	N/A	4.2E-02	3	2.5E-03	N/A	1.2E-06	N/A	8.2E-07	N/A
	Benzo(a)anthracene	C	2.3E-02	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	3.2E-09	N/A	5.3E-09
	Benzo(a)pyrene	C	1.8E-01	N/A	7.3E+00	3.1E-01	3	N/A	2.4E+01	N/A	2.5E-07	N/A	4.2E-07
	Benzo(b)fluoranthene	C	8.5E-02	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	1.2E-08	N/A	2.0E-08
	Benzo(g,h,i)perylene	C	4.6E-02	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	6.4E-09	N/A	1.1E-08
	Benzo(k)fluoranthene	C	2.7E-02	N/A	7.3E-02	3.1E-01	3	N/A	2.4E-01	N/A	3.7E-10	N/A	6.2E-10
	bis(2-Ethylhexyl)phthalate (BEHP)	C	2.7E-01	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	6.1E-06	1.7E-09	1.0E-05	2.9E-09
	Butylbenzylphthalate	N	2.3E-02	2.0E-01	N/A	1.7E-02	3	3.5E-03	N/A	2.1E-06	N/A	1.4E-06	N/A
	Chrysene	C	3.2E-02	7.3E-03	N/A	3.1E-01	3	2.3E-03	N/A	8.3E-07	N/A	1.4E-06	N/A
	Di-n-butylphthalate	N	7.7E-02	1.0E-01	N/A	3.1E-01	3	3.1E-02	N/A	7.9E-07	N/A	5.3E-07	N/A
	Di-n-octylphthalate	N	4.5E-02	4.0E-02	N/A	3.1E-01	3	1.2E-02	N/A	1.1E-06	N/A	7.7E-07	N/A
	Diethylphthalate	N	4.7E-02	8.0E-01	N/A	7.0E-01	3	5.6E-01	N/A	2.7E-08	N/A	1.8E-08	N/A
	Fluoranthene	N	4.6E-02	N/A	4.0E-02	3.1E-01	3	N/A	1.3E-01	N/A	2.4E-09	N/A	1.6E-09
	Fluorene	N	9.5E-02	4.0E-02	N/A	3.1E-01	3	1.2E-02	N/A	2.4E-07	N/A	1.6E-07	N/A
	Indeno(1,2,3-cd)pyrene	C	3.1E-02	7.3E-01	N/A	3.1E-01	3	2.3E-01	N/A	8.1E-09	N/A	1.3E-08	N/A
	Naphthalene	N	1.6E-01	2.0E-02	N/A	5.9E-02	3	1.2E-03	N/A	4.3E-06	N/A	2.9E-06	N/A
	Phenanthrene	N	2.4E-02	N/A	3.0E-02	7.3E-01	3	N/A	4.1E-02	N/A	3.1E-11	N/A	2.1E-11
	Phenol	N	5.5E-02	6.0E-01	N/A	9.0E-01	3	5.4E-01	N/A	3.2E-09	N/A	2.2E-09	N/A
	Pyrene	N	4.3E-02	N/A	3.0E-02	3.1E-01	3	N/A	9.7E-02	N/A	1.3E-10	N/A	8.8E-11
	2-Butanone (MEK)	N	1.8E-01	6.0E-01	N/A	1.0E-01	2	6.0E-02	N/A	9.5E-08	N/A	6.3E-08	N/A
	Acetone	N	1.1E+00	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	3.5E-06	N/A	2.3E-06	N/A
	Benzene	C	3.4E-02	3.0E-03	5.5E-02	8.8E-02	3	2.6E-04	6.3E-01	5.8E-07	9.6E-11	9.7E-07	1.6E-10
	Chlorobenzene	N	6.2E-01	2.0E-02	N/A	7.3E-02	3	1.5E-03	N/A	1.3E-05	N/A	9.0E-06	N/A
	Toluene	N	2.0E-03	2.0E-01	N/A	3.1E-01	3	6.2E-02	N/A	1.0E-09	N/A	6.8E-10	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfDdermal = Dermal reference dose.
RFDoral =Oral reference dose.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-2-28
Wetland 3 Phase II
Sediment Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	2.6E+04	1.0E+00	N/A	8.10E-03	N/A	5.21E-03	N/A
	Arsenic	C	3.6E+01	3.0E-04	1.5E+00	5.35E-03	**2.41E-06**	8.60E-03	**3.87E-06**
	Barium	N	4.4E+02	7.0E-02	N/A	1.98E-03	N/A	1.27E-03	N/A
	Cadmium	N	7.3E+01	5.0E-04	N/A	4.60E-02	N/A	2.96E-02	N/A
	Chromium	N	2.0E+02	N/A	N/A	N/A	N/A	N/A	N/A
	Cobalt	C	2.5E+00	2.0E-02	N/A	5.65E-06	N/A	9.09E-06	N/A
	Copper	N	6.9E+01	4.0E-02	N/A	5.45E-04	N/A	3.50E-04	N/A
	Cyanide (CN)	N	5.1E+00	2.0E-02	N/A	8.07E-05	N/A	5.19E-05	N/A
	Iron	N	3.9E+05	3.0E-01	N/A	4.07E-01	N/A	2.62E-01	N/A
	Lead	N	1.0E+02	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.3E+03	2.4E-02	N/A	1.68E-02	N/A	1.08E-02	N/A
	Selenium	N	2.0E+00	5.0E-03	N/A	1.27E-04	N/A	8.14E-05	N/A
	Vanadium	N	1.6E+02	7.0E-03	N/A	7.24E-03	N/A	4.65E-03	N/A
	Zinc	N	3.0E+02	3.0E-01	N/A	3.13E-04	N/A	2.01E-04	N/A
	4,4'-DDD	C	4.0E-01	N/A	2.4E-01	N/A	4.34E-09	N/A	6.98E-09
	4,4'-DDE	C	1.2E-01	N/A	3.4E-01	N/A	1.85E-09	N/A	2.97E-09
	4,4'-DDT	C	2.2E-01	5.0E-04	3.4E-01	1.99E-05	3.38E-09	3.20E-05	5.44E-09
	Aldrin	C	1.0E-03	3.0E-05	1.7E+01	1.51E-06	7.69E-10	2.42E-06	1.24E-09
	alpha-BHC	C	1.2E-03	5.0E-04	6.3E+00	1.09E-07	3.42E-10	1.74E-07	5.50E-10
	alpha-Chlordane	C	2.2E-03	5.0E-04	3.5E-01	1.99E-07	3.48E-11	3.20E-07	5.60E-11
	Aroclor-1260	C	3.5E-01	N/A	2.0E+00	N/A	3.17E-08	N/A	5.09E-08
	beta-BHC	C	7.0E-04	2.0E-04	1.8E+00	1.58E-07	5.70E-11	2.54E-07	9.16E-11
	delta-BHC	C	2.5E-04	5.0E-04	6.3E+00	2.26E-08	7.12E-11	3.63E-08	1.14E-10
	Dieldrin	C	6.0E-03	5.0E-05	1.6E+01	5.43E-06	4.34E-09	8.72E-06	6.98E-09
	Endosulfan sulfate	N	1.7E-03	6.0E-03	N/A	8.97E-08	N/A	5.77E-08	N/A
	Endrin	N	1.8E-03	3.0E-04	N/A	1.90E-06	N/A	1.22E-06	N/A
	Endrin ketone	N	1.4E-03	3.0E-04	N/A	1.48E-06	N/A	9.50E-07	N/A
	gamma-Chlordane	C	1.7E-03	5.0E-04	3.5E-01	1.54E-07	2.69E-11	2.47E-07	4.32E-11
	1,2-Dichlorobenzene	C	4.1E-01	9.0E-02	N/A	2.06E-07	N/A	3.31E-07	N/A
	1,4-Dichlorobenzene	C	1.4E+00	3.0E-02	2.4E-02	2.11E-06	1.52E-09	3.39E-06	2.44E-09
	Acenaphthene	N	9.8E-02	6.0E-02	N/A	5.17E-07	N/A	3.32E-07	N/A
	Benzo(a)anthracene	C	2.3E-02	N/A	7.3E-01	N/A	7.59E-10	N/A	1.22E-09
	Benzo(a)pyrene	C	1.8E-01	N/A	7.3E+00	N/A	5.94E-08	N/A	9.55E-08
	Benzo(b)fluoranthene	C	8.5E-02	N/A	7.3E-01	N/A	2.81E-09	N/A	4.51E-09
	Benzo(g,h,i)perylene	C	4.6E-02	N/A	7.3E-01	N/A	1.52E-09	N/A	2.44E-09
	Benzo(k)fluoranthene	C	2.7E-02	N/A	7.3E-02	N/A	8.91E-11	N/A	1.43E-10
	bis(2-Ethylhexyl)phthalate (BEHP)	C	2.7E-01	2.0E-02	1.4E-02	6.11E-07	1.71E-10	9.81E-07	2.75E-10
	Butylbenzylphthalate	N	2.3E-02	2.0E-01	N/A	3.64E-08	N/A	2.34E-08	N/A
	Chrysene	C	3.2E-02	7.3E-03	N/A	1.98E-07	N/A	3.19E-07	N/A
	Di-n-butylphthalate	N	7.7E-02	1.0E-01	N/A	2.44E-07	N/A	1.57E-07	N/A
	Di-n-octylphthalate	N	4.5E-02	4.0E-02	N/A	3.56E-07	N/A	2.29E-07	N/A
	Diethylphthalate	N	4.7E-02	8.0E-01	N/A	1.86E-08	N/A	1.20E-08	N/A
	Fluoranthene	N	4.6E-02	N/A	4.0E-02	N/A	5.83E-10	N/A	3.74E-10
	Fluorene	N	9.5E-02	4.0E-02	N/A	7.52E-07	N/A	4.83E-07	N/A
	Indeno(1,2,3-cd)pyrene	C	3.1E-02	7.3E-01	N/A	1.92E-09	N/A	3.09E-09	N/A
	Naphthalene	N	1.6E-01	2.0E-02	N/A	2.53E-06	N/A	1.63E-06	N/A
	Phenanthrene	N	2.4E-02	N/A	3.0E-02	N/A	2.28E-10	N/A	1.47E-10
	Phenol	N	5.5E-02	6.0E-01	N/A	2.90E-08	N/A	1.87E-08	N/A
	Pyrene	N	4.3E-02	N/A	3.0E-02	N/A	4.08E-10	N/A	2.63E-10
	2-Butanone (MEK)	N	1.8E-01	6.0E-01	N/A	9.50E-08	N/A	6.11E-08	N/A
	Acetone	N	1.1E+00	1.0E-01	N/A	3.48E-06	N/A	2.24E-06	N/A
	Benzene	C	3.4E-02	3.0E-03	5.5E-02	5.13E-07	8.46E-11	8.24E-07	1.36E-10
	Chlorobenzene	N	6.2E-01	2.0E-02	N/A	9.81E-06	N/A	6.31E-06	N/A
	Toluene	N	2.0E-03	2.0E-01	N/A	3.17E-09	N/A	2.04E-09	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = chronic daily intake (mg/kg-day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPCsd \times IRsd \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
IRsd = 100 mg/day for age groups greater than 6-years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 10-2-29
Wetland 3 Phase II
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	9.9E+01	=	2.2E+03	=	UG/L	041W030201	7 / 7	NAV	5.6E+02	2.2E-03	1.0E-03	5.59E-06	8.85E-05	1.18E-04
7440393	Barium	N	2.8E+01	J	5.7E+01	J	UG/L	041W030301	7 / 7	NAV	3.8E+01	5.7E-05	1.0E-03	1.48E-07	2.34E-06	3.13E-06
7440439	Cadmium	N	3.4E+00	J	3.8E+00	J	UG/L	041W030301	2 / 7	3.0E+00 / 4.6E+00	2.4E+00	3.8E-06	1.0E-03	9.88E-09	1.56E-07	2.09E-07
7440508	Copper	N	4.7E+00	J	9.6E+00	J	UG/L	041W030301	2 / 7	4.0E+00 / 4.5E+00	3.6E+00	9.6E-06	1.0E-03	2.50E-08	3.95E-07	5.28E-07
7439896	Iron	N	7.8E+03	=	1.8E+05	=	UG/L	041W030301	7 / 7	NAV	4.3E+04	1.8E-01	2.5E-04	1.14E-04	1.81E-03	2.42E-03
7439921	Lead	N	1.9E+00	J	2.0E+01	=	UG/L	041W030201	3 / 7	1.0E+00 / 1.6E+00	4.6E+00	2.0E-05	3.4E-04	1.79E-08	2.84E-07	3.80E-07
7439965	Manganese	N	1.3E+02	=	2.7E+02	=	UG/L	041W030201	7 / 7	NAV	1.7E+02	2.7E-04	1.0E-03	6.89E-07	1.09E-05	1.46E-05
7440622	Vanadium	N	2.2E+00	J	1.1E+01	J	UG/L	041W030301	4 / 7	2.0E+00 / 4.4E+00	4.3E+00	1.1E-05	1.0E-03	2.89E-08	4.57E-07	6.11E-07
11096825	Aroclor-1260	C	N/A	N/A	5.0E-01	J	UG/L	041W030201	1 / 7	1.0E+00 / 1.0E+00	5.0E-01	5.0E-07	8.1E-01	3.80E-06	8.59E-06	2.87E-05
53494705	Endrin ketone	N	N/A	N/A	2.5E-01	J	UG/L	041W030201	1 / 7	1.0E-01 / 1.0E-01	7.9E-02	2.5E-07	1.2E-02	8.28E-08	1.31E-06	1.75E-06
95501	1,2-Dichlorobenzene	C	N/A	N/A	1.0E+00	=	UG/L	041W030301	1 / 7	1.0E+00 / 1.0E+01	2.5E+00	1.0E-06	4.1E-02	1.58E-07	3.58E-07	1.20E-06
106467	1,4-Dichlorobenzene	C	2.0E+00	J	1.0E+01	=	UG/L	041W030301	6 / 7	N/A / 1.0E+01	4.1E+00	1.0E-05	4.2E-02	1.62E-06	3.67E-06	1.23E-05
91203	Naphthalene	N	N/A	N/A	1.0E+00	=	UG/L	041W030401	1 / 7	1.0E+00 / 1.0E+01	2.5E+00	1.0E-06	4.7E-02	1.65E-07	2.61E-06	3.49E-06
71432	Benzene	C	1.0E+00	J	3.0E+00	=	UG/L	041W030401	5 / 7	1.0E+00 / 1.0E+01	2.1E+00	3.0E-06	1.5E-02	1.35E-07	3.05E-07	1.02E-06
85018	Chlorobenzene	N	3.0E+00	=	3.0E+01	D	UG/L	041W030301	6 / 7	N/A / 1.0E+01	1.1E+01	3.0E-05	2.8E-02	2.83E-06	4.49E-05	6.00E-05
156592	cis-1,2-Dichloroethene	N	N/A	N/A	1.0E+00	=	UG/L	041W030401	1 / 4	1.0E+00 / 1.0E+00	6.3E-01	1.0E-06	1.5E-02	4.83E-08	7.65E-07	1.02E-06
75092	Methylene chloride	C	1.2E+02	D	1.2E+03	D	UG/L	041W030101	2 / 7	3.0E+00 / 1.0E+01	1.9E+02	1.2E-03	3.5E-03	1.35E-05	3.06E-05	1.02E-04

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound,
calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 10-2-30
Wetland 3 Phase II
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	2.2E-03	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	8.8E-04	N/A	1.2E-03	N/A
	Barium	N	5.7E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	4.8E-04	N/A	6.4E-04	N/A
	Cadmium	N	3.8E-06	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	1.3E-02	N/A	1.7E-02	N/A
	Copper	N	9.6E-06	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	3.3E-05	N/A	4.4E-05	N/A
	Iron	N	1.8E-01	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	2.0E-05	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.7E-04	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	1.9E-03	N/A	2.6E-03	N/A
	Vanadium	N	1.1E-05	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	2.5E-03	N/A	3.4E-03	N/A
	Aroclor-1260	C	5.0E-07	N/A	2.0E+00	1.4E-01	2	N/A	1.4E+01	N/A	N/A	N/A	N/A
	Endrin ketone	N	2.5E-07	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	3.5E-01	N/A	4.7E-01	N/A
	1,2-Dichlorobenzene	C	1.0E-06	9.0E-02	N/A	8.0E-01	3	7.2E-02	N/A	5.0E-06	N/A	1.7E-05	N/A
	1,4-Dichlorobenzene	C	1.0E-05	3.0E-02	2.4E-02	9.0E-01	3	2.7E-02	2.7E-02	1.4E-04	9.8E-08	4.5E-04	3.3E-07
	Naphthalene	N	1.0E-06	2.0E-02	N/A	5.9E-02	3	1.2E-03	N/A	2.2E-03	N/A	3.0E-03	N/A
	Benzene	C	3.0E-06	3.0E-03	5.5E-02	8.8E-02	3	2.6E-04	6.3E-01	1.2E-03	1.9E-07	3.9E-03	6.4E-07
	Chlorobenzene	N	3.0E-05	2.0E-02	N/A	7.3E-02	3	1.5E-03	N/A	3.1E-02	N/A	4.1E-02	N/A
	cis-1,2-Dichloroethene	N	1.0E-06	1.0E-02	N/A	1.0E+00	3	1.0E-02	N/A	7.6E-05	N/A	1.0E-04	N/A
	Methylene chloride	C	1.2E-03	6.0E-02	7.5E-03	1.0E-01	3	6.1E-03	7.4E-02	5.0E-03	**2.3E-06**	1.7E-02	**7.6E-06**

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-2-31
Wetland 3 Phase II
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser: Ingestion Hazard Quotient	Child Trespasser: Ingestion Cancer Risk	Maintenance Worker: Ingestion Hazard Quotient	Maintenance Worker: Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	2.2E-03	1.0E+00	N/A	6.8E-08	N/A	4.4E-08	N/A
	Barium	N	5.7E-05	7.0E-02	N/A	2.6E-08	N/A	1.7E-08	N/A
	Cadmium	N	3.8E-06	5.0E-04	N/A	2.4E-07	N/A	1.5E-07	N/A
	Copper	N	9.6E-06	4.0E-02	N/A	7.6E-09	N/A	4.9E-09	N/A
	Iron	N	1.8E-01	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	2.0E-05	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.7E-04	1.4E-01	N/A	6.0E-08	N/A	3.9E-08	N/A
	Vanadium	N	1.1E-05	7.0E-03	N/A	5.0E-08	N/A	3.2E-08	N/A
	Aroclor-1260	C	5.0E-07	N/A	2.0E+00	N/A	4.5E-12	N/A	7.3E-12
	Endrin ketone	N	2.5E-07	3.0E-04	N/A	2.6E-08	N/A	1.7E-08	N/A
	1,2-Dichlorobenzene	C	1.0E-06	9.0E-02	N/A	5.0E-11	N/A	8.1E-11	N/A
	1,4-Dichlorobenzene	C	1.0E-05	3.0E-02	2.4E-02	1.5E-09	1.1E-12	2.4E-09	1.7E-12
	Naphthalene	N	1.0E-06	2.0E-02	N/A	1.6E-09	N/A	1.0E-09	N/A
	Benzene	C	3.0E-06	3.0E-03	5.5E-02	4.5E-09	7.5E-13	7.3E-09	1.2E-12
	Chlorobenzene	N	3.0E-05	2.0E-02	N/A	4.7E-08	N/A	3.1E-08	N/A
	cis-1,2-Dichloroethene	N	1.0E-06	1.0E-02	N/A	3.2E-09	N/A	2.0E-09	N/A
	Methylene chloride	C	1.2E-03	6.0E-02	7.5E-03	9.0E-08	4.1E-11	1.5E-07	6.5E-11

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Table 10-2-32
Wetland 3 Phase III
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg·day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	1.6E+03	=	3.0E+03	=	MG/KG	041M030201	2 / 2	NAV	2.3E+03	1.0E-03	3	5.90E-07	2.95E-07	9.34E-06	6.24E-06
7440382	Arsenic	C	4.2E+00	J	1.5E+01	=	MG/KG	041M030201	2 / 2	NAV	9.4E+00	3.0E-02	2	8.76E-08	4.38E-08	1.98E-07	3.31E-07
7440393	Barium	N	1.9E+01	=	8.7E+01	=	MG/KG	041M030201	2 / 2	NAV	5.3E+01	1.0E-03	3	1.74E-08	8.70E-09	2.75E-07	1.84E-07
7440439	Cadmium	N	N/A	N/A	9.3E+00	=	MG/KG	041M030701	1 / 2	N/A / 2.0E+00	5.2E+00	1.0E-03	3	1.86E-09	9.30E-10	2.94E-08	1.97E-08
7440484	Cobalt	C	N/A	N/A	5.7E-01	J	MG/KG	041M030701	1 / 2	N/A / 6.5E-01	4.5E-01	1.0E-03	3	1.14E-10	5.70E-11	2.58E-10	4.31E-10
57125	Cyanide (CN)	N	N/A	N/A	2.6E+00	J	MG/KG	041M030701	1 / 2	N/A / 3.0E+00	2.1E+00	1.0E-01	2	5.20E-08	2.60E-08	8.23E-07	5.50E-07
7439896	Iron	N	6.7E+04	=	2.5E+05	=	MG/KG	041M030201	2 / 2	NAV	1.6E+05	1.0E-03	3	4.92E-05	2.46E-05	7.79E-04	5.21E-04
7439921	Lead	N	2.1E+01	=	3.6E+01	=	MG/KG	041M030701	2 / 2	NAV	2.8E+01	1.0E-03	3	7.12E-09	3.56E-09	1.13E-07	7.54E-08
7439965	Manganese	N	4.3E+01	=	2.4E+02	=	MG/KG	041M030201	2 / 2	NAV	1.4E+02	1.0E-03	3	4.72E-08	2.36E-08	7.47E-07	5.00E-07
7782492	Selenium	N	2.0E+00	J	5.4E+00	=	MG/KG	041M030201	2 / 2	NAV	3.7E+00	1.0E-03	3	1.08E-09	5.40E-10	1.71E-08	1.14E-08
7440622	Vanadium	N	6.4E+00	=	1.4E+01	=	MG/KG	041M030201	2 / 2	NAV	1.0E+01	1.0E-03	3	2.70E-09	1.35E-09	4.27E-08	2.86E-08
7440666	Zinc	N	4.6E+01	=	2.3E+02	=	MG/KG	041M030701	2 / 2	NAV	1.4E+02	1.0E-03	3	4.68E-08	2.34E-08	7.41E-07	4.95E-07
72548	4,4'-DDD	C	1.4E-02	J	4.9E-02	=	MG/KG	041M030701	2 / 2	NAV	3.2E-02	3.0E-02	1	2.94E-10	1.47E-10	6.65E-10	1.11E-09
72559	4,4'-DDE	C	N/A	N/A	1.1E-02	=	MG/KG	041M030701	1 / 2	N/A / 1.6E-02	9.5E-03	3.0E-02	1	6.60E-11	3.30E-11	1.49E-10	2.49E-10
50293	4,4'-DDT	C	3.7E-03	J	9.3E-03	=	MG/KG	041M030701	2 / 2	NAV	6.5E-03	3.0E-02	1	5.58E-11	2.79E-11	1.26E-10	2.11E-10
1031078	Endosulfan sulfate	N	N/A	N/A	7.2E-03	J	MG/KG	041M030701	1 / 2	N/A / 1.6E-02	7.6E-03	1.0E-01	2	1.44E-10	7.20E-11	2.28E-09	1.52E-09
72208	Endrin	N	N/A	N/A	2.8E-03	J	MG/KG	041M030201	1 / 2	N/A / 7.0E-03	3.2E-03	1.0E-01	2	5.60E-11	2.80E-11	8.86E-10	5.93E-10
57749	gamma-Chlordane	C	N/A	N/A	7.4E-04	J	MG/KG	041M030701	1 / 2	N/A / 8.5E-03	2.5E-03	4.0E-02	2	5.92E-12	2.96E-12	1.34E-11	2.24E-11
117817	(BEHP)	C	N/A	N/A	5.0E-01	J	MG/KG	041M030701	1 / 2	N/A / 1.6E+00	6.5E-01	1.0E-01	1	1.00E-08	5.00E-09	2.26E-08	3.78E-08
78933	2-Butanone (MEK)	N	3.8E-02	=	1.2E-01	=	MG/KG	041M030201	2 / 2	NAV	7.9E-02	1.0E-02	3	2.40E-10	1.20E-10	3.80E-09	2.54E-09
67641	Acetone	N	2.4E-01	=	7.7E-01	J	MG/KG	041M030201	2 / 2	NAV	5.1E-01	1.0E-02	3	1.54E-09	7.70E-10	2.44E-08	1.63E-08
75150	Carbon disulfide	N	N/A	N/A	1.7E-02	J	MG/KG	041M030201	1 / 2	N/A / 1.1E-02	1.1E-02	2.5E-01	3	8.50E-10	4.25E-10	1.35E-08	9.00E-09

Notes:

Equation for sediment risk:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DA_{event} for sediment contact:

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

Where:

C_{sd} = Chemical concentration in sediment (mg/kg).
CF = Conversion factor (10^{-6} kg/mg).
AF = Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;
(2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Table 10-2-33
Wetland 3 Phase III
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
Sediment Dermal Risk	Aluminum	N	3.0E+03	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	9.3E-05	N/A	6.2E-05	N/A
	Arsenic	C	1.5E+01	3.0E-04	1.5E+00	4.1E-01	3	1.2E-04	3.7E+00	1.6E-03	7.2E-07	2.7E-03	**1.2E-06**
	Barium	N	8.7E+01	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	5.6E-05	N/A	3.8E-05	N/A
	Cadmium	N	9.3E+00	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	2.4E-03	N/A	1.6E-03	N/A
	Cobalt	C	5.7E-01	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	1.6E-08	N/A	2.7E-08	N/A
	Cyanide (CN)	N	2.6E+00	2.0E-02	N/A	1.7E-01	3	3.4E-03	N/A	2.4E-04	N/A	1.6E-04	N/A
	Iron	N	2.5E+05	3.0E-01	N/A	1.5E-01	3	4.5E-02	N/A	1.7E-02	N/A	1.2E-02	N/A
	Lead	N	3.6E+01	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.4E+02	2.4E-02	N/A	4.0E-02	1, 3	9.6E-04	N/A	7.8E-04	N/A	5.2E-04	N/A
	Selenium	N	5.4E+00	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	6.2E-06	N/A	4.2E-06	N/A
	Vanadium	N	1.4E+01	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	2.3E-04	N/A	1.6E-04	N/A
	Zinc	N	2.3E+02	3.0E-01	N/A	2.0E-01	3, 4	6.0E-02	N/A	1.2E-05	N/A	8.3E-06	N/A
	4,4'-DDD	C	4.9E-02	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	5.3E-09	N/A	8.9E-09
	4,4'-DDE	C	1.1E-02	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	1.7E-09	N/A	2.8E-09
	4,4'-DDT	C	9.3E-03	5.0E-04	3.4E-01	3.0E-02	2	1.5E-05	1.1E+01	8.4E-06	1.4E-09	1.4E-05	2.4E-09
	Endosulfan sulfate	N	7.2E-03	6.0E-03	N/A	5.0E-01	3	3.0E-03	N/A	7.6E-07	N/A	5.1E-07	N/A
	Endrin	N	2.8E-03	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	2.4E-04	N/A	1.6E-04	N/A
	gamma-Chlordane	C	7.4E-04	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	3.3E-08	5.9E-12	5.6E-08	9.8E-12
	bis(2-Ethylhexyl)phthalate (BEHP)	C	5.0E-01	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	1.1E-05	3.2E-09	1.9E-05	5.3E-09
	2-Butanone (MEK)	N	1.2E-01	6.0E-01	N/A	1.0E-01	2	6.0E-02	N/A	6.3E-08	N/A	4.2E-08	N/A
	Acetone	N	7.7E-01	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	2.4E-06	N/A	1.6E-06	N/A
	Carbon disulfide	N	1.7E-02	1.0E-01	N/A	1.0E-01	3	1.0E-02	N/A	1.3E-06	N/A	8.6E-07	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-2-34
Wetland 3 Phase III
Sediment Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	3.0E+03	1.0E+00	N/A	9.34E-04	N/A	6.00E-04	N/A
	Arsenic	C	1.5E+01	3.0E-04	1.5E+00	2.20E-03	9.90E-07	3.54E-03	**1.59E-06**
	Barium	N	8.7E+01	7.0E-02	N/A	3.93E-04	N/A	2.53E-04	N/A
	Cadmium	N	9.3E+00	5.0E-04	N/A	5.89E-03	N/A	3.79E-03	N/A
	Cobalt	C	5.7E-01	2.0E-02	N/A	1.29E-06	N/A	2.07E-06	N/A
	Cyanide (CN)	N	2.6E+00	2.0E-02	N/A	4.12E-05	N/A	2.65E-05	N/A
	Iron	N	2.5E+05	3.0E-01	N/A	2.60E-01	N/A	1.67E-01	N/A
	Lead	N	3.6E+01	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.4E+02	2.4E-02	N/A	3.11E-03	N/A	2.00E-03	N/A
	Selenium	N	5.4E+00	5.0E-03	N/A	3.42E-04	N/A	2.20E-04	N/A
	Vanadium	N	1.4E+01	7.0E-03	N/A	6.11E-04	N/A	3.93E-04	N/A
	Zinc	N	2.3E+02	3.0E-01	N/A	2.47E-04	N/A	1.59E-04	N/A
	4,4'-DDD	C	4.9E-02	N/A	2.4E-01	N/A	5.32E-10	N/A	8.55E-10
	4,4'-DDE	C	1.1E-02	N/A	3.4E-01	N/A	1.69E-10	N/A	2.72E-10
	4,4'-DDT	C	9.3E-03	5.0E-04	3.4E-01	8.41E-07	1.43E-10	1.35E-06	2.30E-10
	Endosulfan sulfate	N	7.2E-03	6.0E-03	N/A	3.80E-07	N/A	2.44E-07	N/A
	Endrin	N	2.8E-03	3.0E-04	N/A	2.95E-06	N/A	1.90E-06	N/A
	gamma-Chlordane	C	7.4E-04	5.0E-04	3.5E-01	6.69E-08	1.17E-11	1.08E-07	1.88E-11
	bis(2-Ethylhexyl)phthalate (BEHP)	C	5.0E-01	2.0E-02	1.4E-02	1.13E-06	3.17E-10	1.82E-06	5.09E-10
	2-Butanone (MEK)	N	1.2E-01	6.0E-01	N/A	6.33E-08	N/A	4.07E-08	N/A
	Acetone	N	7.7E-01	1.0E-01	N/A	2.44E-06	N/A	1.57E-06	N/A
	Carbon disulfide	N	1.7E-02	1.0E-01	N/A	5.38E-08	N/A	3.46E-08	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = chronic daily intake (mg/kg-day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
IRsd = 100 mg/day for age groups greater than 6-years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 10-2-35
Wetland 3 Phase III
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	N/A	N/A	5.9E+01	J	UG/L	041W030101	1 / 1	NAV	5.9E+01	5.9E-05	1.0E-03	1.54E-07	2.43E-06	3.25E-06
7440393	Barium	N	N/A	N/A	3.7E+01	=	UG/L	041W030101	1 / 1	NAV	3.7E+01	3.7E-05	1.0E-03	9.67E-08	1.53E-06	2.05E-06
7439896	Iron	N	N/A	N/A	2.0E+04	=	UG/L	041W030101	1 / 1	NAV	2.0E+04	2.0E-02	2.5E-04	1.27E-05	2.02E-04	2.70E-04
7439965	Manganese	N	N/A	N/A	2.3E+02	=	UG/L	041W030101	1 / 1	NAV	2.3E+02	2.3E-04	1.0E-03	6.01E-07	9.51E-06	1.27E-05
67641	Acetone	N	N/A	N/A	2.8E+01	=	UG/L	041W030101	1 / 1	NAV	2.8E+01	2.8E-05	5.7E-04	5.23E-08	8.28E-07	1.11E-06
85018	Chlorobenzene	N	N/A	N/A	8.2E-01	J	UG/L	041W030101	1 / 1	NAV	8.2E-01	8.2E-07	2.8E-02	7.75E-08	1.23E-06	1.64E-06

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).

EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1+B} + 2\tau_{event} \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound,
calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 10-2-36
Wetland 3 Phase III
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	5.9E-05	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	2.4E-05	N/A	3.3E-05	N/A
	Barium	N	3.7E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	3.1E-04	N/A	4.2E-04	N/A
	Iron	N	2.0E-02	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.3E-04	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	1.7E-03	N/A	2.3E-03	N/A
	Acetone	N	2.8E-05	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	8.3E-05	N/A	1.1E-04	N/A
	Chlorobenzene	N	8.2E-07	2.0E-02	N/A	7.3E-02	3	1.5E-03	N/A	8.4E-04	N/A	1.1E-03	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-2-37
Wetland 3 Phase III
Surface Water Incidental Ingestion Exposure Risk – Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	5.9E-05	1.0E+00	N/A	1.9E-09	N/A	1.2E-09	N/A
	Barium	N	3.7E-05	7.0E-02	N/A	1.7E-08	N/A	1.1E-08	N/A
	Iron	N	2.0E-02	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.3E-04	1.4E-01	N/A	5.2E-08	N/A	3.4E-08	N/A
	Acetone	N	2.8E-05	1.0E-01	N/A	8.9E-09	N/A	5.7E-09	N/A
	Chlorobenzene	N	8.2E-07	2.0E-02	N/A	1.3E-09	N/A	8.3E-10	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:

CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:

Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer – 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer – 25,550 days (child trespasser/adult maintenance worker).

10.3 Wetland 4D — Screening Level Problem Formulation

10.3.1 Site Description and Habitats Present at Wetland 4D

Wetland 4D is in the northern portion of the eastern half of NAS Pensacola (Figure 10-1). It is bound on the west, south, and east by the A.C. Read Golf Course and on the north by Bayou Grande. Wetland 4D is fed by Wetland 3 from the west, Wetland 4C from the south, and is tidally influenced by Bayou Grande from the north (Figure 10-2). Groundwater from western adjacent Site 1 also flows toward this wetland. Parsons and Pruitt (USEPA, 1991a) described this wetland as an estuarine system with emergent vegetation. Saw grass and black needle rush are the prominent vegetative features at this wetland. Wetland 4D receives freshwater from surface water discharges from Wetland 3 and Wetland 4C via Wetlands 4A and 4B (Wetland 4A encompasses an irrigation reservoir for the golf course and drains into Bayou Grande through Wetlands 4B, 4C, and 4D).

Photograph 1 Wetland 4D — Facing Northeast

The open water portion of the wetland ranges from 1 to about 8 feet in depth and has a maximum width of about 70 feet. Sediment in most of the wetland is sandy.

The IR site potentially affecting Wetland 4D is Site 1. As described in Section 10, the Site 1 (OU 1) landfill was used from the mid-1950s until 1976 as the predominant disposal site for all solid wastes generated on the base. Based on the data collected during the Site 1 RI, the *Final ROD* issued by Ensafe on August 19, 1998, outlined three RAOs for the OU 1 site:

1. Protection of groundwater from leachable compounds

2. Restoration of groundwater and prevention of further contamination of shallow/intermediate groundwater

3. Prevention of further contamination of surface water in Wetland 3

The remedial actions selected for the site included:

1. Institutional controls to restrict groundwater use and intrusive activities

2. Implementation of a groundwater monitoring program to ensure that natural processes are effectively reducing the concentrations of organic compounds to attain performance standards

3. A groundwater interceptor system to treat the iron-contaminated groundwater that is migrating from the landfill and discharging to Wetland 3

The long-term monitoring plan was implemented by TtNUS. Groundwater was monitored for the following constituents: 1,1,2,2-tetrachlorethane, benzene, chlorobenzene, vinyl chloride, xylenes, aluminum, cadmium, chromium, iron, manganese, and nickel. Based upon collected data, the Third Annual Groundwater Monitoring Report recommended continued monitoring for benzene, vinyl chloride, xylenes, aluminum, cadmium, iron, and manganese (TtNUS, 2003b). The other constituents no longer exceeded MCLs and were dropped from the monitoring plan.

As stated in the ROD, the interceptor trench was installed to prevent iron–contaminated groundwater from discharging to Wetland 3. The interceptor trench installed by Bechtel has operated since 1999. Intercepted groundwater has been discharged to the FOTW for treatment. Despite the operation of the system, iron concentrations in Wetland 3 and its discharge point in Wetland 4D remain above reference concentrations. The current recommendation is to discontinue the pumping operation and modify the monitoring program in the trench and Wetland 3 area (TtNUS, 2004b).

10.3.2 Wetland 4D — Sample Location Description

Phase II Sediment Sample Location Description

Five sediment samples were collected and analyzed in 1995 for Wetland 4D. Figure 10-4 shows the sediment sampling locations. Two sample locations were to the southwest, near where Wetland 3 discharges to Wetland 4D. One sample was near where Wetland 4C discharges to Wetland 4D. One sample location was near the center of the wetland, and one was located at the wetland discharge point into Bayou Grande. Table 10-3-1 (tables are located at the end of each section) provides a physical description of the sediments collected at Wetland 4D. Sediment composition at Wetland 4D ranged from light brown poorly graded sand with gravel and TOC of 0.154% (041M040501) to dark brown silty sand with organics and a TOC of 7.0% (041M040401).

Phase II Surface Water Sample Location Description

Two surface water samples were collected at Wetland 4D, co-located with sediment locations 041M04D101 and 041M04D401 (Figure 10-4). Table 10-3-2 provides a physical description of the surface water collected at Wetland 4D. Surface water from Wetland 4D was found to be very hard and had slightly acidic pH. Surface water at Wetland 4D had hardness as CaCO3 concentrations ranging from 344 to 735 mg/L, salinity from 0.14% to 0.76%, and pH from 6.02 to 6.55. Specific conductivity concentrations ranged from 3.31 to 12.6 mS/cm. Surface water at Wetland 4D had turbidity readings of 0 NTUs at both locations.

10.3.3 Wetland 4D — Nature and Extent of Contamination

Figure 10-4 presents the sediment and surface water sampling locations for Wetland 4D.

Phase II Sediment

Table 10-3-3 summarizes the analytical results of the five Wetland 4D sediment samples.

Metals — Twenty metals were detected during sediment sampling at Wetland 4D. Locations 041M04D101, 041M04D201, and 041M04D401 each had 20 metals detected. Seventeen of the 20 metals detected at location 041M04D201 were present at concentrations exceeding the applicable reference values. These included aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, potassium, selenium, sodium, and vanadium. In fact, most of these detections represented the highest metal concentrations detected at Wetland 4D. Locations 041M04D101 and 041M04D401 each had 15 reference value exceedances. Location 041M04D501 had 14 detections, with a single exceedance. Location 041M04D301 had 15 detections, none of which exceeded reference concentration values. The metals at Wetland 4D were widespread across the site, with multiple exceedances present at locations 041M04D101, 041M04D201, and 041M04D401.

Pesticides and PCBs — Eight pesticide compounds and three PCBs were detected during sediment sampling at Wetland 4D. Total DDT was calculated for each location by adding the concentrations of 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT. Likewise, a base wide total DDT reference concentration was calculated using the base wide concentrations for these same constituents. Eight pesticide compounds and aroclor-1260 were detected at location 041M04D101. The base wide reference concentration for 4,4′-DDE was exceeded at this location. Location 041M04D401 had six pesticides detected, with the concentrations of 4,4′-DDD, 4,4′-DDE, and total DDT exceeding the base wide reference value. The other three locations had detections of pesticide compounds; however, the concentrations were all below the applicable reference values.

The PCBs aroclor–1248, aroclor–1254, and aroclor–1260 — were each detected in one or more samples. Location 041M04D101 had the highest PCB concentrations and had the only detection of aroclor–1260.

Aroclor–1254 was the only PCB detected at location 041M04D201. Location 041M04D501 had detections of aroclor–1248 and aroclor–1254 at low concentrations. The other two locations exhibited no detections of PCBs.

Pesticide compounds were detected in all sediment samples collected. The highest concentrations were detected at two locations — 041M04D401 and 041M04D101 — near the shore of the wetlands adjacent to the golf course.

SVOCs — Fourteen SVOCs were detected in the five sediment samples collected at Wetland 4D. Locations 041M04D101 and 041M04D201 had the most SVOCs detected, with 13 and 12 detections, respectively. Generally, location 041M04D201 had the highest SVOC concentrations detected at the wetland. Location 041M04D301 had 11 detections, at lower concentrations than 041M04D201 and 041M04D101. The other two locations each had a single detection. Even though 041M04D401 only had a single detection of SVOCs (diethylphthalate), the concentration (71,000 ppb) was high.

VOCs — Two VOCs, acetone and carbon disulfide, were detected in sediment samples collected from Wetland 4D. Both compounds were detected at locations 041M04D201 and 041M04D401. These two locations also exhibited the highest concentrations of acetone. The other three locations had single detections.

Summary

The distribution of metals across Wetland 4D displays no trend. Pesticides were present at the highest concentrations at location 041M04D401. PCBs are widely distributed, except for locations 041M04D301 and 041M04D401. Although SVOCs are also widespread in the wetland, the greatest concentrations detected were at location 041M04D201, near the center of the wetland. VOCs were present at all locations across the wetland.

Phase II Surface Water

Figure 10-4 presents the surface water sampling locations for Wetland 4D. Table 10-3-4 summarizes the analytical results of the two Wetland 4D surface water samples.

Metals — Seven metals were detected in the surface water samples collected from Wetland 4D. The sample collected from location 041W4D401 exhibited all seven analytes, while the sample from location 041W04D101 had six metals detected. Both of these locations had two reference concentration exceedances for metals. Manganese concentrations in both samples exceeded the estuarine reference value. Thallium at location 041W04D401 and iron at location 041W04D101 also exceeded their respective reference values. Both of these locations are near the shore, adjacent to the golf course.

Pesticides and PCBs — No pesticide compounds or PCBs were detected during surface water sampling at Wetland 4D.

SVOCs — No SVOCs were detected during surface water sampling at Wetland 4D.

VOCs — Methylene chloride — detected at location 041W04D401 — was the only VOC detected during surface water sampling at Wetland 4D.

10.3.4 Ecological Risk Assessment

Phase II Investigation Summary — Wetland 4D

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-3-5, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. COPCs retained after screening are listed in Table 10-3-6.

Baseline Problem Formulation — Wetland 4D Sediment COPC Refinement

During the COPC refinement, additional information was used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. This risk assessment presents a statement of potential risk for each of the preliminary COPCs.

The COPC refinement process included:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to base wide total DDT concentrations
- Comparison of inorganic constituents to reference wetland values
- Regression analysis of inorganic constituents
- Comparison of detected concentrations compared to EqP SQGs
- Comparison to Swartz consensus values
- Mean ERM quotients

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 10-3-7. COPCs retained after refinement are presented in Table 10-3-8.

For Wetland 4D, aluminum, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, selenium, and vanadium exceeded their Site 41 estuarine sediment reference concentrations. The majority of inorganic exceedances were detected at sample location 041M04D201. Lead generated the largest inorganic SV and RV HQs (11.5 and 3.11, respectively). Of the five sediment samples, three locations exceeded the lead RV and

reference value. Based on regression analysis of the Phase II data, sample locations, 041M04D101 and 041M04D201 were identified as outliers for lead concentrations. After refinement, aluminum, barium, beryllium, calcium, cobalt, iron, lead, magnesium, manganese, potassium, selenium, sodium, and vanadium were included as COPCs for Wetland 4D. The maximum detections of the essential nutrients (calcium, magnesium, potassium, and sodium) were all slightly above reference wetland ranges; however, it is not likely that adverse ecological effects are resulting from these concentrations. Further evaluation of potential for adverse effects of these constituents is not required.

At Wetland 4D, total DDT and 4,4'-DDD were above base wide levels and were carried forward in the ERA Process (Figure 10-5). The highest DDT exceedances occurred at location 041M04D401; whereas, the only endosulfan sulfate detection occurred at 041M04D101. Total BHCs were also detected at 041M04D101 and exceeded their RV, four out of five times. Pesticides were evaluated further using a food chain model for the OU 1 wetlands.

When normalized to detected TOC concentrations, VOCs were not risk drivers for Wetland 4D. However, carbon disulfide is not addressed by this approach and is therefore carried forward as a COPC. A number of PAHs were detected throughout the Wetland 4D sediments. Applying the Swartz consensus value to TOC-normalized PAH values, reveals a total PAH value, that is below the median effects concentration (MEC) during refinement (Figure 10-6). Several other PAHs detected in Wetland 4D sediments were retained, since the Swartz consensus values do not pertain to all the PAHs (Section 8). The detected SVOC generating the largest HQs was diethylphthalate (max SV HQ 390); however, it was only detected at location 041M04D401. Diethylphthalate and carbazole are included as a COPC for Wetland 4D.

Table 10-3-9 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Based on this approach, two sample locations (041M04D301 and 041M04D501) were determined to be Category 1, indicating sediments in these locations are considered nontoxic. Three sample locations — 041M04D101, 041M04D201, and 041M04D401 — were determined to be Category 2, indicating sediments in these wetlands, according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this category also has the highest level of uncertainly in predicting toxicity. Figure 10-7 shows the Mean ERM category for each sediment sample location at OU 1 and Wetland 4D.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-3-10, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-3-11.

Baseline Problem Formulation — Wetland 4D Surface Water COPC Refinement

During the surface water COPC refinement, additional information was used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. The COPC refinement process will include:

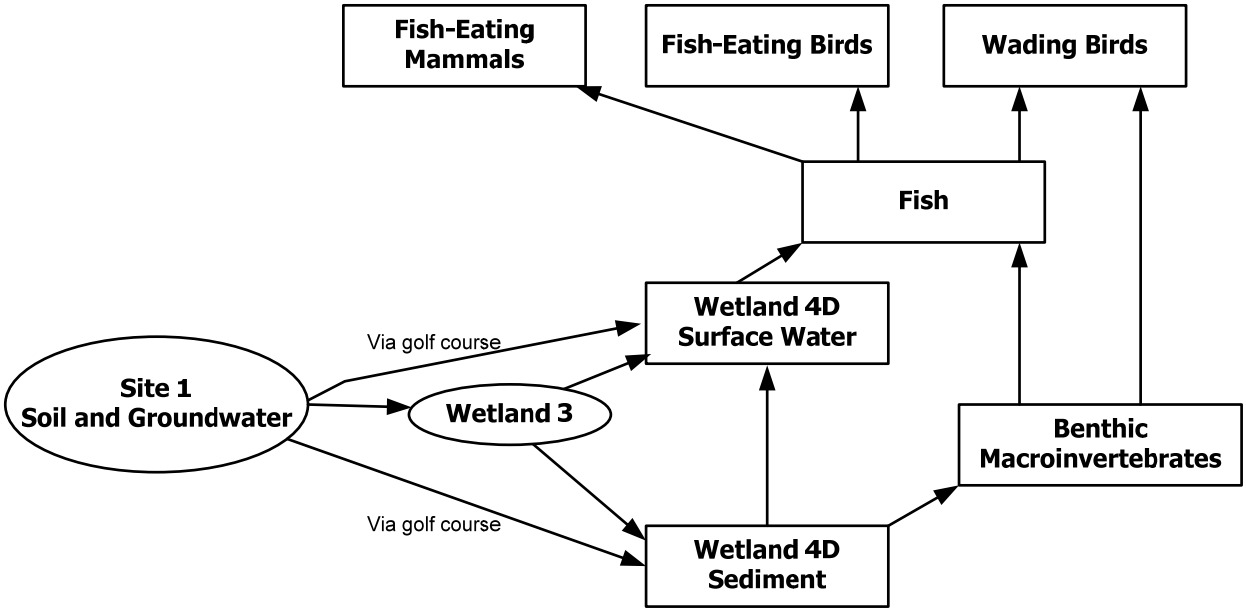
- Comparison of maximum concentrations to average concentrations
- Comparison of inorganic constituents to reference wetland values
- Description of surface water exceedances and their extent

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 10-3-12. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland. COPCs retained after refinement are presented in Table 10-3-13.

For Wetland 4D, iron, manganese, and thallium exceeded the Site 41 estuarine reference surface water concentrations and were retained as potential COPCs. At Wetland 4D, the highest inorganic constituents detected, exceeding reference concentrations in surface water, were iron and thallium. Iron was detected at location 041W04D101, which coincides with sediment detections of iron at the same location. Thallium was detected in surface water at one location 041W04D401; however, thallium was not detected in any of the five sediment locations.

The conceptual model below symbolizes which environmental habitats may be impacted by Wetland 4D Phase II constituents retained during the ERA Process.

Wetland 4D
Conceptual Site Model



Wetland 4D was previously identified as a Red-Coded Wetland, indicating contaminants were detected and contamination appears to be directly related to nearby IR sites. In addition, Wetland 4D was categorized as Group C, which includes Wetland 15, 16, 18 (A & B), and 63A. Wetlands 16 and 18 were sampled to represent the Group C wetlands in Phase III because of their similar condition and relatively higher contaminant concentrations. To assess risks from contaminants that bioaccumulate, the results from Wetland 4D will be used in the OU 1 food-chain model presented in Section 10.8.

10.3.5 Wetland 4D — Human Health Risk Assessment

Wetland 4D is described in Section 10.3.1 and the HHRA is summarized below.

10.3.5.1 Site Data

Surface water and sediment data were collected at Wetland 4D during the RI. Section 10.3.2 summarizes the nature and extent of contamination for this wetland. Surface water and sediment data are summarized in Tables 10-3-3 and 10-3-4, which also identify COPCs.

10.3.5.2 Conceptual Site Model

As described in Section 10.3.1, Wetland 4D is estuarine and part of the NAS Pensacola golf course; therefore, a recreational scenario is possible. Swimming, wading, and fishing are not allowed, so trespassing and retrieving golf balls may be the only viable scenarios. Dermal contact could be a significant exposure pathway for these scenarios and was included in this HHRA.

COPCs were identified as described in Section 9. The following scenarios and exposure pathways were evaluated for this wetland:

Scenario	Medium	Ingestion	Dermal
Maintenance	Sediment	√	√
	Surface water	√	√
Trespasser	Sediment	√	√
	Surface water	√	√

10.3.5.3 Risk Characterization

The child trespasser and adult maintenance worker scenarios were assessed for this wetland.

Trespasser

As shown in Tables 10-3-14 through 10-3-16, sediment ingestion risk estimates exceed FDEP's risk threshold of 1E-6, and the only risk driver was arsenic. Hazard indices were below 1.0. As shown in Tables 10-3-17 through 10-3-19, there were no risk drivers for surface water at Wetland 4D. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 10-3-14 through 10-3-16, sediment ingestion risk estimates exceed FDEP's risk threshold of 1E-6, and the only risk driver was arsenic. Hazard indices were below 1.0. As shown in Tables 10-3-17 through 10-3-19, there were no risk drivers for surface water at Wetland 4D. Hazard indices were below 1.0.

Summary of Wetland 4D Phase Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	4.60E-02	5.35E-06
	Surface water	4.74E-02	5.50E-07
Trespasser	Sediment	6.29E-02	3.27E-06
	Surface water	3.49E-02	1.64E-07

Wetland 4D

HHRA COC Summary

The following parameter was determined in the HHRA to be a COC for Wetland 4D:

- Arsenic

10.3.6 Wetland 4D — Fate and Transport Analysis

This wetland occupies an area to the northeast of Site 1. Wetland 4D receives drainage from Wetland 3 along the southeastern portion, and Wetlands 4A, 4B, and 4C drain into it from the south. Internally, the wetland drains from the southeast, eventually emptying into Bayou Grande (see Figure 10-1).

The sediment and surface water COPCs retained after refinement are summarized in Tables 10-3-8 and 10-3-13 respectively. The associated monitoring wells used, for comparing data for the fate and transport analysis, are provided below. All associated monitoring wells and borings are used in the comparison (no considerations given for upgradient/downgradient positioning) because of the potential for tidal flux influences on internal wetland flow.

Associated Monitoring Wells: 001GS058, 001GS037, 001GM038, 001SI036, 001GI036, 001GM032, 001GM069, 001SI035, 001GI035, 001GI072, 001GS071

Surface Water/Sediment Transport into the Wetland Media:

Surface Water — No directly comparable storm water data are available from the area proximal to this wetland complex. Because of the lack of data, no definitive statement can be made regarding the validation of the pathway via storm water runoff into the wetland complex. The wetland is surrounded by unpaved areas, so the storm water runoff pathway is likely to be less influential than the groundwater discharge pathways.

Sediment — Based on the data from surface soil proximal to this wetland complex, the surface soil to wetland sediment pathway is validated for the following parameters:

Phase II	
Aluminum	Vanadium
Iron	Endosulfan sulfate
Lead	4,4'-DDD
Manganese	Total DDT

Groundwater to Wetland Media Pathways:

Surface Water — Based on the data from associated monitoring wells, the groundwater to wetland surface water pathway is validated and significant for the following parameters (**note:** the 1993 metals are not used for validation purposes due to potential bias introduced by the sampling methodology):

Phase II
Iron
Manganese

Sediment — Based on the data from associated monitoring wells, the groundwater to wetland sediment pathway is validated and significant for the following parameters (**note:** the 1993 metals data are not used for validation purposes due to potential bias introduced by the sampling methodology):

Phase II	
Aluminum	Manganese
Iron	Potassium

Surface Water/Sediment Transport within the Wetlands:

To evaluate these pathways in Wetland 4D, upgradient sediment sample location 041M04D101 was compared to downgradient surface sediment location 041M04D301. The surface water pathway is not evaluated, because one sample was collected in this wetland. Criteria of note are the number of detected parameters and the apparent trend in concentrations.

Sediment — Evaluation of upgradient 041M04D101 with downgradient 041M04D301 indicates a decrease in detected parameters (20 metals/23 organics upgradient versus 15 metals/16 organics downgradient). All 15 metals detected downgradient exhibited a marked decrease in concentration. One organic parameter was present downgradient that was not detected upgradient, and the remaining 15 organic parameters exhibited slight to moderate decreases in concentration. The organics detected included pesticides and BAP equivalents, each indicative of application residuals and storm water runoff/incomplete combustion by-products. TOC also exhibited a marked decrease in concentration. All of this data suggests that sediment within this wetland is fixing these parameters and thus reducing the downgradient transport significantly.

Table 10-3-1
Wetland 4D Phase II
Sediment Physical Parameters

	December 1995 Data				
Parameter	**041M040101**	**041M040201**	**041M040301**	**041M040401**	**041M040501**
TOC (%)	3.3	4.51	0.204	7	0.154
Percent Solids (%)	38.1	26.1	83.6	27.5	85.4
Grain Size Analysis (percent of composition[1])					
Fine Gravel	0	0	0	0	37
Coarse Sand	0	0	0	0	0
Medium Sand	20	22	37	16	14
Fine Sand	52	46	62	54	48
Silt and Clay	28	32	1	30	1
Description	Black Silty Medium to Fine Sand with Organics	Black Silty Medium to Fine Sand with Organics	Black/Brown Medium to Fine Sand	Dark Brown Silty Sand with Organics	Light Brown Poorly Graded Sand with some Gravel

Note:
[1] = Derived from sieve analyses.

Table 10-3-2
Wetland 4D Phase II
Surface Water Physical Parameters

Parameter	041W04D101	041W04D401
Hardness as CaCO3 (mg/L)	344	735
pH	6.55	6.02
Specific Conductivity (mS/cm)	3.31	12.6
Turbidity (NTU)	0	0
Salinity (%)	0.15	0.76

Notes:
mg/L = Milligrams per liter
MS/cm = Millsiemens per centimeter
NTU = Nephelometric turbidity units
% = Percent

Table 10-3-3
Wetland 4D Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	4,274.0	3	5	5	390.0	14,700.0	7,450.0	041M04D201
Antimony	0.260	1	1	5	0.950	0.950	0.279	041M04D201
Arsenic	2.140	3	5	5	0.490	20.0	8.80	041M04D201
Barium	3.840	3	5	5	0.340	9.0	4.860	041M04D201
Beryllium	0.130	3	3	5	0.370	0.550	0.282	041M04D201
Cadmium	0.390	3	4	5	0.260	3.70	2.070	041M04D201
Calcium	1,978.80	3	5	5	26.30	4,510.0	1,790.0	041M04D201
Chromium	13.10	3	5	5	0.740	70.20	36.20	041M04D101
Cobalt	0.910	3	3	5	1.10	2.10	0.996	041M04D201
Copper	8.440	3	5	5	0.490	45.80	19.40	041M04D201
Iron	2,684.40	3	5	5	671.0	39,400.0	18,800.0	041M04D201
Lead	21.040	3	5	5	0.730	348.0	142.0	041M04D201
Magnesium	2,943.60	1	5	5	19.60	4,590.0	2,030.0	041M04D201
Manganese	9.810	4	5	5	2.0	69.30	42.10	041M04D201
Mercury	0.110	2	2	5	0.120	0.160	0.081	041M04D401
Nickel	3.690	3	3	5	6.10	6.70	3.930	041M04D201
Potassium	899.720	1	5	5	18.40	1,530.0	649.0	041M04D201
Selenium	0.660	3	3	5	1.50	2.30	1.160	041M04D401
Sodium	11,439.60	1	5	5	2.50	11,800.0	4,300.0	041M04D201
Vanadium	8.590	3	5	5	0.90	38.70	17.50	041M04D201
Zinc	14.360	3	5	5	1.40	102.0	51.0	041M04D201
PAHs (g/kg)								
Benzo(a)anthracene	N/A	0	3	5	88.0	250.0	228.0	041M04D201
Benzo(a)pyrene	N/A	0	3	5	120.0	310.0	258.0	041M04D201
Chrysene	N/A	0	3	5	120.0	240.0	236.0	041M04D201
Fluoranthene	N/A	0	3	5	110.0	310.0	274.0	041M04D201
Phenanthrene	N/A	0	3	5	38.0	80.0	168.0	041M04D201
Pyrene	N/A	0	3	5	130.0	410.0	294.0	041M04D201
Total PAHs	N/A	0	3	5	725.0	1,989.0	2,410.0	041M04D201
Pesticides and PCBs (g/kg)								
Aroclor-1248	N/A	0	1	5	0.620	0.620	2.260	041M04D501
Aroclor-1254	N/A	0	2	5	1.70	42.0	10.20	041M04D201
Aroclor-1260	N/A	0	1	5	50.0	50.0	11.90	041M04D101
Total PCBs	N/A	0	3	5	8.570	66.70	35.90	041M04D101
Dieldrin	N/A	0	2	5	0.780	1.10	0.486	041M04D401

Table 10-3-3
Wetland 4D Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections			
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection	Average Detection	Maximum Detection Location
Pesticides and PCBs (g/kg) - cont.								
Endosulfan sulfate	N/A	0	1	5	0.630	0.630	0.313	041M04D101
alpha-Chlordane	N/A	0	3	5	1.0	1.50	0.782	041M04D101
Total Chlordane	N/A	0	3	5	1.017	1.512	0.794	041M04D101
alpha-BHC	N/A	0	2	5	0.460	0.940	0.288	041M04D301
delta-BHC	N/A	0	4	5	0.110	16.0	5.820	041M04D101
Total BHC	N/A	0	4	5	1.060	16.484	6.140	041M04D101
4,4'-DDD	50.0	1	3	5	15.0	110.0	31.60	041M04D401
4,4'-DDE	40.0	2	5	5	0.320	65.0	28.20	041M04D401
4,4'-DDT	20.0	0	4	5	1.50	3.90	2.120	041M04D401
Total DDT	110.0	1	5	5	0.530	178.90	62.0	041M04D401
SVOCs (g/kg)								
Benzo(b)fluoranthene	N/A	0	3	5	160.0	380.0	290.0	041M04D201
Benzo(g,h,i)perylene	N/A	0	3	5	130.0	390.0	296.0	041M04D201
Benzo(k)fluoranthene	N/A	0	3	5	100.0	230.0	228.0	041M04D201
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	4	5	61.0	240.0	1,410.0	041M04D201
Butylbenzylphthalate	N/A	0	2	5	68.0	81.0	1,410.0	041M04D101
Carbazole	N/A	0	1	5	66.0	66.0	1,520.0	041M04D101
Diethylphthalate	N/A	0	1	5	71,000.0	71,000.0	14,500.0	041M04D401
Indeno(1,2,3-cd)pyrene	N/A	0	3	5	77.0	240.0	228.0	041M04D201
VOCs (g/kg)								
Acetone	N/A	0	4	5	33.0	280.0	150.0	041M04D401
Carbon disulfide	N/A	0	3	5	4.0	27.0	12.40	041M04D101

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 10-3-4
Wetland 4D Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (g/L)								
Calcium	76,800.0	0	2	2	32,600.0	55,000.0	43,800.0	041W04D401
Iron	1,352.0	1	2	2	695.0	1,580.0	1,140.0	041W04D101
Magnesium	243,650.0	0	2	2	63,700.0	145,000.0	104,000.0	041W04D401
Manganese	12.15	2	2	2	22.6	36.4	29.5	041W04D101
Potassium	81,250.0	0	2	2	21,500.0	45,900.0	33,700.0	041W04D401
Sodium	1,952,000.0	0	2	2	686,000.0	1,270,000.0	978,000.0	041W04D401
Thallium	2.55	1	1	2	11.0	11.0	11.0	041W04D401
VOCs (g/L)								
Methylene chloride	N/A	0	1	2	87.0	87.0	87.0	041W04D401

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 10-3-5
Wetland 4D Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	5	5			390	14,700	041M04D201	14,700			N/A		Yes	No SV
Antimony	1	5	0.06	0.19	0.95	0.95	041M04D201	0.95	J	12	2	0.08	No	Max Detect < SV
Arsenic	**5**	**5**			**0.49**	**20**	**041M04D201**	**20**		**7.24**	**1, 2**	**2.76**	**Yes**	**Max Detect > SV**
Barium	5	5			0.34	9	041M04D201	9	J		N/A		Yes	No SV
Beryllium	3	5	0.03	0.03	0.37	0.55	041M04D201	0.55	J		N/A		Yes	No SV
Cadmium	**4**	**5**	**0.09**	**0.09**	**0.26**	**3.7**	**041M04D201**	**3.7**		**0.676**	**1**	**5.47**	**Yes**	**Max Detect > SV**
Calcium	5	5			26.3	4,510	041M04D201	4,510			N/A		Yes	No SV
Chromium	**5**	**5**			**0.74**	**70.2**	**041M04D101**	**70.2**		**52.3**	**1, 2**	**1.34**	**Yes**	**Max Detect > SV**
Cobalt	3	5	0.09	0.09	1.1	2.1	041M04D201	2.1	J		N/A		Yes	No SV
Copper	**5**	**5**			**0.49**	**45.8**	**041M04D201**	**45.8**		**18.7**	**1, 2**	**2.45**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	5	0.285	0.95			ND	0.95	U		N/A		Yes	No SV
Iron	5	5			671	39,400	041M04D201	39,400			N/A		Yes	No SV
Lead	**5**	**5**			**0.73**	**348**	**041M04D201**	**348**		**30.2**	**1, 2**	**11.5**	**Yes**	**Max Detect > SV**
Magnesium	5	5			19.6	4590	041M04D201	4,590			N/A		Yes	No SV
Manganese	5	5			2	69.3	041M04D201	69.3	J		N/A		Yes	No SV
Mercury	**2**	**5**	**0.025**	**0.075**	**0.12**	**0.16**	**041M04D401**	**0.16**	**J**	**0.13**	**1, 2**	**1.23**	**Yes**	**Max Detect > SV**
Nickel	3	5	0.36	0.37	6.1	6.7	041M04D201	6.7	J	15.9	1, 2	0.42	No	Max Detect < SV
Potassium	5	5			18.4	1530	041M04D201	1,530			N/A		Yes	No SV
Selenium	3	5	0.09	0.09	1.5	2.3	041M04D401	2.3	J		N/A		Yes	No SV
Silver	0	5	0.12	0.385			ND	0.385	UJ	0.733	1	0.53	No	Max SQL< SV
Sodium	5	5			2.5	11,800	041M04D201	11,800			N/A		Yes	No SV
Thallium	0	5	0.09	0.29			ND	0.29	U		N/A		Yes	No SV
Vanadium	5	5			0.9	38.7	041M04D201	38.7			N/A		Yes	No SV
Zinc	5	5			1.4	102	041M04D201	102		124	1, 2	0.82	No	Max Detect < SV
PAHs (g/kg)														
2-Methylnaphthalene	0	5	20	650			ND	650	UJ	20.2	1	32.2	Yes	Max SQL> SV
Acenaphthene	0	5	9.5	310			ND	310	UJ	6.71	1	46.2	Yes	Max SQL > SV
Acenaphthylene	0	5	20	650			ND	650	UJ	5.87	1	111	Yes	Max SQL > SV
Anthracene	0	5	20	650			ND	650	UJ	46.9	1	13.9	Yes	Max SQL> SV
Benzo(a)anthracene	**3**	**5**	**20.5**	**650**	**88**	**250**	**041M04D201**	**250**		**74.8**	**1**	**3.34**	**Yes**	**Max Detect > SV**
Benzo(a)pyrene	**3**	**5**	**20.5**	**650**	**120**	**310**	**041M04D201**	**310**		**88.8**	**1**	**3.49**	**Yes**	**Max Detect > SV**
Chrysene	**3**	**5**	**20.5**	**650**	**120**	**240**	**041M04D201**	**240**		**108**	**1**	**2.22**	**Yes**	**Max Detect > SV**
Dibenz(a,h)anthracene	0	5	20	650			ND	650	UJ	6.22	1	105	Yes	Max SQL > SV
Fluoranthene	**3**	**5**	**20.5**	**650**	**110**	**310**	**041M04D201**	**310**		**113**	**1**	**2.74**	**Yes**	**Max Detect > SV**
Fluorene	0	5	9.5	310			ND	310	UJ	21.2	1	14.6	Yes	Max SQL> SV
Naphthalene	0	5	20	650			ND	650	UJ	34.6	1	18.8	Yes	Max SQL> SV
Phenanthrene	3	5	20.5	650	38	80	041M04D201	80	J	86.7	1	0.92	No	Max Detect < SV
Pyrene	**3**	**5**	**20.5**	**650**	**130**	**410**	**041M04D201**	**410**		**153**	**1**	**2.68**	**Yes**	**Max Detect > SV**
Total PAHs	**3**	**5**	**246**	**7,770**	**725**	**1,990**	**041M04D201**	**1,990**		**1,684**	**1, 2**	**1.18**	**Yes**	**Max Detect > SV**
TOC Normalized PAHs	**3**	**5**	**111**	**159.42**	**40.73**	**355.39**	**041M04D301**	**355.39**		**290**	**3**	**1.23**	**Yes**	**Max Detect > SV**
PCB's (g/kg)														
Aroclor-1016	0	5	1.05	3.85			ND	3.85	U	21.6	N/A	0.18	No	Max SQL< SV
Aroclor-1221	0	5	2	7.5			ND	7.5	U	67	2	0.11	No	Max SQL< SV
Aroclor-1232	0	5	1.05	3.85			ND	3.85	U	21.6	N/A	0.18	No	Max SQL< SV
Aroclor-1242	0	5	1.05	3.85			ND	3.85	U	21.6	N/A	0.18	No	Max SQL< SV
Aroclor-1248	1	5	1.05	3.85	0.62	0.62	041M04D501	0.62	J	21.6	N/A	0.03	No	Max Detect < SV
Aroclor-1254	**2**	**5**	**1.05**	**3.85**	**1.7**	**42**	**041M04D501**	**42**	**J**	**21.6**	**N/A**	**1.94**	**Yes**	**Max Detect > SV**
Aroclor-1260	**1**	**5**	**1.05**	**3.85**	**50**	**50**	**041M04D101**	**50**	**J**	**21.6**	**N/A**	**2.31**	**Yes**	**Max Detect > SV**
Total PCBs	**3**	**5**	**8.3**	**30.6**	**8.57**	**66.7**	**041M04D501**	**66.7**		**21.6**	**1**	**3.09**	**Yes**	**Max Detect > SV**
Pesticides (g/kg)														
Aldrin	0	5	0.005	0.0195			ND	0.0195	U		N/A		Yes	No SV
Dieldrin	**2**	**5**	**0.105**	**0.34**	**0.78**	**1.1**	**041M04D401**	**1.1**	**J**	**0.716**	**1**	**1.54**	**Yes**	**Max Detect > SV**
Endosulfan I	0	5	0.005	0.0195			ND	0.0195	U		N/A		Yes	No SV
Endosulfan II	0	5	0.105	0.385			ND	0.385	U		N/A		Yes	No SV
Endosulfan sulfate	1	5	0.105	0.385	0.63	0.63	041M04D101	0.63	J		N/A		Yes	No SV
Heptachlor	0	5	0.005	0.0195			ND	0.0195	U		N/A		Yes	No SV
Heptachlor epoxide	0	5	0.005	0.0195			ND	0.0195	U		N/A		Yes	No SV
Methoxychlor	0	5	0.5	1.95			ND	1.95	U		N/A		Yes	No SV
Toxaphene	0	5	10.5	38.5			ND	38.5	U		N/A		Yes	No SV
alpha-Chlordane	3	5	0.005	0.0055	1	1.5	041M04D101	1.5	J	1.7	1	0.88	No	Max Detect < SV
gamma-Chlordane	0	5	0.005	0.0195			ND	0.0195	U	1.7	1	0.01	No	Max SQL< SV
Total Chlordane	3	5	0.01	0.011	1.02	1.51	041M04D101	1.51		1.7	1	0.89	No	Max Detect < SV
Endrin	0	5	0.105	0.385			ND	0.385	U	3.3	2	0.12	No	Max SQL< SV
Endrin aldehyde	0	5	0.105	0.385			ND	0.385	U	3.3	2	0.12	No	Max SQL< SV
Endrin ketone	0	5	0.105	0.385			ND	0.385	U	3.3	2	0.12	No	Max SQL< SV
Total Endrin	0	5	0.315	1.16			ND	1.16	U	3.3	2	0.35	No	Max SQL< SV
alpha-BHC	2	5	0.0055	0.0195	0.46	0.94	041M04D301	0.94	J		N/A		Yes	No SV
beta-BHC	0	5	0.005	0.0195			ND	0.0195	U	0.32	N/A	0.06	No	Max SQL< SV
delta-BHC	**4**	**5**	**0.0055**	**0.0055**	**0.11**	**16**	**041M04D401**	**16**	**DJ**	**0.32**	**N/A**	**50**	**Yes**	**Max Detect > SV**
gamma-BHC (Lindane)	0	5	0.005	0.0195			ND	0.0195	U	0.32	1	0.06	No	Max SQL< SV
Total BHC	**4**	**5**	**0.022**	**0.022**	**1.06**	**16.5**	**041M04D401**	**16.5**		**0.32**	**2**	**51.5**	**Yes**	**Max Detect > SV**
4,4'-DDD	**3**	**5**	**0.105**	**0.105**	**15**	**110**	**041M04D401**	**110**	**D**	**1.22**	**1**	**90.2**	**Yes**	**Max Detect > SV**
4,4'-DDE	**5**	**5**			**0.32**	**65**	**041M04D401**	**65**	**DJ**	**2.07**	**1**	**31.4**	**Yes**	**Max Detect > SV**
4,4'-DDT	**4**	**5**	**0.105**	**0.105**	**1.5**	**3.9**	**041M04D401**	**3.9**	**J**	**1.19**	**1**	**3.28**	**Yes**	**Max Detect > SV**
Total DDT	**5**	**5**			**0.53**	**179**	**041M04D401**	**179**		**3.3**	**2**	**54.2**	**Yes**	**Max Detect > SV**

Table 10-3-5
Wetland 4D Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
1,2-Dichlorobenzene	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
1,3-Dichlorobenzene	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
1,4-Dichlorobenzene	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	5	485	15,500			ND	15,500	UJ		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
2,4-Dichlorophenol	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
2,4-Dimethylphenol	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
2,4-Dinitrophenol	0	5	485	15,500			ND	15,500	UJ		N/A		Yes	No SV
2,4-Dinitrotoluene	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
2,6-Dinitrotoluene	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
2-Chloronaphthalene	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
2-Chlorophenol	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	5	485	15,500			ND	15,500	UJ		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
2-Nitroaniline	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
2-Nitrophenol	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
3-Nitroaniline	0	5	485	15,500			ND	15,500	UJ		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
4-Chloroaniline	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
4-Nitroaniline	0	5	485	15,500			ND	15,500	UJ		N/A		Yes	No SV
4-Nitrophenol	0	5	485	15,500			ND	15,500	UJ		N/A		Yes	No SV
Benzo(b)fluoranthene	3	5	20.5	650	160	380	041M04D201	380			N/A		Yes	No SV
Benzo(g,h,i)perylene	3	5	20.5	650	130	390	041M04D201	390			N/A		Yes	No SV
Benzo(k)fluoranthene	3	5	20.5	650	100	230	041M04D201	230			N/A		Yes	No SV
bis(2-Chloroethoxy)methane	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	5	20	650			ND	650	UJ		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**4**	**5**	**6,500**	**6,500**	**61**	**240**	**041M04D201**	**240**	**J**	**182**	**1, 2**	**1.32**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	2	5	200	6,500	68	81	041M04D101	81	J	182	1, 2	0.45	No	Max Detect < SV
Carbazole	1	5	200	6,500	66	66	041M04D101	66	J		N/A		Yes	No SV
Dibenzofuran	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
Diethylphthalate	**1**	**5**	**200**	**650**	**71,000**	**71,000**	**041M04D401**	**71,000**	**J**	**182**	**1, 2**	**390**	**Yes**	**Max Detect > SV**
Dimethylphthalate	0	5	200	6,500			ND	6,500	UJ	182	1, 2	35.7	Yes	Max SQL > SV
Di-n-butylphthalate	0	5	200	6,500			ND	6,500	UJ	182	1, 2	35.7	Yes	Max SQL > SV
Di-n-octylphthalate	0	5	200	6,500			ND	6,500	UJ	182	1, 2	35.7	Yes	Max SQL > SV
Hexachlorobenzene	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
Hexachlorobutadiene	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
Hexachloroethane	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	3	5	20.5	650	77	240	041M04D201	240			N/A		Yes	No SV
Isophorone	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
Nitrobenzene	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	5	20	650			ND	650	UJ		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
Pentachlorophenol	0	5	485	15,500			ND	15,500	UJ		N/A		Yes	No SV
Phenol	0	5	200	6,500			ND	6,500	UJ		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
1,1-Dichloroethane	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
1,2-Dichloropropane	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
2-Butanone (MEK)	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
2-Hexanone	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Acetone	4	5	125	125	33	280	041M04D401	280			N/A		Yes	No SV
Benzene	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Bromodichloromethane	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Bromoform	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Bromomethane	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Carbon disulfide	3	5	6	7	4	27	041M04D101	27	J		N/A		Yes	No SV
Carbon tetrachloride	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Chlorobenzene	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Chloroethane	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Chloroform	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Chloromethane	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Dibromochloromethane	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Ethylbenzene	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Methylene chloride	0	5	6	23.5			ND	23.5	U		N/A		Yes	No SV
Styrene	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV

Table 10-3-5
Wetland 4D Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
VOCs (g/kg) - cont.														
Tetrachloroethene	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Toluene	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Trichloroethene	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV
Vinyl chloride	0	5	1.5	5.5			ND	5.5	U		N/A		Yes	No SV
Xylene (Total)	0	5	6	18.5			ND	18.5	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
  g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 10-3-6
Wetland 4D Phase II
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4-DDD	Benzo(a)anthracene	Acetone
Arsenic	4,4-DDE	Benzo(a)pyrene	Carbon disulfide
Barium	4,4-DDT	Benzo(b)fluoranthene	
Beryllium	alpha-BHC	Benzo(g,h,i)perylene	
Cadmium	delta-BHC	Benzo(k)fluoranthene	
Calcium	Dieldrin	bis(2-Ethylhexyl)phthalate (BEHP)	
Chromium	Endosulfan sulfate	Carbazole	
Cobalt	Total BHC	Chrysene	
Copper	Total DDT	Diethylphthalate	
Iron	Aroclor-1254	Fluoranthene	
Lead	Aroclor-1260	Indeno(1,2,3-cd)pyrene	
Magnesium	Total PCBs	Pyrene	
Manganese		TOC Normalized PAHs	
Mercury		Total PAHs	
Potassium			
Selenium			
Sodium			
Vanadium			
		Not Detected Parameters	
Cyanide (CN)	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Thallium	Endosulfan I	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
	Endosulfan II	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Heptachlor	1,4-Dichlorobenzene	1,1-Dichloroethane
	Heptachlor epoxide	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Methoxychlor	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Toxaphene	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
		2,4-Dichlorophenol	1,2-Dichloropropane
		2,4-Dimethylphenol	2-Butanone (MEK)
		2,4-Dinitrophenol	2-Hexanone
		2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
		2,6-Dinitrotoluene	Benzene
		2-Chloronaphthalene	Bromodichloromethane
		2-Chlorophenol	Bromoform
		2-Methyl-4,6-Dinitrophenol	Bromomethane
		2-Methylnaphthalene	Carbon tetrachloride
		2-Methylphenol (o-Cresol)	Chlorobenzene
		2-Nitroaniline	Chloroethane
		2-Nitrophenol	Chloroform
		3,3'-Dichlorobenzidine	Chloromethane
		3-Nitroaniline	cis-1,3-Dichloropropene
		4-Bromophenyl-phenylether	Dibromochloromethane
		4-Chloro-3-methylphenol	Ethylbenzene
		4-Chloroaniline	Methylene chloride
		4-Chlorophenylphenyl ether	Styrene
		4-Methylphenol (p-Cresol)	Tetrachloroethene
		4-Nitroaniline	Toluene
		4-Nitrophenol	trans-1,3-Dichloropropene
		Acenaphthene	Trichloroethene
		Acenaphthylene	Vinyl chloride
		Anthracene	Xylene (Total)
		bis(2-Chloroethoxy)methane	
		bis(2-Chloroethyl)ether	
		Dibenz(a,h)anthracene	
		Dibenzofuran	
		Dimethylphthalate	
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		Fluorene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Naphthalene	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 10-3-7
Wetland 4D Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metal (mg/kg)																							
Aluminum	5	5				7,450	390	14,700	14,700		041M04D201			NA					0	4274	3	Yes	EPC > RC and no RV
Arsenic	5	5				8.8	0.49	20	20		041M04D201	7.24	41.6	PEL	2.76	1.22	0.48	0.21	0	2.14	3	No	EPC > RC, but < RV
Barium	5	5				4.86	0.34	9	9	J	041M04D201			NA					0	3.84	3	Yes	EPC > RC and no RV
Beryllium	3	5	0.03	0.03	0.03	0.282	0.37	0.55	0.55	J	041M04D201			NA					0	0.13	3	Yes	EPC > RC and no RV
Cadmium	4	5	0.09	0.09	0.09	2.07	0.26	3.7	3.7		041M04D201	0.68	4.21	PEL	5.47	3.06	0.88	0.49	0	0.39	3	No	EPC > RC, but < RV
Calcium	5	5				1790	26.3	4,510	4,510		041M04D201			NA					0	1979	3	No	Essential Nutrient
Chromium	5	5				36.2	0.74	70.2	70.2		041M04D101	52.3	160	PEL	1.34	0.69	0.44	0.23	0	13.1	3	No	EPC > RC, but < RV
Cobalt	3	5	0.09	0.09	0.09	0.996	1.1	2.1	2.1	J	041M04D201			NA					0	0.91	3	Yes	EPC > RC and no RV
Copper	5	5				19.4	0.49	45.8	45.8		041M04D201	18.7	108	PEL	2.45	1.04	0.42	0.18	0	8.44	3	No	EPC > RC, but < RV
Cyanide (CN)	0	5	0.606	0.285	0.95	0.606			0.95	U	ND			NA					0	1.29	0	No	Paramter Not Detected
Iron	5	5				18,800	671	39,400	39,400		041M04D201			NA					0	2684	3	Yes	EPC > RC and no RV
Lead	**5**	**5**				**142**	**0.73**	**348**	**348**		**041M04D201**	**30.2**	**112**	**PEL**	**11.5**	**4.71**	**3.11**	**1.27**	**3**	**21.04**	**3**	**Yes**	**EPC > RV and RC**
Magnesium	5	5				2,030	19.6	4,590	4,590		041M04D201			NA					0	2944	1	No	Essential Nutrient
Manganese	5	5				42.1	2	69.3	69.3	J	041M04D201			NA					0	9.81	4	Yes	EPC > RC and no RV
Mercury	2	5	0.0417	0.025	0.075	0.081	0.12	0.16	0.16	J	041M04D401	0.13	0.696	PEL	1.23	0.62	0.23	0.12	0	0.11	2	No	EPC > RC, but < RV
Potassium	5	5				649	18.4	1,530	1,530		041M04D201			NA					0	899.7	1	No	Essential Nutrient
Selenium	3	5	0.09	0.09	0.09	1.16	1.5	2.3	2.3	J	041M04D401			NA					0	0.66	3	Yes	EPC > RC and no RV
Sodium	5	5				4,300	2.5	11,800	11,800		041M04D201			NA					0	11440	1	No	Essential Nutrient
Thallium	0	5	0.193	0.09	0.29	0.193			0.29	U	ND			NA					0	0.39	0	No	Paramter Not Detected
Vanadium	5	5				17.5	0.9	38.7	38.7		041M04D201			NA					0	8.59	3	Yes	EPC > RC and no RV
PAHs (g/kg)																							
2-Methylnaphthalene	0	5	161	20	650	161			650	UJ	ND	20.2	201	PEL	32.2	7.95	3.23	0.80	0		0	No	Paramter Not Detected; Max SQL > RV
Acenaphthene	0	5	76.9	9.5	310	76.9			310	UJ	ND	6.71	88.9	PEL	46.2	11.5	3.49	0.87	0		0	No	Paramter Not Detected; Max SQL > RV
Acenaphthylene	0	5	161	20	650	161			650	UJ	ND	5.87	128	PEL	111	27.3	5.08	1.25	0		0	No	Paramter Not Detected; Max SQL > RV
Anthracene	0	5	161	20	650	161			650	UJ	ND	46.9	245	PEL	13.9	3.42	2.65	0.66	0		0	No	Paramter Not Detected; Max SQL > RV
Benzo(a)anthracene	3	5	335	20.5	650	228	88	250	250		041M04D201	74.8	693	PEL	3.34	3.04	0.36	0.33	0		0	No	RV HQ <1 and no RC
Benzo(a)pyrene	3	5	335	20.5	650	258	120	310	310		041M04D201	88.8	763	PEL	3.49	2.91	0.41	0.34	0		0	No	RV HQ <1 and no RC
Chrysene	3	5	335	20.5	650	236	120	240	240		041M04D201	108	846	PEL	2.22	2.19	0.28	0.28	0		0	No	RV HQ <1 and no RC
Dibenz(a,h)anthracene	0	5	161	20	650	161			650	UJ	ND	6.22	135	PEL	105	25.8	4.81	1.19	0		0	No	Paramter Not Detected; Max SQL > RV
Fluoranthene	3	5	335	20.5	650	274	110	310	310		041M04D201	113	1,494	PEL	2.74	2.43	0.21	0.18	0		0	No	RV HQ <1 and no RC
Fluorene	0	5	76.9	9.5	310	76.9			310	UJ	ND	21.2	144	PEL	14.6	3.63	2.15	0.53	0		0	No	Paramter Not Detected; Max SQL > RV
Naphthalene	0	5	161	20	650	161			650	UJ	ND	34.6	391	PEL	18.8	4.64	1.66	0.41	0		0	No	Paramter Not Detected; Max SQL > RV
Phenanthrene	3	5	335	20.5	650	168	38	80	80	J	041M04D201	86.7	544	PEL	0.92	1.94	0.15	0.31	0		0	No	RV HQ <1 and no RC
Pyrene	3	5	335	20.5	650	294	130	410	410		041M04D201	153	1,398	PEL	2.68	1.92	0.29	0.21	0		0	No	RV HQ <1 and no RC
Total PAHs	3	5	4,010	246	7,770	2,410	725	1,990	1,990		041M04D201	1684	16,770	PEL	1.18	1.43	0.12	0.14	0		0	No	RV HQ <1 and no RC
TOC Normalized PAHs	3	5	135.21	111	159.42	142.13	40.73	355.39	355.39		041M04D301	290	1,800	MEC	1.23	0.49	0.20	0.08	0		0	No	RV HQ <1 and no RC
PCBs (g/kg)																							
Aroclor-1016	0	5	2.35	1.05	3.85	2.35			3.85	U	ND	21.6	189	PEL	0.18	0.11	0.02	0.01	0		0	No	Parameter Not Detected
Aroclor-1221	0	5	4.55	2	7.5	4.55			7.5	U	ND	67	189	PEL	0.11	0.07	0.04	0.02	0		0	No	Parameter Not Detected
Aroclor-1232	0	5	2.35	1.05	3.85	2.35			3.85	U	ND	21.6	189	PEL	0.18	0.11	0.02	0.01	0		0	No	Parameter Not Detected
Aroclor-1242	0	5	2.35	1.05	3.85	2.35			3.85	U	ND	21.6	189	PEL	0.18	0.11	0.02	0.01	0		0	No	Parameter Not Detected
Aroclor-1248	1	5	2.67	1.05	3.85	2.26	0.62	0.62	0.62	J	041M04D501	21.6	189	PEL	0.03	0.11	0.00	0.01	0		0	No	RV HQ <1 and no RC
Aroclor-1254	2	5	2.43	1.05	3.85	10.2	1.7	42	42	J	041M04D501	21.6	189	PEL	1.94	0.47	0.22	0.05	0		0	No	RV HQ <1 and no RC
Aroclor-1260	1	5	2.34	1.05	3.85	11.9	50	50	50	J	041M04D101	21.6	189	PEL	2.31	0.55	0.27	0.06	0		0	No	RV HQ <1 and no RC
Total PCBs	3	5	19.5	8.3	30.6	35.9	8.57	66.7	66.7		041M04D501	21.6	189	PEL	3.09	1.66	0.35	0.19	0		0	No	RV HQ <1 and no RC
Pesticides (g/kg)																							
Aldrin	0	5	0.0118	0.005	0.0195	0.0118			0.0195	U	ND			NA					0		0	No	Parameter Not Detected
Dieldrin	2	5	0.183	0.105	0.34	0.486	0.78	1.1	1.1	J	041M04D401	0.72	4.3	PEL	1.54	0.68	0.26	0.11	0		0	No	RV HQ <1 and no RC
Endosulfan I	0	5	0.0118	0.005	0.0195	0.0118			0.0195	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	5	0.235	0.105	0.385	0.235			0.385	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	1	5	0.234	0.105	0.385	0.313	0.63	0.63	0.63	J	041M04D101			NA					0		0	Yes	No SV, no RV, and no RC
Heptachlor	0	5	0.0118	0.005	0.0195	0.0118			0.0195	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	5	0.0118	0.005	0.0195	0.0118			0.0195	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	5	1.18	0.5	1.95	1.18			1.95	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	5	23.5	10.5	38.5	23.5			38.5	U	ND			NA					0		0	No	Parameter Not Detected
alpha-BHC	2	5	0.014	0.0055	0.0195	0.288	0.46	0.94	0.94	J	041M04D301		0.99	PEL			0.95	0.29	0		0	No	RV HQ <1 and no RC
beta-BHC	0	5	0.0118	0.005	0.0195	0.0118			0.0195	U	ND	0.32	0.99	PEL	0.06	0.04	0.02	0.01	0		0	No	Parameter Not Detected
delta-BHC	**4**	**5**	**0.0055**	**0.0055**	**0.0055**	**5.82**	**0.11**	**16**	**16**	**DJ**	**041M04D101**	**0.32**	**0.99**	**PEL**	**50**	**18.2**	**16.2**	**5.88**	**3**		**0**	**Yes**	**RV HQ > 1 and no RC**
gamma-BHC (Lindane)	0	5	0.0118	0.005	0.0195	0.0118			0.0195	U	ND	0.32	0.99	PEL	0.06	0.04	0.02	0.01	0		0	No	Parameter Not Detected
Total BHC	**4**	**5**	**0.022**	**0.022**	**0.022**	**6.14**	**1.06**	**16.5**	**16.5**		**041M04D101**	**0.32**	**0.99**	**PEL**	**51.5**	**19.2**	**16.7**	**6.2**	**4**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	**3**	**5**	**0.105**	**0.105**	**0.105**	**31.6**	**15**	**110**	**110**	**D**	**041M04D401**	**1.22**	**7.81**	**PEL**	**90.2**	**25.9**	**14.1**	**4.05**	**3**	**50**	**1**	**Yes**	**EPC > RV and RC**
4,4'-DDE	5	5				28.2	0.32	65	65	DJ	041M04D401	2.07	374	PEL	31.4	13.6	0.17	0.08	0	40	2	No	EPC > RC, but < RV
4,4'-DDT	4	5	0.105	0.105	0.105	2.12	1.5	3.9	3.9	J	041M04D401	1.19	4.77	PEL	3.28	1.78	0.82	0.45	0	20	0	No	EPC < RC and RV
Total DDT	**5**	**5**				**62**	**0.53**	**179**	**179**		**041M04D401**	**3.3**	**51.7**	**PEL**	**54.2**	**18.8**	**3.46**	**1.2**	**2**	**110**	**1**	**Yes**	**EPC > RV and RC**
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	5	3,850	485	15,500	3,850			15,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	5	3,850	485	15,500	3,850			15,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	5	3,850	485	15,500	3,850			15,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected

Table 10-3-7
Wetland 4D Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
3-Nitroaniline	0	5	3,850	485	15,500	3,850			15,500	UJ	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	5	3,850	485	15,500	3,850			15,500	UJ	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	5	3,850	485	15,500	3,850			15,500	UJ	ND			NA					0		0	No	Parameter Not Detected
Benzo(b)fluoranthene	3	5	335	20.5	650	290	160	380	380		041M04D201			NA					0		0	No	TOC normalized PAHs < MEC
Benzo(g,h,i)perylene	3	5	335	20.5	650	296	130	390	390		041M04D201			NA					0		0	No	TOC normalized PAHs < MEC
Benzo(k)fluoranthene	3	5	335	20.5	650	228	100	230	230		041M04D201			NA					0		0	No	TOC normalized PAHs < MEC
bis(2-Chloroethoxy)methane	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	5	161	20	650	161			650	UJ	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	4	5	6,500	6,500	6,500	1,410	61	240	240	J	041M04D201	182	2647	PEL	1.32	7.73	0.09	0.53	0		0	No	RV HQ <1 and no RC
Carbazole	1	5	1,890	200	6,500	1,520	66	66	66	J	041M04D101			NA					0		0	Yes	No SV, no RV, and no RC
Dibenzofuran	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	**1**	**5**	**381**	**200**	**650**	**14,500**	**71,000**	**71,000**	**71,000**	**J**	**041M04D401**	**182**	**2647**	**PEL**	**390**	**79.7**	**26.8**	**5.48**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Dimethylphthalate	0	5	1,610	200	6,500	1,610			6,500	UJ	ND	182	2647	PEL	35.7	8.82	2.46	0.61	0		0	No	Parameter Not Detected; Max SQL > RV
Di-n-butylphthalate	0	5	1,610	200	6,500	1,610			6,500	UJ	ND	182	2647	PEL	35.7	8.82	2.46	0.61	0		0	No	Parameter Not Detected; Max SQL > RV
Di-n-octylphthalate	0	5	1,610	200	6,500	1,610			6,500	UJ	ND	182	2647	PEL	35.7	8.82	2.46	0.61	0		0	No	Parameter Not Detected; Max SQL > RV
Hexachlorobenzene	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	3	5	335	20.5	650	228	77	240	240		041M04D201			NA					0		0	No	TOC normalized PAHs < MEC
Isophorone	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	5	161	20	650	161			650	UJ	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	5	3,850	485	15,500	3,850			15,500	UJ	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	5	1,610	200	6,500	1,610			6,500	UJ	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Hexanone	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	4	5	125	125	125	150	33	280	280		041M04D401			NA					0		0	Yes	No SV, no RV, and no RC
Benzene	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	3	5	6.5	6	7	12.4	4	27	27	J	041M04D101			NA					0		0	Yes	No SV, no RV, and no RC
Carbon tetrachloride	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroethane	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	5	14.9	6	23.5	14.9			23.5	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	5	4	1.5	5.5	4			5.5	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	5	13.5	6	18.5	13.5			18.5	U	ND			NA					0		0	No	Parameter Not Detected

Notes;

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result
Parameters in bold were detected and exceeded screening values.

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8)
RV = Refinement value (detailed explanation of RVs provided in Section 8)
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detection
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT

Table 10-3-8
Wetland 4D Phase II
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	Endosulfan sulfate	Diethylphthalate	Carbon Disulfide
Barium	delta-BHC	Carbazole	
Beryllium	Total BHC		
Cobalt	4,4'-DDD		
Iron	Total DDT		
Lead			
Manganese			
Selenium			
Vanadium			

Table 10-3-9
Wetland 4D Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M04D101	12/5/1995	mg/kg	12		Arsenic	8.2	70	0.17
041M04D101	12/5/1995	mg/kg	3.5		Cadmium	1.2	9.6	0.36
041M04D101	12/5/1995	mg/kg	70.2		Chromium	81	370	0.19
041M04D101	12/5/1995	mg/kg	21.3		Copper	34	270	0.08
041M04D101	12/5/1995	mg/kg	190		Lead	46.7	218	0.87
041M04D101	12/5/1995	mg/kg	0.12	J	Mercury	0.15	0.71	0.17
041M04D101	12/5/1995	mg/kg	6.1		Nickel	20.9	51.6	0.12
041M04D101	12/5/1995	mg/kg	0.275	UJ	Silver	1	3.7	0.07
041M04D101	12/5/1995	mg/kg	70.6		Zinc	150	410	0.17
041M04D101	**12/5/1995**	**g/kg**	**46**	**DJ**	**4,4'-DDE**	**2.2**	**27**	**1.70**
041M04D101	12/5/1995	g/kg	2.9	J	4,4'-DDT	1.58	46.1	0.06
041M04D101	12/5/1995	g/kg	66.7		Total PCBs	22.7	180	0.37
041M04D101	12/5/1995	g/kg	47	U	2-Methylnaphthalene	70	670	0.07
041M04D101	12/5/1995	g/kg	23	U	Acenaphthene	16	500	0.05
041M04D101	12/5/1995	g/kg	47	U	Acenaphthylene	44	640	0.07
041M04D101	12/5/1995	g/kg	47	U	Anthracene	85.3	1,100	0.04
041M04D101	12/5/1995	g/kg	130		Benzo(a)anthracene	261	1,600	0.08
041M04D101	12/5/1995	g/kg	190		Benzo(a)pyrene	430	1,600	0.12
041M04D101	12/5/1995	g/kg	150		Chrysene	384	2,800	0.05
041M04D101	12/5/1995	g/kg	47	U	Dibenz(a,h)anthracene	63.4	260	0.18
041M04D101	12/5/1995	g/kg	280		Fluoranthene	600	5,100	0.05
041M04D101	12/5/1995	g/kg	23	U	Fluorene	19	540	0.04
041M04D101	12/5/1995	g/kg	47	U	Naphthalene	160	2,100	0.02
041M04D101	12/5/1995	g/kg	53	J	Phenanthrene	240	1,500	0.04
041M04D101	12/5/1995	g/kg	260		Pyrene	665	2,600	0.10
041M04D101	12/5/1995				ERM Quotient Sum			5.27
041M04D101	12/5/1995				Mean ERM Quotient			0.21
041M04D101	12/5/1995				Mean ERM Quotient without ND			0.19
041M04D101	12/5/1995				Mean ERM Quotient Category			3
041M04D201	12/5/1995	mg/kg	20		Arsenic	8.2	70	0.29
041M04D201	12/5/1995	mg/kg	3.7		Cadmium	1.2	9.6	0.39
041M04D201	12/5/1995	mg/kg	65.5		Chromium	81	370	0.18
041M04D201	12/5/1995	mg/kg	45.8		Copper	34	270	0.17
041M04D201	**12/5/1995**	**mg/kg**	**348**		**Lead**	**46.7**	**218**	**1.60**
041M04D201	12/5/1995	mg/kg	0.075	U	Mercury	0.15	0.71	0.11
041M04D201	12/5/1995	mg/kg	6.7	J	Nickel	20.9	51.6	0.13
041M04D201	12/5/1995	mg/kg	0.385	UJ	Silver	1	3.7	0.10
041M04D201	12/5/1995	mg/kg	102		Zinc	150	410	0.25
041M04D201	**12/5/1995**	**g/kg**	**29**	**DJ**	**4,4'-DDE**	**2.2**	**27**	**1.07**
041M04D201	12/5/1995	g/kg	2.2	J	4,4'-DDT	1.58	46.1	0.05
041M04D201	12/5/1995	g/kg	65.5		Total PCBs	22.7	180	0.36
041M04D201	12/5/1995	g/kg	65	U	2-Methylnaphthalene	70	670	0.10
041M04D201	12/5/1995	g/kg	32	U	Acenaphthene	16	500	0.06
041M04D201	12/5/1995	g/kg	65	U	Acenaphthylene	44	640	0.10
041M04D201	12/5/1995	g/kg	65	U	Anthracene	85.3	1,100	0.06
041M04D201	12/5/1995	g/kg	250		Benzo(a)anthracene	261	1,600	0.16
041M04D201	12/5/1995	g/kg	310		Benzo(a)pyrene	430	1,600	0.19
041M04D201	12/5/1995	g/kg	240		Chrysene	384	2,800	0.09
041M04D201	12/5/1995	g/kg	65	U	Dibenz(a,h)anthracene	63.4	260	0.25
041M04D201	12/5/1995	g/kg	310		Fluoranthene	600	5,100	0.06
041M04D201	12/5/1995	g/kg	32	U	Fluorene	19	540	0.06
041M04D201	12/5/1995	g/kg	65	U	Naphthalene	160	2,100	0.03
041M04D201	12/5/1995	g/kg	80	J	Phenanthrene	240	1,500	0.05
041M04D201	12/5/1995	g/kg	410		Pyrene	665	2,600	0.16
041M04D201	12/5/1995				ERM Quotient Sum			6.06
041M04D201	12/5/1995				Mean ERM Quotient			0.24
041M04D201	12/5/1995				Mean ERM Quotient without ND			0.21
041M04D201	12/5/1995				Mean ERM Quotient Category			2
041M04D301	12/5/1995	mg/kg	0.49	J	Arsenic	8.2	70	0.01
041M04D301	12/5/1995	mg/kg	0.26	J	Cadmium	1.2	9.6	0.03
041M04D301	12/5/1995	mg/kg	1.3		Chromium	81	370	0.00
041M04D301	12/5/1995	mg/kg	2.6		Copper	34	270	0.01
041M04D301	12/5/1995	mg/kg	10.9		Lead	46.7	218	0.05
041M04D301	12/5/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M04D301	12/5/1995	mg/kg	0.36	U	Nickel	20.9	51.6	0.01
041M04D301	12/5/1995	mg/kg	0.12	UJ	Silver	1	3.7	0.03
041M04D301	12/5/1995	mg/kg	3.6		Zinc	150	410	0.01
041M04D301	12/5/1995	g/kg	0.72	J	4,4'-DDE	2.2	27	0.03
041M04D301	12/5/1995	g/kg	1.5	J	4,4'-DDT	1.58	46.1	0.03
041M04D301	12/5/1995	g/kg	8.3	U	Total PCBs	22.7	180	0.05
041M04D301	12/5/1995	g/kg	20	U	2-Methylnaphthalene	70	670	0.03
041M04D301	12/5/1995	g/kg	9.5	U	Acenaphthene	16	500	0.02
041M04D301	12/5/1995	g/kg	20	U	Acenaphthylene	44	640	0.03
041M04D301	12/5/1995	g/kg	20	U	Anthracene	85.3	1,100	0.02
041M04D301	12/5/1995	g/kg	88		Benzo(a)anthracene	261	1,600	0.06
041M04D301	12/5/1995	g/kg	120		Benzo(a)pyrene	430	1,600	0.08
041M04D301	12/5/1995	g/kg	120		Chrysene	384	2,800	0.04
041M04D301	12/5/1995	g/kg	20	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M04D301	12/5/1995	g/kg	110		Fluoranthene	600	5,100	0.02
041M04D301	12/5/1995	g/kg	9.5	U	Fluorene	19	540	0.02
041M04D301	12/5/1995	g/kg	20	U	Naphthalene	160	2,100	0.01
041M04D301	12/5/1995	g/kg	38	J	Phenanthrene	240	1,500	0.03

Table 10-3-9
Wetland 4D Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M04D301	12/5/1995	g/kg	130		Pyrene	665	2,600	0.05
041M04D301	12/5/1995				ERM Quotient Sum			0.76
041M04D301	12/5/1995				Mean ERM Quotient			0.03
041M04D301	12/5/1995				Mean ERM Quotient without ND			0.02
041M04D301	12/5/1995				Mean ERM Quotient Category			1
041M04D401	12/5/1995	mg/kg	11		Arsenic	8.2	70	0.16
041M04D401	12/5/1995	mg/kg	2.8		Cadmium	1.2	9.6	0.29
041M04D401	12/5/1995	mg/kg	43.5		Chromium	81	370	0.12
041M04D401	12/5/1995	mg/kg	27		Copper	34	270	0.10
041M04D401	12/5/1995	mg/kg	162		Lead	46.7	218	0.74
041M04D401	12/5/1995	mg/kg	0.16	J	Mercury	0.15	0.71	0.23
041M04D401	12/5/1995	mg/kg	6.1	J	Nickel	20.9	51.6	0.12
041M04D401	12/5/1995	mg/kg	0.385	UJ	Silver	1	3.7	0.10
041M04D401	12/5/1995	mg/kg	77.5		Zinc	150	410	0.19
041M04D401	**12/5/1995**	**g/kg**	**65**	**DJ**	**4,4'-DDE**	**2.2**	**27**	**2.41**
041M04D401	12/5/1995	g/kg	3.9	J	4,4'-DDT	1.58	46.1	0.08
041M04D401	12/5/1995	g/kg	30.6	U	Total PCBs	22.7	180	0.17
041M04D401	12/5/1995	g/kg	650	UJ	2-Methylnaphthalene	70	670	0.97
041M04D401	12/5/1995	g/kg	310	UJ	Acenaphthene	16	500	0.62
041M04D401	12/5/1995	g/kg	650	UJ	Acenaphthylene	44	640	1.02
041M04D401	12/5/1995	g/kg	650	UJ	Anthracene	85.3	1,100	0.59
041M04D401	12/5/1995	g/kg	650	UJ	Benzo(a)anthracene	261	1,600	0.41
041M04D401	12/5/1995	g/kg	650	UJ	Benzo(a)pyrene	430	1,600	0.41
041M04D401	12/5/1995	g/kg	650	UJ	Chrysene	384	2,800	0.23
041M04D401	12/5/1995	g/kg	650	UJ	Dibenz(a,h)anthracene	63.4	260	2.50
041M04D401	12/5/1995	g/kg	650	UJ	Fluoranthene	600	5,100	0.13
041M04D401	12/5/1995	g/kg	310	UJ	Fluorene	19	540	0.57
041M04D401	12/5/1995	g/kg	650	UJ	Naphthalene	160	2,100	0.31
041M04D401	12/5/1995	g/kg	650	UJ	Phenanthrene	240	1,500	0.43
041M04D401	12/5/1995	g/kg	650	UJ	Pyrene	665	2,600	0.25
041M04D401	12/5/1995				ERM Quotient Sum			13.14
041M04D401	12/5/1995				Mean ERM Quotient			0.53
041M04D401	12/5/1995				Mean ERM Quotient without ND			0.18
041M04D401	12/5/1995				Mean ERM Quotient Category			2
041M04D501	12/5/1995	mg/kg	0.51	J	Arsenic	8.2	70	0.01
041M04D501	12/5/1995	mg/kg	0.09	U	Cadmium	1.2	9.6	0.01
041M04D501	12/5/1995	mg/kg	0.74		Chromium	81	370	0.00
041M04D501	12/5/1995	mg/kg	0.49	J	Copper	34	270	0.00
041M04D501	12/5/1995	mg/kg	0.73		Lead	46.7	218	0.00
041M04D501	12/5/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M04D501	12/5/1995	mg/kg	0.37	U	Nickel	20.9	51.6	0.01
041M04D501	12/5/1995	mg/kg	0.125	UJ	Silver	1	3.7	0.03
041M04D501	12/5/1995	mg/kg	1.4		Zinc	150	410	0.00
041M04D501	12/5/1995	g/kg	0.32		4,4'-DDE	2.2	27	0.01
041M04D501	12/5/1995	g/kg	0.105	U	4,4'-DDT	1.58	46.1	0.00
041M04D501	12/5/1995	g/kg	8.57		Total PCBs	22.7	180	0.05
041M04D501	12/5/1995	g/kg	20.5	U	2-Methylnaphthalene	70	670	0.03
041M04D501	12/5/1995	g/kg	10	U	Acenaphthene	16	500	0.02
041M04D501	12/5/1995	g/kg	20.5	U	Acenaphthylene	44	640	0.03
041M04D501	12/5/1995	g/kg	20.5	U	Anthracene	85.3	1,100	0.02
041M04D501	12/5/1995	g/kg	20.5	U	Benzo(a)anthracene	261	1,600	0.01
041M04D501	12/5/1995	g/kg	20.5	U	Benzo(a)pyrene	430	1,600	0.01
041M04D501	12/5/1995	g/kg	20.5	U	Chrysene	384	2,800	0.01
041M04D501	12/5/1995	g/kg	20.5	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M04D501	12/5/1995	g/kg	20.5	U	Fluoranthene	600	5,100	0.00
041M04D501	12/5/1995	g/kg	10	U	Fluorene	19	540	0.02
041M04D501	12/5/1995	g/kg	20.5	U	Naphthalene	160	2,100	0.01
041M04D501	12/5/1995	g/kg	20.5	U	Phenanthrene	240	1,500	0.01
041M04D501	12/5/1995	g/kg	20.5	U	Pyrene	665	2,600	0.01
041M04D501	12/5/1995				ERM Quotient Sum			0.43
041M04D501	12/5/1995				Mean ERM Quotient			0.02
041M04D501	12/5/1995				Mean ERM Quotient without ND			0.00
041M04D501	12/5/1995				Mean ERM Quotient Category			1

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 10-3-10
Wetland 4D Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	0	2	45.4	34.75	56	45.4			ND	56	U		NA		Yes	No SV
Antimony	0	2	1	1	1	1			ND	1	UJ		NA		Yes	No SV
Arsenic	0	2	1	1	1	1			ND	1	U	36	EPA	0.03	No	Max SQL< SV
Barium	0	2	6.68	6.4	6.95	6.68			ND	6.95	U		NA		Yes	No SV
Beryllium	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Cadmium	0	2	1	1	1	1			ND	1	U	9.3	EPA	0.11	No	Max SQL< SV
Calcium	2	2				43,800	32,600	55,000	041W04D401	55,000			NA		Yes	No SV
Chromium	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	50	EPA	0.05	No	Max SQL< SV
Cobalt	0	2	1	1	1	1			ND	1	U		NA		Yes	No SV
Copper	0	2	2	2	2	2			ND	2	U	2.9	EPA	0.69	No	Max SQL< SV
Cyanide (CN)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	1	EPA	2.5	Yes	Max SQL > SV
Iron	2	2				1,140	695	1,580	041W04D101	1,580			NA		Yes	No SV
Lead	0	2	1	1	1	1			ND	1	U	8.5	EPA	0.12	No	Max SQL< SV
Magnesium	2	2				104,000	63,700	145,000	041W04D401	145,000			NA		Yes	No SV
Manganese	2	2				29.5	22.6	36.4	041W04D101	36.4			NA		Yes	No SV
Mercury	0	2	0.065	0.065	0.065	0.065			ND	0.065	U	0.025	EPA	2.6	Yes	Max SQL > SV
Nickel	0	2	4.5	4.5	4.5	4.5			ND	4.5	U	8.3	EPA	0.542	No	Max SQL< SV
Potassium	2	2				33,700	21,500	45,900	041W04D401	45,900			NA		Yes	No SV
Selenium	0	2	2	2	2	2			ND	2	U	71	EPA	0.03	No	Max SQL< SV
Silver	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	0.23	EPA	10.9	Yes	Max SQL > SV
Sodium	2	2				978,000	686,000	1,270,000	041W04D401	1,270,000			NA		Yes	No SV
Thallium	**1**	**2**	**2**	**2**	**2**	**6.5**	**11**	**11**	**041W04D401**	**11**		**6.3**	**FDEP**	**1.75**	**Yes**	**Max Detect > SV**
Vanadium	0	2	1	1	1	1			ND	1	U		NA		Yes	No SV
Zinc	0	2	2	2	2	2			ND	2	U	86	EPA	0.02	No	Max SQL< SV
Pesticides (g/L)																
Aldrin	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0087	EPA	2.87	Yes	Max SQL > SV
Endosulfan II	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0036	EPA	6.94	Yes	Max SQL > SV
Heptachlor epoxide	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	2	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.004	EPA	12.5	Yes	Max SQL > SV
Endrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	UJ	0.005	FDEP	5	Yes	Max SQL > SV
beta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.016	EPA	1.56	Yes	Max SQL > SV
Total BHC	0	2	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	2	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	FDEP	35.7	Yes	Max SQL > SV
Total PCB	0	2	4	4	4	4			ND	4	U		NA		Yes	No SV

Table 10-3-10
Wetland 4D Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chloronaphthalene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitroaniline	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitrophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloroaniline	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Nitrophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Butylbenzylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dibenzofuran	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Diethylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dimethylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Di-n-butylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	3.4	EPA	0.74	No	Max SQL< SV
Di-n-octylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Hexachlorobutadiene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	2	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
Hexachloroethane	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Isophorone	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Nitrobenzene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pentachlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Phenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthylene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Anthracene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)anthracene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)pyrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chrysene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluoranthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluorene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Naphthalene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	23.5	EPA	0.02	No	Max SQL< SV
Phenanthrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Pyrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Total PAH	0	2	6.5	6.5	6.5	6.5			ND	6.5	U		NA		Yes	No SV

Table 10-3-10
Wetland 4D Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
VOCs (g/L)																
1,1,1-Trichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	270	FDEP	0.00	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.16	No	Max SQL< SV
1,2-Dibromo-3-Chloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	19.7	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	3	FDEP	0.17	No	Max SQL< SV
2-Hexanone	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	71.28	FDEP	0.01	No	Max SQL< SV
Bromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	17	FDEP	0.03	No	Max SQL< SV
Chloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	470.8	FDEP	0.00	No	Max SQL< SV
Chloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	4.3	EPA	0.12	No	Max SQL< SV
Methylene chloride	1	2	1	1	1	44	87	87	041W04D401	87	D	1,580	FDEP	0.06	No	Max Detect < SV
Styrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	37	EPA	0.01	No	Max SQL< SV
trans-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Vinyl chloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value

Table 10-3-11
Wetland 4D Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Calcium	None	None	None
Magnesium			
Potassium			
Iron			
Manganese			
Sodium			
Thallium			
		Not Detected Parameters	
Aluminum	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Antimony	Dieldrin	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1,2-Trichloroethane
Barium	Endosulfan I	2,4,5-Trichlorophenol	1,1-Dichloroethane
Beryllium	Endosulfan II	2,4,6-Trichlorophenol	1,2-Dibromo-3-Chloropropane
Cobalt	Endosulfan sulfate	2,4-Dichlorophenol	1,2-Dibromoethane
Cyanide (CN)	Heptachlor	2,4-Dimethylphenol	1,2-Dichloroethane
Mercury	Heptachlor epoxide	2,4-Dinitrophenol	1,2-Dichloropropane
Silver	Methoxychlor	2,4-Dinitrotoluene	1,3-Dichlorobenzene
Vanadium	Toxaphene	2,6-Dinitrotoluene	2-Hexanone
	alpha-Chlordane	2-Chloronaphthalene	4-Methyl-2-Pentanone (MIBK)
	gamma-Chlordane	2-Chlorophenol	Bromochloromethane
	Total Chlordane	2-Methyl-4,6-Dinitrophenol	Bromodichloromethane
	Endrin	2-Methylphenol (o-Cresol)	Bromoform
	Endrin aldehyde	2-Nitroaniline	Bromomethane
	Endrin ketone	2-Nitrophenol	Carbon disulfide
	Total Endrin	3,3'-Dichlorobenzidine	Carbon tetrachloride
	alpha-BHC	3-Nitroaniline	Chloroethane
	beta-BHC	4-Bromophenyl-phenylether	Chloromethane
	delta-BHC	4-Chloro-3-methylphenol	cis-1,2-Dichloroethene
	gamma-BHC (Lindane)	4-Chloroaniline	cis-1,3-Dichloropropene
	Total BHC	4-Chlorophenylphenyl ether	Dibromochloromethane
	4,4'-DDD	4-Methylphenol (p-Cresol)	Styrene
	4,4'-DDE	4-Nitroaniline	Tetrachloroethene
	4,4'-DDT	4-Nitrophenol	trans-1,2-Dichloroethene
	Total DDT	Benzo(b)fluoranthene	trans-1,3-Dichloropropene
	Aroclor-1016	Benzo(g,h,i)perylene	Trichloroethene
	Aroclor-1221	Benzo(k)fluoranthene	Vinyl chloride
	Aroclor-1232	bis(2-Chloroethoxy)methane	Xylene (Total)
	Aroclor-1242	bis(2-Chloroethyl)ether	
	Aroclor-1248	bis(2-Ethylhexyl)phthalate (BEHP)	
	Aroclor-1254	Butylbenzylphthalate	
	Aroclor-1260	Dibenzofuran	
	Total PCBs	Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 10-3-12
Wetland 4D Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Metals (g/L)																			
Aluminum	0	2	45.4	34.75	56	45.4			ND	56	U		NA			2,930	0	No	Max SQL < Ref. Conc.
Antimony	0	2	1	1	1	1			ND	1	UJ		NA			4.15	0	No	Max SQL < Ref. Conc.
Barium	0	2	6.68	6.4	6.95	6.68			ND	6.95	U		NA			9.43	0	No	Max SQL < Ref. Conc.
Beryllium	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA			0.82	0	No	Max SQL < Ref. Conc.
Calcium	2	2				43,800	32,600	55,000	041W04D401	55,000			NA			76,800	0	No	Max Result < Ref. Conc.
Cobalt	0	2	1	1	1	1			ND	1	U		NA			2.38	0	No	Max SQL < Ref. Conc.
Cyanide (CN)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	1	EPA	2.5	2.5	4.1	0	No	Max SQL < Ref. Conc.
Iron	2	2				1,140	695	1,580	041W04D101	1,580			NA			1,352	1	Yes	Max Result > Ref. Conc.
Magnesium	2	2				104,000	63,700	145,000	041W04D401	145,000			NA			243,650	0	No	Max Result < Ref. Conc.
Manganese	2	2				29.5	22.6	36.4	041W04D101	36.4			NA			12.2	2	Yes	Max Result > Ref. Conc.
Mercury	0	2	0.065	0.065	0.065	0.065			ND	0.065	U	0.025	EPA	2.6	2.6	0.21	0	No	Max SQL < Ref. Conc.
Potassium	2	2				33,700	21,500	45,900	041W04D401	45,900			NA			81,250	0	No	Max Result < Ref. Conc.
Silver	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	0.23	EPA	11	10.9	3.01	0	No	Max SQL < Ref. Conc.
Sodium	2	2				978,000	686,000	1,270,000	041W04D401	1,270,000			NA			1,952,000	0	No	Max Result < Ref. Conc.
Thallium	**1**	**2**	**2**	**2**	**2**	**6.5**	**11**	**11**	**041W04D401**	**11**		**6.3**	**FDEP**	**2**	**1.03**	**2.6**	**1**	**Yes**	**Max Result > Ref. Conc.**
Vanadium	0	2	1	1	1	1			ND	1	U		NA			6.69	0	No	Max SQL < Ref. Conc.
Pesticides (g/L)																			
Aldrin	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Dieldrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan I	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0087	EPA	3	2.87		0	No	Parameter Not Detected; Max SQL > SV
Endosulfan II	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan sulfate	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Heptachlor	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0036	EPA	7	6.94		0	No	Parameter Not Detected; Max SQL > SV
Heptachlor epoxide	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	No	Parameter Not Detected; Max SQL > SV
Methoxychlor	0	2	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	No	Parameter Not Detected
Toxaphene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
alpha-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
gamma-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Total Chlordane	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.004	EPA	12.5	12.5		0	No	Parameter Not Detected; Max SQL > SV
Endrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin aldehyde	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin ketone	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22	21.7		0	No	Parameter Not Detected; Max SQL > SV
Total Endrin	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
alpha-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	UJ	0.005	FDEP	5	5		0	No	Parameter Not Detected; Max SQL > SV
beta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
delta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
gamma-BHC (Lindane)	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.016	EPA	2	1.56		0	No	Parameter Not Detected; Max SQL > SV
Total BHC	0	2	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	No	Parameter Not Detected
4,4'-DDD	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	No	Parameter Not Detected; Max SQL > SV
4,4'-DDE	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	No	Parameter Not Detected; Max SQL > SV
4,4'-DDT	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85	84.7		0	No	Parameter Not Detected; Max SQL > SV
Total DDT	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
PCBs (g/L)																			
Aroclor-1016	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1221	0	2	1	1	1	1			ND	1	U		NA				0	No	Parameter Not Detected
Aroclor-1232	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1242	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1248	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1254	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1260	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	FDEP	36	35.7		0	No	Parameter Not Detected; Max SQL > SV
Total PCB	0	2	4	4	4	4			ND	4	U		NA				0	No	Parameter Not Detected
SVOCs (g/L)																			
1,2,4-Trichlorobenzene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dichlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dimethylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dinitrophenol	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Chloronaphthalene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Chlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Nitroaniline	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected

Table 10-3-12
Wetland 4D Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
SVOCs (g/L) - cont.																			
2-Nitrophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
3-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chloroaniline	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
4-Nitrophenol	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Butylbenzylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Dibenzofuran	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Diethylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Dimethylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Di-n-octylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Hexachlorobutadiene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	2	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	No	Parameter Not Detected
Hexachloroethane	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Isophorone	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Nitrobenzene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Pentachlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Phenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
PAHs (g/L)																			
2-Methylnaphthalene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Acenaphthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Acenaphthylene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Anthracene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(a)anthracene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(a)pyrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chrysene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Fluoranthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Fluorene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Phenanthrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Pyrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Total PAH	0	2	6.5	6.5	6.5	6.5			ND	6.5	U		NA				0	No	Parameter Not Detected
VOCs (g/L)																			
1,1,2,2-Tetrachloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,1-Dichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dibromo-3-Chloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dibromoethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dichloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
2-Hexanone	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Bromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromodichloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromoform	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromomethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Carbon disulfide	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Carbon tetrachloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
cis-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Dibromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Styrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected

Table 10-3-12
Wetland 4D Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
VOCs (g/L) - cont.																			
Tetrachloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Trichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Vinyl chloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Xylene (Total)	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL

UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8)
RV = Refinement value (detailed explanation of RVs provided in Section 8)
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. .
As a result, some average detections may exceed the Max detection
Parameters in bold were detected and exceeded Ref. Conc.s

Table 10-3-13
Wetland 4D Phase II
Surface Water COPCs Retained after Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Iron	None	None	None
Manganese			
Thallium			

FINAL REMEDIAL INVESTIGATION REPORT
SITE 41 — OPERABLE UNIT 16 — NAS PENSACOLA WETLANDS

NAVAL AIR STATION
PENSACOLA, FLORIDA

SOUTHNAVFACENGCOM
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10.4 Wetland 15 — Screening Level Problem Formulation

10.4.1 Site Description and Habitats Present at Wetland 15

Wetland 15 is on the shore of Bayou Grande, just northeast of Site 1, between Wetland 4D and the NAS Pensacola Picnic Ground (Figure 10-1). This wetland is bordered by the A.C. Read Golf Course to the south, east, and west, and Bayou Grande to the north. Wetland 15 is fed from the south by surface water runoff from the area of the golf course and from the north by tidal influences from Bayou Grande. Site 1 groundwater also flows toward this wetland.

Photograph 1 Wetland 15 — Facing Northeast

Photograph 2 Wetland 15 — Facing South

Parsons and Pruitt (USEPA, 1991a) describe this area as an estuarine emergent system, with predominantly *Juncus romerianus*. Wetland 15 generally flows north into Bayou Grande through a drainage channel about 3 feet wide. The open water portion of the wetland ranges from 1 to about 3 feet in depth and has a maximum width of about 300 feet. Sediment in the wetland is highly organic, with TOC levels detected up to 40%. The mowed grass and abrupt topography, between the wetland and golf course, make the border between open water and upland obvious.

As described in Section 10, the landfill was used from the mid-1950s until 1976 as the predominant disposal site for all solid wastes generated on the base. Based on the data collected during the Site 1 RI, the *Final ROD* issued on August 19, 1998, outlined three RAOs for the OU 1 site:

1. Protection of groundwater from leachable compounds

2. Restoration of groundwater and prevention of further contamination of shallow/ intermediate groundwater

3. Prevention of further contamination of surface water in Wetland 15

The remedial actions selected for the site included:

1. Institutional controls to restrict groundwater use and intrusive activities

2. Implementation of a groundwater monitoring program to ensure that natural processes are effectively reducing the concentrations of organic compounds to attain performance standards

3. A groundwater interceptor system to treat the iron-contaminated groundwater that is migrating from the landfill and discharging to Wetland 3

The long-term monitoring plan was implemented by TtNUS. Groundwater was monitored for the following constituents: 1,1,2,2–tetrachlorethane, benzene, chlorobenzene, vinyl chloride, xylenes, aluminum, cadmium, chromium, iron, manganese, and nickel. Based upon collected data, the Third Annual Groundwater Monitoring Report recommended continued monitoring for benzene, vinyl chloride, xylenes, aluminum, cadmium, iron, and manganese (TtNUS, 2003b). The other constituents no longer exceeded MCLs and were dropped from the monitoring plan. Treatment of iron at Wetland 3 is discussed in Section 10.2.

10.4.2 Wetland 15 — Sample Location Description

Phase II Sediment Sample Location Description

Four sediment samples were collected in December 1995 to assess conditions at Wetland 15. Sample locations 041M150101, 041M150201, and 041M150401 were spaced through the center of the wetland. Location 041M150301 was selected, because it appeared that runoff was entering the wetland at this location. Sample locations 041M150101 and 041M150201 were in very shallow water (< 2 inches), whereas 041M150401 was submerged in 1 to 2 feet of water (Figure 10-4). Table 10-4-1 provides a physical description of the Phase II sediments collected at Wetland 15. Sediments at Wetland 15 were composed of black sandy organic silt (041M150101 and 041M150301 to black silty sand with organics (041M150401). TOC concentrations ranged from 11.2% (041M150301) to 39.5% (041M150401).

Phase II Surface Water Sample Location Description

Two surface water samples were collected from Wetland 15 in 1995. The stations were collocated with sediment locations 041W150101 and 041W150201 (Figure 10-4). Location 041W150201 is in the center of the wetland, whereas 041W150101 is towards the south.

Table 10-4-2 provides a physical description of the surface water collected at Wetland 15. Surface water from Wetland 15 was found to be moderately hard, sample 041W150101 was slightly acidic, and sample 041W150201 of neutral pH. Surface water at Wetland 15 had hardness as CaCO3 concentrations ranging from 360 to 708 mg/L, salinity from 0.05% to 0.08%, and pH from 6.01 to 6.98. Specific conductivity concentrations ranged from 1.2 to 1.74 mS/cm. It should be noted that sample location 041W150101 had a very high turbidity reading (greater than 1,000 NTUs) due to sampling techniques that could result in elevated constituent levels in this sample.

Phase IV/2004 Surface Water Sample Location Description

Due to elevated metals concentrations detected in the Phase II surface water sample and the possible connection with sample turbidity, a confirmation sample was attempted at location 041W1501 in Wetland 15 in 2004 for inorganic analysis. The location was determined to be dry, and no surface water sample could be collected even with rain conditions.

August 31, 2004. Wetland 15, looking southwest toward the original sample location 1501. No standing water present to sample.

10.4.3 Wetland 15 — Nature and Extent of Contamination

Figure 10-4 presents the sediment and surface water sampling locations for Wetland 15.

Phase II Sediment

Table 10-4-3 summarizes the analytical results of the four Wetland 15 sediment samples.

Metals — Nineteen metals were detected during sediment sampling at Wetland 15. The greatest number of inorganic detections at Wetland 15 was at location 041M150401, where 18 analytes were detected. Of these 18 detections, 11 exceeded the estuarine reference values. These include aluminum, arsenic, barium, beryllium, calcium, cobalt, iron, magnesium, manganese, potassium, and selenium. Location 041M150201 had 17 metals detected, 13 of which were present at concentrations exceeding the applicable estuarine reference values. Most of these detections at location 041M150201 represent the highest concentration detected at Wetland 15. Location 041M150101 had 15 metals detected in the sediment, of these 10 exceeded the applicable reference concentrations. Location 041M150301 had 14 metals detected, and nine detections exceeded the applicable reference value. The metals at Wetland 15 are widespread across the site area, with most detection exceeding the applicable reference values.

Pesticides and PCBs — Eleven pesticide compounds and the PCB aroclor-1260 were detected during sediment sampling at Wetland 15. Total 4,4′-DDT was calculated for each location by adding the concentrations of 4,4-DDD, 4,4-DDE, and 4,4-DDT. Likewise, a base wide total DDT reference concentration was calculated using the base wide concentrations for these same constituents. Locations 041M150101 and 041M150201 each had seven pesticide compounds and aroclor-1260 detected. These same two locations exhibited concentrations of 4,4′-DDD, 4,4′-DDE, and total DDT that exceeded the applicable estuarine and base wide reference values. Location 041M150301 also exhibited reference values exceedances for 4,4′-DDD, 4,4′-DDE, and total DDT. This location had six pesticide compounds and aroclor-1260 detected. Location 041M150401 had three pesticide compounds detected, none of which exceeded any applicable reference value. Pesticide compounds and aroclor-1260 are prevalent across Wetland 15 with the exception of location 041M150404, which is closest to Bayou Grande.

SVOCs — Eleven SVOCs were detected in the four sediment samples collected at Wetland 15. Location 041M150101 had the greatest number of detections with seven present. Generally locations 041M150401, 041M150201, and 041M150301 had six, five, and four detections, respectively. Location 041M150101 exhibited the highest concentrations of SVOCs overall. The other locations each had individual compounds present at higher concentrations, usually only for a singe compound. The greatest number of detections and generally highest concentrations were at location 041M150101, near the south end of the wetland.

VOCs — Locations 041M150201 and 041M150301 each had two VOCs detected. Location 041M150301 exhibited the highest concentration of 2-butanone and acetone detected in the wetland. Location 041M150201 had detections of acetone and methylene chloride. The other two locations had no VOC detections.

Summary

The distribution of metals across Wetland 15 displays no trend. Pesticides and PCBs are also fairly widespread, except for location 041M150401. Although SVOCs are also widespread, the greatest concentrations detected are at location 041M150101. VOCs are present at locations 041M150301 and 041M150201.

Phase II Surface Water

Figure 10-4 presents the surface water sampling locations for Wetland 15. Table 10-4-4 summarizes the analytical results of the two Wetland 15 surface water samples.

Metals — Twenty-one metals were detected in the surface water samples taken from Wetland 15. The sample collected from location 041W150101 exhibited 20 of these analytes, while the sample from location 041W150201 had 14 metals detected. Location 041W150101 detected 16 metals, with concentrations exceeding the applicable estuarine reference values. Location 041W150201 had six exceedances. Location 041W150101, near the south end of the wetland adjacent to the golf course, had the greatest number of metals detected and the highest number of reference value exceedances at Wetland 15. The detections were attributable to the high turbidity of the sample. An attempt was made in 2004 to resample, but the location was determined to be dry.

Pesticides and PCBs — A single pesticide compound — 4,4′-DDE — was detected in the surface water sample collected from location 041W150101.

SVOCs — No SVOCs were detected during surface water sampling at Wetland 15.

VOCs — No VOCs were detected in the Wetland 15 surface water samples collected.

10.4.4 Ecological Risk Assessment

Phase II Investigation Summary — Wetland 15

Sediment-Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-4-5, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with

no screening values were carried forward to COPC refinement. While several constituents had HQs exceeding 1, total DDT (HQ=132) generated the highest HQ of any constituents. A list of all COPCs after screening is included in Table 10-4-6.

Baseline Problem Formulation — Wetland 15 Sediment COPC Refinement

During the COPC refinement, additional information was used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. This risk assessment will present a statement of potential risk for each of the preliminary COPCs.

The COPC refinement process included:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to base wide total DDT concentrations
- Comparison of inorganic constituents to reference wetland values
- Regression analysis of inorganic constituents
- Comparison of detected concentrations compared to EqP SQGs
- Comparison to Swartz consensus values
- Mean ERM quotients
- Description of sediment exceedances and their extent

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 10-4-7. COPCs retained after refinement are presented in Table 10-4-8.

All detected inorganic constituents exceeding their Site 41 estuarine sediment reference concentrations were carried forward in the ERA Process. Sample locations 041M150201 and 041M150301 were identified as outliers through regression analysis for chromium, copper, and zinc, when compared to iron and aluminum concentrations. Sample location 041M150301 was also identified as an outlier for lead. Arsenic, copper, and lead exceeded their SVs. There are also RV exceedences for arsenic and lead. Lead exceeded its RV at two locations (041M150201 and 041M150301) and generated a maximum RV HQ of 1.88. Arsenic exceeded its RV at location 041M150301, but generated the highest HQs of any inorganic at Wetland 15.

At Wetland 15, the highest inorganic exceedance detected was at sample location 041M150301. Arsenic generated the largest inorganic SV and RV HQs (19.5 and 3.39, respectively). Of the

four sediment samples, only one location exceeded the arsenic RV (041M150301). The other RV exceedance was lead (max RV HQ = 1.88) at location 041M150201. Based on the analysis of the inorganic constituents detected at Wetland 15, arsenic and lead are the primary concerns for potential risk (highest HQs) and are included as COPCs. While calcium, magnesium, potassium, and sodium exceeded their reference values, they are typically considered essential nutrients and are not included as COPCs for further evaluation. Other inorganic constituents included as COPCs for Wetland 15 include aluminum, barium, beryllium, cobalt, iron, manganese, selenium, and vanadium.

Sample location 041M150301 and 041M150101 were the stations with the highest 4,4′-DDD and total DDT levels (Figure 10-5). These locations are in the southern vicinity of the wetland, where surface water from the golf course has been observed entering the wetland. 4,4′-DDT and its daughter products were detected throughout the entire wetland. Based on total DDTs widespread exceedance of SV and RV (base wide levels) and the magnitude of HQs generated, it will be included as a COPC and evaluated further using a food-chain model. The remaining pesticides, PCBs, and SVOCs were detected at various locations throughout the wetland. Many of the screening COPCs were retained either due to SQLs or a lack of screening values but were never actually detected at Wetland 15. The pesticides included as COPCs are total BHC, total endrin, endosulfan I, and heptachlor. Pesticides will be evaluated on an OU-wide basis using a food-chain model.

When normalized to detected TOC concentrations, VOCs and PAHs were not risk drivers for Wetland 15. TOC normalized PAHs are presented on Figure 10-6. The following SVOCs detected but have no RV are included as COPCs: 2,2′-oxybis(1-chloropropane), 2,4-dimethylphenol, 4-methylphenol, and phenol.

Table 10-4-9 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Based on this approach, three sample locations — (041M150201, 041M150301, and 041M150401) — were determined to be Category 2, which according to tests evaluated in developing this methodology, had average survival rates of approximately 80%; however, this category also has the highest level of uncertainty in predicting toxicity. Sample location 041M150101 was determined to be Category 3, which according to the studies, about 50% of the samples were found to be toxic, and average survival was about 60-70%. Figure 10-7 shows the Mean ERM category for each sediment sample location at OU 1 wetlands.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-4-10, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with

no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-4-11.

Baseline Problem Formulation — Wetland 15 Surface Water COPC Refinement

During the surface water COPC refinement, additional information was used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs.

The COPC refinement process included:

- Comparison of maximum concentrations to average concentrations
- Comparison of inorganic constituents to reference wetland values
- Description of surface water exceedances and their extent

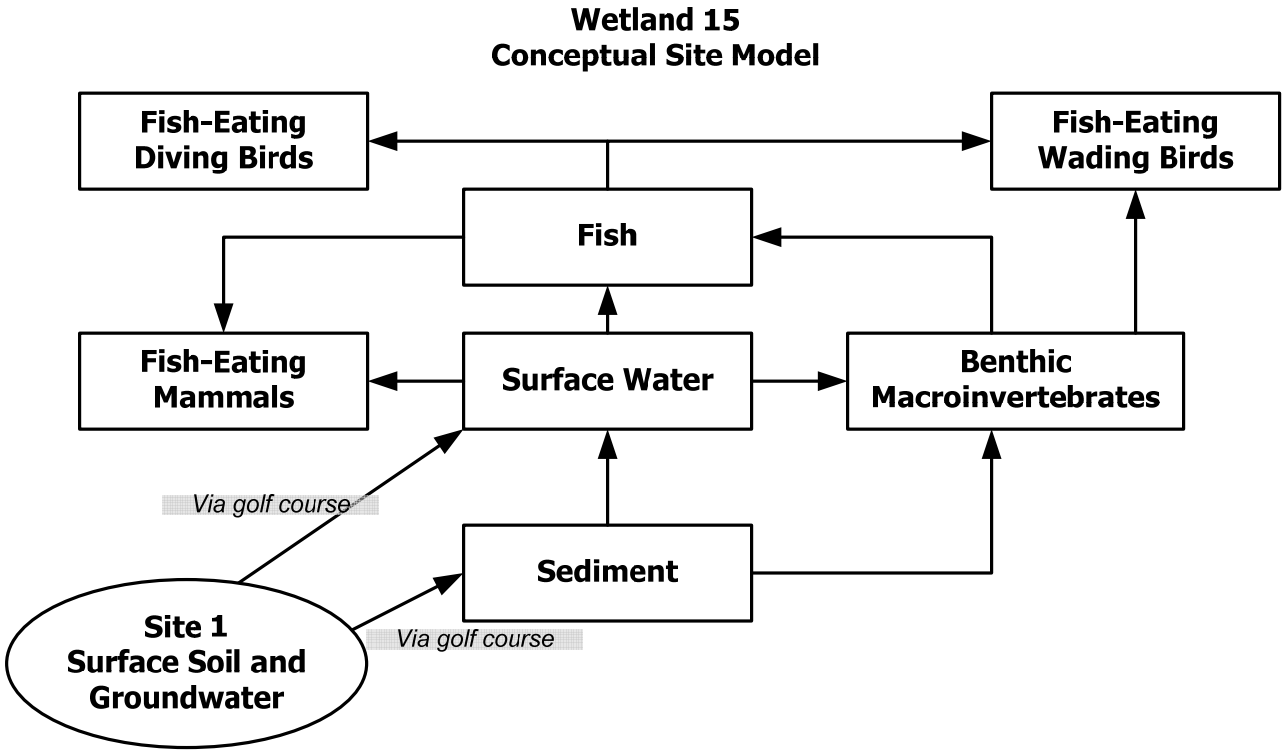
The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 10-4-12. COPCs retained after refinement are presented in Table 10-4-13. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland.

For Wetland 15, aluminum, antimony, arsenic, barium, beryllium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, vanadium, and zinc exceeded their Site 41 estuarine reference surface water concentrations (Table 10-4-12). These constituents are identified as COPCs for further consideration in the ERA process, with the exception of the essential nutrient calcium.

In 1995, station 041W150101 was found to have the highest inorganic concentrations of the two stations sampled. Aluminum and iron HQs were orders of magnitude higher than other inorganic constituents. Beryllium, copper, lead, mercury, nickel, and zinc had double digit HQs; however, the concentrations may have been artificially high due to very high turbidity, as a result of sampling technique. In 1995, 4,4'-DDE was detected at the same location (041W150101) where the surface water runoff from the golf course enters the wetland, and is included as a COPC. At Wetland 15 during the Phase II investigation, many of the same constituents were detected in sediment and surface water samples. However, none of these constituents were detected at the same locations. An explanation for this uncertainty and lack of concordance between sediments and surface water locations may be high levels of turbidity.

As summarized in the approved *Final RI/FS SAP Addendum, Site 41* (E/A&H, 1997d), Wetland 15 was identified as an Orange-Coded Wetland based on the Phase II results, indicating contamination that was possibly related to nearby IR sites, but with limited contaminants exceeding sediment criteria and reference concentrations. Contaminants detected in these wetlands were also considered to be possible sources of ecological risk. Wetland 15 was also classified as a Group C wetland. Based on similar contaminants and physical characteristics, the other Group C wetlands include 4D, 16, 18 (A and B), and 63A. Wetlands 16 and 18 were sampled in Phase III to represent the Group C wetlands based on their relatively higher concentrations and extent of contamination. To assess risks from contaminants that bioaccumulate, the results from Wetland 15 will be used in the OU 1 food-chain model presented in Section 10.8.

The conceptual model below symbolizes which environmental habitats may be impacted by Wetland 15 Phase II constituents retained during the ERA Process.



10.4.5 Wetland 15 — Human Health Risk Assessment

Wetland 15 is described in Section 10.4.1, and the HHRA is summarized below.

10.4.5.1 Site Data

Surface water and sediment data were collected at Wetland 15 during Phases II of the RI. Section 10.4.3 summarizes the nature and extent of contamination for this wetland. Surface water and sediment data are summarized in Tables 10-4-3 and 10-4-4. Excluded from dermal exposure estimates in surface water was 4,4′-DDE. This is in accordance with USEPA's policy for chlorinated pesticides and PAHs with a molecular weight greater than 250.

10.4.5.2 Conceptual Site Model

As described in Section 10.4.1, Wetland 15 is estuarine and is bordered by the A. C. Read Golf Course and Bayou Grande. This wetland has recreational or functional uses, because it could be accessed by Navy personnel or trespassers walking and/or wading through the area, and fishing is possible in a trespassing scenario. Some sediment at this wetland is exposed for most of the year, so sediment exposure would be assessed using soil exposure models. Dermal contact could be a significant exposure pathway and was included in this HHRA. Based on the species present, depth of surface water, and available habitat, fishing could occur, and wading would be the most likely exposure scenario.

COPCs were identified as described in Section 9. The following scenarios and exposure pathways were evaluated for this wetland:

Scenario	Medium	Ingestion	Dermal	Fish Tissue Ingestion
Maintenance	Sediment	√	√	
	Surface water	√	√	
Trespasser	Sediment	√	√	
	Surface water	√	√	
Fisherman	Fish Tissue Uptake from Sediment			√

10.4.5.3 Risk Characterization

The child trespasser, adult maintenance worker, and fisherman scenarios were assessed for this wetland.

Trespasser

Phase II Data

As shown in Tables 10-4-14 through 10-4-16, sediment dermal contact and ingestion risk estimates exceed FDEP's risk threshold of 1E-6, and the only risk driver was arsenic. As shown in Tables 10-4-17

through 10-4-19, surface water dermal contact risk estimates for arsenic exceed FDEP's risk threshold of 1E-6. Hazard indices were below 1.0.

Maintenance Worker

Phase II Data

As shown in Tables 10-4-14 through 10-4-16, sediment ingestion and dermal contact risk estimates exceed FDEP's risk threshold of 1E-6, and the only risk driver was arsenic. As shown in Tables 10-4-17 through 10-4-19, surface water dermal contact risk estimates for arsenic exceed FDEP's risk threshold of 1E-6. Hazard indices were below 1.0.

Fisherman

As shown in Table 10-4-20, fish tissue uptake from sediment risk estimates for 4,4'-DDD, 4,4'-DDE, aroclor-1260, and delta-BHC exceeded FDEP's risk threshold of 1E-6.

Summary of Wetland 15 Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	2.38E-01	2.77E-05
	Surface water	5.10E-01	4.95E-06
Trespasser	Sediment	3.12E-01	1.69E-05
	Surface water	3.77E-01	1.48E-06
Fisherman	Fish Tissue Uptake from Sediment	9.31E-02	2.42E-05

Based on Phase II data, arsenic, 4,4'-DDD, 4,4'-DDE, aroclor-1260, and delta-BHC were identified as COCs.

Wetland 15 HHRA COC Summary

The following parameters were determined in the HHRA to be COCs for Wetland 15.

- Arsenic
- Aroclor-1260
- Delta-BHC
- 4,4'-DDD
- 4,4'-DDE

10.4.6 Wetland 15 — Fate and Transport Analysis

This wetland occupies an area to the northeast of Site 1. It is bounded on the north by Bayou Grande. Internally, the wetland drains from the southeast to the northwest, eventually emptying into Bayou Grande (see Figure 10-1). Four sediment and two surface water samples were collected as part of the wetland assessment.

The sediment and surface water COPCs retained after refinement for Wetland 15 are summarized in Tables 10-4-8 and 10-4-13 respectively. Provided below are the associated monitoring wells used for comparing data for the fate and transport analysis. All associated monitoring wells and borings are used in the comparison (no considerations given for upgradient/downgradient positioning) because of the potential for tidal flux influences on internal wetland flow.

Associated Monitoring Wells: 001GM004, 001GI048, 001GM003, 001GM044, 001GI032, 001GS057

Associated Borings: 001SI048, 001SI032

Surface Water/Sediment Transport into the Wetland Media:

Surface Water — There are no directly comparable storm water data from the area proximal to this wetland complex. Because of the lack of data, no definitive statement can be made regarding the validation of the pathway via storm water runoff into the wetland complex. The wetland is surrounded by non-paved areas, so the storm water runoff pathway is likely to be less influential than the groundwater discharge pathways.

Sediment — Based on the data from surface soil proximal to this wetland complex, this storm water to sediment pathway is validated for the following parameters:

Phase II	
Aluminum	Manganese
Barium	Vanadium
Cobalt	Total DDT
Iron	Endrin aldehyde
Lead	Endrin ketone

Groundwater to Wetland Media Pathways:

Surface Water — Based on the data from associated monitoring wells, this groundwater to wetland surface water pathway is validated and significant for the following parameters, (**note:** the 1993 metals data are not used for validation purposes due to potential bias introduced by the sampling methodology):

Phase II
Barium
Iron
Manganese
Zinc

Sediment — Based on the data from associated monitoring wells, this pathway is validated and significant for the following parameters, (**note:** that 1993 metals data are not used for validation purposes due to potential bias introduced by the sampling methodology):

Phase II
Barium
Iron
Manganese

Surface Water/Sediment Transport within the Wetlands:

To evaluate these pathways for surface water in Wetland 15, upgradient location 041M1501 was compared to downgradient location 041M1502. To evaluate these pathways for sediment in Wetland 15, upgradient sediment sample location 041M1501 was compared to downgradient sediment location 041M1504. Criteria of note are the number of detected parameters and the apparent general trend in concentrations.

Surface Water — Evaluation of upgradient location 041M1501 with downgradient 041M1502 indicates a decrease in detected parameters (20 metals/one organic upgradient versus 14 metals/zero organics downgradient). However, the sample collected at 041M1501 was determined to have high turbidity attributable to sampler error. A confirmation sample at that location could not be collected in 2004, because it was dry.

One metal was present downgradient that was not presenting in upgradient samples, one detection increased, and 12 exhibited marked decreases in concentrations. This is likely due to the high turbidity, dispersion within the wetland, partitioning to sediment, and/or tidal influences from Bayou Grande.

Sediment — Evaluation of upgradient 041M1501 with downgradient 041M1504 indicates an increase in detected metals and a decrease in detected organics (15 metals/15 organics upgradient versus 18 metals/nine organics downgradient). Three metals were present downgradient that were not present upgradient, five detections exhibited an increase, and 10 exhibited a decrease. Four organic parameters were present downgradient that were not detected upgradient and five organic parameters exhibited a decrease. Metals overall experienced a moderate to slight increase, and organics (specifically pesticides) experienced a marked decrease. TOC exhibited a marked increase, which would provide more adsorptive capabilities for the sediment, but the lack of increases overall indicates that contaminants are being fixed within the sediment further upgradient.

Table 10-4-1
Wetland 15 Phase II
Sediment Physical Parameters

Parameter	041M150101	041M150201	041M150301	041M150401
TOC (%)	12.1	14.9	11.2	39.5
Percent Solids (%)	12.6	9.2	12.9	29.5
Grain Size Analysis (percent of composition[1])				
Medium Sand	13	5	15	14
Fine Sand	10	5	3	47
Silt and Clay	77	90	82	39
Description	Black Sandy Organic Silt	Black Organic Silt with Sand	Black Sandy Organic Silt	Black Silty Sand with Organics

Note:
[1] = Derived from sieve analyses.

Table 10-4-2
Wetland 15 Phase II
Surface Water Physical Parameters

Parameter	041W150101	041W150201
Hardness as CaCO3 (mg/L)	708	360
pH	6.01	6.98
Specific Conductivity (mS/cm)	1.2	1.74
Turbidity (NTU)	>1000	0
Salinity (%)	0.05	0.08

Notes:
mg/L = Milligrams per liter
pH = Hydrogen ion content
MS/cm = Millisiemens per centimeter
NTU = Nephelometric turbidity units
% = Percent

Table 10-4-3
Wetland 15 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
Metals (mg/kg)								
Aluminum	4,274.0	4	4	4	7,810.0	15,800.0	10,200.0	041M150201
Antimony	0.260	4	1	4	6.0	6.0	2.030	041M150201
Arsenic	2.140	4	4	4	2.50	141.0	40.90	041M150301
Barium	3.840	4	4	4	6.20	40.90	25.90	041M150301
Beryllium	0.130	4	1	4	0.340	0.340	0.259	041M150401
Calcium	1,978.80	4	4	4	3,010.0	11,300.0	7,210.0	041M150301
Chromium	13.10	4	4	4	14.30	45.70	29.60	041M150201
Cobalt	0.910	1	1	4	1.50	1.50	0.887	041M150401
Copper	8.440	3	4	4	5.50	20.20	13.30	041M150201
Iron	2,684.40	4	4	4	11,200.0	223,000.0	71,000.0	041M150301
Lead	21.040	3	4	4	20.70	211.0	111.0	041M150201
Magnesium	2,943.60	2	4	4	912.0	4,980.0	2,580.0	041M150201
Manganese	9.810	4	4	4	47.70	520.0	205.0	041M150301
Nickel	3.690	2	2	4	5.60	12.40	5.720	041M150201
Potassium	899.720	2	4	4	310.0	1,460.0	808.0	041M150201
Selenium	0.660	3	3	4	0.930	2.70	1.460	041M150201
Sodium	11,439.60	1	4	4	206.0	14,200.0	6,530.0	041M150201
Vanadium	8.590	4	4	4	10.50	36.0	21.60	041M150201
Zinc	14.360	4	4	4	23.50	83.60	48.30	041M150301
PAHs (g/kg)								
Benzo(a)pyrene	N/A	0	1	4	59.0	59.0	121.0	041M150401
Fluoranthene	N/A	0	4	4	94.0	240.0	181.0	041M150201
Pyrene	N/A	0	3	4	120.0	210.0	165.0	041M150201
Total PAHs	N/A	0	4	4	768.0	1,940.0	1,540.0	041M150201
Pesticides and PCBs (g/kg)								
Aroclor-1260	N/A	0	3	4	14.0	32.0	18.20	041M150301
Total PCBs	N/A	0	3	4	66.50	77.0	60.80	041M150301
Endosulfan I	N/A	0	1	4	1.70	1.70	0.649	041M150301
Heptachlor	N/A	0	1	4	1.10	1.10	0.484	041M150201
alpha-Chlordane	N/A	0	1	4	1.40	1.40	0.559	041M150201
Total Chlordane	N/A	0	1	4	1.775	1.775	0.861	041M150201
Endrin	N/A	0	3	4	1.50	16.0	5.160	041M150201
Endrin aldehyde	N/A	0	2	4	1.30	7.30	2.410	041M150101
Endrin ketone	N/A	0	1	4	1.90	1.90	0.899	041M150101
Total Endrin	N/A	0	4	4	2.090	17.50	8.470	041M150201

Table 10-4-3
Wetland 15 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
Pesticides and PCBs (g/kg) - cont.								
beta-BHC	N/A	0	2	4	0.940	1.40	0.70	041M150201
delta-BHC	N/A	0	1	4	5.50	5.50	1.60	041M150301
Total BHC	N/A	0	3	4	2.065	6.445	2.90	041M150301
4,4'-DDD	50.0	3	4	4	1.30	200.0	87.10	041M150301
4,4'-DDE	40.0	3	4	4	10.0	340.0	132.0	041M150101
4,4'-DDT	20.0	0	3	4	4.30	16.0	7.620	041M150301
Total DDT	110.0	3	4	4	11.595	434.90	227.0	041M150101
SVOCs (g/kg)								
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	N/A	0	1	4	82.0	82.0	1,080.0	041M150401
2,4-Dimethylphenol	N/A	0	1	4	630.0	630.0	983.0	041M150101
2-Methylphenol (o-Cresol)	N/A	0	1	4	330.0	330.0	908.0	041M150101
4-Methylphenol (p-Cresol)	N/A	0	1	4	4,800.0	4,800.0	2,030.0	041M150101
Benzo(b)fluoranthene	N/A	0	3	4	79.0	250.0	170.0	041M150301
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	3	4	220.0	490.0	548.0	041M150201
Di-n-butylphthalate	N/A	0	3	4	130.0	250.0	280.0	041M150101
Phenol	N/A	0	1	4	280.0	280.0	895.0	041M150101
VOCs (g/kg)								
2-Butanone (MEK)	N/A	0	1	3	350.0	350.0	137.0	041M150301
Acetone	N/A	0	2	3	130.0	1,400.0	517.0	041M150301
Methylene chloride	N/A	0	1	3	34.0	34.0	36.80	041M150201

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 10-4-4
Wetland 15 Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Range of Detections: Average Detection	Range of Detections: Maximum Detection Location
Metals (g/L)								
Aluminum	2,927.5	1	2	2	934.0	213,000.0	107,000.0	041W150101
Antimony	4.15	1	1	2	32.4	32.4	32.4	041W150101
Arsenic	3.6	2	2	2	4.5	68.8	36.6	041W150101
Barium	9.43	2	2	2	34.7	642.0	338.0	041W150101
Beryllium	0.82	1	1	2	3.2	3.2	3.2	041W150101
Calcium	76,800.0	2	2	2	87,100.0	178,000.0	133,000.0	041W150101
Chromium	10.87	1	1	2	327.0	327.0	327.0	041W150101
Cobalt	2.38	1	1	2	23.5	23.5	23.5	041W150101
Copper	7.03	1	2	2	4.0	191.0	97.5	041W150101
Iron	1,352.0	2	2	2	8,300.0	715,000.0	362,000.0	041W150101
Lead	13.75	2	2	2	22.5	801.0	412.0	041W150101
Magnesium	243,650.0	0	2	2	34,600.0	63,700.0	49,200.0	041W150101
Manganese	12.15	2	2	2	121.0	1,640.0	881.0	041W150101
Mercury	0.21	1	1	2	0.94	0.94	0.94	041W150101
Nickel	9.3	1	1	2	103.0	103.0	103.0	041W150101
Potassium	81,250.0	0	2	2	11,400.0	16,000.0	13,700.0	041W150101
Selenium	2.9	1	1	2	16.3	16.3	16.3	041W150101
Sodium	1,952,000.0	0	2	2	141,000.0	174,000.0	158,000.0	041W150201
Thallium	2.55	1	1	2	3.2	3.2	3.2	041W150201
Vanadium	6.69	1	2	2	2.0	337.0	170.0	041W150101
Zinc	12.88	1	2	2	12.7	1,010.0	511.0	041W150101
Pesticides and PCBs (g/L)								
4,4'-DDE	N/A	0	1	2	0.063	0.063	0.063	041W150101
Total DDT	N/A	0	1	2	0.163	0.163	0.163	041W150101

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 10-4-5
Wetland 15 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	4	4			7,810	15,800	041M150201	15,800			N/A		Yes	No SV
Antimony	1	4	0.36	1	6	6	041M150201	6	J	12	2	0.5	No	Max Detect < SV
Arsenic	**4**	**4**			**2.5**	**141**	**041M150301**	**141**		**7.24**	**1, 2**	**19.5**	**Yes**	**Max Detect > SV**
Barium	4	4			6.2	40.9	041M150301	40.9	J		N/A		Yes	No SV
Beryllium	1	4	0.205	0.285	0.34	0.34	041M150401	0.34	J		N/A		Yes	No SV
Cadmium	0	4	0.26	0.85			ND	0.85	U	0.676	1	1.26	Yes	Max SQL> SV
Calcium	4	4			3,010	11,300	041M150301	11,300	J		N/A		Yes	No SV
Chromium	4	4			14.3	45.7	041M150201	45.7	J	52.3	1, 2	0.87	No	Max Detect < SV
Cobalt	1	4	0.6	0.85	1.5	1.5	041M150401	1.5	J		N/A		Yes	No SV
Copper	**4**	**4**			**5.5**	**20.2**	**041M150201**	**20.2**		**18.7**	**1, 2**	**1.08**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	4	0.8	2.6			ND	2.6	U		N/A		Yes	No SV
Iron	4	4			11,200	223,000	041M150301	223,000			N/A		Yes	No SV
Lead	**4**	**4**			**20.7**	**211**	**041M150201**	**211**		**30.2**	**1, 2**	**6.99**	**Yes**	**Max Detect > SV**
Magnesium	4	4			912	4,980	041M150201	4,980			N/A		Yes	No SV
Manganese	4	4			47.7	520	041M150301	520			N/A		Yes	No SV
Mercury	0	4	0.07	0.225			ND	0.225	UJ	0.13	1, 2	1.73	Yes	Max SQL> SV
Nickel	2	4	2.45	2.45	5.6	12.4	041M150201	12.4	J	15.9	1, 2	0.78	No	Max Detect < SV
Potassium	4	4			310	1,460	041M150201	1,460	J		N/A		Yes	No SV
Selenium	3	4	0.6	0.6	0.93	2.7	041M150201	2.7	J		N/A		Yes	No SV
Silver	0	4	0.345	1.15			ND	1.15	UJ	0.733	1	1.57	Yes	Max SQL> SV
Sodium	4	4			206	14,200	041M150201	14,200			N/A		Yes	No SV
Thallium	0	4	0.26	0.85			ND	0.85	U		N/A		Yes	No SV
Vanadium	4	4			10.5	36	041M150201	36			N/A		Yes	No SV
Zinc	4	4			23.5	83.6	041M150301	83.6		124	1, 2	0.67	No	Max Detect < SV
PAHs (g/kg)														
2-Methylnaphthalene	0	4	55	150			ND	150	U	20.2	1	7.43	No	TOC normalized PAHs < TEC
Acenaphthene	0	4	27.5	70			ND	70	U	6.71	1	10.4	No	TOC normalized PAHs < TEC
Acenaphthylene	0	4	55	150			ND	150	U	5.87	1	25.6	No	TOC normalized PAHs < TEC
Anthracene	0	4	55	150			ND	150	U	46.9	1	3.2	No	TOC normalized PAHs < TEC
Benzo(a)anthracene	0	4	55	150			ND	150	U	74.8	1	2.01	No	TOC normalized PAHs < TEC
Benzo(a)pyrene	1	4	125	150	59	59	041M150401	59	J	88.8	1	0.66	No	TOC normalized PAHs < TEC
Chrysene	0	4	55	150			ND	150	U	108	1	1.39	No	TOC normalized PAHs < TEC
Dibenz(a,h)anthracene	0	4	55	150			ND	150	U	6.22	1	24.1	No	TOC normalized PAHs < TEC
Fluoranthene	4	4			94	240	041M150201	240	J	113	1	2.12	No	TOC normalized PAHs < TEC
Fluorene	0	4	27.5	70			ND	70	U	21.2	1	3.3	No	TOC normalized PAHs < TEC
Naphthalene	0	4	55	150			ND	150	U	34.6	1	4.34	No	TOC normalized PAHs < TEC
Phenanthrene	0	4	55	150			ND	150	U	86.7	1	1.73	No	TOC normalized PAHs < TEC
Pyrene	3	4	150	150	120	210	041M150201	210	J	153	1	1.37	No	TOC normalized PAHs < TEC
Total PAHs	4	4			768	1,940	041M150201	1,940		1,684	1, 2	1.15	No	TOC normalized PAHs < TEC
TOC Normalized PAHs	4	4			1.94	15.21	041M150101	15.21		290	3	0.0524	No	Max Detect < SV
PCBs (g/kg)														
Aroclor-1016	0	4	2.95	7.5			ND	7.5	U	21.6	N/A	0.35	No	Max SQL< SV
Aroclor-1221	0	4	5.5	15			ND	15	U	67	2	0.22	No	Max SQL< SV
Aroclor-1232	0	4	2.95	7.5			ND	7.5	U	21.6	N/A	0.35	No	Max SQL< SV
Aroclor-1242	0	4	2.95	7.5			ND	7.5	U	21.6	N/A	0.35	No	Max SQL< SV
Aroclor-1248	0	4	2.95	7.5			ND	7.5	U	21.6	N/A	0.35	No	Max SQL< SV
Aroclor-1254	0	4	2.95	7.5			ND	7.5	U	21.6	N/A	0.35	No	Max SQL< SV
Aroclor-1260	**3**	**4**	**2.95**	**2.95**	**14**	**32**	**041M150301**	**32**	**J**	**21.6**	**N/A**	**1.48**	**Yes**	**Max Detect > SV**
Total PCBs	**3**	**4**	**23.2**	**23.2**	**66.5**	**77**	**041M150301**	**77**		**21.6**	**1**	**3.56**	**Yes**	**Max Detect > SV**
Pesticides (g/kg)														
Aldrin	0	4	0.145	0.375			ND	0.375	U		N/A		Yes	No SV
Dieldrin	0	4	0.295	0.75			ND	0.75	U	0.716	1	1.05	Yes	Max SQL> SV
Endosulfan I	1	4	0.145	0.375	1.7	1.7	041M150301	1.7	J		N/A		Yes	No SV
Endosulfan II	0	4	0.295	0.75			ND	0.75	U		N/A		Yes	No SV
Endosulfan sulfate	0	4	0.295	0.75			ND	0.75	U		N/A		Yes	No SV
Heptachlor	1	4	0.145	0.375	1.1	1.1	041M150201	1.1	J		N/A		Yes	No SV
Heptachlor epoxide	0	4	0.145	0.375			ND	0.375	U		N/A		Yes	No SV
Methoxychlor	0	4	1.45	3.75			ND	3.75	U		N/A		Yes	No SV
Toxaphene	0	4	14.5	37.5			ND	37.5	U		N/A		Yes	No SV
alpha-Chlordane	1	4	0.145	0.375	1.4	1.4	041M150201	1.4	J	1.7	1	0.82	No	Max Detect < SV

Table 10-4-5
Wetland 15 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Pesticides (g/kg) - cont.														
gamma-Chlordane	0	4	0.145	0.375			ND	0.375	U	1.7	1	0.22	No	Max SQL< SV
Total Chlordane	**1**	**4**	**0.29**	**0.75**	**1.78**	**1.78**	**041M150201**	**1.78**		**1.7**	**1**	**1.04**	**Yes**	**Max Detect > SV**
Endrin	**3**	**4**	**0.65**	**0.65**	**1.5**	**16**	**041M150201**	**16**	**J**	**3.3**	**2**	**4.85**	**Yes**	**Max Detect > SV**
Endrin aldehyde	**2**	**4**	**0.295**	**0.75**	**1.3**	**7.3**	**041M150101**	**7.3**	**J**	**3.3**	**2**	**2.21**	**Yes**	**Max Detect > SV**
Endrin ketone	1	4	0.295	0.75	1.9	1.9	041M150101	1.9	J	3.3	2	0.58	No	Max Detect < SV
Total Endrin	**4**	**4**			**2.09**	**17.5**	**041M150201**	**17.5**		**3.3**	**2**	**5.3**	**Yes**	**Max Detect > SV**
alpha-BHC	0	4	0.145	0.375			ND	0.375	UJ		N/A		Yes	No SV
beta-BHC	**2**	**4**	**0.145**	**0.315**	**0.94**	**1.4**	**041M150201**	**1.4**	**J**	**0.32**	**N/A**	**4.38**	**Yes**	**Max Detect > SV**
delta-BHC	**1**	**4**	**0.145**	**0.375**	**5.5**	**5.5**	**041M150301**	**5.5**	**J**	**0.32**	**N/A**	**17.2**	**Yes**	**Max Detect > SV**
gamma-BHC (Lindane)	0	4	0.145	0.375			ND	0.375	U	0.32	1	1.17	Yes	Max SQL> SV
Total BHC	**3**	**4**	**0.58**	**0.58**	**2.06**	**6.45**	**041M150301**	**6.45**		**0.32**	**2**	**20.1**	**Yes**	**Max Detect > SV**
4,4'-DDD	**4**	**4**			**1.3**	**200**	**041M150301**	**200**	**DJ**	**1.22**	**1**	**164**	**Yes**	**Max Detect > SV**
4,4'-DDE	**4**	**4**			**10**	**340**	**041M150101**	**340**	**DJ**	**2.07**	**1**	**164**	**Yes**	**Max Detect > SV**
4,4'-DDT	**3**	**4**	**0.295**	**0.295**	**4.3**	**16**	**041M150301**	**16**	**J**	**1.19**	**1**	**13.4**	**Yes**	**Max Detect > SV**
Total DDT	**4**	**4**			**11.6**	**435**	**041M150101**	**435**		**3.3**	**2**	**132**	**Yes**	**Max Detect > SV**
SVOCs (kg)														
1,2,4-Trichlorobenzene	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1	4	1,250	1,500	82	82	041M150401	82	J		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	4	1,350	3,600			ND	3,600	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
2,4-Dimethylphenol	1	4	550	1,500	630	630	041M150101	630	J		N/A		Yes	No SV
2,4-Dinitrophenol	0	4	1,350	3,600			ND	3,600	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
2-Chloronaphthalene	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
2-Chlorophenol	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	4	1,350	3,600			ND	3,600	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	1	4	550	1,500	330	330	041M150101	330	J		N/A		Yes	No SV
2-Nitroaniline	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
2-Nitrophenol	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
3-Nitroaniline	0	4	1,350	3,600			ND	3,600	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
4-Chloroaniline	0	1	1,250	1,250			ND	1,250	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	4	550	1,500			ND	1500	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	1	4	550	1,500	4800	4800	041M150101	4,800			N/A		Yes	No SV
4-Nitroaniline	0	4	1,350	3,600			ND	3,600	U		N/A		Yes	No SV
4-Nitrophenol	0	4	1,350	3,600			ND	3,600	U		N/A		Yes	No SV
Benzo(b)fluoranthene	3	4	150	150	79	250	041M150301	250	J		N/A		No	TOC normalized PAHs < TEC
Benzo(g,h,i)perylene	0	4	55	150			ND	150	U		N/A		No	TOC normalized PAHs < TEC
Benzo(k)fluoranthene	0	4	55	150			ND	150	U		N/A		No	TOC normalized PAHs < TEC
bis(2-Chloroethoxy)methane	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	4	55	150			ND	150	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**3**	**4**	**1,250**	**1,250**	**220**	**490**	**041M150201**	**490**	**J**	**182**	**1, 2**	**2.69**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	0	4	550	1,500			ND	1,500	U	182	1, 2	8.24	Yes	Max SQL > SV
Carbazole	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
Dibenzofuran	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
Diethylphthalate	0	4	550	1,500			ND	1,500	U	182	1, 2	8.24	Yes	Max SQL > SV
Dimethylphthalate	0	4	550	1,500			ND	1,500	U	182	1, 2	8.24	Yes	Max SQL > SV
Di-n-butylphthalate	**3**	**4**	**550**	**550**	**130**	**250**	**041M150101**	**250**	**J**	**182**	**1, 2**	**1.37**	**Yes**	**Max Detect > SV**
Di-n-octylphthalate	0	4	550	1,500			ND	1,500	U	182	1, 2	8.24	Yes	Max SQL > SV
Hexachlorobenzene	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
Hexachlorobutadiene	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	4	550	1,500			ND	1,500	UJ		N/A		Yes	No SV
Hexachloroethane	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	4	55	150			ND	150	U		N/A		No	TOC normalized PAHs < TEC

Table 10-4-5
Wetland 15 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (kg) - cont.														
Isophorone	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
Nitrobenzene	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
N-Nitroso-di-n-propylaMine	0	4	55	150			ND	150	U		N/A		Yes	No SV
N-NitrosodiphenylaMine	0	4	550	1,500			ND	1,500	U		N/A		Yes	No SV
Pentachlorophenol	0	4	1,350	3,600			ND	3,600	U		N/A		Yes	No SV
Phenol	1	4	550	1,500	280	280	041M150101	280	J		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
1,1-Dichloroethane	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
1,2-Dichloropropane	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
2-Butanone (MEK)	1	3	21.5	38.5	350	350	041M150301	350			N/A		Yes	No SV
2-Hexanone	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Acetone	2	3	21.5	21.5	130	1400	041M150301	1,400			N/A		Yes	No SV
Benzene	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Bromodichloromethane	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Bromoform	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Bromomethane	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Carbon disulfide	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Carbon tetrachloride	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Chlorobenzene	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Chloroethane	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Chloroform	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Chloromethane	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Dibromochloromethane	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Ethylbenzene	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Methylene chloride	1	3	21.5	55	34	34	041M150201	34	J		N/A		Yes	No SV
Styrene	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Tetrachloroethene	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Toluene	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Trichloroethene	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV
Vinyl chloride	0	3	6.5	11.5			ND	11.5	U		N/A		Yes	No SV
Xylene (Total)	0	3	21.5	38.5			ND	38.5	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 10-4-6
Wetland 15 Phase II
Sediment COPCs Retained after Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	Endosulfan I	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	2-Butanone (MEK)
Arsenic	Heptachlor	2,4-Dimethylphenol	Acetone
Barium	Total Chlordane	2-Methylphenol (o-Cresol)	Methylene chloride
Beryllium	Endrin	4-Methylphenol (p-Cresol)	
Calcium	Endrin aldehyde	bis(2-Ethylhexyl)phthalate (BEHP)	
Cobalt	Total Endrin	Di-n-butylphthalate	
Copper	beta-BHC	Phenol	
Iron	delta-BHC		
Lead	Total BHC		
Magnesium	4,4'-DDD		
Manganese	4,4'-DDE		
Potassium	4,4'-DDT		
Selenium	Total DDT		
Sodium	Aroclor-1260		
Vanadium	Total PCBs		
		Not Detected Parameters	
Cadmium	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Cyanide (CN)	alpha-BHC	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
Mercury	Dieldrin	1,3-Dichlorobenzene	1,1,2-Trichloroethane
Silver	Endosulfan II	1,4-Dichlorobenzene	1,1-Dichloroethane
Thallium	Endosulfan sulfate	2,4,5-Trichlorophenol	1,1-Dichloroethene
	gamma-BHC (Lindane)	2,4,6-Trichlorophenol	1,2-Dichloroethane
	Heptachlor epoxide	2,4-Dichlorophenol	1,2-Dichloroethene (total)
	Methoxychlor	2,4-Dinitrophenol	1,2-Dichloropropane
	Toxaphene	2,4-Dinitrotoluene	2-Hexanone
		2,6-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
		2-Chloronaphthalene	Benzene
		2-Chlorophenol	Bromodichloromethane
		2-Methyl-4,6-Dinitrophenol	Bromoform
		2-Nitroaniline	Bromomethane
		2-Nitrophenol	Carbon disulfide
		3,3'-Dichlorobenzidine	Carbon tetrachloride
		3-Nitroaniline	Chlorobenzene
		4-Bromophenyl-phenylether	Chloroethane
		4-Chloro-3-methylphenol	Chloroform
		4-Chloroaniline	Chloromethane
		4-Chlorophenylphenyl ether	cis-1,3-Dichloropropene
		4-Nitroaniline	Dibromochloromethane
		4-Nitrophenol	Ethylbenzene
		bis(2-Chloroethoxy)methane	Styrene
		bis(2-Chloroethyl)ether	Tetrachloroethene
		Butylbenzylphthalate	Toluene
		Carbazole	trans-1,3-Dichloropropene
		Dibenzofuran	Trichloroethene
		Diethylphthalate	Vinyl chloride
		Dimethylphthalate	Xylene (Total)
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	

Table 10-4-7
Wetland 15 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	4	4				10,200	7,810	15,800	15,800		041M150201			NA					0	4274	4	Yes	EPC > RC and no RV
Arsenic	**4**	**4**				**40.9**	**2.5**	**141**	**141**		**041M150301**	**7.24**	**41.6**	**PEL**	**19.5**	**5.65**	**3.39**	**0.98**	**1**	**2.14**	**4**	**Yes**	**EPC > RV and RC**
Barium	4	4				25.9	6.2	40.9	40.9	J	041M150301			NA					0	3.84	4	Yes	EPC > RC and no RV
Beryllium	1	4	0.232	0.205	0.285	0.259	0.34	0.34	0.34	J	041M150401			NA					0	0.13	4	Yes	EPC > RC and no RV
Calcium	4	4				7,210	3,010	11,300	11,300	J	041M150301			NA					0	1,979	4	No	Essential Nutrient
Cadmium	0	4		0.26	0.85	0.58			0.85	U	ND	0.676	4.21	PEL	1.26	0.86	0.2	0.14	0	0.39	0	No	Parameter Not Detected
Cobalt	1	4	0.683	0.6	0.85	0.887	1.5	1.5	1.5	J	041M150401			NA					0	0.91	1	Yes	EPC > RC and no RV
Copper	4	4				13.3	5.5	20.2	20.2		041M150201	18.7	108	PEL	1.08	0.71	0.19	0.12	0	8.44	3	No	EPC > RC, but < RV
Cyanide (CN)	0	4	1.81	0.8	2.6	1.81			2.6	U	ND			NA					0	1.29	0	No	Parameter Not Detected
Iron	4	4				71,000	11,200	223,000	223,000		041M150301			NA					0	2,684.40	4	Yes	EPC > RC and no RV
Lead	**4**	**4**				**111**	**20.7**	**211**	**211**		**041M150201**	**30.2**	**112**	**PEL**	**6.99**	**3.69**	**1.88**	**0.99**	**2**	**21.04**	**3**	**Yes**	**EPC > RV and RC**
Magnesium	4	4				2,580	912	4,980	4,980		041M150201			NA					0	2,943.60	2	No	Essential Nutrient
Manganese	4	4				205	47.7	520	520		041M150301			NA					0	9.81	4	Yes	EPC > RC and no RV
Potassium	4	4				808	310	1,460	1,460	J	041M150201			NA					0	899.72	2	No	Essential Nutrient
Selenium	3	4	0.6	0.6	0.6	1.46	0.93	2.7	2.7	J	041M150201			NA					0	0.66	3	Yes	EPC > RC and no RV
Sodium	4	4				6,530	206	14,200	14,200		041M150201			NA					0	11,439.60	1	No	Essential Nutrient
Thallium	0	4	0.578	0.26	0.85	0.578			0.85	U	ND			NA					0	0.39	0	No	Parameter Not Detected
Vanadium	4	4				21.6	10.5	36	36		041M150201			NA					0	8.59	4	Yes	EPC > RC and no RV
PCBs (g/kg)																							
Aroclor-1016	0	4	6.11	2.95	7.5	6.11			7.5	U	ND	21.6	189	PEL	0.35	0.28	0.04	0.03	0		0	No	Parameter Not Detected
Aroclor-1221	0	4	12	5.5	15	12			15	U	ND	67	189	PEL	0.22	0.18	0.08	0.06	0		0	No	Parameter Not Detected
Aroclor-1232	0	4	6.11	2.95	7.5	6.11			7.5	U	ND	21.6	189	PEL	0.35	0.28	0.04	0.03	0		0	No	Parameter Not Detected
Aroclor-1242	0	4	6.11	2.95	7.5	6.11			7.5	U	ND	21.6	189	PEL	0.35	0.28	0.04	0.03	0		0	No	Parameter Not Detected
Aroclor-1248	0	4	6.11	2.95	7.5	6.11			7.5	U	ND	21.6	189	PEL	0.35	0.28	0.04	0.03	0		0	No	Parameter Not Detected
Aroclor-1254	0	4	6.11	2.95	7.5	6.11			7.5	U	ND	21.6	189	PEL	0.35	0.28	0.04	0.03	0		0	No	Parameter Not Detected
Aroclor-1260	3	4	2.95	2.95	2.95	18.2	14	32	32	J	041M150301	21.6	189	PEL	1.48	0.84	0.17	0.10	0		0	No	RV HQ <1 and no RC
Total PCBs	3	4	23.2	23.2	23.2	60.8	66.5	77	77		041M150301	21.6	189	PEL	3.56	2.81	0.41	0.32	0		0	No	RV HQ <1 and no RC
Pesticides (g/kg)																							
Aldrin	0	4	0.302	0.145	0.375	0.302			0.375	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan I	1	4	0.298	0.145	0.375	0.649	1.7	1.7	1.7	J	041M150301			NA					0		0	Yes	No SV, no RV, and no RC
Endosulfan II	0	4	0.611	0.295	0.75	0.611			0.75	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	0	4	0.611	0.295	0.75	0.611			0.75	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor	1	4	0.278	0.145	0.375	0.484	1.1	1.1	1.1	J	041M150201			NA					0		0	Yes	No SV, no RV, and no RC
Heptachlor epoxide	0	4	0.302	0.145	0.375	0.302			0.375	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	4	3.02	1.45	3.75	3.02			3.75	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	4	30.3	14.5	37.5	30.3			37.5	U	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	1	4	0.278	0.145	0.375	0.559	1.4	1.4	1.4	J	041M150201	1.7	4.79	PEL	0.82	0.33	0.29	0.12	0		0	No	RV HQ <1 and no RC
gamma-Chlordane	0	4	0.302	0.145	0.375	0.302			0.375	U	ND	1.7	4.79	PEL	0.22	0.18	0.08	0.06	0		0	No	Parameter Not Detected
Total Chlordane	1	4	0.557	0.29	0.75	0.861	1.78	1.78	1.78		041M150201	1.7	4.79	PEL	1.04	0.51	0.37	0.18	0		0	No	RV HQ <1 and no RC
Endrin	3	4	0.65	0.65	0.65	5.16	1.5	16	16	J	041M150201	3.3		NA	4.85	1.56			0		0	Yes	No RV or RC and EPC > SV
Endrin aldehyde	2	4	0.522	0.295	0.75	2.41	1.3	7.3	7.3	J	041M150101	3.3		NA	2.21	0.73			0		0	Yes	No RV or RC and EPC > SV
Endrin ketone	1	4	0.565	0.295	0.75	0.899	1.9	1.9	1.9	J	041M150101	3.3		NA	0.58	0.27			0		0	Yes	No RV or RC and EPC > SV
Total Endrin	4	4				8.47	2.09	17.5	17.5		041M150201	3.3		NA	5.3	2.57			0		0	Yes	No RV or RC and EPC > SV
alpha-BHC	0	4	0.302	0.145	0.375	0.302			0.375	UJ	ND		0.99	PEL			0.38	0.31	0		0	No	Parameter Not Detected
beta-BHC	**2**	**4**	**0.23**	**0.145**	**0.315**	**0.7**	**0.94**	**1.4**	**1.4**	**J**	**041M150201**	**0.32**	**0.99**	**PEL**	**4.38**	**2.19**	**1.41**	**0.71**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
delta-BHC	**1**	**4**	**0.298**	**0.145**	**0.375**	**1.6**	**5.5**	**5.5**	**5.5**	**J**	**041M150301**	**0.32**	**0.99**	**PEL**	**17.2**	**5**	**5.56**	**1.61**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
gamma-BHC (Lindane)	0	4	0.302	0.145	0.375	0.302			0.375	U	ND	0.32	0.99	PEL	1.17	0.95	0.38	0.31	0		0	No	Parameter Not Detected
Total BHC	**3**	**4**	**0.58**	**0.58**	**0.58**	**2.9**	**2.06**	**6.45**	**6.45**		**041M150301**	**0.32**	**0.99**	**PEL**	**20.1**	**9.07**	**6.51**	**2.93**	**3**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	**4**	**4**				**87.1**	**1.3**	**200**	**200**	**DJ**	**041M150301**	**1.22**	**7.81**	**PEL**	**164**	**71.4**	**25.6**	**11.1**	**3**	**50**	**3**	**Yes**	**EPC > RV and RC**
4,4'-DDE	4	4				132	10	340	340	DJ	041M150101	2.07	374	PEL	164	63.9	0.91	0.35	0	40	3	No	EPC > RC, but < RV
4,4'-DDT	**3**	**4**	**0.295**	**0.295**	**0.295**	**7.62**	**4.3**	**16**	**16**	**J**	**041M150301**	**1.19**	**4.77**	**PEL**	**13.4**	**6.41**	**3.35**	**1.6**	**2**	**20**	**0**	**No**	**EPC > RV, but < RC**
Total DDT	**4**	**4**				**227**	**11.6**	**435**	**435**		**041M150101**	**3.3**	**51.7**	**PEL**	**132**	**68.8**	**8.41**	**4.39**	**3**	**110**	**3**	**Yes**	**EPC > RV and RC**
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1	4	1,420	1250	1,500	1,080	82	82	82	J	041M150401			NA					0		0	Yes	No SV, no RV, and no RC
2,4,5-Trichlorophenol	0	4	2,900	1350	3,600	2,900			3,600	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	1	4	1,100	550	1,500	983	630	630	630	J	041M150101			NA					0		0	Yes	No SV, no RV, and no RC
2,4-Dinitrophenol	0	4	2,900	1,350	3,600	2,900			3,600	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	4	2,900	1,350	3,600	2,900			3,600	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	1	4	1,100	550	1,500	908	330	330	330	J	041M150101			NA					0		0	Yes	No SV, no RV, and no RC
2-Nitroaniline	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	4	2,900	1,350	3,600	2,900			3,600	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected

Table 10-4-7
Wetland 15 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
4-Chloroaniline	0	1	1,250	1,250	1,250	1,250			1,250	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	1	4	1,100	550	1,500	2,030	4800	4800	4,800		041M150101			NA					0		0	Yes	No SV, no RV, and no RC
4-Nitroaniline	0	4	2,900	1,350	3,600	2,900			3,600	U	ND			NA					0		0	No	Parameter Not Detected

Table 10-4-7
Wetland 15 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
4-Nitrophenol	0	4	2,900	1,350	3,600	2,900			3,600	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	4	120	55	150	120			150	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	3	4	1,250	1,250	1,250	548	220	490	490	J	041M150201	182	2,647	PEL	2.69	3.01	0.19	0.21	0		0	No	RV HQ <1 and no RC
Butylbenzylphthalate	0	4	1,200	550	1,500	1,200			1,500	U	ND	182	2,647	PEL	8.24	6.59	0.57	0.45	0		0	No	Parameter Not Detected
Carbazole	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	0	4	1,200	550	1,500	1,200			1,500	U	ND	182	2,647	PEL	8.24	6.59	0.57	0.45	0		0	No	Parameter Not Detected
Dimethylphthalate	0	4	1,200	550	1,500	1,200			1,500	U	ND	182	2,647	PEL	8.24	6.59	0.57	0.45	0		0	No	Parameter Not Detected
Di-n-butylphthalate	3	4	550	550	550	280	130	250	250	J	041M150101	182	2,647	PEL	1.37	1.54	0.09	0.11	0		0	No	RV HQ <1 and no RC
Di-n-octylphthalate	0	4	1,200	550	1,500	1,200			1,500	U	ND	182	2,647	PEL	8.24	6.59	0.57	0.45	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	4	1,200	550	1,500	1,200			1,500	UJ	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	4	120	55	150	120			150	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	4	1,200	550	1,500	1,200			1,500	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	4	2,900	1,350	3,600	2,900			3,600	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	1	4	1,100	550	1,500	895	280	280	280	J	041M150101			NA					0		0	Yes	No SV, no RV, and no RC
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	1	3	30	21.5	38.5	137	350	350	350		041M150301			NA					0		0	Yes	No SV, no RV, and no RC
2-Hexanone	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	2	3	21.5	21.5	21.5	517	130	1400	1,400		041M150301			NA					0		0	Yes	No SV, no RV, and no RC
Benzene	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroethane	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	1	3	38.3	21.5	55	36.8	34	34	34	J	041M150201			NA					0		0	Yes	No SV, no RV, and no RC
Styrene	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	3	9.5	6.5	11.5	9.5			11.5	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	3	31.8	21.5	38.5	31.8			38.5	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 10-4-8
Wetland 15 Phase II
Sediment COPCs Retained after Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
	Detected Parameters		
Aluminum	Endosulfan I	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	None
Arsenic	Heptachlor	2,4-Dimethylphenol	
Barium	Endrin	2-Methylphenol (o-Cresol)	
Beryllium	Endrin aldehyde	4-Methylphenol (p-Cresol)	
Cobalt	Endrin ketone	Phenol	
Iron	Total Endrin		
Lead	beta-BHC		
Manganese	delta-BHC		
Selenium	Total BHC		
Vanadium	4,4'-DDD		
	Total DDT		

Table 10-4-9
Wetland 15 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M150101	12/6/1995	mg/kg	4.8		Arsenic	8.2	70	0.07
041M150101	12/6/1995	mg/kg	0.6	U	Cadmium	1.2	9.6	0.06
041M150101	12/6/1995	mg/kg	14.3	J	Chromium	81	370	0.04
041M150101	12/6/1995	mg/kg	8.5	J	Copper	34	270	0.03
041M150101	12/6/1995	mg/kg	39.7		Lead	46.7	218	0.18
041M150101	12/6/1995	mg/kg	0.175	U	Mercury	0.15	0.71	0.25
041M150101	12/6/1995	mg/kg	2.45	U	Nickel	20.9	51.6	0.05
041M150101	12/6/1995	mg/kg	0.8	UJ	Silver	1	3.7	0.22
041M150101	12/6/1995	mg/kg	26.3		Zinc	150	410	0.06
041M150101	**12/6/1995**	**g/kg**	**340**	**DJ**	**4,4'-DDE**	**2.2**	**27**	**12.59**
041M150101	12/6/1995	g/kg	9.9	J	4,4'-DDT	1.58	46.1	0.21
041M150101	12/6/1995	g/kg	66.5		Total PCBs	22.7	180	0.37
041M150101	12/6/1995	g/kg	150	U	2-Methylnaphthalene	70	670	0.22
041M150101	12/6/1995	g/kg	70	U	Acenaphthene	16	500	0.14
041M150101	12/6/1995	g/kg	150	U	Acenaphthylene	44	640	0.23
041M150101	12/6/1995	g/kg	150	U	Anthracene	85.3	1,100	0.14
041M150101	12/6/1995	g/kg	150	U	Benzo(a)anthracene	261	1,600	0.09
041M150101	12/6/1995	g/kg	150	U	Benzo(a)pyrene	430	1,600	0.09
041M150101	12/6/1995	g/kg	150	U	Chrysene	384	2,800	0.05
041M150101	12/6/1995	g/kg	150	U	Dibenz(a,h)anthracene	63.4	260	0.58
041M150101	12/6/1995	g/kg	200	J	Fluoranthene	600	5,100	0.04
041M150101	12/6/1995	g/kg	70	U	Fluorene	19	540	0.13
041M150101	12/6/1995	g/kg	150	U	Naphthalene	160	2,100	0.07
041M150101	12/6/1995	g/kg	150	U	Phenanthrene	240	1,500	0.10
041M150101	12/6/1995	g/kg	150	U	Pyrene	665	2,600	0.06
041M150101	12/6/1995				ERM Quotient Sum			16.09
041M150101	12/6/1995				Mean ERM Quotient			0.64
041M150101	12/6/1995				Mean ERM Quotient without ND			0.54
041M150101	12/6/1995				Mean ERM Quotient Category			3
041M150201	12/6/1995	mg/kg	15.2		Arsenic	8.2	70	0.22
041M150201	12/6/1995	mg/kg	0.85	U	Cadmium	1.2	9.6	0.09
041M150201	12/6/1995	mg/kg	45.7	J	Chromium	81	370	0.12
041M150201	12/6/1995	mg/kg	20.2		Copper	34	270	0.07
041M150201	12/6/1995	mg/kg	211		Lead	46.7	218	0.97
041M150201	12/6/1995	mg/kg	0.225	UJ	Mercury	0.15	0.71	0.32
041M150201	12/6/1995	mg/kg	12.4	J	Nickel	20.9	51.6	0.24
041M150201	12/6/1995	mg/kg	1.15	UJ	Silver	1	3.7	0.31
041M150201	12/6/1995	mg/kg	59.9		Zinc	150	410	0.15
041M150201	**12/6/1995**	**g/kg**	**110**	**DJ**	**4,4'-DDE**	**2.2**	**27**	**4.07**
041M150201	12/6/1995	g/kg	4.3	J	4,4'-DDT	1.58	46.1	0.09
041M150201	12/6/1995	g/kg	76.5		Total PCBs	22.7	180	0.43
041M150201	12/6/1995	g/kg	150	U	2-Methylnaphthalene	70	670	0.22
041M150201	12/6/1995	g/kg	70	U	Acenaphthene	16	500	0.14
041M150201	12/6/1995	g/kg	150	U	Acenaphthylene	44	640	0.23
041M150201	12/6/1995	g/kg	150	U	Anthracene	85.3	1,100	0.14
041M150201	12/6/1995	g/kg	150	U	Benzo(a)anthracene	261	1,600	0.09
041M150201	12/6/1995	g/kg	150	U	Benzo(a)pyrene	430	1,600	0.09
041M150201	12/6/1995	g/kg	150	U	Chrysene	384	2,800	0.05
041M150201	12/6/1995	g/kg	150	U	Dibenz(a,h)anthracene	63.4	260	0.58
041M150201	12/6/1995	g/kg	240	J	Fluoranthene	600	5,100	0.05
041M150201	12/6/1995	g/kg	70	U	Fluorene	19	540	0.13
041M150201	12/6/1995	g/kg	150	U	Naphthalene	160	2,100	0.07
041M150201	12/6/1995	g/kg	150	U	Phenanthrene	240	1,500	0.10
041M150201	12/6/1995	g/kg	210	J	Pyrene	665	2,600	0.08
041M150201	12/6/1995				ERM Quotient Sum			9.06
041M150201	12/6/1995				Mean ERM Quotient			0.36
041M150201	12/6/1995				Mean ERM Quotient without ND			0.26
041M150201	12/6/1995				Mean ERM Quotient Category			2
041M150301	**12/6/1995**	**mg/kg**	**141**		**Arsenic**	**8.2**	**70**	**2.01**
041M150301	12/6/1995	mg/kg	0.6	U	Cadmium	1.2	9.6	0.06
041M150301	12/6/1995	mg/kg	37.7	J	Chromium	81	370	0.10
041M150301	12/6/1995	mg/kg	18.9		Copper	34	270	0.07
041M150301	12/6/1995	mg/kg	174		Lead	46.7	218	0.80
041M150301	12/6/1995	mg/kg	0.16	UJ	Mercury	0.15	0.71	0.23
041M150301	12/6/1995	mg/kg	2.45	U	Nickel	20.9	51.6	0.05
041M150301	12/6/1995	mg/kg	0.8	UJ	Silver	1	3.7	0.22
041M150301	12/6/1995	mg/kg	83.6		Zinc	150	410	0.20
041M150301	**12/6/1995**	**g/kg**	**69**	**DJ**	**4,4'-DDE**	**2.2**	**27**	**2.56**
041M150301	12/6/1995	g/kg	16	J	4,4'-DDT	1.58	46.1	0.35
041M150301	12/6/1995	g/kg	77		Total PCBs	22.7	180	0.43
041M150301	12/6/1995	g/kg	125	U	2-Methylnaphthalene	70	670	0.19
041M150301	12/6/1995	g/kg	60	U	Acenaphthene	16	500	0.12
041M150301	12/6/1995	g/kg	125	U	Acenaphthylene	44	640	0.20
041M150301	12/6/1995	g/kg	125	U	Anthracene	85.3	1,100	0.11
041M150301	12/6/1995	g/kg	125	U	Benzo(a)anthracene	261	1,600	0.08
041M150301	12/6/1995	g/kg	125	U	Benzo(a)pyrene	430	1,600	0.08
041M150301	12/6/1995	g/kg	125	U	Chrysene	384	2,800	0.04
041M150301	12/6/1995	g/kg	125	U	Dibenz(a,h)anthracene	63.4	260	0.48
041M150301	12/6/1995	g/kg	190	J	Fluoranthene	600	5,100	0.04
041M150301	12/6/1995	g/kg	60	U	Fluorene	19	540	0.11
041M150301	12/6/1995	g/kg	125	U	Naphthalene	160	2,100	0.06
041M150301	12/6/1995	g/kg	125	U	Phenanthrene	240	1,500	0.08
041M150301	12/6/1995	g/kg	180	J	Pyrene	665	2,600	0.07
041M150301	12/6/1995				ERM Quotient Sum			8.73
041M150301	12/6/1995				Mean ERM Quotient			0.35

Table 10-4-9
Wetland 15 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M150301	12/6/1995				Mean ERM Quotient without ND			0.27
041M150301	12/6/1995				Mean ERM Quotient Category			2
041M150401	12/6/1995	mg/kg	2.5		Arsenic	8.2	70	0.04
041M150401	12/6/1995	mg/kg	0.26	U	Cadmium	1.2	9.6	0.03
041M150401	12/6/1995	mg/kg	20.8	J	Chromium	81	370	0.06
041M150401	12/6/1995	mg/kg	5.5	J	Copper	34	270	0.02
041M150401	12/6/1995	mg/kg	20.7		Lead	46.7	218	0.09
041M150401	12/6/1995	mg/kg	0.07	UJ	Mercury	0.15	0.71	0.10
041M150401	12/6/1995	mg/kg	5.6	J	Nickel	20.9	51.6	0.11
041M150401	12/6/1995	mg/kg	0.345	UJ	Silver	1	3.7	0.09
041M150401	12/6/1995	mg/kg	23.5		Zinc	150	410	0.06
041M150401	12/6/1995	g/kg	10	J	4,4'-DDE	2.2	27	0.37
041M150401	12/6/1995	g/kg	0.295	U	4,4'-DDT	1.58	46.1	0.01
041M150401	12/6/1995	g/kg	23.2	U	Total PCBs	22.7	180	0.13
041M150401	12/6/1995	g/kg	55	U	2-Methylnaphthalene	70	670	0.08
041M150401	12/6/1995	g/kg	27.5	U	Acenaphthene	16	500	0.06
041M150401	12/6/1995	g/kg	55	U	Acenaphthylene	44	640	0.09
041M150401	12/6/1995	g/kg	55	U	Anthracene	85.3	1,100	0.05
041M150401	12/6/1995	g/kg	55	U	Benzo(a)anthracene	261	1,600	0.03
041M150401	12/6/1995	g/kg	59	J	Benzo(a)pyrene	430	1,600	0.04
041M150401	12/6/1995	g/kg	55	U	Chrysene	384	2,800	0.02
041M150401	12/6/1995	g/kg	55	U	Dibenz(a,h)anthracene	63.4	260	0.21
041M150401	12/6/1995	g/kg	94	J	Fluoranthene	600	5,100	0.02
041M150401	12/6/1995	g/kg	27.5	U	Fluorene	19	540	0.05
041M150401	12/6/1995	g/kg	55	U	Naphthalene	160	2,100	0.03
041M150401	12/6/1995	g/kg	55	U	Phenanthrene	240	1,500	0.04
041M150401	12/6/1995	g/kg	120		Pyrene	665	2,600	0.05
041M150401	12/6/1995				ERM Quotient Sum			1.85
041M150401	12/6/1995				Mean ERM Quotient			0.07
041M150401	12/6/1995				Mean ERM Quotient without ND			0.03
041M150401	12/6/1995				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 10-4-10
Wetland 15 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	2	2				107,000	934	213,000	041W150101	213,000			NA		Yes	No SV
Antimony	1	2	1.85	1.85	1.85	17.1	32.4	32.4	041W150101	32.4	J		NA		Yes	No SV
Arsenic	**2**	**2**				**36.6**	**4.5**	**68.8**	**041W150101**	**68.8**		**36**	**EPA**	**1.91**	**Yes**	**Max Detect > SV**
Barium	2	2				338	34.7	642	041W150101	642			NA		Yes	No SV
Beryllium	1	2	0.5	0.5	0.5	1.85	3.2	3.2	041W150101	3.2	J		NA		Yes	No SV
Cadmium	0	2	1.5	1.5	1.5	1.5			ND	1.5	U	9.3	EPA	0.16	No	Max SQL< SV
Calcium	2	2				133,000	87,100	178,000	041W150101	178,000			NA		Yes	No SV
Chromium	**1**	**2**	**4**	**4**	**4**	**166**	**327**	**327**	**041W150101**	**327**		**50**	**EPA**	**6.54**	**Yes**	**Max Detect > SV**
Cobalt	1	2	1.5	1.5	1.5	12.5	23.5	23.5	041W150101	23.5	J		NA		Yes	No SV
Copper	**2**	**2**				**97.5**	**4**	**191**	**041W150101**	**191**		**2.9**	**EPA**	**65.9**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	1	EPA	2.5	Yes	Max SQL > SV
Iron	2	2				362,000	8,300	715,000	041W150101	715,000			NA		Yes	No SV
Lead	**2**	**2**				**412**	**22.5**	**801**	**041W150101**	**801**		**8.5**	**EPA**	**94.2**	**Yes**	**Max Detect > SV**
Magnesium	2	2				49,200	34,600	63,700	041W150101	63,700			NA		Yes	No SV
Manganese	2	2				881	121	1,640	041W150101	1,640			NA		Yes	No SV
Mercury	**1**	**2**	**0.065**	**0.065**	**0.065**	**0.503**	**0.94**	**0.94**	**041W150101**	**0.94**		**0.025**	**EPA**	**37.6**	**Yes**	**Max Detect > SV**
Nickel	**1**	**2**	**6**	**6**	**6**	**54.5**	**103**	**103**	**041W150101**	**103**		**8.3**	**EPA**	**12.4**	**Yes**	**Max Detect > SV**
Potassium	2	2				13,700	11,400	16,000	041W150101	16,000			NA		Yes	No SV
Selenium	1	2	1.5	1.5	1.5	8.9	16.3	16.3	041W150101	16.3		71	EPA	0.23	No	Max Detect < SV
Silver	0	2	2	2	2	2			ND	2	U	0.23	EPA	8.7	Yes	Max SQL > SV
Sodium	2	2				158,000	141,000	174,000	041W150201	174,000			NA		Yes	No SV
Thallium	1	2	1.5	1.5	1.5	2.35	3.2	3.2	041W150201	3.2	J	6.3	FDEP	0.51	No	Max Detect < SV
Vanadium	2	2				170	2	337	041W150101	337			NA		Yes	No SV
Zinc	**2**	**2**				**511**	**12.7**	**1,010**	**041W150101**	**1,010**		**86**	**EPA**	**11.7**	**Yes**	**Max Detect > SV**
Pesticides (g/L)																
Aldrin	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0087	EPA	2.87	Yes	Max SQL > SV
Endosulfan II	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0036	EPA	6.94	Yes	Max SQL > SV
Heptachlor epoxide	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	2	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.004	EPA	12.5	Yes	Max SQL > SV
Endrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	UJ	0.005	FDEP	5	Yes	Max SQL > SV
beta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.016	EPA	1.56	Yes	Max SQL > SV
Total BHC	0	2	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	**1**	**2**	**0.05**	**0.05**	**0.05**	**0.0565**	**0.063**	**0.063**	**041W150101**	**0.063**	**J**	**0.0002**	**FDEP**	**315**	**Yes**	**Max Detect > SV**
4,4'-DDT	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	1	2	0.15	0.15	0.15	0.157	0.163	0.163	041W150101	0.163			NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	2	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	FDEP	35.7	Yes	Max SQL > SV
Total PCB	0	2	4	4	4	4			ND	4	U		NA		Yes	No SV

Table 10-4-10
Wetland 15 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chloronaphthalene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitroaniline	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitrophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloroaniline	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Nitrophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	2	3	2.5	3.5	3			ND	3.5	U		NA		Yes	No SV
Butylbenzylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dibenzofuran	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Diethylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dimethylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Di-n-butylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	3.4	EPA	0.74	No	Max SQL< SV
Di-n-octylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Hexachlorobutadiene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachloroethane	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Isophorone	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Nitrobenzene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pentachlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Phenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthylene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Anthracene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)anthracene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)pyrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chrysene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluoranthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluorene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Naphthalene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	23.5	EPA	0.02	No	Max SQL< SV
Phenanthrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Pyrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Total PAH	0	2	6.5	6.5	6.5	6.5			ND	6.5	U		NA		Yes	No SV

Table 10-4-10
Wetland 15 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
VOCs (g/L)																
1,1,1-Trichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	270	FDEP	0.00	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.16	No	Max SQL< SV
1,2-Dibromo-3-Chloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	19.7	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	3	FDEP	0.17	No	Max SQL< SV
2-Butanone (MEK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	71.28	FDEP	0.01	No	Max SQL< SV
Bromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	17	FDEP	0.03	No	Max SQL< SV
Chloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	470.8	FDEP	0.00	No	Max SQL< SV
Chloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	4.3	EPA	0.12	No	Max SQL< SV
Methylene chloride	0	2	3	1.5	4.5	3			ND	4.5	U	1,580	FDEP	0.00	No	Max SQL< SV
Styrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	37	EPA	0.01	No	Max SQL< SV
trans-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Vinyl chloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 10-4-10
Wetland 15 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
VOCs (g/L)																
1,1,1-Trichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	270	FDEP	0.00	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.16	No	Max SQL< SV
1,2-Dibromo-3-Chloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	19.7	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	3	FDEP	0.17	No	Max SQL< SV
2-Butanone (MEK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	71.28	FDEP	0.01	No	Max SQL< SV
Bromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	17	FDEP	0.03	No	Max SQL< SV
Chloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	470.8	FDEP	0.00	No	Max SQL< SV
Chloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	4.3	EPA	0.12	No	Max SQL< SV
Methylene chloride	0	2	3	1.5	4.5	3			ND	4.5	U	1,580	FDEP	0.00	No	Max SQL< SV
Styrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	37	EPA	0.01	No	Max SQL< SV
trans-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Vinyl chloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
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Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value

Table 10-4-11
Wetland 15 Phase II
Surface Water COPCs Retained after Screening

Metals	Pesticides/PCBs	SVOCs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDE	None	None
Antimony	Total DDT		
Arsenic			
Barium			
Beryllium			
Calcium			
Chromium			
Cobalt			
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Mercury			
Nickel			
Potassium			
Sodium			
Vanadium			
Zinc			
		Not Detected Parameters	
Cyanide (CN)	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Silver	Dieldrin	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1,2-Trichloroethane
	Endosulfan I	2,4,5-Trichlorophenol	1,1-Dichloroethane
	Endosulfan II	2,4,6-Trichlorophenol	1,2-Dibromo-3-Chloropropane
	Endosulfan sulfate	2,4-Dichlorophenol	1,2-Dibromoethane
	Heptachlor	2,4-Dimethylphenol	1,2-Dichloroethane
	Heptachlor epoxide	2,4-Dinitrophenol	1,2-Dichloropropane
	Methoxychlor	2,4-Dinitrotoluene	1,3-Dichlorobenzene
	Toxaphene	2,6-Dinitrotoluene	2-Butanone (MEK)
	alpha-Chlordane	2-Chloronaphthalene	2-Hexanone
	gamma-Chlordane	2-Chlorophenol	4-Methyl-2-Pentanone (MIBK)
	Total Chlordane	2-Methyl-4,6-Dinitrophenol	Bromochloromethane
	Endrin	2-Methylphenol (o-Cresol)	Bromodichloromethane
	Endrin aldehyde	2-Nitroaniline	Bromoform
	Endrin ketone	2-Nitrophenol	Bromomethane
	Total Endrin	3,3'-Dichlorobenzidine	Carbon disulfide
	alpha-BHC	3-Nitroaniline	Carbon tetrachloride
	beta-BHC	4-Bromophenyl-phenylether	Chloroethane
	delta-BHC	4-Chloro-3-methylphenol	Chloromethane
	gamma-BHC (Lindane)	4-Chloroaniline	cis-1,2-Dichloroethene
	Total BHC	4-Chlorophenylphenyl ether	cis-1,3-Dichloropropene
	4,4'-DDD	4-Methylphenol (p-Cresol)	Dibromochloromethane
	4,4'-DDT	4-Nitroaniline	Styrene
	Aroclor-1016	4-Nitrophenol	Tetrachloroethene
	Aroclor-1221	Benzo(b)fluoranthene	trans-1,2-Dichloroethene
	Aroclor-1232	Benzo(g,h,i)perylene	trans-1,3-Dichloropropene
	Aroclor-1242	Benzo(k)fluoranthene	Trichloroethene
	Aroclor-1248	bis(2-Chloroethoxy)methane	Vinyl chloride
	Aroclor-1254	bis(2-Chloroethyl)ether	Xylene (Total)
	Aroclor-1260	bis(2-Ethylhexyl)phthalate (BEHP)	
	Total PCBs	Butylbenzylphthalate	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 10-4-12
Wetland 15 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
Metals (µg/L)																				
Aluminum	2	2				107,000	934	213,000	041W150101	213,000			NA			2,928	1	2	Yes	Max Result > Ref. Conc.
Antimony	1	2	1.85	1.85	1.85	17.1	32.4	32.4	041W150101	32.4	J		NA			4.15	1	2	Yes	Max Result > Ref. Conc.
Arsenic	**2**	**2**				**36.6**	**4.5**	**68.8**	**041W150101**	**68.8**		**36**	**EPA**	**2**	**1.02**	**3.6**	**2**	**2**	**Yes**	**Max Result > Ref. Conc.**
Barium	2	2				338	34.7	642	041W150101	642			NA			9.43	2	2	Yes	Max Result > Ref. Conc.
Beryllium	1	2	0.5	0.5	0.5	1.85	3.2	3.2	041W150101	3.2	J		NA			0.82	1	2	Yes	Max Result > Ref. Conc.
Calcium	2	2				133,000	87,100	178,000	041W150101	178,000			NA			76,800	2	2	No	Essential Nutrient
Chromium	**1**	**2**	**4**	**4**	**4**	**166**	**327**	**327**	**041W150101**	**327**		**50**	**EPA**	**7**	**3.31**	**10.87**	**1**	**2**	**Yes**	**Max Result > Ref. Conc.**
Cobalt	1	2	1.5	1.5	1.5	12.5	23.5	23.5	041W150101	23.5	J		NA			2.38	1	2	Yes	Max Result > Ref. Conc.
Copper	**2**	**2**				**97.5**	**4**	**191**	**041W150101**	**191**		**2.9**	**EPA**	**66**	**33.6**	**7.03**	**1**	**2**	**Yes**	**Max Result > Ref. Conc.**
Cyanide (CN)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	1	EPA	2.5	2.5	4.1	0	2	No	Max SQL < Ref. Conc.
Iron	2	2				362,000	8,300	715,000	041W150101	715,000			NA			1352	2	2	Yes	Max Result > Ref. Conc.
Lead	**2**	**2**				**412**	**22.5**	**801**	**041W150101**	**801**		**8.5**	**EPA**	**94.24**	**48.4**	**13.75**	**2**	**2**	**Yes**	**Max Result > Ref. Conc.**
Magnesium	2	2				49,200	34,600	63,700	041W150101	63,700			NA			243,650	0	2	No	Max Result < Ref. Conc.
Manganese	2	2				881	121	1640	041W150101	1640			NA			12.15	2	2	Yes	Max Result > Ref. Conc.
Mercury	**1**	**2**	**0.065**	**0.065**	**0.065**	**0.503**	**0.94**	**0.94**	**041W150101**	**0.94**		**0.025**	**EPA**	**38**	**20.1**	**0.21**	**1**	**2**	**Yes**	**Max Result > Ref. Conc.**
Nickel	**1**	**2**	**6**	**6**	**6**	**54.5**	**103**	**103**	**041W150101**	**103**		**8.3**	**EPA**	**12.41**	**6.57**	**9.3**	**1**	**2**	**Yes**	**Max Result > Ref. Conc.**
Potassium	2	2				13,700	11,400	16,000	041W150101	16,000			NA			81,250	0	2	No	Max Result < Ref. Conc.
Silver	0	2	2	2	2	2			ND	2	U	0.23	EPA	9	8.7	3.01	0	2	No	Max SQL < Ref. Conc.
Sodium	2	2				158,000	141,000	174,000	041W150201	174,000			NA			1,952,000	0	2	No	Max Result < Ref. Conc.
Vanadium	2	2				170	2	337	041W150101	337			NA			6.69	1	2	Yes	Max Result > Ref. Conc.
Zinc	**2**	**2**				**511**	**12.7**	**1,010**	**041W150101**	**1,010**		**86**	**EPA**	**12**	**5.95**	**12.88**	**1**	**2**	**Yes**	**Max Result > Ref. Conc.**
Pesticides (µg/L)																				
Aldrin	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	2	No	Parameter Not Detected
Dieldrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	2	No	Parameter Not Detected
Endosulfan I	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0087	EPA	3	2.87		0	2	No	Parameter Not Detected
Endosulfan II	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	2	No	Parameter Not Detected
Endosulfan sulfate	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	2	No	Parameter Not Detected
Heptachlor	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0036	EPA	7	6.94		0	2	No	Parameter Not Detected
Heptachlor epoxide	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	2	No	Parameter Not Detected
Methoxychlor	0	2	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	2	No	Parameter Not Detected
Toxaphene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
alpha-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	2	No	Parameter Not Detected
gamma-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	2	No	Parameter Not Detected
Total Chlordane	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.004	EPA	12.5	12.5		0	2	No	Parameter Not Detected
Endrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	2	No	Parameter Not Detected
Endrin aldehyde	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	2	No	Parameter Not Detected
Endrin ketone	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22	21.7		0	2	No	Parameter Not Detected
Total Endrin	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	2	No	Parameter Not Detected
alpha-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	UJ	0.005	FDEP	5	5		0	2	No	Parameter Not Detected
beta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	2	No	Parameter Not Detected
delta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	2	No	Parameter Not Detected
gamma-BHC (Lindane)	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.016	EPA	2	1.56		0	2	No	Parameter Not Detected
Total BHC	0	2	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	2	No	Parameter Not Detected
4,4'-DDD	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	2	No	Parameter Not Detected
4,4'-DDE	**1**	**2**	**0.05**	**0.05**	**0.05**	**0.0565**	**0.063**	**0.063**	**041W150101**	**0.063**	**J**	**0.0002**	**FDEP**	**315**	**283**		**0**	**2**	**Yes**	**Max Result > SV; No Ref. Conc.**
4,4'-DDT	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85	84.7		0	2	No	Parameter Not Detected
Total DDT	1	2	0.15	0.15	0.15	0.157	0.163	0.163	041W150101	0.163			NA				0	2	Yes	No SV
PCBs (µg/L)																				
Aroclor-1016	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Aroclor-1221	0	2	1	1	1	1			ND	1	U		NA				0	2	No	Parameter Not Detected
Aroclor-1232	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Aroclor-1242	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Aroclor-1248	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Aroclor-1254	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Aroclor-1260	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	FDEP	36	35.7		0	2	No	Parameter Not Detected
Total PCB	0	2	4	4	4	4			ND	4	U		NA				0	2	No	Parameter Not Detected
SVOCs (µg/L)																				
1,2,4-Trichlorobenzene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	2	10	10	10	10			ND	10	U		NA				0	2	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
2,4-Dichlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
2,4-Dimethylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
2,4-Dinitrophenol	0	2	10	10	10	10			ND	10	U		NA				0	2	No	Parameter Not Detected
2,4-Dinitrotoluene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
2,6-Dinitrotoluene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
2-Chloronaphthalene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
2-Chlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	2	10	10	10	10			ND	10	U		NA				0	2	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
2-Nitroaniline	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
2-Nitrophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
3-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA				0	2	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected

Table 10-4-12
Wetland 15 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
SVOCs (µg/L) - cont.																				
4-Chloroaniline	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
4-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA				0	2	No	Parameter Not Detected
4-Nitrophenol	0	2	10	10	10	10			ND	10	U		NA				0	2	No	Parameter Not Detected
Benzo(b)fluoranthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Benzo(k)fluoranthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	2	3	2.5	3.5	3			ND	3.5	U		NA				0	2	No	Parameter Not Detected
Butylbenzylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
Dibenzofuran	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
Diethylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
Dimethylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
Di-n-octylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
Hexachlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Hexachlorobutadiene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
Hexachloroethane	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Isophorone	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
Nitrobenzene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
Pentachlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
Phenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
PAHs (µg/L)																				
2-Methylnaphthalene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Acenaphthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Acenaphthylene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Anthracene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Benzo(a)anthracene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Benzo(a)pyrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Chrysene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Fluoranthene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Fluorene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Naphthalene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	23.5	EPA	0.02	0.02		0	2	No	Parameter Not Detected
Phenanthrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Pyrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Total PAH	0	2	6.5	6.5	6.5	6.5			ND	6.5	U		NA				0	2	No	Parameter Not Detected
VOCs (µg/L)																				
1,1,2,2-Tetrachloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
1,1,2-Trichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
1,1-Dichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
1,2-Dibromo-3-Chloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
1,2-Dibromoethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
1,2-Dichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
1,2-Dichloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
1,3-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
2-Butanone (MEK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
Bromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Bromodichloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Bromoform	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Bromomethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Carbon disulfide	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Carbon tetrachloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Chloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Chloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
cis-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Dibromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Styrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Tetrachloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected

Table 10-4-12
Wetland 15 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
VOCs (µg/L) - cont.																				
trans-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Trichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Vinyl chloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Xylene (Total)	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 10-4-13
Wetland 15 Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDE	None	None
Antimony	Total DDT		
Arsenic			
Barium			
Beryllium			
Chromium			
Cobalt			
Copper			
Iron			
Lead			
Manganese			
Mercury			
Nickel			
Vanadium			
Zinc			

Table 10-4-14
Wetland 15
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd}Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	7.8E+03	=	1.6E+04	=	MG/KG	041M150201	4 / 4	NAV	1.0E+04	1.0E-03	3	3.16E-06	1.58E-06	5.00E-05	3.34E-05
7440382	Arsenic	C	2.5E+00	=	1.4E+02	=	MG/KG	041M150301	4 / 4	NAV	4.1E+01	3.0E-02	2	8.46E-07	4.23E-07	1.91E-06	3.20E-06
7440393	Barium	N	6.2E+00	J	4.1E+01	J	MG/KG	041M150301	4 / 4	NAV	2.6E+01	1.0E-03	3	8.18E-09	4.09E-09	1.29E-07	8.66E-08
7440417	Beryllium	N	N/A	N/A	3.4E-01	J	MG/KG	041M150401	1 / 4	4.1E-01 / 5.7E-01	2.6E-01	1.0E-03	3	6.80E-11	3.40E-11	1.08E-09	7.20E-10
7440484	Cobalt	C	N/A	N/A	1.5E+00	J	MG/KG	041M150401	1 / 4	1.2E+00 / 1.7E+00	8.9E-01	1.0E-03	3	3.00E-10	1.50E-10	6.78E-10	1.13E-09
7440508	Copper	N	5.5E+00	J	2.0E+01	=	MG/KG	041M150201	4 / 4	NAV	1.3E+01	1.0E-03	3	4.04E-09	2.02E-09	6.40E-08	4.28E-08
7439896	Iron	N	1.1E+04	=	2.2E+05	=	MG/KG	041M150301	4 / 4	NAV	7.1E+04	1.0E-03	3	4.46E-05	2.23E-05	7.06E-04	4.72E-04
7439921	Lead	N	2.1E+01	=	2.1E+02	=	MG/KG	041M150201	4 / 4	NAV	1.1E+02	1.0E-03	3	4.22E-08	2.11E-08	6.68E-07	4.47E-07
7439965	Manganese	N	4.8E+01	=	5.2E+02	=	MG/KG	041M150301	4 / 4	NAV	2.0E+02	1.0E-03	3	1.04E-07	5.20E-08	1.65E-06	1.10E-06
7782492	Selenium	N	9.3E-01	=	2.7E+00	J	MG/KG	041M150201	3 / 4	N/A / 1.2E+00	1.5E+00	1.0E-03	3	5.40E-10	2.70E-10	8.55E-09	5.71E-09
7440622	Vanadium	N	1.1E+01	=	3.6E+01	=	MG/KG	041M150201	4 / 4	NAV	2.2E+01	1.0E-03	3	7.20E-09	3.60E-09	1.14E-07	7.62E-08
72548	4,4'-DDD	C	1.3E-03	J	2.0E-01	DJ	MG/KG	041M150301	4 / 4	NAV	8.7E-02	3.0E-02	1	1.20E-09	6.00E-10	2.71E-09	4.54E-09
72559	4,4'-DDE	C	1.0E-02	J	3.4E-01	DJ	MG/KG	041M150101	4 / 4	NAV	1.3E-01	3.0E-02	1	2.04E-09	1.02E-09	4.61E-09	7.71E-09
50293	4,4'-DDT	C	4.3E-03	J	1.6E-02	J	MG/KG	041M150301	3 / 4	N/A / 5.9E-04	7.6E-03	3.0E-02	1	9.60E-11	4.80E-11	2.17E-10	3.63E-10
5103719	alpha-Chlordane	C	N/A	N/A	1.4E-03	J	MG/KG	041M150201	1 / 4	2.9E-04 / 7.5E-04	5.6E-04	4.0E-02	2	1.12E-11	5.60E-12	2.53E-11	4.23E-11
11096825	Aroclor-1260	C	1.4E-02	J	3.2E-02	J	MG/KG	041M150301	3 / 4	N/A / 5.9E-03	1.8E-02	1.4E-01	1	8.96E-10	4.48E-10	2.03E-09	3.39E-09
319857	beta-BHC	C	9.4E-04	J	1.4E-03	J	MG/KG	041M150201	2 / 4	2.9E-04 / 6.3E-04	7.0E-04	4.0E-02	2	1.12E-11	5.60E-12	2.53E-11	4.23E-11
319868	delta-BHC	C	N/A	N/A	5.5E-03	J	MG/KG	041M150301	1 / 4	2.9E-04 / 7.5E-04	1.6E-03	4.0E-02	2	4.40E-11	2.20E-11	9.95E-11	1.66E-10
115297	Endosulfan I	N	N/A	N/A	1.7E-03	J	MG/KG	041M150301	1 / 4	2.9E-04 / 7.5E-04	6.5E-04	1.0E-01	2	3.40E-11	1.70E-11	5.38E-10	3.60E-10
72208	Endrin	N	1.5E-03	J	1.6E-02	J	MG/KG	041M150201	3 / 4	N/A / 1.3E-03	5.2E-03	1.0E-01	2	3.20E-10	1.60E-10	5.07E-09	3.39E-09
7421934	Endrin aldehyde	N	1.3E-03	J	7.3E-03	J	MG/KG	041M150101	2 / 4	5.9E-04 / 1.5E-03	2.4E-03	1.0E-01	2	1.46E-10	7.30E-11	2.31E-09	1.55E-09
53494705	Endrin ketone	N	N/A	N/A	1.9E-03	J	MG/KG	041M150101	1 / 4	5.9E-04 / 1.5E-03	9.0E-04	1.0E-01	2	3.80E-11	1.90E-11	6.02E-10	4.02E-10
76448	Heptachlor	C	N/A	N/A	1.1E-03	J	MG/KG	041M150201	1 / 4	2.9E-04 / 7.5E-04	4.8E-04	1.0E-01	2	2.20E-11	1.10E-11	4.97E-11	8.32E-11
108601	2,2'-oxybis(1-Chloropropane)	C	N/A	N/A	8.2E-02	J	MG/KG	041M150401	1 / 4	2.5E+00 / 3.0E+00	1.1E+00	1.0E-01	3	1.64E-09	8.20E-10	3.71E-09	6.20E-09
105679	2,4-Dimethylphenol	N	N/A	N/A	6.3E-01	J	MG/KG	041M150101	1 / 4	1.1E+00 / 3.0E+00	9.8E-01	1.0E-01	2	1.26E-08	6.30E-09	1.99E-07	1.33E-07
95487	2-Methylphenol (o-Cresol)	N	N/A	N/A	3.3E-01	J	MG/KG	041M150101	1 / 4	1.1E+00 / 3.0E+00	9.1E-01	1.0E-01	2	6.60E-09	3.30E-09	1.04E-07	6.98E-08
106445	4-Methylphenol (p-Cresol)	N	N/A	N/A	4.8E+00	=	MG/KG	041M150101	1 / 4	1.1E+00 / 3.0E+00	2.0E+00	1.0E-01	2	9.60E-08	4.80E-08	1.52E-06	1.02E-06
50328	Benzo(a)pyrene	C	N/A	N/A	5.9E-02	J	MG/KG	041M150401	1 / 4	2.5E-01 / 3.0E-01	1.2E-01	1.3E-01	2	1.53E-09	7.67E-10	3.47E-09	5.80E-09
205992	Benzo(b)fluoranthene	C	7.9E-02	J	2.5E-01	J	MG/KG	041M150301	3 / 4	N/A / 3.0E-01	1.7E-01	1.3E-01	2	6.50E-09	3.25E-09	1.47E-08	2.46E-08
117817	bis(2-Ethylhexyl)phthalate (BEHP)	C	2.2E-01	J	4.9E-01	J	MG/KG	041M150201	3 / 4	N/A / 2.5E+00	5.5E-01	1.0E-01	1	9.80E-09	4.90E-09	2.22E-08	3.70E-08
84742	Di-n-butylphthalate	N	1.3E-01	J	2.5E-01	J	MG/KG	041M150101	3 / 4	N/A / 1.1E+00	2.8E-01	1.0E-01	2	5.00E-09	2.50E-09	7.91E-08	5.29E-08
206440	Fluoranthene	N	9.4E-02	J	2.4E-01	J	MG/KG	041M150201	4 / 4	NAV	1.8E-01	1.3E-01	2	6.24E-09	3.12E-09	9.88E-08	6.60E-08
108952	Phenol	N	N/A	N/A	2.8E-01	J	MG/KG	041M150101	1 / 4	1.1E+00 / 3.0E+00	9.0E-01	1.0E-01	2	5.60E-09	2.80E-09	8.86E-08	5.93E-08
129000	Pyrene	N	1.2E-01	=	2.1E-01	J	MG/KG	041M150201	3 / 4	N/A / 3.0E-01	1.7E-01	1.0E-02	3	4.20E-10	2.10E-10	6.65E-09	4.44E-09
78933	2-Butanone (MEK)	N	N/A	N/A	3.5E-01	=	MG/KG	041M150301	1 / 4	4.3E-02 / 7.7E-02	1.1E-01	1.0E-02	3	7.00E-10	3.50E-10	1.11E-08	7.41E-09
67641	Acetone	N	1.3E-01	=	1.4E+00	=	MG/KG	041M150301	2 / 4	4.3E-02 / 4.3E-01	4.4E-01	1.0E-02	3	2.80E-09	1.40E-09	4.43E-08	2.96E-08
75092	Methylene chloride	C	N/A	N/A	3.4E-02	J	MG/KG	041M150201	1 / 4	4.3E-02 / 1.1E-01	4.0E-02	1.0E-02	3	6.80E-11	3.40E-11	1.54E-10	2.57E-10

Notes:

Equation for sediment risk:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Equation for DA_{event} for sediment contact:

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

Where:

C_{sd} = Chemical concentration in sediment (mg/kg).
CF = Conversion factor (10^{-6} kg/mg).
AF = Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;

Table 10-4-15
Wetland 15
Sediment Dermal Exposure Risk-Child Tresspasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABSGI	ABSGISource	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser Dermal Hazard Quotient	Child Trespasser Dermal Cancer Risk	Maintenance Worker Dermal Hazard Quotient	Maintenance Worker Dermal Cancer Risk
Sediment Dermal Risk	Aluminum	N	1.6E+04	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	5.0E-04	N/A	3.3E-04	N/A
	Arsenic	C	1.4E+02	3.0E-04	1.5E+00	4.1E-01	3	1.2E-04	3.7E+00	1.6E-02	**7.0E-06**	2.6E-02	**1.2E-05**
	Barium	N	4.1E+01	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	2.6E-05	N/A	1.8E-05	N/A
	Beryllium	N	3.4E-01	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	7.7E-05	N/A	5.1E-05	N/A
	Cobalt	C	1.5E+00	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	4.2E-08	N/A	7.1E-08	N/A
	Copper	N	2.0E+01	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	5.3E-06	N/A	3.6E-06	N/A
	Iron	N	2.2E+05	3.0E-01	N/A	1.5E-01	3	4.5E-02	N/A	1.6E-02	N/A	1.0E-02	N/A
	Lead	N	2.1E+02	1.0E-07	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	5.2E+02	2.4E-02	N/A	4.0E-02	1, 3	9.6E-04	N/A	1.7E-03	N/A	1.1E-03	N/A
	Selenium	N	2.7E+00	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	3.1E-06	N/A	2.1E-06	N/A
	Vanadium	N	3.6E+01	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	6.3E-04	N/A	4.2E-04	N/A
	4,4'-DDD	C	2.0E-01	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	2.2E-08	N/A	3.6E-08
	4,4'-DDE	C	3.4E-01	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	5.2E-08	N/A	8.7E-08
	4,4'-DDT	C	1.6E-02	5.0E-04	3.4E-01	3.0E-02	2	1.5E-05	1.1E+01	1.4E-05	2.5E-09	2.4E-05	4.1E-09
	alpha-Chlordane	C	1.4E-03	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	6.3E-08	1.1E-11	1.1E-07	1.9E-11
	Aroclor-1260	C	3.2E-02	N/A	2.0E+00	1.4E-01	2	N/A	1.4E+01	N/A	2.9E-08	N/A	4.8E-08
	beta-BHC	C	1.4E-03	2.0E-04	1.8E+00	1.4E-02	3	2.8E-06	1.3E+02	8.9E-06	3.2E-09	1.5E-05	5.4E-09
	delta-BHC	C	5.5E-03	5.0E-04	6.3E+00	1.4E-02	3	7.1E-06	4.4E+02	1.4E-05	4.4E-08	2.3E-05	7.4E-08
	Endosulfan I	N	1.7E-03	6.0E-03	N/A	5.0E-01	3	3.0E-03	N/A	1.8E-07	N/A	1.2E-07	N/A
	Endrin	N	1.6E-02	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	1.4E-03	N/A	9.0E-04	N/A
	Endrin aldehyde	N	7.3E-03	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	6.2E-04	N/A	4.1E-04	N/A
	Endrin ketone	N	1.9E-03	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	1.6E-04	N/A	1.1E-04	N/A
	Heptachlor	C	1.1E-03	5.0E-04	4.5E+00	1.1E-02	3	5.6E-06	4.0E+02	8.9E-06	2.0E-08	1.5E-05	3.3E-08
	2,2'-oxybis(1-Chloropropane)	C	8.2E-02	4.0E-02	7.0E-02	3.5E-02	3	1.4E-03	2.0E+00	2.7E-06	7.4E-09	4.4E-06	1.2E-08
	2,4-Dimethylphenol	N	6.3E-01	2.0E-02	N/A	5.8E-02	3	1.2E-03	N/A	1.7E-04	N/A	1.1E-04	N/A
	2-Methylphenol (o-Cresol)	N	3.3E-01	5.0E-02	N/A	7.4E-02	3	3.7E-03	N/A	2.8E-05	N/A	1.9E-05	N/A
	4-Methylphenol (p-Cresol)	N	4.8E+00	5.0E-03	N/A	7.4E-02	3	3.7E-04	N/A	4.1E-03	N/A	2.7E-03	N/A
	Benzo(a)pyrene	C	5.9E-02	N/A	7.3E+00	3.1E-01	3	N/A	2.4E+01	N/A	8.2E-08	N/A	1.4E-07
	Benzo(b)fluoranthene	C	2.5E-01	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	3.5E-08	N/A	5.8E-08
	bis(2-Ethylhexyl)phthalate (BEHP)	C	4.9E-01	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	1.1E-05	3.1E-09	1.9E-05	5.2E-09
	Di-n-butylphthalate	N	2.5E-01	1.0E-01	N/A	3.1E-01	3	3.1E-02	N/A	2.6E-06	N/A	1.7E-06	N/A
	Fluoranthene	N	2.4E-01	N/A	4.0E-02	3.1E-01	3	N/A	1.3E-01	N/A	1.3E-08	N/A	8.5E-09
	Phenol	N	2.8E-01	6.0E-01	N/A	8.2E-02	3	4.9E-02	N/A	1.8E-06	N/A	1.2E-06	N/A
	Pyrene	N	2.1E-01	N/A	3.0E-02	3.1E-01	3	N/A	9.7E-02	N/A	6.4E-10	N/A	4.3E-10
	2-Butanone (MEK)	N	3.5E-01	6.0E-01	N/A	1.0E-01	2	6.0E-02	N/A	1.8E-07	N/A	1.2E-07	N/A
	Acetone	N	1.4E+00	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	4.4E-06	N/A	3.0E-06	N/A
	Methylene chloride	C	3.4E-02	6.0E-02	7.5E-03	1.0E-01	3	6.1E-03	7.4E-02	2.5E-08	1.1E-11	4.2E-08	1.9E-11

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfDdermal = Dermal reference dose.
RFDoral = Oral reference dose.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-4-16
Wetland 15
Sediment Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	1.6E+04	1.0E+00	N/A	5.00E-03	N/A	3.22E-03	N/A
	Arsenic	C	1.4E+02	3.0E-04	1.5E+00	2.13E-02	**9.57E-06**	3.42E-02	**1.54E-05**
	Barium	N	4.1E+01	7.0E-02	N/A	1.85E-04	N/A	1.19E-04	N/A
	Beryllium	N	3.4E-01	2.0E-03	N/A	5.38E-05	N/A	3.46E-05	N/A
	Cobalt	C	1.5E+00	2.0E-02	N/A	3.39E-06	N/A	5.45E-06	N/A
	Copper	N	2.0E+01	4.0E-02	N/A	1.60E-04	N/A	1.03E-04	N/A
	Iron	N	2.2E+05	3.0E-01	N/A	2.35E-01	N/A	1.51E-01	N/A
	Lead	N	2.1E+02	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	5.2E+02	2.4E-02	N/A	6.86E-03	N/A	4.41E-03	N/A
	Selenium	N	2.7E+00	5.0E-03	N/A	1.71E-04	N/A	1.10E-04	N/A
	Vanadium	N	3.6E+01	7.0E-03	N/A	1.63E-03	N/A	1.05E-03	N/A
	4,4'-DDD	C	2.0E-01	N/A	2.4E-01	N/A	2.17E-09	N/A	3.49E-09
	4,4'-DDE	C	3.4E-01	N/A	3.4E-01	N/A	5.23E-09	N/A	8.40E-09
	4,4'-DDT	C	1.6E-02	5.0E-04	3.4E-01	1.45E-06	2.46E-10	2.33E-06	3.95E-10
	alpha-Chlordane	C	1.4E-03	5.0E-04	3.5E-01	1.27E-07	2.22E-11	2.04E-07	3.56E-11
	Aroclor-1260	C	3.2E-02	N/A	2.0E+00	N/A	2.89E-09	N/A	4.65E-09
	beta-BHC	C	1.4E-03	2.0E-04	1.8E+00	3.17E-07	1.14E-10	5.09E-07	1.83E-10
	delta-BHC	C	5.5E-03	5.0E-04	6.3E+00	4.97E-07	1.57E-09	8.00E-07	2.52E-09
	Endosulfan I	N	1.7E-03	6.0E-03	N/A	8.97E-08	N/A	5.77E-08	N/A
	Endrin	N	1.6E-02	3.0E-04	N/A	1.69E-05	N/A	1.09E-05	N/A
	Endrin aldehyde	N	7.3E-03	3.0E-04	N/A	7.70E-06	N/A	4.95E-06	N/A
	Endrin ketone	N	1.9E-03	3.0E-04	N/A	2.01E-06	N/A	1.29E-06	N/A
	Heptachlor	C	1.1E-03	5.0E-04	4.5E+00	9.95E-08	2.24E-10	1.60E-07	3.60E-10
	2,2'-oxybis(1-Chloropropane)	C	8.2E-02	4.0E-02	7.0E-02	9.27E-08	2.60E-10	1.49E-07	4.17E-10
	2,4-Dimethylphenol	N	6.3E-01	2.0E-02	N/A	9.97E-06	N/A	6.41E-06	N/A
	2-Methylphenol (o-Cresol)	N	3.3E-01	5.0E-02	N/A	2.09E-06	N/A	1.34E-06	N/A
	4-Methylphenol (p-Cresol)	N	4.8E+00	5.0E-03	N/A	3.04E-04	N/A	1.95E-04	N/A
	Benzo(a)pyrene	C	5.9E-02	N/A	7.3E+00	N/A	1.95E-08	N/A	3.13E-08
	Benzo(b)fluoranthene	C	2.5E-01	N/A	7.3E-01	N/A	8.25E-09	N/A	1.33E-08
	bis(2-Ethylhexyl)phthalate (BEHP)	C	4.9E-01	2.0E-02	1.4E-02	1.11E-06	3.10E-10	1.78E-06	4.99E-10
	Di-n-butylphthalate	N	2.5E-01	1.0E-01	N/A	7.91E-07	N/A	5.09E-07	N/A
	Fluoranthene	N	2.4E-01	N/A	4.0E-02	N/A	3.04E-09	N/A	1.95E-09
	Phenol	N	2.8E-01	6.0E-01	N/A	1.48E-07	N/A	9.50E-08	N/A
	Pyrene	N	2.1E-01	N/A	3.0E-02	N/A	1.99E-09	N/A	1.28E-09
	2-Butanone (MEK)	N	3.5E-01	6.0E-01	N/A	1.85E-07	N/A	1.19E-07	N/A
	Acetone	N	1.4E+00	1.0E-01	N/A	4.43E-06	N/A	2.85E-06	N/A
	Methylene chloride	C	3.4E-02	6.0E-02	7.5E-03	2.56E-08	1.15E-11	4.12E-08	1.85E-11

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = Chronic dialy intake (mg/kg/day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
IRsd = 100 mg/day for age groups greater than 6-years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 10-4-17
Wetland 15 Phase II
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max. Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum Concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	9.3E+02	=	2.1E+05	=	UG/L	041W150101	2 / 2	NAV	1.1E+05	2.1E-01	1.0E-03	5.54E-04	8.77E-03	1.17E-02
7440382	Arsenic	C	4.5E+00	J	6.9E+01	=	UG/L	041W150101	2 / 2	NAV	3.7E+01	6.9E-05	1.0E-03	1.79E-07	4.05E-07	1.35E-06
7440393	Barium	N	3.5E+01	J	6.4E+02	=	UG/L	041W150101	2 / 2	NAV	3.4E+02	6.4E-04	1.0E-03	1.67E-06	2.64E-05	3.53E-05
7440417	Beryllium	N	N/A	N/A	3.2E+00	J	UG/L	041W150101	1 / 2	N/A / 1.0E+00	1.9E+00	3.2E-06	1.0E-03	8.32E-09	1.32E-07	1.76E-07
7440473	Chromium	N	N/A	N/A	3.3E+02	=	UG/L	041W150101	1 / 2	N/A / 8.0E+00	1.7E+02	3.3E-04	1.0E-03	8.50E-07	1.35E-05	1.80E-05
7440484	Cobalt	C	N/A	N/A	2.4E+01	J	UG/L	041W150101	1 / 2	N/A / 3.0E+00	1.3E+01	2.4E-05	1.2E-03	7.33E-08	1.66E-07	5.54E-07
7440508	Copper	N	4.0E+00	J	1.9E+02	=	UG/L	041W150101	2 / 2	NAV	9.8E+01	1.9E-04	1.0E-03	4.97E-07	7.86E-06	1.05E-05
7439896	Iron	N	8.3E+03	=	7.2E+05	=	UG/L	041W150101	2 / 2	NAV	3.6E+05	7.2E-01	2.5E-04	4.65E-04	7.36E-03	9.84E-03
7439921	Lead	N	2.3E+01	=	8.0E+02	=	UG/L	041W150101	2 / 2	NAV	4.1E+02	8.0E-04	3.4E-04	7.08E-07	1.12E-05	1.50E-05
7439965	Manganese	N	1.2E+02	=	1.6E+03	=	UG/L	041W150101	2 / 2	NAV	8.8E+02	1.6E-03	1.0E-03	4.26E-06	6.75E-05	9.03E-05
7487947	Mercury	N	N/A	N/A	9.4E-01	=	UG/L	041W150101	1 / 2	N/A / 1.3E-01	5.0E-01	9.4E-07	1.0E-03	2.44E-09	3.87E-08	5.17E-08
7782492	Selenium	N	N/A	N/A	1.6E+01	=	UG/L	041W150101	1 / 2	N/A / 3.0E+00	8.9E+00	1.6E-05	1.0E-03	4.24E-08	6.71E-07	8.97E-07
7440622	Vanadium	N	2.0E+00	J	3.4E+02	=	UG/L	041W150101	2 / 2	NAV	1.7E+02	3.4E-04	1.0E-03	8.76E-07	1.39E-05	1.85E-05
7440666	Zinc	N	1.3E+01	J	1.0E+03	=	UG/L	041W150101	2 / 2	NAV	5.1E+02	1.0E-03	6.0E-04	1.58E-06	2.49E-05	3.33E-05
72548	4,4'-DDE	C	N/A	N/A	6.3E-02	J	UG/L	041W150101	1 / 2	N/A / 1.0E-01	5.7E-02	6.3E-08	1.6E-01	1.98E-07	4.48E-07	1.50E-06

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).

EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 10-4-18
Wetland 15 Phase II
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	2.1E-01	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	8.8E-02	N/A	1.2E-01	N/A
	Arsenic	C	6.9E-05	3.0E-04	1.5E+00	4.1E-01	2	1.2E-04	3.7E+00	3.3E-03	**1.5E-06**	1.1E-02	**4.9E-06**
	Barium	N	6.4E-04	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	5.4E-03	N/A	7.2E-03	N/A
	Beryllium	N	3.2E-06	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	9.4E-03	N/A	1.3E-02	N/A
	Chromium	N	3.3E-04	3.0E-03	N/A	2.5E-02	1	7.5E-05	N/A	1.8E-01	N/A	2.4E-01	N/A
	Cobalt	C	2.4E-05	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	1.0E-05	N/A	3.5E-05	N/A
	Copper	N	1.9E-04	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	6.6E-04	N/A	8.8E-04	N/A
	Iron	N	7.2E-01	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	8.0E-04	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.6E-03	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	1.2E-02	N/A	1.6E-02	N/A
	Mercury	N	9.4E-07	3.0E-04	N/A	7.0E-02	1	2.1E-05	N/A	1.8E-03	N/A	2.5E-03	N/A
	Selenium	N	1.6E-05	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	2.4E-04	N/A	3.3E-04	N/A
	Vanadium	N	3.4E-04	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	7.6E-02	N/A	1.0E-01	N/A
	Zinc	N	1.0E-03	3.0E-01	N/A	2.0E-01	2, 4	6.0E-02	N/A	4.2E-04	N/A	5.6E-04	N/A
	4,4'-DDE	C	6.3E-08	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	N/A	N/A	N/a

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-4-19
Wetland 15 Phase II
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	2.1E-01	1.0E+00	N/A	6.7E-06	N/A	4.3E-06	N/A
	Arsenic	C	6.9E-05	3.0E-04	1.5E+00	1.0E-06	4.7E-10	1.7E-06	7.5E-10
	Barium	N	6.4E-04	7.0E-02	N/A	2.9E-07	N/A	1.9E-07	N/A
	Beryllium	N	3.2E-06	2.0E-03	N/A	5.1E-08	N/A	3.3E-08	N/A
	Chromium	N	3.3E-04	3.0E-03	N/A	3.5E-06	N/A	2.2E-06	N/A
	Cobalt	C	2.4E-05	2.0E-02	N/A	5.3E-09	N/A	8.5E-09	N/A
	Copper	N	1.9E-04	4.0E-02	N/A	1.5E-07	N/A	9.7E-08	N/A
	Iron	N	7.2E-01	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	8.0E-04	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.6E-03	1.4E-01	N/A	3.7E-07	N/A	2.4E-07	N/A
	Mercury	N	9.4E-07	3.0E-04	N/A	9.9E-08	N/A	6.4E-08	N/A
	Selenium	N	1.6E-05	5.0E-03	N/A	1.0E-07	N/A	6.6E-08	N/A
	Vanadium	N	3.4E-04	7.0E-03	N/A	1.5E-06	N/A	9.8E-07	N/A
	Zinc	N	1.0E-03	3.0E-01	N/A	1.1E-07	N/A	6.9E-08	N/A
	4,4'-DDE	C	6.3E-08	N/A	3.4E-01	N/A	9.7E-14	N/A	1.6E-13

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

10.5 Wetland 16 — Screening Level Problem Formulation

10.5.1 Site Description and Habitats Present at Wetland 16

Wetland 16 is on the northern side of Site 1, along the shore of Bayou Grande (Figure 10-1, which are located at the end of this section). The NAS Pensacola picnic ground lies to the east. Parsons and Pruitt (USEPA, 1991a) described this area as an estuarine emergent system containing predominantly black needle rush *(Juncus romerianus)* and saw grass *(Cladium jamaicense)*. Wetland 16 generally flows northwest into Bayou Grande through a drainage channel about 3 feet wide. The open water portion of the wetland ranges from 1 to about 4 feet in depth and has a maximum width of about 200 feet.

Photograph 1 Wetland 16 — Facing South

Photograph 2 Wetland 16 — Facing Southwest

Wetland 16 is fed from the south and southeast by groundwater from the area of Site 1 and from the northwest by tidal influences from Bayou Grande. Rubble deposits to the south, from Site 1 and other abrupt transitions, make the border between open water and upland obvious.

As described in Section 10, the Site 1 landfill was used from the mid-1950s until 1976 as the predominant disposal site for all solid wastes generated on the base. Based on the data collected during the Site 1 RI, the *Final ROD* issued on August 19, 1998, outlined three RAOs for the OU 1 site:

1. Protection of groundwater from leachable compounds

2. Restoration of groundwater and prevention of further contamination of shallow/intermediate groundwater

3. Prevention of further contamination of surface water in Wetland 3

The remedial actions selected for the site included:

1. Institutional controls to restrict groundwater use and intrusive activities

2. Implementation of a groundwater monitoring program to ensure that natural processes are effectively reducing the concentrations of organic compounds to attain performance standards

3. A groundwater interceptor system to treat the iron-contaminated groundwater that is migrating from the landfill and discharging to Wetland 3

The long-term monitoring plan was implemented by TtNUS. Groundwater was monitored for the following constituents: 1,1,2,2-tetrachlorethane, benzene, chlorobenzene, vinyl chloride, xylenes, aluminum, cadmium, chromium, iron, manganese, and nickel. Based upon collected data, the Third Annual Groundwater Monitoring Report recommended continued monitoring for benzene, xylenes, vinyl chloride, aluminum, cadmium, iron, and manganese (TtNUS, 2003b). The other constituents no longer exceeded MCLs and were dropped from the monitoring plan. Treatment of iron at Wetland 3 is discussed in Section 10.2.

10.5.2 Wetland 16 — Sample Location Description

Phase II Sediment Sample Location Description

Four Phase II sediment samples were collected in Wetland 16 to assess sediment conditions (Figure 10-4). Sample location 001M001601 was collected from the center of the wetland in June 1994, while locations 041M160101, 041M160201, and 041M160301 were collected near the perimeter to the north, southwest, and southeast in December 1995. Sample location 041M160301 is closest to the Site 1 landfill. Table 10-5-1 (tables are located at the end of each section) provides a physical description of the Phase II sediments collected at Wetland 16. Phase II sediments at Wetland 16 were composed of brown poorly graded sand, medium to fine (041M160101) with 0.144% TOC to black sandy organic silt (041M160301) with 5.53% TOC.

Phase III Sediment Sample Location Description

Table 10-5-2 provides a physical description of the sediments collected at Wetland 16 during the Phase III sampling effort (Figure 10-8). Sediments at Wetland 16 were mostly composed of fine sand to very fine-grained silt and clay. The TOC concentration was 1.7%.

Phase II Surface Water Sample Location Description

Three surface water samples were collected from Wetland 16 and used to develop the data set for this ERA. Sample 001W001601 was collected in June 1994 during the Site 1 investigation, while samples 041W160101 and 041W160201 were collected in December 1995 during the investigation of Site 41. The data have been combined for this report. Surface water samples were collocated with sediment samples as shown in Figure 10-4. Table 10-5-3 provides a physical description of the two Phase II surface water collections at Wetland 16 in 1995. Phase II surface water from Wetland 16 was found to be very hard and of neutral pH. Turbidity readings ranged from 10 — 17 NTUs, and salinity concentrations ranged from 1.17% to 1.26%.

Phase IV/2004 Surface Water Sample Location Description

One surface water sample was collected from Wetland 16 during the Phase IV-2004 sampling effort as shown on Figure 10-8. This sample was only analyzed for metals. Due to a sampling error, physical parameters of the Phase IV-2004 surface water sample was not collected.

10.5.3 Wetland 16 — Nature and Extent of Contamination

Phase II Sediment

Figure 10-4 presents the Phase II sediment sampling locations for Wetland 16. Table 10-5-4 summarizes the analytical results of the four Phase II sediment samples.

Metals — Twenty-one metals were detected during Phase II sediment sampling at Wetland 16. The distribution of inorganic detections and reference value exceedances was centered at location 041M160301, near the southeast corner of the wetland, where all 21 analytes were detected. All analytes detected, except nickel, were present at concentrations exceeding their respective estuarine reference values. In addition, the metals at location 041M160301 were the highest detected across the wetland. Location 041M160201 had 19 detections, with six exceeding their reference values. Locations 001M001601 and 041M160101 had 12 and 13 detections, respectively. Reference values were exceeded for four metals at location 001M001601. Location 041M160101 had no reference value exceedances.

Pesticides and PCBs — Five pesticide compounds and aroclor-1254 were detected during Phase II sediment sampling at Wetland 16. Total DDT was calculated for each location by adding the concentrations of 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT. Likewise, a basewide total DDT reference concentration was calculated using the basewide concentrations for these same constituents. None of the pesticides detected exceeded the available basewide reference values.

The greatest number of pesticides detected in Wetland 16 sediments during Phase II sampling was near the southeast corner of the wetland at location 041M160301, where five pesticides were detected. Locations 001M001601, 041M160101, and 041M160201 had detections 1, 2, and 3, respectively. Aroclor-1254 was detected at three sampling locations (041M160101 through 041M160301). The highest concentration detected was at location 041M160301.

SVOCs — Five SVOCs were detected in sediment samples collected during Phase II sampling at Wetland 16. Locations 041M160201 and 041M160301 had five compounds detected each. These locations also had two detections at the highest concentrations in the wetland. Location 041M160101 had two detections of SVOCs, while location 001M001601 had no SVOCs detected.

VOCs — A single VOC was detected in sediments collected from Wetland 16 during Phase II sampling. This detection was methylene chloride, which was detected at location 041M160301.

The greatest number of constituents and generally the highest concentrations were detected at location 041M160301, near the southeast corner of the wetland. This location exhibited detections of 32 analytes, most of which exceeded their respective estuarine reference values.

Phase III Sediment

Based on the results of the Phase II sampling, Phase III was initiated to confirm elevated detections at sediment location 041M160301 (Figure 10-8). Table 10-5-5 summarizes the analytical results of the Phase III sediment sampling.

Metals — During Phase III sediment sampling, the same 21 metals were detected at location 041M160301 as detected in Phase II. The concentrations were significantly lower except for selenium which showed a slight increase. Fourteen of the 21 detected metals were present at concentrations exceeding their respective estuarine reference values compared to 21 during Phase II. The Phase III sample results confirmed the common problematic analytes as aluminum, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, manganese, potassium, selenium, vanadium, and zinc.

Pesticides and PCBs — In general, the Phase III results showed less diversity of pesticide compounds, when compared to Phase II results. Although the concentrations of 4,4′-DDD and 4,4′-DDT increased, the overall total DDT concentration decreased. Endrin, not detected during Phase II sampling, was detected but at a relatively low concentration. No PCBs were detected during Phase III sampling at Wetland 16.

SVOCs — Fluoranthene was the only SVOC detected during Phase III sampling. The concentration of this SVOC had decreased by more than half the Phase II concentration.

VOCs — No VOCS were detected during Phase III sediment sampling at Wetland 16.

Overall, the number of analytes present and concentrations detected decreased from Phase II to Phase III at Wetland 16.

Phase II Surface Water

Figure 10-4 presents the Phase II surface sampling locations for Wetland 16. Table 10-5-6 summarizes the analytical results of the three Phase II surface water samples.

Metals — Ten metals were detected in Phase II surface water samples taken from Wetland 16. The greatest diversity of detections was at location 041W160201, near the southwest corner of the wetland. Locations 041W160101 and 001W001601 had nine and seven detections, respectively. Locations 041W160101 and 041W160201 each had seven reference value exceedances. Location 001W001601 had five reference values exceedances, as well as the highest concentrations detected.

Pesticides and PCBs — Pesticide compounds and PCBs were not detected during Phase II surface water sampling at Wetland 16.

SVOCs — SVOCs were not detected during Phase II surface water sampling at Wetland 16.

VOCs — Two VOCs were detected during Phase II surface water sampling at Wetland 16. Location 001W001601 had detections of 1,1-dichloroethane and chlorobenzene at low concentrations. Chlorobenzene was also detected at a low concentration at location 041W160101. No VOCs were detected at location 041W160201.

Phase IV/2004 Surface Water

Figure 10-8 presents the Phase IV-2004 surface sampling location for Wetland 16. Table 10-5-7 summarizes the analytical results of the one Phase IV/2004 surface water sample.

Metals — Fifteen metals were detected during the Phase IV/2004 surface water sampling at Wetland 16. Eleven of the 15 inorganic detections exceeded the reference value at sample location 041W150101.

Organics — Pesticides, PCBs, SVOCs, and VOCs were not collected during the Phase IV/2004 surface water sampling event.

10.5.4 Ecological Risk Assessment

10.5.4.1 Phase II Investigation Summary — Wetland 16

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-5-8, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-5-9.

Baseline Problem Formulation — Sediment COPC Refinement

During the COPC refinement, additional information was used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. This risk assessment presents a statement of potential risk for each of the COPCs.

The COPC refinement process included:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to basewide (reference) concentrations for total DDT
- Comparison of inorganic constituents to reference wetland values
- Regression Analysis of inorganic constituents
- Di Toro EqP SQGs for VOCs
- Comparison to Swartz consensus values
- Mean ERM quotients
- Description of exceedances of RVs and their extent

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 10-5-10. COPCs retained after refinement are presented in Table 10-5-11.

At Wetland 16, metals were detected at all sample locations; however, the majority of higher detections occurred at location 041M160301, which is the location closest to Site 1. For Wetland 16, aluminum, barium, beryllium, cadmium, calcium, cobalt, iron, lead, magnesium, manganese, potassium, selenium, silver, sodium, vanadium, and zinc exceeded their Site 41 estuarine sediment reference concentrations.

All these constituents are retained as COPCs, with the exception of the essential nutrients calcium, magnesium, potassium, and sodium. Based on regression analysis of the Phase II Wetland 16 data, when compared to aluminum concentrations, copper, lead, and mercury were identified as outliers for sample location 041M160301. Barium, cadmium, and chromium were identified as outlier during the comparison of these constituents to iron concentrations. Cadmium generated the highest maximum SV HQ and average SV HQ and exceeded its RV at location 041M160301. Other inorganic constituents that exceeded their RVs at this location included lead, silver, and zinc.

At Wetland 16, total DDT and its daughter products were below the basewide levels, indicating that pesticide application levels in this area were in accordance with other base activities (Figure 10-5). As a result, these constituents are not carried forward as COPCs in the ERA Process. However, dieldrin did exceed its screening value and will be included in the OU-wide food chain modeling. PCBs also exceeded their screening criteria for maximum concentration and average concentration. However, they did not exceed RVs at any location. Although PCBs are not listed as COPCs for this site, the concentrations for Wetland 16 are included in the OU-wide food chain model.

When normalized to detected TOC concentrations, both VOCs and PAHs were not risk drivers for Wetland 16. TOC normalized PAHs are presented on Figure 10-6.

Table 10-5-12 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Based on this approach, two sample locations (001M00160201 and 041M160301) were determined to be Category 2, indicating sediments in this wetland, and according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this category also has the highest level of uncertainty in predicting toxicity. Sample location 041M160101 was determined to be Category 1, indicating the sediments at this location are considered nontoxic. Sample location 041M160301 is the closest location to Site 1 and may be impacted by previous site activities. Figure 10-7 shows the Mean ERM category for each sediment sample location at OU 1.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-5-13, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-5-14.

Baseline Problem Formulation — Surface Water COPC Refinement

During the surface water COPC refinement, additional information was used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs.

The COPC refinement process included:

- Comparison of maximum SV concentrations to average SV concentrations
- Comparison of inorganic constituents to reference wetland values
- Description of surface water exceedances and their extent

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 10-5-15. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland. Phase II surface water COPCs retained after refinement is presented on Table 10-5-16.

At Wetland 16, barium, manganese, and thallium exceeded their Site 41 estuarine reference concentrations and are carried forward in the ERA Process. Calcium, magnesium, potassium, and sodium also exceeded their reference concentrations, but are not known to be associated with waste at Site 1. The essential nutrients are not included as COPCs for further evaluation. The majority of these inorganic exceedances occurred at sample location 001W001601. 1,1–Dichloroethane was also detected at this location; however, there is no screening value associated with this constituent; therefore, it was retained as a COPC.

During the Phase II investigation at Wetland 16, many of the same constituents were detected in sediment and surface water samples. Although constituents were detected at different frequencies and concentrations throughout the wetland, there was little agreement between maximum detections and sample locations.

As summarized in the approved *Final RI/FS SAP Addendum* (E/A&H, 1997d), Wetland 16 was identified as a Red-Coded Wetland based on the Phase II results, indicating contamination appeared to be site related. Wetland 16 was also classified as a Group C wetland. Based on similar contaminants and physical characteristics, the other Group C wetlands include 4D, 15, 18 (A&B), and 63A. Wetlands 16 and 18 were sampled in Phase III to represent the Group C wetlands based on their relatively higher concentrations and extent of contamination.

10.5.4.2 Phase III Investigation Summary — Wetland 16

Additional investigation was determined to be necessary based on the Phase II results. The following assessment and measurement endpoints were selected:

Wetland Groups and Representative Wetland(s)	Assessment Endpoints	Measurement Endpoints
Wetland 16	A) Survival and growth of invertebrates associated with the benthic environment (general benthic community)	A1) 10-day *Neanthes arenaceodentata,* survival and growth (by weight) A2) 7-day amphipod, *Leptocheirus plumulosus,* test with survival endpoint A3) Benthic community indices
	B) Bioaccumulation in wading birds and mammals	B1) These endpoints will be evaluated in the Food Chain Model in Section 10.8.

As detailed in the *Final RI/FS SAP Addendum* (E/A&H, 1997d), additional sampling was conducted at location 041M160301/041W160301 within Wetland 16, where COPC concentrations were high.

This sample was analyzed for the following parameters:

- Laboratory analysis of full TAL/TCL list
- TOC and other physical parameters
- Sediment toxicity testing
- Benthic Community Indices

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Tables 10-5-17, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-5-18.

Baseline Problem Formulation — Phase III Sediment COPC Refinement

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum concentrations to RVs are presented in Table 10-5-19. Phase III sediment COPCs retained after refinement, are presented on Table 10-5-20.

The following inorganic constituents exceeded their Site 41 estuarine sediment reference concentrations and are carried forward in the ERA Process: aluminum, barium, beryllium, iron, manganese, potassium, selenium, and vanadium.

The regression analysis of the Phase III sediment data identified barium, cadmium, chromium, copper, lead, mercury, and zinc concentrations at sample location 041M160301 as outliers when compared to both aluminum and iron. However, cadmium generated a SV HQ greater than 1 at Wetland 16 during Phase III.

At Wetland 16, total DDT and its daughter products were below the basewide levels, suggesting that these constituents are not a concern for this wetland and, therefore, are not retained as COPCs. OU 1 total DDT concentrations are presented on Figure 10-5. Total endrin was also detected during Phase III and is retained as a COPC and included in the OU-wide food chain models.

When normalized to detected TOC concentrations, VOCs and PAHs were not detected at levels expected to cause unacceptable ecological effects. TOC normalized PAHs for OU 1 are presented in Figure 10-6.

Table 10-5-21 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient category by individual sample location. Based on this approach, sample location 041M160301 was determined to be Category 2, which according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this category also has the highest level of uncertainty in predicting toxicity. Figure 10-7 also shows the Mean ERM category for each sediment sample location at Wetland 16.

10.5.4.3 Comparison of Phase II and III Sediment Results

Both the Phase II and III results indicate that inorganic constituents are of concern in Wetland 16. Concentrations decreased among constituents common between the two phases, except for selenium.

The differences between the Phase II and Phase III sampling efforts are:

Constituent	Phase II-Sediment (mg/kg)	Phase III-Sediment (mg/kg)	Difference (mg/kg)
Aluminum	8,800	5,320	-3,480
Barium	8.1	4.7	-3.4
Beryllium	0.47	0.26	-0.21
Iron	39,500	17,000	-22,500
Manganese	211	39	-172

Constituent	Phase II-Sediment (mg/kg)	Phase III-Sediment (mg/kg)	Difference (mg/kg)
Potassium	1,580	1,060	-520
Selenium	0.84	1	+0.16
Vanadium	34	15.3	-18.7

10.5.5 Evaluation of Assessment Endpoints

In addition to the chemical analyses, during the Phase III sampling, one sediment was collected for whole sediment toxicity tests and species diversity analysis. These tests were used as measurement endpoints to evaluate the assessment endpoints identified for Wetland 16.

Assessment Endpoint A — Survival, Growth, and Emergence of Macroinvertebrates Associated with the Benthic Environment

The benthic invertebrate communities inhabiting the sediments in the fresh and salt water marshes included in Site 41 were selected as important biological resources to be evaluated in these habitats. This assessment endpoint is aimed at maintaining an ecologically viable benthic community and organism sustainability.

The benthic macroinvertebrates were selected because:

- Their relatively sessile life habits cause potential for increased exposure to contaminated sediments
- They are important component in the aquatic food web
- They are a food source for many species of fish and crustaceans harvested for recreational and commercial purposes
- Benthos has been documented to be an excellent indicator of habitat condition

Risk Questions

- Is the toxicity of COPCs to benthic macroinvertebrates in onsite sediments significantly greater that those of control sediments?
- Are the toxic responses lethal or sublethal?
- Do the results of this study show any stressor-response relationship?

To address the risk questions for this assessment endpoint, the following measurement endpoints were proposed:

- Measurement Endpoint A1: Evaluate the toxicity of COPCs in sediment to the *Neanthes arenaceodentata* by conducting the 10-day, whole-sediment laboratory, toxicity tests measuring the survival and growth (measured by weight)

- Measurement Endpoint A2: Evaluate the toxicity of COPCs in sediment to the amphipod *Leptocheirus plumulosus* by conducting the acute, whole sediment toxicity tests measuring survival.

- Measurement Endpoint A3: Evaluate the health of the onsite benthic community using benthic community indices.

Measurement Endpoint A1

Additional sediments were collected at location 041M160301 during the Phase III portion of the investigation. Sediments from this estuarine wetland were prepared for testing with the polycheate worm, *Neanthes arenaceodentata.* The *Neanthes* test includes two endpoints, survival and growth (measured by weight).

Wetland 16 sediments were also tested against a laboratory control, which has a documented record of good survival and other test endpoint results, to determine if Wetland 16 sediments were impacting benthic species.

The test results are shown and explained below:

Sample Location	Neanthes Survival/100	Neanthes Weight (mg)
Laboratory Control	100	8.5
041M160301	100	8.0

The test acceptability criteria (TAC) are met, when control survival rates are 90% or above for the control and 80% or above for the sediment being tested.

A simple statistical T-test can be preformed on sediment performance compared to the control performance once the TAC are met to determine statistically significant differences between the control test and the sediment being tested.

No statistically significant differences were noted with sediments collected at Wetland 16 location 041M160301. Sediments performed well in the survival and weight portions of the test. The toxicity data reflects good results from these wetland samples and indicates that little or no impact from contaminants has been observed.

Measurement Endpoint A2

The *Leptocherius* test measures only survival as its endpoint. Wetland 16 sediments were also tested against a laboratory control, which has a documented record of good survival and other test endpoint results, to determine if Wetland 16 sediments were influencing benthic species. The test results are shown and explained below:

Sample Location	Amphipod Survival/100
Laboratory Control	98
041M160301	93

The test acceptability criteria (TAC) are met, when control survival rates are 90% or above for the control and 80% or above for the sediment being tested.

A simple statistical T-test can be preformed on sediment performance compared to the control performance once the TAC are met to determine statistically significant differences between the control test and the sediment being tested.

No statistically significant differences were noted with sediments collected at Wetland 16 location 041M160301.

Measurement Endpoint A3

In addition to collecting sediments for chemical characterization and toxicity tests, sediments were also collected for species identification at locations 041M160301 during the Phase III portion of the investigation.

Section 8 describes the process for diversity sampling and explains the importance of evenness and richness. The diversity findings for Wetland 16 are presented below:

Sample Location	Diversity Results
041M160301	1.69 Diversity 1.05 Evenness 4.72 Richness

Location 041M160301 was sampled and found to contain a large population of a few polychaetes. *Capitella capitata, Mediomastus californiensis*, and *Streblospio benedicti* are all polychaetes, which are found in brackish backwater areas and are considered pollution tolerant. The diversity (1.69) was lower than the diversity detected in other estuarine wetlands. Thirty-seven organisms were collected and sorted into five dominant species. The detailed analytical report is provided in Appendix F.

Assessment Endpoint A: Conclusions

This assessment endpoint was assessed by evaluating sediment chemistry, polycheate worm and an amphipod toxicity test results, and community analysis. Based on the evaluation of the data collected for Wetland 16 to date, location 041M160301 indicate a presence of inorganic constituents in sediments that exceed literature-based ecological risk screening and refinement values. However, statistically significant lethal or sublethal effects on benthic invertebrates were not observed. The benthic community evaluation showed slightly lower diversity at this location than other estuarine wetlands.

Assessment Endpoint B: Bioaccumulation in Wading Birds and Mammals

To assess risks from contaminants that bioaccumulate, the results from Wetland 16 are used in the OU 1 food-chain model presented in Section 10.8.

10.5.6 Phase IV/2004 Investigation Summary — Wetland 16

An additional surface water sample was collected for metals during the Phase IV/2004 sampling effort at Wetland 16.

Surface Water Screening — Level Risk-Estimation and Risk Calculation

As presented in Table 10-5-22, the surface water sample was compared with screening values in accordance with the procedures described in Section-8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-5-23.

Baseline Problem Formulation — Surface Water COPC Refinement

The same method used to evaluate Phase II surface water samples (Section 10.5.4) was applied to Phase IV/2004 surface water samples.

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Tables 10-5-24. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland. Phase IV surface water COPCs retained after refinement are presented on Table 10-5-25.

At Wetland 16, antimony, barium, iron, manganese, and thallium exceeded their Site 41 estuarine reference concentrations and are carried forward in the ERA Process. Calcium, magnesium, potassium and sodium also exceeded their reference concentration but are considered essential nutrients and are not known to be an associated with waste at Site 1. The essential nutrients are not carried forward in the ERA Process.

Many of the same constituents retained during the Phase II surface water sampling were also retained in Phase IV surface water samples. Generally, the maximum concentrations of the Phase IV sample were greater than the maximum concentrations during Phase II sampling.

10.5.7 Wetland 16 — Human Health Risk Assessment

Wetland 16 is described in Section 10.5.1, and the HHRA is summarized below.

10.5.7.1 Site Data

Surface water, sediment, and fish tissue data were collected at Wetland 16 during Phases II, III, and IV of the RI. Section 10.5.3 summarizes the nature and extent of contamination for this wetland. Surface water and sediment data are summarized in Tables 10-5-4 through 10-5-7.

10.5.7.2 Conceptual Site Model

As described in Section 10.5.1, Wetland 16 is estuarine. Although no swimming or wading is allowed, the wetland is near the Navy picnic area and could be accessed by Navy personnel or trespassers walking and/or wading through the area. Dermal contact could be a significant exposure pathway and was included in this HHRA. Based on the species present, depth of surface water, and available habitat, fishing could occur in a trespassing scenario. However, wading would be the most likely exposure scenario.

COPCs were identified as described in Section 9. The following scenarios and exposure pathways were evaluated for this wetland:

Scenario	Medium	Ingestion	Dermal	Fish Tissue Ingestion
Maintenance	Sediment			
	Surface water	√	√	
Trespasser	Sediment			
	Surface water	√	√	
Fisherman	Fish Tissue Uptake from Sediment			√

10.5.7.3 Risk Characterization

The child trespasser, adult maintenance worker, and fisherman scenarios were assessed for this wetland.

Phase II Data

Trespasser

As shown in Tables 10-5-26 through 10-5-28, surface water dermal contact and ingestion risk estimates did not exceed FDEP's risk threshold of 1E-6. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 10-5-26 through 10-5-28, surface water dermal contact and ingestion risk estimates did not exceed FDEP's risk threshold of 1E-6. Hazard indices were below 1.0.

Fisherman

As shown in Table 10-5-29, fish tissue uptake from sediment risk estimates exceeded FDEP's risk threshold of 1E-6 based on PCB aroclor–1254. Hazard indices were below 1.0.

Phase III Data

Fisherman

As shown in Table 10-5-30, fish tissue uptake from sediment risk estimates did not exceed FDEP's risk threshold of 1E-6. Hazard indices were below 1.0.

Phase IV Data

Trespasser

As shown in Tables 10-5-31 through 10-5-33, surface water dermal contact and ingestion risk estimates did not exceed FDEP's risk threshold of 1E-6. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 10-5-31 through 10-5-33, surface water dermal contact and ingestion risk estimates did not exceed FDEP's risk threshold of 1E-6. Hazard indices were below 1.0.

Summary of Wetland 16 Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Surface water	6.42E-02	NA
Trespasser	Surface water	4.80E-02	NA
Fisherman	Fish Tissue Uptake from Sediment	6.31E-01	2.30E-05

Based on Phase II data, PCB aroclor–1254 was identified as a COC.

Summary of Phase III Risk Estimates

Scenario	Medium	Hazard Index	Risk
Fisherman	Fish Tissue Uptake from Sediment	7.11E-03	7.06E-07

Based on Phase III data, no COCs were identified.

Summary of Phase IV Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Surface water	1.50E-01	3.96E-07
Trespasser	Surface water	1.12E-01	1.18E-07

Based on Phase IV data, no COCs were identified.

Wetland 16 HHRA COC Summary

The following parameter was determined in the HHRA to be a COC for Wetland 16:

- Aroclor-1254

10.5.8 Wetland 16 — Fate and Transport Analysis

This wetland occupies an area to the north of Site-1. It is bounded on the north by Bayou Grande. Internally, the wetland drains from the southwest to the northwest, eventually emptying into

Bayou Grande (see Figure 10-1). Three sediment and two surface water samples were collected as part of the wetland assessment.

The COPCs retained after refinement for Wetland 16 are summarized in Tables10-5-11 (Phase II) and 10-5-20 (Phase III) for sediment. The surface water COPCs retained after refinement are summarized in Tables 10-5-16 (Phase II) and 10-5-25 (Phase IV). Provided below are the associated monitoring wells used for comparing data for the fate and transport analysis. All associated monitoring wells and borings are used in the comparison (no considerations given for upgradient/downgradient positioning) because of the potential for tidal flux influences on internal wetland flow.

Associated Monitoring Wells: 001GI046, 001GM005, 001GM043

Associated Borings: 001SI046

Surface Water/Sediment Transport to Wetland Media:

Surface Water — No directly comparable storm water data are available from the area proximal to this wetland complex. Because of the lack of data, no definitive statement can be made regarding the validation of the pathway via storm water runoff into the wetland complex. The wetland is surrounded by nonpaved areas, so the storm water runoff pathway is likely to be less influential than the groundwater discharge pathways.

Sediment — Based on the data from surface soil proximal to this wetland complex, the surface soil to sediment pathway is validated for the following parameters:

Phase II	Phase III
Aluminum	Aluminum
Iron	Barium
Manganese	Beryllium
Vanadium	Iron
Zinc	Manganese
	Selenium
	Vanadium

Groundwater to Wetland Media Pathways:

Surface Water — Based on the data from associated monitoring wells, the groundwater to wetland surface water pathway is validated and significant for the following parameters (**note:** the 1993 metals data is not used for validation purposes due to potential bias introduced by the sampling methodology):

Phase II	Phase IV/2004
Barium	Iron
Manganese	Manganese
1,1-Dichloroethane	Barium

Sediment — Based on the data from associated monitoring wells, the groundwater to wetland sediment pathway is validated and significant for the following parameters (**note:** the 1993 metals data are not used for validation purposes due to potential bias introduced by the sampling methodology):

Phase II	Phase III
Aluminum	Aluminum
Barium	Barium
Iron	Iron
Lead	Manganese
Manganese	
Vanadium	
Zinc	

Surface Water/Sediment Transport within the Wetlands:

To evaluate these pathways for surface water in Wetland 16, upgradient location 041W1602 was compared to downgradient location 041W1601. To evaluate these pathways for sediment in Wetland 15, upgradient sediment sample location 041M1602 was compared to downgradient sediment location 041M1601. Criteria of note are the number of detected parameters and the apparent general trend in concentrations.

Surface Water — Evaluation of upgradient location 041M1602 with downgradient 041M1601 indicates 10 metals/zero organics upgradient versus nine metals-and-one organic in the downgradient location. Six metals exhibited slight decreases and three exhibited slight increases. Overall, there are no significant trends relating to this pathway.

Sediment — Evaluation of upgradient 041M1602 with downgradient 014M1601 indicates an increase in the number of detected metals and a decrease in the detected concentrations (19 metals-and-nine organics upgradient versus 13 metals-and-five organics downgradient). All 13 metals exhibited marked decreases in concentrations. One organic parameter was present downgradient that was not detected upgradient, and four organic parameters exhibited marked decreases. TOC exhibited a marked decrease as well. This suggests sediments upgradient, higher in TOC, are capable of adsorbing contamination and thus reducing transport downgradient within the wetland. Contaminants are being fixed within the sediment farther upgradient.

Temporal Evaluation

Wetland 16 — Sediment

One location (041M1603) was sampled as part of Phase II and Phase III activities. An evaluation of both sets of data indicates the following:

- Location 041M1603 — 21 metals and 11 organics were detected during Phase II versus 20 metals and five organics during Phase III. All 21 metal detections decreased in concentration. Seven organic parameters detected in Phase II were not detected in Phase III and one organic parameter detected in Phase III was not present in Phase II. Of three organic parameters that were detected in both phases, two increased in concentrations and one decreased. Finally, TOC concentrations were decreased in Phase III. It can be concluded that inorganic contaminant fraction decreased significantly, although this may be related to a decrease in TOC.

Wetland 16 — Surface Water

One location (041W1601) was sampled as part of Phase II and IV activities. During 2004, only metals were sampled. An evaluation of both sets of data indicated that at Location 01, nine metals were detected during Phase II versus 15 metals during Phase IV. Nine increased in concentration and six were detected in 2004 that were not detected in Phase II. Overall, the fraction of inorganic parameter contamination increased from Phase II to 2004, but the magnitude of increases was not generally remarkable.

Table 10-5-1
Wetland 16 Phase II
Sediment Physical Parameters

Parameter	041M160101	041M160201	041M160301
TOC (%)	0.144	1.26	5.53
Percent Solids (%)	82	44.7	19.3
Grain Size Analysis (percent of composition[1])			
Medium Sand	34	27	4
Fine Sand	64	60	41
Silt and Clay	2	13	55
Description	Brown Poorly Graded Sand, Medium to Fine	Black Silty Sand with Organics	Black Sandy Organic Silt

Note:
[1] = Derived from sieve analyses.

Table 10-5-2
Wetland 16 Phase II
Surface Water Physical Parameters

Parameter	041W160101	041W160201
Hardness as CaCO3 (mg/L)	1,470	1,680
pH	6.86	7.01
Specific Conductivity (mS/cm)	19.6	20
Turbidity (NTU)	10	17
Salinity (%)	1.17	1.26

Notes:

mg/L	= Milligrams per liter
pH	= Hydrogen ion content
MS/cm	= MilliSiemens per centimeter
NTU	= Nephelometric turbidity units
%	= Percent

Table 10-5-3
Wetland 16 Phase III
Sediment Physical Parameters

Parameter	041M160301
TOC (%)	1.7
Percent Solids (%)	No Data
Grain Size Analysis (percent of composition[1])	
Fine Gravel	0
Coarse Sand	0
Medium Sand	9.8
Fine Sand	58
Silt and Clay	32.2

Note:
[1] = Derived from sieve analyses.

Table 10-5-4
Wetland 16 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
Metals (mg/kg)								
Aluminum	4,274.0	2	4	4	255.0	8,880.0	4,350.0	041M160301
Arsenic	2.140	1	4	4	0.720	10.90	3.630	041M160301
Barium	3.840	2	3	4	2.30	8.10	3.740	041M160301
Beryllium	0.130	3	2	4	0.180	0.470	0.221	041M160301
Cadmium	0.390	3	2	4	0.610	8.50	2.450	041M160301
Calcium	1,978.80	1	4	4	53.90	2,090.0	781.0	041M160301
Chromium	13.10	2	4	4	1.90	78.40	27.40	041M160301
Cobalt	0.910	1	2	4	0.70	1.70	0.811	041M160301
Copper	8.440	1	3	4	1.40	90.80	24.90	041M160301
Iron	2,684.40	3	4	4	1,330.0	39,500.0	12,700.0	041M160301
Lead	21.040	1	4	4	2.10	182.0	50.50	041M160301
Magnesium	2,943.60	1	4	4	109.0	3,830.0	1,600.0	041M160301
Manganese	9.810	3	4	4	1.40	211.0	62.70	041M160301
Mercury	0.110	1	1	4	0.410	0.410	0.144	041M160301
Nickel	3.690	2	2	4	1.90	8.40	4.480	041M160301
Potassium	899.720	1	3	4	42.90	1,580.0	650.0	041M160301
Selenium	0.660	2	2	4	0.40	0.840	0.509	041M160301
Silver	0.520	2	1	4	1.80	1.80	0.726	041M160301
Sodium	11,439.60	1	4	4	480.0	12,300.0	4,510.0	041M160301
Vanadium	8.590	1	4	4	1.20	34.0	12.0	041M160301
Zinc	14.360	2	4	4	2.50	319.0	90.80	041M160301
PAHs (g/kg)								
Fluoranthene	N/A	0	2	4	58.0	100.0	122.0	041M160301
Pyrene	N/A	0	2	4	45.0	110.0	121.0	041M160301
Total PAHs	N/A	0	2	4	422.0	1,058.0	1,440.0	041M160301
Pesticides and PCBs (g/kg)								
Aroclor-1254	N/A	0	3	4	2.10	78.0	30.40	041M160301
Total PCBs	N/A	0	3	4	9.350	108.50	95.80	041M160301
Dieldrin	N/A	0	2	4	0.350	4.20	1.930	041M160301
alpha-Chlordane	N/A	0	1	4	0.470	0.470	0.550	041M160301
Total Chlordane	N/A	0	1	4	0.685	0.685	1.040	041M160301
4,4'-DDD	50.0	0	4	4	0.270	4.80	1.750	041M160301
4,4'-DDE	40.0	0	3	4	0.30	26.0	8.110	041M160301
4,4'-DDT	20.0	0	1	4	2.80	2.80	1.530	041M160301
Total DDT	110.0	0	4	4	0.675	33.60	11.40	041M160301

Table 10-5-4
Wetland 16 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
SVOCs (g/kg)								
Benzo(b)fluoranthene	N/A	0	1	4	100.0	100.0	116.0	041M160301
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	3	4	110.0	720.0	330.0	041M160301
Butylbenzylphthalate	N/A	0	1	4	31.0	31.0	378.0	041M160101
Diethylphthalate	N/A	0	1	4	90.0	90.0	363.0	041M160201
Di-n-butylphthalate	N/A	0	1	4	34.0	34.0	349.0	041M160201
VOCs (g/kg)								
Methylene chloride	N/A	0	1	4	110.0	110.0	38.40	041M160301

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 10-5-5
Wetland 16 Phase III
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
Metals (mg/kg)								
Aluminum	4,274.0	1	1	1	5,320.0	5,320.0	5,320.0	041M160301
Arsenic	2.140	1	1	1	5.50	5.50	5.50	041M160301
Barium	3.840	1	1	1	4.70	4.70	4.70	041M160301
Beryllium	0.130	1	1	1	0.260	0.260	0.260	041M160301
Cadmium	0.390	1	1	1	0.910	0.910	0.910	041M160301
Calcium	1,978.80	0	1	1	962.0	962.0	962.0	041M160301
Chromium	13.10	1	1	1	24.60	24.60	24.60	041M160301
Cobalt	0.910	0	1	1	0.860	0.860	0.860	041M160301
Copper	8.440	1	1	1	16.0	16.0	16.0	041M160301
Iron	2,684.40	1	1	1	17,000.0	17,000.0	17,000.0	041M160301
Lead	21.040	1	1	1	29.40	29.40	29.40	041M160301
Magnesium	2,943.60	0	1	1	2,410.0	2,410.0	2,410.0	041M160301
Manganese	9.810	1	1	1	39.0	39.0	39.0	041M160301
Mercury	0.110	0	1	1	0.070	0.070	0.070	041M160301
Nickel	3.690	1	1	1	4.40	4.40	4.40	041M160301
Potassium	899.720	1	1	1	1,060.0	1,060.0	1,060.0	041M160301
Selenium	0.660	1	1	1	1.0	1.0	1.0	041M160301
Silver	0.520	0	1	1	0.340	0.340	0.340	041M160301
Sodium	11,439.60	0	1	1	8,450.0	8,450.0	8,450.0	041M160301
Vanadium	8.590	1	1	1	15.30	15.30	15.30	041M160301
Zinc	14.360	1	1	1	68.50	68.50	68.50	041M160301
PAHs (g/kg)								
Fluoranthene	N/A	0	1	1	32.0	32.0	32.0	041M160301
Total PAHs	N/A	0	1	1	5,252.0	5,252.0	5,250.0	041M160301
Pesticides and PCBs (g/kg)								
Endrin	N/A	0	1	1	1.30	1.30	1.30	041M160301
Total Endrin	N/A	0	1	1	10.0	10.0	10.0	041M160301
4,4'-DDD	50.0	0	1	1	6.90	6.90	6.90	041M160301
4,4'-DDE	40.0	0	1	1	4.80	4.80	4.80	041M160301
4,4'-DDT	20.0	0	1	1	16.0	16.0	16.0	041M160301
Total DDT	110.0	0	1	1	27.70	27.70	27.70	041M160301

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 10-5-6
Wetland 16 Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
Metals (g/L)								
Aluminum	2,927.5	0	2	3	98.9	304.0	201.0	041W160201
Barium	9.43	3	2	3	30.5	31.9	31.2	041W160101
Calcium	76,800.0	3	3	3	104,000.0	145,000.0	121,000.0	001W001601
Iron	1,352.0	0	3	3	414.0	1,020.0	750.0	041W160201
Magnesium	243,650.0	3	3	3	294,000.0	419,000.0	351,000.0	001W001601
Manganese	12.15	3	3	3	50.1	56.6	54.0	001W001601
Potassium	81,250.0	3	3	3	98,700.0	162,000.0	125,000.0	001W001601
Sodium	1,952,000.0	3	3	3	2,410,000.0	3,820,000.0	2,980,000.0	001W001601
Thallium	2.55	3	2	3	13.9	14.8	14.4	041W160201
Zinc	12.88	0	2	3	7.1	7.4	7.25	041W160101
VOCs (g/L)								
1,1-Dichloroethane	N/A	0	1	3	2.0	2.0	2.0	001W001601
Chlorobenzene	N/A	0	2	3	1.0	1.0	1.0	041W160101

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 10-5-7
Wetland 16 Phase IV
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
Metals (g/L)								
Aluminum	2,927.5	0	1	1	500.0	500.0	500.0	041W150102
Antimony	4.15	1	1	1	11.0	11.0	11.0	041W150102
Arsenic	3.6	1	1	1	5.5	5.5	5.5	041W150102
Barium	9.4	1	1	1	43.0	43.0	43.0	041W150102
Beryllium	0.82	0	1	1	0.67	0.67	0.67	041W150102
Calcium	76,800.0	1	1	1	180,000.0	180,000.0	180,000.0	041W150102
Chromium	10.87	0	1	1	2.5	2.5	2.5	041W150102
Iron	1,352.0	1	1	1	2,600.0	2,600.0	2,600.0	041W150102
Magnesium	243,650.0	1	1	1	480,000.0	480,000.0	480,000.0	041W150102
Manganese	12.15	1	1	1	210.0	210.0	210.0	041W150102
Potassium	81,250.0	1	1	1	200,000.0	200,000.0	200,000.0	041W150102
Sodium	1,952,000.0	1	1	1	3,600,000.0	3,600,000.0	3,600,000.0	041W150102
Thallium	2.55	1	1	1	17.0	17.0	17.0	041W150102
Vanadium	6.69	0	1	1	2.3	2.3	2.3	041W150102
Zinc	12.88	1	1	1	13.0	13.0	13.0	041W150102

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 10-5-8
Wetland 16 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SQL	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	4	4			255	8,880	041M160301	8,880			N/A		Yes	No SV
Antimony	0	1	5.5	5.5			ND	5.5	U	12	2	0.46	No	Max SQL< SV
Arsenic	**4**	**4**			**0.72**	**10.9**	**041M160301**	**10.9**		**7.24**	**1, 2**	**1.51**	**Yes**	**Max Detect > SV**
Barium	3	4	0.345	0.345	2.3	8.1	041M160301	8.1	J		N/A		Yes	No SV
Beryllium	2	4	0.035	0.2	0.18	0.47	041M160301	0.47	J		N/A		Yes	No SV
Cadmium	**2**	**4**	**0.095**	**0.6**	**0.61**	**8.5**	**041M160301**	**8.5**		**0.676**	**1**	**12.6**	**Yes**	**Max Detect > SV**
Calcium	4	4			53.9	2090	041M160301	2,090			N/A		Yes	No SV
Chromium	**4**	**4**			**1.9**	**78.4**	**041M160301**	**78.4**		**52.3**	**1, 2**	**1.5**	**Yes**	**Max Detect > SV**
Cobalt	2	4	0.095	0.75	0.7	1.7	041M160301	1.7	J		N/A		Yes	No SV
Copper	**3**	**4**	**1.95**	**1.95**	**1.4**	**90.8**	**041M160301**	**90.8**		**18.7**	**1, 2**	**4.86**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	4	0.295	1.3			ND	1.3	U		N/A		Yes	No SV
Iron	4	4			1,330	39,500	041M160301	39,500			N/A		Yes	No SV
Lead	**4**	**4**			**2.1**	**182**	**041M160301**	**182**		**30.2**	**1, 2**	**6.03**	**Yes**	**Max Detect > SV**
Magnesium	4	4			109	3,830	041M160301	3,830			N/A		Yes	No SV
Manganese	4	4			1.4	211	041M160301	211			N/A		Yes	No SV
Mercury	**1**	**4**	**0.025**	**0.09**	**0.41**	**0.41**	**041M160301**	**0.41**	**J**	**0.13**	**1, 2**	**3.15**	**Yes**	**Max Detect > SV**
Nickel	2	4	0.39	7.25	1.9	8.4	041M160301	8.4	J	15.9	1, 2	0.53	No	Max Detect < SV
Potassium	3	4	465	465	42.9	1,580	041M160301	1,580			N/A		Yes	No SV
Selenium	2	4	0.095	0.7	0.4	0.84	041M160301	0.84	J		N/A		Yes	No SV
Silver	**1**	**4**	**0.13**	**0.75**	**1.8**	**1.8**	**041M160301**	**1.8**	**J**	**0.733**	**1**	**2.46**	**Yes**	**Max Detect > SV**
Sodium	4	4			480	12,300	041M160301	12,300			N/A		Yes	No SV
Thallium	0	4	0.095	0.65			ND	0.65	U		N/A		Yes	No SV
Vanadium	4	4			1.2	34	041M160301	34			N/A		Yes	No SV
Zinc	**4**	**4**			**2.5**	**319**	**041M160301**	**319**		**124**	**1, 2**	**2.57**	**Yes**	**Max Detect > SV**
PAHs (g/kg)														
2-Methylnaphthalene	0	4	20	310			ND	310	U	20.2	1	15.3	No	TOC normalized PAHs < TEC
Acenaphthene	0	4	10	310			ND	310	U	6.71	1	46.2	No	TOC normalized PAHs < TEC
Acenaphthylene	0	4	20	310			ND	310	U	5.87	1	52.8	No	TOC normalized PAHs < TEC
Anthracene	0	4	20	310			ND	310	U	46.9	1	6.61	No	TOC normalized PAHs < TEC
Benzo(a)anthracene	0	4	20	310			ND	310	U	74.8	1	4.14	No	TOC normalized PAHs < TEC
Benzo(a)pyrene	0	4	20	310			ND	310	U	88.8	1	3.49	No	TOC normalized PAHs < TEC
Chrysene	0	4	20	310			ND	310	U	108	1	2.87	No	TOC normalized PAHs < TEC
Dibenz(a,h)anthracene	0	4	20	310			ND	310	U	6.22	1	49.8	No	TOC normalized PAHs < TEC
Fluoranthene	2	4	20	310	58	100	041M160301	100	J	113	1	0.89	No	TOC normalized PAHs < TEC
Fluorene	0	4	10	310			ND	310	U	21.2	1	14.6	No	TOC normalized PAHs < TEC
Naphthalene	0	4	20	310			ND	310	U	34.6	1	8.96	No	TOC normalized PAHs < TEC
Phenanthrene	0	4	20	310			ND	310	U	86.7	1	3.58	No	TOC normalized PAHs < TEC
Pyrene	2	4	20	310	45	110	041M160301	110	J	153	1	0.72	No	TOC normalized PAHs < TEC
Total PAHs	2	4	240	4030	422	1,060	041M160301	1,060		1,684	1, 2	0.63	No	TOC normalized PAHs < TEC
TOC Normalized PAHs	2	4	166.67	2,799	19.13	33.49	041M160201	33.49		290	3	0.115	No	Max Detect < SV
PCBs (g/kg)														
Aroclor-1016	0	4	1.05	30.5			ND	30.5	U	21.6	N/A	1.41	Yes	Max SQL> SV
Aroclor-1221	0	4	2	60			ND	60	U	67	2	0.90	No	Max SQL< SV
Aroclor-1232	0	4	1.05	30.5			ND	30.5	U	21.6	N/A	1.41	Yes	Max SQL> SV
Aroclor-1242	0	4	1.05	30.5			ND	30.5	U	21.6	N/A	1.41	Yes	Max SQL> SV
Aroclor-1248	0	4	1.05	30.5			ND	30.5	U	21.6	N/A	1.41	Yes	Max SQL> SV
Aroclor-1254	**3**	**4**	**30.5**	**30.5**	**2.1**	**78**	**041M160301**	**78**	**J**	**21.6**	**N/A**	**3.61**	**Yes**	**Max Detect > SV**
Aroclor-1260	0	4	1.05	30.5			ND	30.5	U	21.6	N/A	1.41	Yes	Max SQL> SV
Total PCBs	**3**	**4**	**243**	**243**	**9.35**	**109**	**041M160301**	**109**		**21.6**	**1**	**5.02**	**Yes**	**Max Detect > SV**
Pesticides (g/kg)														
Aldrin	0	4	0.05	1.6			ND	1.6	U		N/A		Yes	No SV
Dieldrin	**2**	**4**	**0.105**	**3.05**	**0.35**	**4.2**	**041M160301**	**4.2**	**J**	**0.716**	**1**	**5.87**	**Yes**	**Max Detect > SV**
Endosulfan I	0	4	0.05	1.6			ND	1.6	U		N/A		Yes	No SV
Endosulfan II	0	4	0.105	3.05			ND	3.05	U		N/A		Yes	No SV
Endosulfan sulfate	0	4	0.105	3.05			ND	3.05	U		N/A		Yes	No SV
Heptachlor	0	4	0.05	1.6			ND	1.6	U		N/A		Yes	No SV
Heptachlor epoxide	0	4	0.05	1.6			ND	1.6	U		N/A		Yes	No SV
Methoxychlor	0	4	0.5	16			ND	16	U		N/A		Yes	No SV
Toxaphene	0	4	5	160			ND	160	U		N/A		Yes	No SV
alpha-Chlordane	1	4	0.05	1.6	0.47	0.47	041M160301	0.47	J	1.7	1	0.28	No	Max Detect < SV

Table 10-5-8
Wetland 16 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SQL	Retained for Refinement	Rationale
Pesticides (g/kg) - cont.														
gamma-Chlordane	0	4	0.05	1.6			ND	1.6	U	1.7	1	0.94	No	Max SQL< SV
Total Chlordane	1	4	0.1	3.2	0.685	0.685	041M160301	0.685		1.7	1	0.40	No	Max Detect < SV
Endrin	0	4	0.105	3.05			ND	3.05	U	3.3	2	0.92	No	Max SQL< SV
Endrin aldehyde	0	4	0.105	3.05			ND	3.05	U	3.3	2	0.92	No	Max SQL< SV
Endrin ketone	0	4	0.105	3.05			ND	3.05	U	3.3	2	0.92	No	Max SQL< SV
Total Endrin	0	4	0.315	9.15			ND	9.15	U	3.3	2	2.77	Yes	Max SQL> SV
alpha-BHC	0	4	0.05	1.6			ND	1.6	U		N/A		Yes	No SV
beta-BHC	0	4	0.05	1.6			ND	1.6	U	0.32	N/A	5	Yes	Max SQL> SV
delta-BHC	0	4	0.05	1.6			ND	1.6	U	0.32	N/A	5	Yes	Max SQL> SV
gamma-BHC (Lindane)	0	4	0.05	1.6			ND	1.6	U	0.32	1	5	Yes	Max SQL> SV
Total BHC	0	4	0.2	6.4			ND	6.4	U	0.32	2	20	Yes	Max SQL> SV
4,4'-DDD	**4**	**4**			**0.27**	**4.8**	**041M160301**	**4.8**	**J**	**1.22**	**1**	**3.93**	**Yes**	**Max Detect > SV**
4,4'-DDE	**3**	**4**	**3.05**	**3.05**	**0.3**	**26**	**041M160301**	**26**	**J**	**2.07**	**1**	**12.6**	**Yes**	**Max Detect > SV**
4,4'-DDT	**1**	**4**	**0.105**	**3.05**	**2.8**	**2.8**	**041M160301**	**2.8**	**J**	**1.19**	**1**	**2.35**	**Yes**	**Max Detect > SV**
Total DDT	**4**	**4**			**0.675**	**33.6**	**041M160301**	**33.6**		**3.3**	**2**	**10.2**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	4	200	850			ND	850	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	4	200	850			ND	850	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	4	200	850			ND	850	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	4	200	850			ND	850	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	4	200	850			ND	850	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	4	490	2,050			ND	2,050	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	4	200	850			ND	850	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	4	200	850			ND	850	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	4	200	850			ND	850	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	4	490	2,050			ND	2,050	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	4	200	850			ND	850	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	4	200	850			ND	850	U		N/A		Yes	No SV
2-Chloronaphthalene	0	4	200	850			ND	850	U		N/A		Yes	No SV
2-Chlorophenol	0	4	200	850			ND	850	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	4	490	2,050			ND	2050	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	4	200	850			ND	850	U		N/A		Yes	No SV
2-Nitroaniline	0	4	200	850			ND	850	U		N/A		Yes	No SV
2-Nitrophenol	0	4	200	850			ND	850	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	4	200	850			ND	850	U		N/A		Yes	No SV
3-Nitroaniline	0	4	490	2,050			ND	2,050	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	4	200	850			ND	850	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	4	200	850			ND	850	U		N/A		Yes	No SV
4-Chloroaniline	0	1	310	310			ND	310	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	4	200	850			ND	850	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	0	4	200	850			ND	850	U		N/A		Yes	No SV
4-Nitroaniline	0	4	490	2,050			ND	2,050	U		N/A		Yes	No SV
4-Nitrophenol	0	4	490	2,050			ND	2050	U		N/A		Yes	No SV
Benzo(b)fluoranthene	1	4	20	310	100	100	041M160301	100	J		N/A		No	TOC normalized PAHs < TEC
Benzo(g,h,i)perylene	0	4	20	310			ND	310	U		N/A		No	TOC normalized PAHs < TEC
Benzo(k)fluoranthene	0	4	20	310			ND	310	U		N/A		No	TOC normalized PAHs < TEC
bis(2-Chloroethoxy)methane	0	4	200	850			ND	850	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	4	20	310			ND	310	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**3**	**4**	**310**	**310**	**110**	**720**	**041M160301**	**720**	**J**	**182**	**1, 2**	**3.96**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	1	4	310	850	31	31	041M160101	31	J	182	1, 2	0.17	No	Max Detect < SV
Carbazole	0	4	200	850			ND	850	U		N/A		Yes	No SV
Dibenzofuran	0	4	200	850			ND	850	U		N/A		Yes	No SV
Diethylphthalate	1	4	200	850	90	90	041M160201	90	J	182	1, 2	0.50	No	Max Detect < SV
Dimethylphthalate	0	4	200	850			ND	850	U	182	1, 2	4.67	Yes	Max SQL > SV
Di-n-butylphthalate	1	4	200	850	34	34	041M160201	34	J	182	1, 2	0.19	No	Max Detect < SV
Di-n-octylphthalate	0	4	200	850			ND	850	U	182	1, 2	4.67	Yes	Max SQL > SV
Hexachlorobenzene	0	4	200	850			ND	850	U		N/A		Yes	No SV
Hexachlorobutadiene	0	4	200	850			ND	850	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	4	200	850			ND	850	UJ		N/A		Yes	No SV
Hexachloroethane	0	4	200	850			ND	850	U		N/A		Yes	No SV

Table 10-5-8
Wetland 16 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SQL	Retained for Refinement	Rationale
SVOCs (g/kg)														
Indeno(1,2,3-cd)pyrene	0	4	20	310			ND	310	U		N/A		No	TOC normalized PAHs < TEC
Isophorone	0	4	200	850			ND	850	U		N/A		Yes	No SV
Nitrobenzene	0	4	200	850			ND	850	U		N/A		Yes	No SV
N-Nitroso-di-n-propylaMine	0	4	20	310			ND	310	U		N/A		Yes	No SV
N-NitrosodiphenylaMine	0	4	200	850			ND	850	U		N/A		Yes	No SV
Pentachlorophenol	0	4	490	2,050			ND	2050	U		N/A		Yes	No SV
Phenol	0	4	200	850			ND	850	U		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
1,1-Dichloroethane	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
1,2-Dichloropropane	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
2-Butanone (MEK)	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
2-Hexanone	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Acetone	0	4	6	165			ND	165	U		N/A		Yes	No SV
Benzene	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Bromodichloromethane	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Bromoform	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Bromomethane	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Carbon disulfide	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Carbon tetrachloride	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Chlorobenzene	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Chloroethane	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Chloroform	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Chloromethane	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Dibromochloromethane	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Ethylbenzene	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Methylene chloride	1	4	6	27.5	110	110	041M160301	110			N/A		Yes	No SV
Styrene	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Tetrachloroethene	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Toluene	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV
Vinyl chloride	0	4	2	9.5			ND	9.5	U		N/A		Yes	No SV
Xylene (Total)	0	4	6	22.5			ND	22.5	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 10-5-9
Wetland 16 Phase II
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDD	bis(2-Ethylhexyl)phthalate (BEHP)	Methylene chloride
Arsenic	4,4'-DDE		
Barium	4,4'-DDT		
Beryllium	Dieldrin		
Cadmium	Total DDT		
Calcium	Aroclor-1254		
Chromium	Total PCBs		
Cobalt			
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Mercury			
Potassium			
Selenium			
Silver			
Sodium			
Vanadium			
Zinc			
		Not Detected Parameters	
Cyanide (CN)	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Thallium	Endosulfan I	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
	Endosulfan II	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Endosulfan sulfate	1,4-Dichlorobenzene	1,1-Dichloroethane
	Heptachlor	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Heptachlor epoxide	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Methoxychlor	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
	Toxaphene	2,4-Dichlorophenol	1,2-Dichloropropane
	alpha-BHC	2,4-Dimethylphenol	2-Butanone (MEK)
	beta-BHC	2,4-Dinitrophenol	2-Hexanone
	delta-BHC	2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
	gamma-BHC (Lindane)	2,6-Dinitrotoluene	Acetone
	Total BHC	2-Chloronaphthalene	Benzene
	Total Endrin	2-Chlorophenol	Bromodichloromethane
	Aroclor-1016	2-Methyl-4,6-Dinitrophenol	Bromoform
	Aroclor-1232	2-Methylnaphthalene	Bromomethane
	Aroclor-1242	2-Methylphenol (o-Cresol)	Carbon disulfide
	Aroclor-1248	2-Nitroaniline	Carbon tetrachloride
	Aroclor-1260	2-Nitrophenol	Chlorobenzene
		3,3'-Dichlorobenzidine	Chloroethane
		3-Nitroaniline	Chloroform
		4-Bromophenyl-phenylether	Chloromethane
		4-Chloro-3-methylphenol	cis-1,3-Dichloropropene
		4-Chloroaniline	Dibromochloromethane
		4-Chlorophenylphenyl ether	Ethylbenzene
		4-Methylphenol (p-Cresol)	Styrene
		4-Nitroaniline	Tetrachloroethene
		4-Nitrophenol	Toluene
		bis(2-Chloroethoxy)methane	trans-1,3-Dichloropropene
		bis(2-Chloroethyl)ether	Trichloroethene
		Carbazole	Vinyl chloride
		Dibenzofuran	Xylene (Total)
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 10-5-10
Wetland 16 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	4	4				4,350	255	8,880	8,880		041M160301			NA					0	4,274	2	Yes	EPC > RC and no RV
Arsenic	4	4				3.63	0.72	10.9	10.9		041M160301	7.24	41.6	PEL	1.51	0.50	0.26	0.09	0	2.14	1	No	EPC > RC, but < RV
Barium	3	4	0.345	0.345	0.345	3.74	2.3	8.1	8.1	J	041M160301			NA					0	3.84	2	Yes	EPC > RC and no RV
Beryllium	2	4	0.118	0.035	0.2	0.221	0.18	0.47	0.47	J	041M160301			NA					0	0.13	3	Yes	EPC > RC and no RV
Cadmium	**2**	**4**	**0.347**	**0.095**	**0.6**	**2.45**	**0.61**	**8.5**	**8.5**		**041M160301**	**0.68**	**4.21**	**PEL**	**12.6**	**3.63**	**2.02**	**0.58**	**1**	**0.39**	**3**	**Yes**	**EPC > RV and RC**
Calcium	4	4				781	53.9	2,090	2,090		041M160301			NA					0	1,978.80	1	No	Essential Nutrient
Chromium	4	4				27.4	1.9	78.4	78.4		041M160301	52.3	160	PEL	1.5	0.52	0.49	0.17	0	13.1	2	No	EPC > RC, but < RV
Cobalt	2	4	0.422	0.095	0.75	0.811	0.7	1.7	1.7	J	041M160301			NA					0	0.91	1	Yes	EPC > RC and no RV
Copper	3	4	1.95	1.95	1.95	24.9	1.4	90.8	90.8		041M160301	18.7	108	PEL	4.86	1.33	0.84	0.23	0	8.44	1	No	EPC > RC, but < RV
Cyanide (CN)	0	4	0.637	0.295	1.3	0.637			1.3	U	ND			NA					0	1.29	0	No	Parameter Not Detected
Iron	4	4				12,700	1330	39,500	39,500		041M160301			NA					0	2,684.40	3	Yes	EPC > RC and no RV
Lead	**4**	**4**				**50.5**	**2.1**	**182**	**182**		**041M160301**	**30.2**	**112**	**PEL**	**6.03**	**1.67**	**1.63**	**0.45**	**1**	**21.04**	**1**	**Yes**	**EPC > RV and RC**
Magnesium	4	4				1,600	109	3,830	3,830		041M160301			NA					0	2,943.60	1	No	Essential Nutrient
Manganese	4	4				62.7	1.4	211	211		041M160301			NA					0	9.81	3	Yes	EPC > RC and no RV
Mercury	1	4	0.055	0.025	0.09	0.144	0.41	0.41	0.41	J	041M160301	0.13	0.696	PEL	3.15	1.11	0.59	0.21	0	0.11	1	No	EPC > RC, but < RV
Potassium	3	4	465	465	465	650	42.9	1,580	1,580		041M160301			NA					0	899.72	1	No	Essential Nutrient
Selenium	2	4	0.398	0.095	0.7	0.509	0.4	0.84	0.84	J	041M160301			NA					0	0.66	2	Yes	EPC > RC and no RV
Silver	**1**	**4**	**0.368**	**0.13**	**0.75**	**0.726**	**1.8**	**1.8**	**1.8**	**J**	**041M160301**	**0.73**	**1.77**	**PEL**	**2.46**	**0.99**	**1.02**	**0.41**	**1**	**0.52**	**2**	**Yes**	**EPC > RV and RC**
Sodium	4	4				4,510	480	12,300	12,300		041M160301			NA					0	11,439.60	1	No	Essential Nutrient
Thallium	0	4	0.329	0.095	0.65	0.329			0.65	U	ND			NA					0	0.39	0	No	Parameter Not Detected
Vanadium	4	4				12	1.2	34	34		041M160301			NA					0	8.59	1	Yes	EPC > RC and no RV
Zinc	**4**	**4**				**90.8**	**2.5**	**319**	**319**		**041M160301**	**124**	**271**	**PEL**	**2.57**	**0.73**	**1.18**	**0.34**	**1**	**14.36**	**2**	**Yes**	**EPC > RV and RC**
PCBs (g/kg)																							
Aroclor-1016	0	4	9.4	1.05	30.5	9.4			30.5	U	ND	21.6	189	PEL	1.41	0.44	0.16	0.05	0		0	No	Parameter Not Detected
Aroclor-1221	0	4	18.4	2	60	18.4			60	U	ND	67	189	PEL	0.90	0.28	0.32	0.10	0		0	No	Parameter Not Detected
Aroclor-1232	0	4	9.4	1.05	30.5	9.4			30.5	U	ND	21.6	189	PEL	1.41	0.44	0.16	0.05	0		0	No	Parameter Not Detected
Aroclor-1242	0	4	9.4	1.05	30.5	9.4			30.5	U	ND	21.6	189	PEL	1.41	0.44	0.16	0.05	0		0	No	Parameter Not Detected
Aroclor-1248	0	4	9.4	1.05	30.5	9.4			30.5	U	ND	21.6	189	PEL	1.41	0.44	0.16	0.05	0		0	No	Parameter Not Detected
Aroclor-1254	3	4	30.5	30.5	30.5	30.4	2.1	78	78	J	041M160301	21.6	189	PEL	3.61	1.41	0.41	0.16	0		0	No	RV HQ <1 and no RC
Aroclor-1260	0	4	9.4	1.05	30.5	9.4			30.5	U	ND	21.6	189	PEL	1.41	0.44	0.16	0.05	0		0	No	Parameter Not Detected
Total PCBs	3	4	243	243	243	95.8	9.35	109	109		041M160301	21.6	189	PEL	5.02	4.44	0.57	0.51	0		0	No	RV HQ <1 and no RC
Pesticides (g/kg)																							
Aldrin	0	4	0.486	0.05	1.6	0.486			1.6	U	ND			NA					0		0	No	Parameter Not Detected
Dieldrin	2	4	1.58	0.105	3.05	1.93	0.35	4.2	4.2	J	041M160301	0.716	4.3	PEL	5.87	2.69	0.98	0.45	0		0	No	RV HQ <1 and no RC
Endosulfan I	0	4	0.486	0.05	1.6	0.486			1.6	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	4	0.94	0.105	3.05	0.94			3.05	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	0	4	0.94	0.105	3.05	0.94			3.05	U	ND			NA					0		0	No	Parameter Not Detected
Endrin	0	4	0.94	0.105	3.05	0.94			3.05	U	ND	3.3		NA	0.92	0.31			0		0	No	Parameter Not Detected
Endrin aldehyde	0	4	0.94	0.105	3.05	0.94			3.05	U	ND	3.3		NA	0.92	0.31			0		0	No	Parameter Not Detected
Endrin ketone	0	4	0.94	0.105	3.05	0.94			3.05	U	ND	3.3		NA	0.92	0.31			0		0	No	Parameter Not Detected
Total Endrin	0	4	2.82	0.315	9.15	2.82			9.15	U	ND	3.3		NA	2.77	0.85			0		0	No	Parameter Not Detected
Heptachlor	0	4	0.486	0.05	1.6	0.486			1.6	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	4	0.486	0.05	1.6	0.486			1.6	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	4	4.86	0.5	16	4.86			16	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	4	48.6	5	160	48.6			160	U	ND			NA					0		0	No	Parameter Not Detected
alpha-BHC	0	4	0.486	0.05	1.6	0.486			1.6	U	ND		0.99	PEL			1.62	0.49	0		0	No	Parameter Not Detected; Max SQL > RV
beta-BHC	0	4	0.486	0.05	1.6	0.486			1.6	U	ND	0.32	0.99	PEL	5	1.52	1.62	0.49	0		0	No	Parameter Not Detected; Max SQL > RV
delta-BHC	0	4	0.486	0.05	1.6	0.486			1.6	U	ND	0.32	0.99	PEL	5	1.52	1.62	0.49	0		0	No	Parameter Not Detected; Max SQL > RV
gamma-BHC (Lindane)	0	4	0.486	0.05	1.6	0.486			1.6	U	ND	0.32	0.99	PEL	5	1.52	1.62	0.49	0		0	No	Parameter Not Detected; Max SQL > RV
Total BHC	0	4	1.95	0.2	6.4	1.95			6.4	U	ND	0.32	0.99	PEL	20	6.08	6.46	1.96	0		0	No	Parameter Not Detected; Max SQL > RV
4,4'-DDD	4	4				1.74	0.27	4.8	4.8	J	041M160301	1.22	7.81	PEL	3.93	1.43	0.62	0.22	0	50	0	No	EPC < RC and RV
4,4'-DDE	3	4	3.05	3.05	3.05	8.11	0.3	26	26	J	041M160301	2.07	374	PEL	12.6	3.92	0.07	0.02	0	40	0	No	EPC < RC and RV
4,4'-DDT	1	4	1.11	0.105	3.05	1.53	2.8	2.8	2.8	J	041M160301	1.19	4.77	PEL	2.35	1.29	0.59	0.32	0	20	0	No	EPC < RC and RV
Total DDT	4	4				11.4	0.675	33.6	33.6		041M160301	3.3	51.7	PEL	10.2	3.45	0.65	0.22	0	110	0	No	EPC < RC and RV
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	4	1,010	490	2,050	1,010			2,050	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	4	1,010	490	2,050	1,010			2,050	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	4	1,010	490	2,050	1,010			2,050	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	4	530	200	850	530			850	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	4	1,010	490	2,050	1,010			2,050	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	1	310	310	310	310			310	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected

Table 10-5-10
Wetland 16 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg)																							
4-Methylphenol (p-Cresol)	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	4	1,010	490	2,050	1,010			2,050	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	4	1,010	490	2,050	1,010			2,050	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	4	112	20	310	112			310	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	3	4	310	310	310	330	110	720	720	J	041M160301	182	2647	PEL	3.96	1.81	0.27	0.13	0		0	No	RV HQ <1 and no RC
Carbazole	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
Dimethylphthalate	0	4	420	200	850	420			850	U	ND	182	2647	PEL	4.67	2.31	0.32	0.16	0		0	No	Parameter Not Detected
Di-n-octylphthalate	0	4	420	200	850	420			850	U	ND	182	2647	PEL	4.67	2.31	0.32	0.16	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	4	420	200	850	420			850	UJ	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	4	112	20	310	112			310	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	4	1,010	490	2,050	1,010			2,050	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	4	420	200	850	420			850	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Hexanone	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	0	4	65.3	6	165	65.3			165	U	ND			NA					0		0	No	Parameter Not Detected
Benzene	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroethane	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	1	4	14.5	6	27.5	38.4	110	110	110		041M160301			NA					0		0	No	No SV, no RV, and no RC
Styrene	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	4	5.25	2	9.5	5.25			9.5	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	4	11.6	6	22.5	11.6			22.5	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 10-5-11
Wetland 16 Phase II
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	None	None
Barium			
Beryllium			
Cadmium			
Cobalt			
Iron			
Lead			
Manganese			
Selenium			
Silver			
Vanadium			
Zinc			

Table 10-5-12
Wetland 16 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
001M001601	6/29/1994	mg/kg	1.4	J	Arsenic	8.2	70	0.02
001M001601	6/29/1994	mg/kg	0.6	U	Cadmium	1.2	9.6	0.06
001M001601	6/29/1994	mg/kg	10.3		Chromium	81	370	0.03
001M001601	6/29/1994	mg/kg	1.95	U	Copper	34	270	0.01
001M001601	6/29/1994	mg/kg	4.1	J	Lead	46.7	218	0.02
001M001601	6/29/1994	mg/kg	0.09	U	Mercury	0.15	0.71	0.13
001M001601	6/29/1994	mg/kg	7.25	U	Nickel	20.9	51.6	0.14
001M001601	6/29/1994	mg/kg	0.75	U	Silver	1	3.7	0.20
001M001601	6/29/1994	mg/kg	12.2		Zinc	150	410	0.03
001M001601	6/29/1994	g/kg	3.05	U	4,4'-DDE	2.2	27	0.11
001M001601	6/29/1994	g/kg	3.05	U	4,4'-DDT	1.58	46.1	0.07
001M001601	6/29/1994	g/kg	243	U	Total PCBs	22.7	180	1.35
001M001601	6/29/1994	g/kg	310	U	2-Methylnaphthalene	70	670	0.46
001M001601	6/29/1994	g/kg	310	U	Acenaphthene	16	500	0.62
001M001601	6/29/1994	g/kg	310	U	Acenaphthylene	44	640	0.48
001M001601	6/29/1994	g/kg	310	U	Anthracene	85.3	1,100	0.28
001M001601	6/29/1994	g/kg	310	U	Benzo(a)anthracene	261	1,600	0.19
001M001601	6/29/1994	g/kg	310	U	Benzo(a)pyrene	430	1,600	0.19
001M001601	6/29/1994	g/kg	310	U	Chrysene	384	2,800	0.11
001M001601	6/29/1994	g/kg	310	U	Dibenz(a,h)anthracene	63.4	260	1.19
001M001601	6/29/1994	g/kg	310	U	Fluoranthene	600	5,100	0.06
001M001601	6/29/1994	g/kg	310	U	Fluorene	19	540	0.57
001M001601	6/29/1994	g/kg	310	U	Naphthalene	160	2,100	0.15
001M001601	6/29/1994	g/kg	310	U	Phenanthrene	240	1,500	0.21
001M001601	6/29/1994	g/kg	310	U	Pyrene	665	2,600	0.12
001M001601	6/29/1994				ERM Quotient Sum			6.81
001M001601	6/29/1994				Mean ERM Quotient			0.27
001M001601	6/29/1994				Mean ERM Quotient without ND			0.00
001M001601	6/29/1994				Mean ERM Quotient Category			1
041M160101	12/7/1995	mg/kg	0.72		Arsenic	8.2	70	0.01
041M160101	12/7/1995	mg/kg	0.095	U	Cadmium	1.2	9.6	0.01
041M160101	12/7/1995	mg/kg	1.9		Chromium	81	370	0.01
041M160101	12/7/1995	mg/kg	1.4	J	Copper	34	270	0.01
041M160101	12/7/1995	mg/kg	2.1		Lead	46.7	218	0.01
041M160101	12/7/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M160101	12/7/1995	mg/kg	0.39	U	Nickel	20.9	51.6	0.01
041M160101	12/7/1995	mg/kg	0.13	U	Silver	1	3.7	0.04
041M160101	12/7/1995	mg/kg	2.5		Zinc	150	410	0.01
041M160101	12/7/1995	g/kg	0.3	J	4,4'-DDE	2.2	27	0.01
041M160101	12/7/1995	g/kg	0.105	U	4,4'-DDT	1.58	46.1	0.00
041M160101	12/7/1995	g/kg	9.35		Total PCBs	22.7	180	0.05
041M160101	12/7/1995	g/kg	20	UJ	2-Methylnaphthalene	70	670	0.03
041M160101	12/7/1995	g/kg	10	U	Acenaphthene	16	500	0.02
041M160101	12/7/1995	g/kg	20	U	Acenaphthylene	44	640	0.03
041M160101	12/7/1995	g/kg	20	U	Anthracene	85.3	1,100	0.02
041M160101	12/7/1995	g/kg	20	U	Benzo(a)anthracene	261	1,600	0.01
041M160101	12/7/1995	g/kg	20	U	Benzo(a)pyrene	430	1,600	0.01
041M160101	12/7/1995	g/kg	20	U	Chrysene	384	2,800	0.01
041M160101	12/7/1995	g/kg	20	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M160101	12/7/1995	g/kg	20	U	Fluoranthene	600	5,100	0.00
041M160101	12/7/1995	g/kg	10	U	Fluorene	19	540	0.02
041M160101	12/7/1995	g/kg	20	U	Naphthalene	160	2,100	0.01
041M160101	12/7/1995	g/kg	20	U	Phenanthrene	240	1,500	0.01
041M160101	12/7/1995	g/kg	20	U	Pyrene	665	2,600	0.01
041M160101	12/7/1995				ERM Quotient Sum			0.45
041M160101	12/7/1995				Mean ERM Quotient			0.02
041M160101	12/7/1995				Mean ERM Quotient without ND			0.00
041M160101	12/7/1995				Mean ERM Quotient Category			1
041M160201	12/7/1995	mg/kg	1.5		Arsenic	8.2	70	0.02
041M160201	12/7/1995	mg/kg	0.61		Cadmium	1.2	9.6	0.06
041M160201	12/7/1995	mg/kg	19.1		Chromium	81	370	0.05
041M160201	12/7/1995	mg/kg	5.3		Copper	34	270	0.02
041M160201	12/7/1995	mg/kg	14		Lead	46.7	218	0.06
041M160201	12/7/1995	mg/kg	0.05	U	Mercury	0.15	0.71	0.07
041M160201	12/7/1995	mg/kg	1.9	J	Nickel	20.9	51.6	0.04
041M160201	12/7/1995	mg/kg	0.225	U	Silver	1	3.7	0.06
041M160201	12/7/1995	mg/kg	29.5		Zinc	150	410	0.07
041M160201	12/7/1995	g/kg	3.1	J	4,4'-DDE	2.2	27	0.11
041M160201	12/7/1995	g/kg	0.165	U	4,4'-DDT	1.58	46.1	0.00
041M160201	12/7/1995	g/kg	22.45		Total PCBs	22.7	180	0.12
041M160201	12/7/1995	g/kg	32	U	2-Methylnaphthalene	70	670	0.05
041M160201	12/7/1995	g/kg	15.5	U	Acenaphthene	16	500	0.03
041M160201	12/7/1995	g/kg	32	U	Acenaphthylene	44	640	0.05
041M160201	12/7/1995	g/kg	32	U	Anthracene	85.3	1,100	0.03
041M160201	12/7/1995	g/kg	32	U	Benzo(a)anthracene	261	1,600	0.02
041M160201	12/7/1995	g/kg	32	U	Benzo(a)pyrene	430	1,600	0.02
041M160201	12/7/1995	g/kg	32	U	Chrysene	384	2,800	0.01
041M160201	12/7/1995	g/kg	32	U	Dibenz(a,h)anthracene	63.4	260	0.12
041M160201	12/7/1995	g/kg	58	J	Fluoranthene	600	5,100	0.01
041M160201	12/7/1995	g/kg	15.5	U	Fluorene	19	540	0.03
041M160201	12/7/1995	g/kg	32	U	Naphthalene	160	2,100	0.02
041M160201	12/7/1995	g/kg	32	U	Phenanthrene	240	1,500	0.02
041M160201	12/7/1995	g/kg	45	J	Pyrene	665	2,600	0.02
041M160201	12/7/1995				ERM Quotient Sum			1.13
041M160201	12/7/1995				Mean ERM Quotient			0.05
041M160201	12/7/1995				Mean ERM Quotient without ND			0.02
041M160201	12/7/1995				Mean ERM Quotient Category			2

Table 10-5-12
Wetland 16 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M160301	12/7/1995	mg/kg	10.9		Arsenic	8.2	70	0.16
041M160301	12/7/1995	mg/kg	8.5		Cadmium	1.2	9.6	0.89
041M160301	12/7/1995	mg/kg	78.4		Chromium	81	370	0.21
041M160301	12/7/1995	mg/kg	90.8		Copper	34	270	0.34
041M160301	12/7/1995	mg/kg	182		Lead	46.7	218	0.83
041M160301	12/7/1995	mg/kg	0.41	J	Mercury	0.15	0.71	0.58
041M160301	12/7/1995	mg/kg	8.4	J	Nickel	20.9	51.6	0.16
041M160301	12/7/1995	mg/kg	1.8	J	Silver	1	3.7	0.49
041M160301	12/7/1995	mg/kg	319		Zinc	150	410	0.78
041M160301	12/7/1995	g/kg	26	J	4,4'-DDE	2.2	27	0.96
041M160301	12/7/1995	g/kg	2.8	J	4,4'-DDT	1.58	46.1	0.06
041M160301	12/7/1995	g/kg	108.5		Total PCBs	22.7	180	0.60
041M160301	12/7/1995	g/kg	85	U	2-Methylnaphthalene	70	670	0.13
041M160301	12/7/1995	g/kg	41.5	U	Acenaphthene	16	500	0.08
041M160301	12/7/1995	g/kg	85	U	Acenaphthylene	44	640	0.13
041M160301	12/7/1995	g/kg	85	U	Anthracene	85.3	1,100	0.08
041M160301	12/7/1995	g/kg	85	U	Benzo(a)anthracene	261	1,600	0.05
041M160301	12/7/1995	g/kg	85	U	Benzo(a)pyrene	430	1,600	0.05
041M160301	12/7/1995	g/kg	85	U	Chrysene	384	2,800	0.03
041M160301	12/7/1995	g/kg	85	U	Dibenz(a,h)anthracene	63.4	260	0.33
041M160301	12/7/1995	g/kg	100	J	Fluoranthene	600	5,100	0.02
041M160301	12/7/1995	g/kg	41.5	U	Fluorene	19	540	0.08
041M160301	12/7/1995	g/kg	85	U	Naphthalene	160	2,100	0.04
041M160301	12/7/1995	g/kg	85	U	Phenanthrene	240	1,500	0.06
041M160301	12/7/1995	g/kg	110	J	Pyrene	665	2,600	0.04
041M160301	12/7/1995				ERM Quotient Sum			7.17
041M160301	12/7/1995				Mean ERM Quotient			0.29
041M160301	12/7/1995				Mean ERM Quotient without ND			0.24
041M160301	12/7/1995				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 10-5-13
Wetland 16 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	2	3	45.4	45.35	45.35	149	98.9	304	041W160201	304			NA		Yes	No SV
Antimony	0	3	12.7	5	27.95	12.7			ND	27.95	U		NA		Yes	No SV
Arsenic	0	3	1.13	1	1.4	1.13			ND	1.4	U	36	EPA	0.04	No	Max SQL< SV
Barium	2	3	12.6	12.55	12.55	25	30.5	31.9	041W160101	31.9	J		NA		Yes	No SV
Beryllium	0	3	0.417	0.25	0.5	0.417			ND	0.5	U		NA		Yes	No SV
Cadmium	0	3	1.77	1.5	2.3	1.77			ND	2.3	UJ	9.3	EPA	0.25	No	Max SQL< SV
Calcium	3	3				121,000	104,000	145,000	001W001601	145,000			NA		Yes	No SV
Chromium	0	3	4.2	4	4.6	4.2			ND	4.6	U	50	EPA	0.09	No	Max SQL< SV
Cobalt	0	3	2.22	1.5	3.65	2.22			ND	3.65	U		NA		Yes	No SV
Copper	0	3	2.08	2	2.25	2.08			ND	2.25	U	2.9	EPA	0.78	No	Max SQL< SV
Cyanide (CN)	0	3	3.33	2.5	5	3.33			ND	5	U	1	EPA	5	Yes	Max SQL > SV
Iron	3	3				750	414	1020	041W160201	1,020			NA		Yes	No SV
Lead	0	3	3	0.5	8	3			ND	8	UJ	8.5	EPA	0.94	No	Max SQL< SV
Magnesium	3	3				351,000	294,000	419,000	001W001601	419,000			NA		Yes	No SV
Manganese	3	3				54	50.1	56.6	001W001601	56.6			NA		Yes	No SV
Mercury	0	3	0.0767	0.065	0.1	0.0767			ND	0.1	U	0.025	EPA	4	Yes	Max SQL > SV
Nickel	0	3	6.73	6	8.2	6.73			ND	8.2	U	8.3	EPA	0.99	No	Max SQL< SV
Potassium	3	3				125,000	98,700	162,000	001W001601	162,000			NA		Yes	No SV
Selenium	0	3	1.65	1.5	1.95	1.65			ND	1.95	UJ	71	EPA	0.03	No	Max SQL< SV
Silver	0	3	1.93	1.8	2	1.93			ND	2	U	0.23	EPA	8.7	Yes	Max SQL > SV
Sodium	3	3				2,980,000	2,410,000	3,820,000	001W001601	3,820,000			NA		Yes	No SV
Thallium	**2**	**3**	**180**	**180**	**180**	**69.6**	**13.9**	**14.8**	**041W160201**	**14.8**		**6.3**	**FDEP**	**2.35**	**Yes**	**Max Detect > SV**
Vanadium	0	3	1.4	1	2.2	1.4			ND	2.2	U		NA		Yes	No SV
Zinc	2	3	4.6	4.6	4.6	6.37	7.1	7.4	041W160101	7.4	J	86	EPA	0.09	No	Max Detect < SV
Pesticides (g/L)																
Aldrin	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.0087	EPA	2.87	Yes	Max SQL > SV
Endosulfan II	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.0036	EPA	6.94	Yes	Max SQL > SV
Heptachlor epoxide	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	3	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.004	EPA	12.5	Yes	Max SQL > SV
Endrin	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	3	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.005	FDEP	5	Yes	Max SQL > SV
beta-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.016	EPA	1.56	Yes	Max SQL > SV
Total BHC	0	3	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	3	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	3	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	FDEP	35.7	Yes	Max SQL > SV
Total PCB	0	3	4	4	4	4			ND	4	U		NA		Yes	No SV

Table 10-5-13
Wetland 16 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	1	5	5	5	5			ND	5	U	19.7	EPA	0.25	No	Max SQL< SV
1,3-Dichlorobenzene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	1	5	5	5	5			ND	5	U	3	FDEP	1.67	Yes	Max SQL > SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	3	10.8	10	12.5	10.8			ND	12.5	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	3	10.8	10	12.5	10.8			ND	12.5	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
2-Chloronaphthalene	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
2-Chlorophenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	3	10.8	10	12.5	10.8			ND	12.5	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
2-Nitroaniline	0	3	5.83	2.5	12.5	5.83			ND	12.5	U		NA		Yes	No SV
2-Nitrophenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
3-Nitroaniline	0	3	10.8	10	12.5	10.8			ND	12.5	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
4-Chloroaniline	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
4-Nitroaniline	0	3	10.8	10	12.5	10.8			ND	12.5	U		NA		Yes	No SV
4-Nitrophenol	0	3	10.8	10	12.5	10.8			ND	12.5	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
Butylbenzylphthalate	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
Carbazole	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Dibenzofuran	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
Diethylphthalate	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
Dimethylphthalate	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
Di-n-butylphthalate	0	3	3.33	2.5	5	3.33			ND	5	U	3.4	EPA	1.47	No	Max SQL< SV
Di-n-octylphthalate	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
Hexachlorobenzene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Hexachlorobutadiene	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
Hexachloroethane	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Isophorone	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
Nitrobenzene	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
Pentachlorophenol	0	3	5.83	2.5	12.5	5.83			ND	12.5	U		NA		Yes	No SV
Phenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Acenaphthene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Acenaphthylene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Anthracene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Benzo(a)anthracene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Benzo(a)pyrene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Chrysene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Fluoranthene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Fluorene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Naphthalene	0	3	2	0.5	5	2			ND	5	U	23.5	EPA	0.21	No	Max SQL< SV
Phenanthrene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Pyrene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Total PAH	0	3	26	6.5	65	26			ND	65	U		NA		Yes	No SV

Table 10-5-13
Wetland 16 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
VOCs																
1,1,1-Trichloroethane	0	3	2	0.5	5	2			ND	5	U	270	FDEP	0.02	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
1,1-Dichloroethane	1	3	0.5	0.5	0.5	1	2	2	001W001601	2	J		NA		Yes	No SV
1,1-Dichloroethene	0	3	2	0.5	5	2			ND	5	U	3.2	FDEP	1.56	No	Max SQL< SV
1,2-Dibromo-3-Chloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	19.7	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
1,2-Dichloroethene (total)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
1,2-Dichloropropane	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	3	FDEP	0.17	No	Max SQL< SV
2-Butanone (MEK)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Hexanone	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	3	3.33	2.5	5	3.33			ND	5	U		NA		Yes	No SV
Acetone	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Benzene	0	3	2	0.5	5	2			ND	5	U	71.28	FDEP	0.07	No	Max SQL< SV
Bromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Bromoform	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Bromomethane	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Carbon disulfide	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Carbon tetrachloride	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Chlorobenzene	2	3	0.5	0.5	0.5	0.833	1	1	041W160101	1		17	FDEP	0.06	No	Max Detect < SV
Chloroethane	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Chloroform	0	3	2	0.5	5	2			ND	5	U	470.8	FDEP	0.01	No	Max SQL< SV
Chloromethane	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
cis-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Dibromochloromethane	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Ethylbenzene	0	3	2	0.5	5	2			ND	5	U	4.3	EPA	1.16	No	Max SQL< SV
Methylene chloride	0	3	2.67	1.5	3.5	2.67			ND	3.5	U	1,580	FDEP	0.00	No	Max SQL< SV
Styrene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Tetrachloroethene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Toluene	0	3	2	0.5	5	2			ND	5	U	37	EPA	0.135	No	Max SQL< SV
trans-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Trichloroethene	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Vinyl chloride	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV
Xylene (Total)	0	3	2	0.5	5	2			ND	5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 10-5-14
Wetland 16 Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	None	1,1-Dichloroethane
Barium			
Calcium			
Iron			
Magnesium			
Manganese			
Potassium			
Sodium			
Thallium			
		Not Detected Parameters	
Antimony	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Beryllium	Dieldrin	1,3-Dichlorobenzene	1,1,2-Trichloroethane
Cobalt	Endosulfan I	1,4-Dichlorobenzene	1,2-Dibromo-3-Chloropropane
Cyanide (CN)	Endosulfan II	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,2-Dibromoethane
Mercury	Endosulfan sulfate	2,4,5-Trichlorophenol	1,2-Dichloroethane
Silver	Heptachlor	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
Vanadium	Heptachlor epoxide	2,4-Dichlorophenol	1,2-Dichloropropane
	Methoxychlor	2,4-Dimethylphenol	1,3-Dichlorobenzene
	Toxaphene	2,4-Dinitrophenol	2-Butanone (MEK)
	alpha-Chlordane	2,4-Dinitrotoluene	2-Hexanone
	gamma-Chlordane	2,6-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
	Total Chlordane	2-Chloronaphthalene	Acetone
	Endrin	2-Chlorophenol	Bromochloromethane
	Endrin aldehyde	2-Methyl-4,6-Dinitrophenol	Bromodichloromethane
	Endrin ketone	2-Methylphenol (o-Cresol)	Bromoform
	Total Endrin	2-Nitroaniline	Bromomethane
	alpha-BHC	2-Nitrophenol	Carbon disulfide
	beta-BHC	3,3'-Dichlorobenzidine	Carbon tetrachloride
	delta-BHC	3-Nitroaniline	Chloroethane
	gamma-BHC (Lindane)	4-Bromophenyl-phenylether	Chloromethane
	Total BHC	4-Chloro-3-methylphenol	cis-1,2-Dichloroethene
	4,4'-DDD	4-Chloroaniline	cis-1,3-Dichloropropene
	4,4'-DDE	4-Chlorophenylphenyl ether	Dibromochloromethane
	4,4'-DDT	4-Methylphenol (p-Cresol)	Styrene
	Total DDT	4-Nitroaniline	Tetrachloroethene
	Aroclor-1016	4-Nitrophenol	trans-1,2-Dichloroethene
	Aroclor-1221	Benzo(b)fluoranthene	trans-1,3-Dichloropropene
	Aroclor-1232	Benzo(g,h,i)perylene	Trichloroethene
	Aroclor-1242	Benzo(k)fluoranthene	Vinyl chloride
	Aroclor-1248	bis(2-Chloroethoxy)methane	Xylene (Total)
	Aroclor-1254	bis(2-Chloroethyl)ether	
	Aroclor-1260	bis(2-Ethylhexyl)phthalate (BEHP)	
	Total PCB	Butylbenzylphthalate	
		Carbazole	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 10-5-15
Wetland 16 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maxium Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
Metals (g/L)																				
Aluminum	2	3	45.4	45.35	45.35	149	98.9	304	041W160201	304			NA			2,927.50	0	3	No	Max Result < Ref. Conc.
Antimony	0	3	12.7	5	27.95	12.7			ND	27.95	U		NA			4.15	0	3	No	Parameter Not Detected
Barium	2	3	12.6	12.55	12.55	25	30.5	31.9	041W160101	31.9	J		NA			9.43	3	3	Yes	Max Result > Ref. Conc.
Beryllium	0	3	0.417	0.25	0.5	0.417			ND	0.5	U		NA			0.82	0	3	No	Max SQL < Ref. Conc.
Calcium	3	3				121,000	104,000	145,000	001W001601	145,000			NA			76,800	3	3	No	Essential Nutrient
Cobalt	0	3	2.22	1.5	3.65	2.22			ND	3.65	U		NA			2.38	0	3	No	Parameter Not Detected
Cyanide (CN)	0	3	3.33	2.5	5	3.33			ND	5	U	1	EPA	5	3.33	4.1	0	3	No	Parameter Not Detected
Iron	3	3				750	414	1,020	041W160201	1,020			NA			1352	0	3	No	Max Result < Ref. Conc.
Magnesium	3	3				351,000	294,000	419,000	001W001601	419,000			NA			243,650	3	3	No	Essential Nutrient
Manganese	3	3				54	50.1	56.6	001W001601	56.6			NA			12.15	3	3	Yes	Max Result > Ref. Conc.
Mercury	0	3	0.0767	0.065	0.1	0.0767			ND	0.1	U	0.025	EPA	4	3.07	0.21	0	3	No	Max SQL < Ref. Conc.
Potassium	3	3				125,000	98,700	162,000	001W001601	162,000			NA			81,250	3	3	No	Essential Nutrient
Silver	0	3	1.93	1.8	2	1.93			ND	2	U	0.23	EPA	9	8.41	3.01	0	3	No	Max SQL < Ref. Conc.
Sodium	3	3				2,980,000	2,410,000	3,820,000	001W001601	3,820,000			NA			1,952,000	3	3	No	Essential Nutrient
Thallium	**2**	**3**	**180**	**180**	**180**	**69.6**	**13.9**	**14.8**	**041W160201**	**14.8**		**6.3**	**FDEP**	**2.35**	**11**	**2.55**	**3**	**3**	**Yes**	**Max Result > Ref. Conc.**
Vanadium	0	3	1.4	1	2.2	1.4			ND	2.2	U		NA			6.69	0	3	No	Max SQL < Ref. Conc.
Pesticides (g/L)																				
Aldrin	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	3	No	Parameter Not Detected
Dieldrin	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	3	No	Parameter Not Detected
Endosulfan I	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.0087	EPA	3	2.87		0	3	No	Parameter Not Detected
Endosulfan II	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	3	No	Parameter Not Detected
Endosulfan sulfate	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	3	No	Parameter Not Detected
Heptachlor	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.0036	EPA	7	6.94		0	3	No	Parameter Not Detected
Heptachlor epoxide	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	3	No	Parameter Not Detected
Methoxychlor	0	3	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	3	No	Parameter Not Detected
Toxaphene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	Parameter Not Detected
alpha-Chlordane	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	3	No	Parameter Not Detected
gamma-Chlordane	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	3	No	Parameter Not Detected
Total Chlordane	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.004	EPA	12.5	12.5		0	3	No	Parameter Not Detected
Endrin	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	3	No	Parameter Not Detected
Endrin aldehyde	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	3	No	Parameter Not Detected
Endrin ketone	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22	21.7		0	3	No	Parameter Not Detected
Total Endrin	0	3	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	3	No	Parameter Not Detected
alpha-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.005	FDEP	5	5		0	3	No	Parameter Not Detected
beta-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	3	No	Parameter Not Detected
delta-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	3	No	Parameter Not Detected
gamma-BHC (Lindane)	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.016	EPA	2	1.56		0	3	No	Parameter Not Detected
Total BHC	0	3	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	3	No	Parameter Not Detected
4,4'-DDD	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	3	No	Parameter Not Detected
4,4'-DDE	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	3	No	Parameter Not Detected
4,4'-DDT	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85	84.7		0	3	No	Parameter Not Detected
Total DDT	0	3	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	3	No	Parameter Not Detected
PCBs (g/L)																				
Aroclor-1016	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	Parameter Not Detected
Aroclor-1221	0	3	1	1	1	1			ND	1	U		NA				0	3	No	Parameter Not Detected
Aroclor-1232	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	Parameter Not Detected
Aroclor-1242	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	Parameter Not Detected
Aroclor-1248	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	Parameter Not Detected
Aroclor-1254	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	Parameter Not Detected
Aroclor-1260	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	FDEP	36	35.7		0	3	No	Parameter Not Detected
Total PCB	0	3	4	4	4	4			ND	4	U		NA				0	3	No	Parameter Not Detected
SVOCs (g/L)																				
1,2,4-Trichlorobenzene	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
1,4-Dichlorobenzene	0	1	5	5	5	5			ND	5	U	3	FDEP	2	1.67		0	1	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chl	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	3	10.8	10	12.5	10.8			ND	12.5	U		NA				0	3	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
2,4-Dichlorophenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
2,4-Dimethylphenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
2,4-Dinitrophenol	0	3	10.8	10	12.5	10.8			ND	12.5	U		NA				0	3	No	Parameter Not Detected
2,4-Dinitrotoluene	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
2,6-Dinitrotoluene	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
2-Chloronaphthalene	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
2-Chlorophenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	3	10.8	10	12.5	10.8			ND	12.5	U		NA				0	3	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
2-Nitroaniline	0	3	5.83	2.5	12.5	5.83			ND	12.5	U		NA				0	3	No	Parameter Not Detected
2-Nitrophenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
3-Nitroaniline	0	3	10.8	10	12.5	10.8			ND	12.5	U		NA				0	3	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
4-Chloroaniline	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
4-Nitroaniline	0	3	10.8	10	12.5	10.8			ND	12.5	U		NA				0	3	No	Parameter Not Detected

Table 10-5-15
Wetland 16 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maxium Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
SVOCs (g/L) - cont.																				
4-Nitrophenol	0	3	10.8	10	12.5	10.8			ND	12.5	U		NA				0	3	No	Parameter Not Detected
Benzo(b)fluoranthene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Benzo(k)fluoranthene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
Butylbenzylphthalate	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
Carbazole	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Dibenzofuran	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
Diethylphthalate	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
Dimethylphthalate	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
Di-n-octylphthalate	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
Hexachlorobenzene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Hexachlorobutadiene	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
Hexachloroethane	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Isophorone	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
Nitrobenzene	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
Pentachlorophenol	0	3	5.83	2.5	12.5	5.83			ND	12.5	U		NA				0	3	No	Parameter Not Detected
Phenol	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
PAHs (g/L)																				
2-Methylnaphthalene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Acenaphthene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Acenaphthylene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Anthracene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Benzo(a)anthracene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Benzo(a)pyrene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Chrysene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Fluoranthene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Fluorene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Naphthalene	0	3	2	0.5	5	2			ND	5	U	23.5	EPA	0.21	0.09		0	3	No	Parameter Not Detected
Phenanthrene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Pyrene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Total PAH	0	3	26	6.5	65	26			ND	65	U		NA				0	3	No	Parameter Not Detected
VOCs (g/L)																				
1,1,2,2-Tetrachloroethane	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
1,1,2-Trichloroethane	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
1,1-Dichloroethane	1	3	0.5	0.5	0.5	1	2	2	001W001601	2	J		NA				0	3	Yes	No SV
1,2-Dibromo-3-Chloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
1,2-Dibromoethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
1,2-Dichloroethane	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloropropane	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
1,3-Dichlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
2-Butanone (MEK)	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2-Hexanone	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	3	3.33	2.5	5	3.33			ND	5	U		NA				0	3	No	Parameter Not Detected
Acetone	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Bromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Bromodichloromethane	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Bromoform	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Bromomethane	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Carbon disulfide	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Carbon tetrachloride	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Chloroethane	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Chloromethane	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
cis-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Dibromochloromethane	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Styrene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Tetrachloroethene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Trichloroethene	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Vinyl chloride	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected
Xylene (Total)	0	3	2	0.5	5	2			ND	5	U		NA				0	3	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 10-5-16
Wetland 16 Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Manganese Thallium Barium	None	None	1,1-Dichloroethane

Table 10-5-17
Wetland 16 Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	1	1			5,320	5,320	041M160301	5,320	J		N/A		Yes	No SV
Antimony	0	1	1.3	1.3			ND	1.3	U	12	2	0.11	No	Max SQL< SV
Arsenic	1	1			5.5	5.5	041M160301	5.5		7.24	1, 2	0.76	No	Max Detect < SV
Barium	1	1			4.7	4.7	041M160301	4.7			N/A		Yes	No SV
Beryllium	1	1			0.26	0.26	041M160301	0.26			N/A		Yes	No SV
Cadmium	**1**	**1**			**0.91**	**0.91**	**041M160301**	**0.91**		**0.676**	**1**	**1.35**	**Yes**	**Max Detect > SV**
Calcium	1	1			962	962	041M160301	962			N/A		Yes	No SV
Chromium	1	1			24.6	24.6	041M160301	24.6		52.3	1, 2	0.47	No	Max Detect < SV
Cobalt	1	1			0.86	0.86	041M160301	0.86	J		N/A		Yes	No SV
Copper	1	1			16	16	041M160301	16		18.7	1, 2	0.86	No	Max Detect < SV
Iron	1	1			17,000	17,000	041M160301	17,000			N/A		Yes	No SV
Lead	1	1			29.4	29.4	041M160301	29.4		30.2	1, 2	0.97	No	Max Detect < SV
Magnesium	1	1			2,410	2,410	041M160301	2,410			N/A		Yes	No SV
Manganese	1	1			39	39	041M160301	39			N/A		Yes	No SV
Mercury	1	1			0.07	0.07	041M160301	0.07	J	0.13	1, 2	0.54	No	Max Detect < SV
Nickel	1	1			4.4	4.4	041M160301	4.4		15.9	1, 2	0.28	No	Max Detect < SV
Potassium	1	1			1,060	1,060	041M160301	1,060			N/A		Yes	No SV
Selenium	1	1			1	1	041M160301	1	J		N/A		Yes	No SV
Silver	1	1			0.34	0.34	041M160301	0.34	J	0.733	1	0.46	No	Max Detect < SV
Sodium	1	1			8,450	8,450	041M160301	8,450			N/A		Yes	No SV
Thallium	0	1	0.5	0.5			ND	0.5	UJ		N/A		Yes	No SV
Vanadium	1	1			15.3	15.3	041M160301	15.3			N/A		Yes	No SV
Zinc	1	1			68.5	68.5	041M160301	68.5		124	1, 2	0.55	No	Max Detect < SV
PAHs (g/kg)														
2-Methylnaphthalene	0	1	435	435			ND	435	U	20.2	1	21.5	Yes	Max SQL > SV
Acenaphthene	0	1	435	435			ND	435	U	6.71	1	64.8	Yes	Max SQL > SV
Acenaphthylene	0	1	435	435			ND	435	U	5.87	1	74.1	Yes	Max SQL > SV
Anthracene	0	1	435	435			ND	435	U	46.9	1	9.28	Yes	Max SQL > SV
Benzo(a)anthracene	0	1	435	435			ND	435	U	74.8	1	5.82	Yes	Max SQL > SV
Benzo(a)pyrene	0	1	435	435			ND	435	U	88.8	1	4.9	Yes	Max SQL > SV
Chrysene	0	1	435	435			ND	435	U	108	1	4.03	Yes	Max SQL > SV
Dibenz(a,h)anthracene	0	1	435	435			ND	435	U	6.22	1	69.9	Yes	Max SQL > SV
Fluoranthene	1	1			32	32	041M160301	32	J	113	1	0.28	No	Max Detect < SV
Fluorene	0	1	435	435			ND	435	U	21.2	1	20.5	Yes	Max SQL > SV
Naphthalene	0	1	435	435			ND	435	U	34.6	1	12.6	Yes	Max SQL > SV
Phenanthrene	0	1	435	435			ND	435	U	86.7	1	5.02	Yes	Max SQL > SV
Pyrene	0	1	435	435			ND	435	U	153	1	2.84	Yes	Max SQL > SV
Total PAHs	**1**	**1**			**5250**	**5250**	**041M160301**	**5,250**		**1,684**	**1, 2**	**3.12**	**Yes**	**Max Detect > SV**
TOC Normalized PAHs	**1**	**1**			**308.94**	**308.94**	**041M160301**	**308.94**		**290**	**3**	**1.07**	**Yes**	**Max Detect > SV**
PCBs (g/kg)														
Aroclor-1016	0	1	43.5	43.5			ND	43.5	U	21.6	N/A	2.01	Yes	Max SQL > SV
Aroclor-1221	0	1	90	90			ND	90	U	67	2	1.34	Yes	Max SQL > SV
Aroclor-1232	0	1	43.5	43.5			ND	43.5	U	21.6	N/A	2.01	Yes	Max SQL > SV
Aroclor-1242	0	1	43.5	43.5			ND	43.5	U	21.6	N/A	2.01	Yes	Max SQL > SV
Aroclor-1248	0	1	43.5	43.5			ND	43.5	U	21.6	N/A	2.01	Yes	Max SQL > SV
Aroclor-1254	0	1	43.5	43.5			ND	43.5	U	21.6	N/A	2.01	Yes	Max SQL > SV
Aroclor-1260	0	1	43.5	43.5			ND	43.5	U	21.6	N/A	2.01	Yes	Max SQL > SV
Total PCBs	0	1	351	351			ND	351	U	21.6	1	16.3	Yes	Max SQL > SV
Pesticides (g/kg)														
Aldrin	0	1	2.25	2.25			ND	2.25	U		N/A		Yes	No SV
Dieldrin	0	1	4.35	4.35			ND	4.35	U	0.716	1	6.08	Yes	Max SQL > SV
Endosulfan I	0	1	2.25	2.25			ND	2.25	U		N/A		Yes	No SV
Endosulfan II	0	1	4.35	4.35			ND	4.35	U		N/A		Yes	No SV
Endosulfan sulfate	0	1	4.35	4.35			ND	4.35	U		N/A		Yes	No SV
Heptachlor	0	1	2.25	2.25			ND	2.25	U		N/A		Yes	No SV
Heptachlor epoxide	0	1	2.25	2.25			ND	2.25	U		N/A		Yes	No SV
Methoxychlor	0	1	22.5	22.5			ND	22.5	U		N/A		Yes	No SV
Toxaphene	0	1	225	225			ND	225	U		N/A		Yes	No SV

Table 10-5-17
Wetland 16 Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Pesticides (g/kg) - cont.														
alpha-Chlordane	0	1	2.25	2.25			ND	2.25	U	1.7	1	1.32	Yes	Max SQL > SV
gamma-Chlordane	0	1	2.25	2.25			ND	2.25	U	1.7	1	1.32	Yes	Max SQL > SV
Total Chlordane	0	1	4.5	4.5			ND	4.5	U	1.7	1	2.65	Yes	Max SQL > SV
Endrin	1	1			1.3	1.3	041M160301	1.3	J	3.3	2	0.39	No	Max Detect < SV
Endrin aldehyde	0	1	4.35	4.35			ND	4.35	U	3.3	2	1.32	Yes	Max SQL > SV
Endrin ketone	0	1	4.35	4.35			ND	4.35	U	3.3	2	1.32	Yes	Max SQL > SV
Total Endrin	**1**	**1**			**10**	**10**	**041M160301**	**10**		**3.3**	**2**	**3.03**	**Yes**	**Max Detect > SV**
alpha-BHC	0	1	2.25	2.25			ND	2.25	U		N/A		Yes	No SV
beta-BHC	0	1	2.25	2.25			ND	2.25	U	0.32	N/A	7.03	Yes	Max SQL > SV
delta-BHC	0	1	2.25	2.25			ND	2.25	U	0.32	N/A	7.03	Yes	Max SQL > SV
gamma-BHC (Lindane)	0	1	2.25	2.25			ND	2.25	U	0.32	1	7.03	Yes	Max SQL > SV
Total BHC	0	1	9	9			ND	9	U	0.32	2	28.1	Yes	Max SQL > SV
4,4'-DDD	**1**	**1**			**6.9**	**6.9**	**041M160301**	**6.9**	**J**	**1.22**	**1**	**5.66**	**Yes**	**Max Detect > SV**
4,4'-DDE	**1**	**1**			**4.8**	**4.8**	**041M160301**	**4.8**	**J**	**2.07**	**1**	**2.32**	**Yes**	**Max Detect > SV**
4,4'-DDT	**1**	**1**			**16**	**16**	**041M160301**	**16**		**1.19**	**1**	**13.4**	**Yes**	**Max Detect > SV**
Total DDT	**1**	**1**			**27.7**	**27.7**	**041M160301**	**27.7**		**3.3**	**2**	**8.39**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	1	435	435			ND	435	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	1	435	435			ND	435	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	1	435	435			ND	435	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	1	435	435			ND	435	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	435	435			ND	435	UJ		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	1	435	435			ND	435	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	1	435	435			ND	435	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	1	435	435			ND	435	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	1	435	435			ND	435	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	1	1,050	1,050			ND	1,050	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	1	435	435			ND	435	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	1	435	435			ND	435	U		N/A		Yes	No SV
2-Chloronaphthalene	0	1	435	435			ND	435	U		N/A		Yes	No SV
2-Chlorophenol	0	1	435	435			ND	435	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	1	1,050	1,050			ND	1,050	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	1	435	435			ND	435	U		N/A		Yes	No SV
2-Nitroaniline	0	1	1,050	1,050			ND	1,050	U		N/A		Yes	No SV
2-Nitrophenol	0	1	435	435			ND	435	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	1	850	850			ND	850	UJ		N/A		Yes	No SV
3-Methylphenol/4-Methylphenol	0	1	435	435			ND	435	U				Yes	No SV
3-Nitroaniline	0	1	1,050	1,050			ND	1,050	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	1	435	435			ND	435	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	1	435	435			ND	435	U		N/A		Yes	No SV
4-Chloroaniline	0	1	435	435			ND	435	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	1	435	435			ND	435	U		N/A		Yes	No SV
4-Nitroaniline	0	1	1,050	1,050			ND	1,050	U		N/A		Yes	No SV
4-Nitrophenol	0	1	1,050	1,050			ND	1,050	U		N/A		Yes	No SV
Benzo(b)fluoranthene	0	1	435	435			ND	435	U		N/A		Yes	No SV
Benzo(g,h,i)perylene	0	1	435	435			ND	435	U		N/A		Yes	No SV
Benzo(k)fluoranthene	0	1	435	435			ND	435	U		N/A		Yes	No SV
bis(2-Chloroethoxy)methane	0	1	435	435			ND	435	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	1	435	435			ND	435	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	435	435			ND	435	U	182	1, 2	2.39	Yes	Max SQL > SV
Butylbenzylphthalate	0	1	435	435			ND	435	U	182	1, 2	2.39	Yes	Max SQL > SV
Carbazole	0	1	435	435			ND	435	U		N/A		Yes	No SV
Dibenzofuran	0	1	435	435			ND	435	U		N/A		Yes	No SV
Diethylphthalate	0	1	435	435			ND	435	U	182	1, 2	2.39	Yes	Max SQL > SV
Dimethylphthalate	0	1	435	435			ND	435	U	182	1, 2	2.39	Yes	Max SQL > SV
Di-n-butylphthalate	0	1	435	435			ND	435	U	182	1, 2	2.39	Yes	Max SQL > SV
Di-n-octylphthalate	0	1	435	435			ND	435	U	182	1, 2	2.39	Yes	Max SQL > SV
Hexachlorobenzene	0	1	435	435			ND	435	U		N/A		Yes	No SV
Hexachlorobutadiene	0	1	435	435			ND	435	U		N/A		Yes	No SV

Table 10-5-17
Wetland 16 Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
Hexachlorocyclopentadiene	0	1	435	435			ND	435	U		N/A		Yes	No SV
Hexachloroethane	0	1	435	435			ND	435	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	1	435	435			ND	435	U		N/A		Yes	No SV
Isophorone	0	1	435	435			ND	435	U		N/A		Yes	No SV
Nitrobenzene	0	1	435	435			ND	435	U		N/A		Yes	No SV
N-Nitroso-di-n-propylaMine	0	1	435	435			ND	435	U		N/A		Yes	No SV
N-NitrosodiphenylaMine	0	1	435	435			ND	435	U		N/A		Yes	No SV
Pentachlorophenol	0	1	1,050	1,050			ND	1,050	U		N/A		Yes	No SV
Phenol	0	1	435	435			ND	435	U		N/A		Yes	No SV
VOCs (g.kg)														
1,1,1-Trichloroethane	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
1,1-Dichloroethane	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
1,2-Dichloropropane	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
2-Butanone (MEK)	0	1	13	13			ND	13	U		N/A		Yes	No SV
2-Hexanone	0	1	13	13			ND	13	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	13	13			ND	13	U		N/A		Yes	No SV
Acetone	0	1	13	13			ND	13	U		N/A		Yes	No SV
Benzene	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Bromodichloromethane	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Bromoform	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Bromomethane	0	1	13	13			ND	13	U		N/A		Yes	No SV
Carbon disulfide	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Carbon tetrachloride	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Chlorobenzene	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Chloroethane	0	1	13	13			ND	13	U		N/A		Yes	No SV
Chloroform	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Chloromethane	0	1	13	13			ND	13	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Dibromochloromethane	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Ethylbenzene	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Methylene chloride	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Styrene	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Tetrachloroethene	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Toluene	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Trichloroethene	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Vinyl chloride	0	1	13	13			ND	13	U		N/A		Yes	No SV
Xylene (Total)	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 10-5-18
Wetland 16 Phase III
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4-DDD	Total PAHs	None
Barium	4,4-DDE	TOC Normalized PAHs	
Beryllium	4,4-DDT		
Cadmium	Total DDT		
Calcium	Total Endrin		
Cobalt			
Iron			
Magnesium			
Manganese			
Potassium			
Selenium			
Sodium			
Vanadium			
		Not Detected Parameters	
Thallium	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
	Dieldrin	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
	Endosulfan I	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Endosulfan II	1,4-Dichlorobenzene	1,1-Dichloroethane
	Endosulfan sulfate	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Heptachlor	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Heptachlor epoxide	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
	Methoxychlor	2,4-Dichlorophenol	1,2-Dichloropropane
	Toxaphene	2,4-Dimethylphenol	2-Butanone (MEK)
	alpha-Chlordane	2,4-Dinitrophenol	2-Hexanone
	gamma-Chlordane	2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
	Total Chlordane	2,6-Dinitrotoluene	Acetone
	Endrin aldehyde	2-Chloronaphthalene	Benzene
	Endrin ketone	2-Chlorophenol	Bromodichloromethane
	alpha-BHC	2-Methyl-4,6-Dinitrophenol	Bromoform
	beta-BHC	2-Methylnaphthalene	Bromomethane
	delta-BHC	2-Methylphenol (o-Cresol)	Carbon disulfide
	gamma-BHC (Lindane)	2-Nitroaniline	Carbon tetrachloride
	Total BHC	2-Nitrophenol	Chlorobenzene
	Aroclor-1016	3,3'-Dichlorobenzidine	Chloroethane
	Aroclor-1221	3-Methylphenol/4-Methylpheno	Chloroform
	Aroclor-1232	3-Nitroaniline	Chloromethane
	Aroclor-1242	4-Bromophenyl-phenyleth	cis-1,3-Dichloropropene
	Aroclor-1248	4-Chloro-3-methylphenol	Dibromochloromethane
	Aroclor-1254	4-Chloroaniline	Ethylbenzene
	Aroclor-1260	4-Chlorophenylphenyl eth	Methylene chloride
	Total PCBs	4-Nitroaniline	Styrene
		4-Nitrophenol	Tetrachloroethene
		Acenaphthene	Toluene
		Acenaphthylene	trans-1,3-Dichloropropene
		Anthracene	Trichloroethene
		Benzo(a)anthracene	Vinyl chloride
		Benzo(a)pyrene	Xylene (Total)
		Benzo(b)fluoranthene	
		Benzo(g,h,i)perylene	
		Benzo(k)fluoranthene	
		bis(2-Chloroethoxy)methane	
		bis(2-Chloroethyl)ether	
		bis(2-Ethylhexyl)phthalate (BEHP)	
		Butylbenzylphthalate	
		Carbazole	
		Chrysene	
		Dibenz(a,h)anthracene	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		Fluorene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Naphthalene	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenanthrene	
		Phenol	
		Pyrene	

Table 10-5-19
Wetland 16 Phase III
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	1	1				5,320	5,320	5,320	5,320	J	041M160301			NA					0	4,274	1	Yes	EPC > RC and no RV
Barium	1	1				4.7	4.7	4.7	4.7		041M160301			NA					0	3.84	1	Yes	EPC > RC and no RV
Beryllium	1	1				0.26	0.26	0.26	0.26		041M160301			NA					0	0.13	1	Yes	EPC > RC and no RV
Cadmium	1	1				0.91	0.91	0.91	0.91		041M160301	0.676	4.21	PEL	1.35	1.35	0.22	0.22	0	0.39	1	No	EPC > RC, but < RV
Calcium	1	1				962	962	962	962		041M160301			NA					0	1,978.80	0	No	EPC < RC; Essential Nutrient
Cobalt	1	1				0.86	0.86	0.86	0.86	J	041M160301			NA					0	0.91	0	No	EPC < RC
Iron	1	1				17,000	17,000	17,000	17,000		041M160301			NA					0	2,684.40	1	Yes	EPC > RC and no RV
Magnesium	1	1				2,410	2,410	2,410	2,410		041M160301			NA					0	2,943.60	0	No	EPC < RC; Essential Nutrient
Manganese	1	1				39	39	39	39		041M160301			NA					0	9.81	1	Yes	EPC > RC and no RV
Potassium	1	1				1,060	1,060	1,060	1,060		041M160301			NA					0	899.72	1	No	Essential Nutrient
Selenium	1	1				1	1	1	1	J	041M160301			NA					0	0.66	1	Yes	EPC > RC and no RV
Sodium	1	1				8,450	8,450	8,450	8,450		041M160301			NA					0	11,439.60	0	No	EPC < RC; Essential Nutrient
Thallium	0	1	0.5	0.5	0.5	0.5			0.5	UJ	ND			NA					0	0.39	0	No	Parameter Not Detected
Vanadium	1	1				15.3	15.3	15.3	15.3		041M160301			NA					0	8.59	1	Yes	EPC > RC and no RV
PAHs (g/kg)																							
2-Methylnaphthalene	0	1	435	435	435	435			435	U	ND	20.2	201	PEL	21.5	21.5	2.16	2.16	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthene	0	1	435	435	435	435			435	U	ND	6.71	88.9	PEL	64.8	64.8	4.89	4.89	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthylene	0	1	435	435	435	435			435	U	ND	5.87	128	PEL	74.1	74.1	3.4	3.4	0		0	No	Parameter Not Detected; Max SQL > RV
Anthracene	0	1	435	435	435	435			435	U	ND	46.9	245	PEL	9.28	9.28	1.78	1.78	0		0	No	Parameter Not Detected; Max SQL > RV
Benzo(a)anthracene	0	1	435	435	435	435			435	U	ND	74.8	693	PEL	5.82	5.82	0.63	0.63	0		0	No	Parameter Not Detected
Benzo(a)pyrene	0	1	435	435	435	435			435	U	ND	88.8	763	PEL	4.9	4.9	0.57	0.57	0		0	No	Parameter Not Detected
Chrysene	0	1	435	435	435	435			435	U	ND	108	846	PEL	4.03	4.03	0.51	0.51	0		0	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	1	435	435	435	435			435	U	ND	6.22	135	PEL	69.9	69.9	3.22	3.22	0		0	No	Parameter Not Detected; Max SQL > RV
Fluoranthene	1	1				32	32	32	32	J	041M160301	113	1,494	PEL	0.28	0.28	0.02	0.02	0		0	No	RV HQ <1 and no RC
Fluorene	0	1	435	435	435	435			435	U	ND	21.2	144	PEL	20.5	20.5	3.02	3.02	0		0	No	Parameter Not Detected; Max SQL > RV
Naphthalene	0	1	435	435	435	435			435	U	ND	34.6	391	PEL	12.6	12.6	1.11	1.11	0		0	No	Parameter Not Detected; Max SQL > RV
Phenanthrene	0	1	435	435	435	435			435	U	ND	86.7	544	PEL	5.02	5.02	0.8	0.8	0		0	No	Parameter Not Detected
Pyrene	0	1	435	435	435	435			435	U	ND	153	1,398	PEL	2.84	2.84	0.31	0.31	0		0	No	Parameter Not Detected
Total PAHs	1	1				5,250	5,250	5,250	5,250		041M160301	1,684	16,770	PEL	3.12	3.12	0.31	0.31	0		0	No	RV HQ <1 and no RC
TOC Normalized PAHs	1	1				308.94	308.94	308.94	308.94		041M160301	290	1,800	MEC	1.07	1.07	0.17	0.17	0		0	No	RV HQ <1 and no RC
PCBs (g/kg)																							
Aroclor-1016	0	1	43.5	43.5	43.5	43.5			43.5	U	ND	21.6	189	PEL	2.01	2.01	0.23	0.23	0		0	No	Parameter Not Detected
Aroclor-1221	0	1	90	90	90	90			90	U	ND	67	189	PEL	1.34	1.34	0.48	0.48	0		0	No	Parameter Not Detected
Aroclor-1232	0	1	43.5	43.5	43.5	43.5			43.5	U	ND	21.6	189	PEL	2.01	2.01	0.23	0.23	0		0	No	Parameter Not Detected
Aroclor-1242	0	1	43.5	43.5	43.5	43.5			43.5	U	ND	21.6	189	PEL	2.01	2.01	0.23	0.23	0		0	No	Parameter Not Detected
Aroclor-1248	0	1	43.5	43.5	43.5	43.5			43.5	U	ND	21.6	189	PEL	2.01	2.01	0.23	0.23	0		0	No	Parameter Not Detected
Aroclor-1254	0	1	43.5	43.5	43.5	43.5			43.5	U	ND	21.6	189	PEL	2.01	2.01	0.23	0.23	0		0	No	Parameter Not Detected
Aroclor-1260	0	1	43.5	43.5	43.5	43.5			43.5	U	ND	21.6	189	PEL	2.01	2.01	0.23	0.23	0		0	No	Parameter Not Detected
Total PCBs	0	1	351	351	351	351			351	U	ND	21.6	189	PEL	16.3	16.3	1.86	1.86	0		0	No	Parameter Not Detected; Max SQL > RV
Pesticides (g/kg)																							
Aldrin	0	1	2.25	2.25	2.25	2.25			2.25	U	ND			NA					0		0	No	Parameter Not Detected
Dieldrin	0	1	4.35	4.35	4.35	4.35			4.35	U	ND	0.716	4.3	PEL	6.08	6.08	1.01	1.01	0		0	No	Parameter Not Detected; Max SQL > RV
Endosulfan I	0	1	2.25	2.25	2.25	2.25			2.25	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	1	4.35	4.35	4.35	4.35			4.35	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	0	1	4.35	4.35	4.35	4.35			4.35	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor	0	1	2.25	2.25	2.25	2.25			2.25	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	1	2.25	2.25	2.25	2.25			2.25	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	1	22.5	22.5	22.5	22.5			22.5	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	1	225	225	225	225			225	U	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	0	1	2.25	2.25	2.25	2.25			2.25	U	ND	1.7	4.79	PEL	1.32	1.32	0.47	0.47	0		0	No	Parameter Not Detected
gamma-Chlordane	0	1	2.25	2.25	2.25	2.25			2.25	U	ND	1.7	4.79	PEL	1.32	1.32	0.47	0.47	0		0	No	Parameter Not Detected
Total Chlordane	0	1	4.5	4.5	4.5	4.5			4.5	U	ND	1.7	4.79	PEL	2.65	2.65	0.94	0.94	0		0	No	Parameter Not Detected
Endrin	1	1				1.3	1.3	1.3	1.3	J	041M160301	3.3		NA	0.39	0.39			0		0	No	Max Detect < SV
Endrin aldehyde	0	1	4.35	4.35	4.35	4.35			4.35	U	ND	3.3		NA	1.32	1.32			0		0	No	Parameter Not Detected
Endrin ketone	0	1	4.35	4.35	4.35	4.35			4.35	U	ND	3.3		NA	1.32	1.32			0		0	No	Parameter Not Detected
Total Endrin	1	1				10	10	10	10		041M160301	3.3		NA	3.03	3.03			0		0	Yes	No RV or RC and EPC > SV
alpha-BHC	0	1	2.25	2.25	2.25	2.25			2.25	U	ND		0.99	PEL			2.27	2.27	0		0	No	Parameter Not Detected; Max SQL > RV
beta-BHC	0	1	2.25	2.25	2.25	2.25			2.25	U	ND	0.32	0.99	PEL	7.03	7.03	2.27	2.27	0		0	No	Parameter Not Detected; Max SQL > RV
delta-BHC	0	1	2.25	2.25	2.25	2.25			2.25	U	ND	0.32	0.99	PEL	7.03	7.03	2.27	2.27	0		0	No	Parameter Not Detected; Max SQL > RV
gamma-BHC (Lindane)	0	1	2.25	2.25	2.25	2.25			2.25	U	ND	0.32	0.99	PEL	7.03	7.03	2.27	2.27	0		0	No	Parameter Not Detected; Max SQL > RV
Total BHC	0	1	9	9	9	9			9	U	ND	0.32	0.99	PEL	28.1	28.1	9.09	9.09	0		0	No	Parameter Not Detected; Max SQL > RV
4,4'-DDD	1	1				6.9	6.9	6.9	6.9	J	041M160301	1.22	7.81	PEL	5.66	5.66	0.88	0.88	0	50	0	No	EPC < RC and RV
4,4'-DDE	1	1				4.8	4.8	4.8	4.8	J	041M160301	2.07	374	PEL	2.32	2.32	0.01	0.01	0	40	0	No	EPC < RC and RV
4,4'-DDT	**1**	**1**				**16**	**16**	**16**	**16**		**041M160301**	**1.19**	**4.77**	**PEL**	**13.4**	**13.4**	**3.35**	**3.35**	**1**	**20**	**0**	**No**	**EPC > RV, but < RC**
Total DDT	1	1				27.7	27.7	27.7	27.7		041M160301	3.3	51.7	PEL	8.39	8.39	0.54	0.54	0	110	0	No	EPC < RC and RV
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	435	435	435	435			435	UJ	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	1	1,050	1,050	1,050	1,050			1,050	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	1	1,050	1,050	1,050	1,050			1,050	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected

Table 10-5-19
Wetland 16 Phase III
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
2-Nitroaniline	0	1	1,050	1,050	1,050	1,050			1,050	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	1	850	850	850	850			850	UJ	ND			NA					0		0	No	Parameter Not Detected
3-Methylphenol/4-Methylphenol	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	1	1,050	1,050	1,050	1,050			1,050	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	1	1,050	1,050	1,050	1,050			1,050	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	1	1,050	1,050	1,050	1,050			1,050	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	435	435	435	435			435	U	ND	182	2,647	PEL	2.39	2.39	0.16	0.16	0		0	No	Parameter Not Detected
Butylbenzylphthalate	0	1	435	435	435	435			435	U	ND	182	2,647	PEL	2.39	2.39	0.16	0.16	0		0	No	Parameter Not Detected
Carbazole	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	0	1	435	435	435	435			435	U	ND	182	2,647	PEL	2.39	2.39	0.16	0.16	0		0	No	Parameter Not Detected
Dimethylphthalate	0	1	435	435	435	435			435	U	ND	182	2,647	PEL	2.39	2.39	0.16	0.16	0		0	No	Parameter Not Detected
Di-n-butylphthalate	0	1	435	435	435	435			435	U	ND	182	2,647	PEL	2.39	2.39	0.16	0.16	0		0	No	Parameter Not Detected
Di-n-octylphthalate	0	1	435	435	435	435			435	U	ND	182	2,647	PEL	2.39	2.39	0.16	0.16	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	1	1,050	1,050	1,050	1,050			1,050	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	1	435	435	435	435			435	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	1	13	13	13	13			13	U	ND			NA					0		0	No	Parameter Not Detected
2-Hexanone	0	1	13	13	13	13			13	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	13	13	13	13			13	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	0	1	13	13	13	13			13	U	ND			NA					0		0	No	Parameter Not Detected
Benzene	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	1	13	13	13	13			13	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroethane	0	1	13	13	13	13			13	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	1	13	13	13	13			13	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	1	13	13	13	13			13	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 10-5-20
Wetland 16 Phase III
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
	Detected Parameters		
Aluminum	Total Endrin	None	None
Barium			
Beryllium			
Iron			
Manganese			
Selenium			
Vanadium			

Table 10-5-21
Wetland 16 Phase III
Mean ERM Quotient

Sample_ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M160301	9/4/1997	mg/kg	5.5		Arsenic	8.2	70	0.08
041M160301	9/4/1997	mg/kg	0.91		Cadmium	1.2	9.6	0.09
041M160301	9/4/1997	mg/kg	24.6		Chromium	81	370	0.07
041M160301	9/4/1997	mg/kg	16		Copper	34	270	0.06
041M160301	9/4/1997	mg/kg	29.4		Lead	46.7	218	0.13
041M160301	9/4/1997	mg/kg	0.07	J	Mercury	0.15	0.71	0.10
041M160301	9/4/1997	mg/kg	4.4		Nickel	20.9	51.6	0.09
041M160301	9/4/1997	mg/kg	0.34	J	Silver	1	3.7	0.09
041M160301	9/4/1997	mg/kg	68.5		Zinc	150	410	0.17
041M160301	9/4/1997	g/kg	4.8	J	4,4'-DDE	2.2	27	0.18
041M160301	9/4/1997	g/kg	16		4,4'-DDT	1.58	46.1	0.35
041M160301	9/4/1997	g/kg	351	U	Total PCBs	22.7	180	1.95
041M160301	9/4/1997	g/kg	435	U	2-Methylnaphthalene	70	670	0.65
041M160301	9/4/1997	g/kg	435	U	Acenaphthene	16	500	0.87
041M160301	9/4/1997	g/kg	435	U	Acenaphthylene	44	640	0.68
041M160301	9/4/1997	g/kg	435	U	Anthracene	85.3	1100	0.40
041M160301	9/4/1997	g/kg	435	U	Benzo(a)anthracene	261	1600	0.27
041M160301	9/4/1997	g/kg	435	U	Benzo(a)pyrene	430	1600	0.27
041M160301	9/4/1997	g/kg	435	U	Chrysene	384	2800	0.16
041M160301	9/4/1997	g/kg	435	U	Dibenz(a,h)anthracene	63.4	260	1.67
041M160301	9/4/1997	g/kg	32	J	Fluoranthene	600	5100	0.01
041M160301	9/4/1997	g/kg	435	U	Fluorene	19	540	0.81
041M160301	9/4/1997	g/kg	435	U	Naphthalene	160	2100	0.21
041M160301	9/4/1997	g/kg	435	U	Phenanthrene	240	1500	0.29
041M160301	9/4/1997	g/kg	435	U	Pyrene	665	2600	0.17
041M160301	9/4/1997				ERM Quotient Sum			9.79
041M160301	9/4/1997				Mean ERM Quotient			0.39
041M160301	9/4/1997				Mean ERM Quotient without ND			0.06
041M160301	9/4/1997				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 10-5-22
Wetland 16 Phase IV
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	1	1				500	500	500	041W150102	500			NA		Yes	No SV
Antimony	1	1				11	11	11	041W150102	11	I		NA		Yes	No SV
Arsenic	1	1				5.5	5.5	5.5	041W150102	5.5	I	36	EPA	0.15	No	Max Detect < SV
Barium	1	1				43	43	43	041W150102	43			NA		Yes	No SV
Beryllium	1	1				0.67	0.67	0.67	041W150102	0.67	I		NA		Yes	No SV
Cadmium	0	1	0.3	0.3	0.3	0.3			ND	0.3	U	9.3	EPA	0.03	No	Max SQL< SV
Calcium	1	1				180,000	180,000	180,000	041W150102	180,000			NA		Yes	No SV
Chromium	1	1				2.5	2.5	2.5	041W150102	2.5	I	50	EPA	0.05	No	Max Detect < SV
Cobalt	0	1	0.6	0.6	0.6	0.6			ND	0.6	U		NA		Yes	No SV
Copper	0	1	0.3	0.3	0.3	0.3			ND	0.3	U	2.9	EPA	0.10	No	Max SQL< SV
Iron	1	1				2,600	2,600	2,600	041W150102	2,600			NA		Yes	No SV
Lead	0	1	0.95	0.95	0.95	0.95			ND	0.95	U	8.5	EPA	0.11	No	Max SQL< SV
Magnesium	1	1				480,000	480,000	480,000	041W150102	480,000			NA		Yes	No SV
Manganese	1	1				210	210	210	041W150102	210			NA		Yes	No SV
Mercury	0	1	0.039	0.039	0.039	0.039			ND	0.039	U	0.025	EPA	1.56	Yes	Max SQL > SV
Nickel	0	1	0.75	0.75	0.75	0.75			ND	0.75	U	8.3	EPA	0.09	No	Max SQL< SV
Potassium	1	1				200,000	200,000	200,000	041W150102	200,000			NA		Yes	No SV
Selenium	0	1	2.65	2.65	2.65	2.65			ND	2.65	U	71	EPA	0.04	No	Max SQL< SV
Silver	0	1	0.55	0.55	0.55	0.55			ND	0.55	U	0.23	EPA	2.39	Yes	Max SQL > SV
Sodium	1	1				3,600,000	3,600,000	3,600,000	041W150102	3,600,000			NA		Yes	No SV
Thallium	**1**	**1**				**17**	**17**	**17**	**041W150102**	**17**		**6.3**	**FDEP**	**2.7**	**Yes**	**Max Detect > SV**
Vanadium	1	1				2.3	2.3	2.3	041W150102	2.3	I		NA		Yes	No SV
Zinc	1	1				13	13	13	041W150102	13	I	86	EPA	0.15	No	Max Detect < SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections. Parameters in bold were detected and exceeded the screening value.

Table 10-5-23
Wetland 16 Phase IV
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Aluminum	Not Analyzed	Not Analyzed	Not Analyzed
Antimony			
Barium			
Beryllium			
Calcium			
Iron			
Magnesium			
Manganese			
Potassium			
Sodium			
Thallium			
Vanadium			
Not Detected Parameters			
Cobalt	Not Analyzed	Not Analyzed	Not Analyzed
Mercury			
Silver			

Table 10-5-24
Wetland 16 Phase IV
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Metals (g/L)																			
Aluminum	1	1				500	500	500	041W150102	500			NA			2,927.50	0	No	Max Result < Ref. Conc.
Antimony	1	1				11	11	11	041W150102	11	I		NA			4.15	1	Yes	Max Result > Ref. Conc.
Barium	1	1				43	43	43	041W150102	43			NA			9.43	1	Yes	Max Result > Ref. Conc.
Beryllium	1	1				0.67	0.67	0.67	041W150102	0.67	I		NA			0.82	0	No	Max Result < Ref. Conc.
Calcium	1	1				180,000	180,000	180,000	041W150102	180,000			NA			76,800	1	No	Essential Nutrient
Cobalt	0	1	0.6	0.6	0.6	0.6			ND	0.6	U		NA			2.38	0	No	Max SQL < Ref. Conc.
Iron	1	1				2600	2600	2600	041W150102	2600			NA			1352	1	Yes	Max Result > Ref. Conc.
Magnesium	1	1				480,000	480,000	480,000	041W150102	480,000			NA			243,650	1	No	Essential Nutrient
Manganese	1	1				210	210	210	041W150102	210			NA			12.15	1	Yes	Max Result > Ref. Conc.
Mercury	0	1	0.039	0.039	0.039	0.039			ND	0.039	U	0.025	EPA	2	1.56	0.21	0	No	Max SQL < Ref. Conc.
Potassium	1	1				200,000	200,000	200,000	041W150102	200,000			NA			81250	1	No	Essential Nutrient
Silver	0	1	0.55	0.55	0.55	0.55			ND	0.55	U	0.23	EPA	2.39	2.39	3.01	0	No	Max SQL < Ref. Conc.
Sodium	1	1				3,600,000	3,600,000	3,600,000	041W150102	3,600,000			NA			1,952,000	1	No	Essential Nutrient
Thallium	**1**	**1**				**17**	**17**	**17**	**041W150102**	**17**		**6.3**	**FDEP**	**3**	**2.7**	**2.55**	**1**	**Yes**	**Max Result > Ref. Conc.**
Vanadium	1	1				2.3	2.3	2.3	041W150102	2.3	I		NA			6.69	0	No	Max Result < Ref. Conc.

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 10-5-25
Wetland 16 Phase IV
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
	Detected Parameters		
Iron	Not Analyzed	Not Analyzed	Not Analyzed
Manganese			
Thallium			
Antimony			
Barium			

Table 10-5-26
Wetland 16
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	9.9E+01	=	3.0E+02	=	UG/L	041W160201	2 / 3	N/A / 9.1E+01	1.5E+02	3.0E-04	1.0E-03	7.90E-07	1.25E-05	1.67E-05
7440393	Barium	N	3.1E+01	J	3.2E+01	J	UG/L	041W160101	2 / 3	N/A / 2.5E+01	2.5E+01	3.2E-05	1.0E-03	8.29E-08	1.31E-06	1.76E-06
7439896	Iron	N	4.1E+02	=	1.0E+03	=	UG/L	041W160201	3 / 3	NAV	7.5E+02	1.0E-03	2.5E-04	6.63E-07	1.05E-05	1.40E-05
7439965	Manganese	N	5.0E+01	=	5.7E+01	=	UG/L	001W001601	3 / 3	NAV	5.4E+01	5.7E-05	1.0E-03	1.47E-07	2.33E-06	3.11E-06
7440280	Thallium	N	1.4E+01	=	1.5E+01	=	UG/L	041W160201	2 / 3	N/A / 3.6E+02	7.0E+01	1.5E-05	1.0E-03	3.85E-08	6.09E-07	8.14E-07
75343	1,1-Dichloroethane	N	N/A	N/A	2.0E+00	J	UG/L	001W001601	1 / 3	1.0E+00 / 1.0E+00	1.0E+00	2.0E-06	6.7E-03	4.44E-08	7.03E-07	9.40E-07
85018	Chlorobenzene	N	1.0E+00	J	1.0E+00	=	UG/L	041W160101	2 / 3	N/A / 1.0E+00	8.3E-01	1.0E-06	2.8E-02	9.45E-08	1.50E-06	2.00E-06

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).

EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound,
calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 10-5-27
Wetland 16
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	3.0E-04	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	1.3E-04	N/A	1.7E-04	N/A
	Barium	N	3.2E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	2.7E-04	N/A	3.6E-04	N/A
	Iron	N	1.0E-03	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	5.7E-05	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	4.2E-04	N/A	5.6E-04	N/A
	Thallium	N	1.5E-05	6.6E-05	N/A	2.0E-01	3, 4	1.3E-05	N/A	4.6E-02	N/A	6.2E-02	N/A
	1,1-Dichloroethane	N	2.0E-06	1.0E-01	N/A	1.0E+00	3	1.0E-01	N/A	7.0E-06	N/A	9.4E-06	N/A
	Chlorobenzene	N	1.0E-06	2.0E-02	N/A	7.3E-02	3	1.5E-03	N/A	1.0E-03	N/A	1.4E-03	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-5-28
Wetland 16
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	3.0E-04	1.0E+00	N/A	9.6E-09	N/A	6.2E-09	N/A
	Barium	N	3.2E-05	7.0E-02	N/A	1.4E-08	N/A	9.3E-09	N/A
	Iron	N	1.0E-03	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	5.7E-05	1.4E-01	N/A	1.3E-08	N/A	8.2E-09	N/A
	Thallium	N	1.5E-05	6.6E-05	N/A	7.1E-06	N/A	4.6E-06	N/A
	1,1-Dichloroethane	N	2.0E-06	1.0E-01	N/A	6.3E-10	N/A	4.1E-10	N/A
	Chlorobenzene	N	1.0E-06	2.0E-02	N/A	1.6E-09	N/A	1.0E-09	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:

CDI = Chronic daily intake (mg/kg-day).
EPCsw = Exposure point concentration in surface water (mg/L).
IRsw = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:

Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Table 10-5-29
Wetland 16 Phase II
Fish Tissue Ingestion Exposure Recreational and Subsistence Fishermen

Exposure Route	COPC		Sediment Concentration (mg/kg)	BSAF	Estimated Tissue Concentration [a] (mg/kg)	Atrophic transfer factor	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Oral RfD/SF Source	Recreational Ingestion Hazard Quotient	Recreational Ingestion Cancer Risk
Fish Tissue Ingestion	Aluminum	N	8,880	N/A	N/A	N/A	1.00E+00	N/A	2	N/A	N/A
	Arsenic	C	10.9	N/A	N/A	N/A	3.00E-04	1.50E+00	1, 2	N/A	N/A
	Barium	N	8.1	N/A	N/A	N/A	7.00E-02	N/A	1, 2	N/A	N/A
	Beryllium	N	0.47	N/A	N/A	N/A	2.00E-03	N/A		N/A	N/A
	Cadmium	N	8.5	N/A	N/A	N/A	5.00E-04	N/A		N/A	N/A
	Chromium	N	78.4	N/A	N/A	N/A	N/A	N/A		N/A	N/A
	Cobalt	C	1.7	N/A	N/A	N/A	2.00E-02	N/A	2	N/A	N/A
	Copper	N	90.8	4.00E-01	3.63E+01	1.00E+00	4.00E-02	N/A	2	7.47E-02	N/A
	Iron	N	39,500	4.58E-04	1.81E+01	1.00E+00	3.00E-01	N/A		4.96E-03	N/A
	Lead	N	182	N/A	N/A	N/A	N/A	N/A		N/A	N/A
	Manganese	N	211	N/A	N/A	N/A	2.40E-02	N/A	1, 2	N/A	N/A
	Mercury	N	0.41	N/A	N/A	N/A	3.00E-04	N/A		N/A	N/A
	Selenium	N	0.84	N/A	N/A	N/A	5.00E-03	N/A		N/A	N/A
	Silver	N	1.8	N/A	N/A	N/A	5.00E-03	N/A		N/A	N/A
	Vanadium	N	34	N/A	N/A	N/A	7.00E-03	N/A	2	N/A	N/A
	4,4'-DDD	C	0.0048	1.93E+00	9.26E-03	3.08E+00	N/A	2.40E-01	2	N/A	8.06E-08
	4,4'-DDE	C	0.026	1.93E+00	5.02E-02	3.64E+00	N/A	3.40E-01	2	N/A	7.30E-07
	4,4'-DDT	C	0.0028	1.93E+00	5.40E-03	3.69E+00	5.00E-04	3.40E-01		4.69E-04	7.97E-08
	alpha-Chlordane	C	0.00047	3.90E+00	1.83E-03	3.25E+00	5.00E-04	3.50E-01		1.40E-04	2.45E-08
	Aroclor-1254	C	0.078	3.21E+00	2.51E-01	3.73E+00	2.00E-05	2.00E+00		5.50E-01	2.20E-05
	Dieldrin	C	0.0042	N/A	N/A	N/A	5.00E-05	1.60E+01		N/A	N/A
	Benzo(b)fluoranthene	C	0.1	N/A	N/A	N/A	N/A	7.30E-01		N/A	N/A
	bis(2-Ethylhexyl)phthalate (BEHP)	C	0.72	0.184	1.32E-01	2.27E+00	2.00E-02	1.40E-02	1, 2	1.77E-04	4.95E-08
	Butylbenzylphthalate	N	0.031	N/A	N/A	N/A	2.00E-01	N/A		N/A	N/A
	Diethylphthalate	N	0.09	N/A	N/A	N/A	8.00E-01	N/A		N/A	N/A
	Di-n-butylphthalate	N	0.034	N/A	N/A	N/A	1.00E-01	N/A		N/A	N/A
	Fluoranthene	N	0.1	N/A	N/A	N/A	N/A	4.00E-02		N/A	N/A
	Pyrene	N	0.11	N/A	N/A	N/A	N/A	3.00E-02		N/A	N/A
	Methylene chloride	C	0.11	N/A	N/A	N/A	6.00E-02	7.50E-03		N/A	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
a = Tissue concentration determined as described in Section 8 of the text; see Table 9-5.

$$CDI = \frac{EPC_t \times IR_t \times EF \times ED \times CF}{BW \times AT}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_t = Exposure point concentration in sediment (mg/kg).
IR_t = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = conversion factor (0.001 kg/g)
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:
IR_t = Fish tissue ingestion rate for sediment (recreational: 26 g/day; subsistence: 170 g/day).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Risk calculation equation, cancer:

$$Risk = CDI \times SF_{oral}$$

Risk calculation equation, non cancer:

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Table 10-5-30
Wetland 16 Phase III
Fish Tissue Ingestion Exposure Recreational and Subsistence Fishermen

Exposure Route	COPC		Sediment Concentration (mg/kg)	BSAF	Estimated Tissue Concentration [a] (mg/kg)	Atrophic Transfer Factor	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Oral RfD/SF Source	Recreational Ingestion Hazard Quotient	Recreational Ingestion Cancer Risk
Fish Tissue Ingestion	Aluminum	N	5.32E+03	N/A	N/A	N/A	1.00E+00	N/A	2	N/A	N/A
	Barium	N	4.70E+00	N/A	N/A	N/A	7.00E-02	N/A	1, 2	N/A	N/A
	Beryllium	N	2.60E-01	N/A	N/A	N/A	2.00E-03	N/A		N/A	N/A
	Cadmium	N	9.10E-01	N/A	N/A	N/A	5.00E-04	N/A		N/A	N/A
	Cobalt	C	8.60E-01	N/A	N/A	N/A	2.00E-02	N/A	2	N/A	N/A
	Iron	N	1.70E+04	4.58E-04	7.79E+00	1.00E+00	3.00E-01	N/A		2.14E-03	N/A
	Manganese	N	3.90E+01	N/A	N/A	N/A	2.40E-02	N/A	1, 2	N/A	N/A
	Selenium	N	1.00E+00	N/A	N/A	N/A	5.00E-03	N/A		N/A	N/A
	Vanadium	N	1.53E+01	N/A	N/A	N/A	7.00E-03	N/A	2	N/A	N/A
	4,4'-DDD	C	6.90E-03	1.93E+00	1.33E-02	3.08E+00	N/A	2.40E-01	2	N/A	1.16E-07
	4,4'-DDE	C	4.80E-03	1.93E+00	9.26E-03	3.64E+00	N/A	3.40E-01	2	N/A	1.35E-07
	4,4'-DDT	C	1.60E-02	1.93E+00	3.09E-02	3.69E+00	5.00E-04	3.40E-01		2.68E-03	4.55E-07
	Endrin	N	1.30E-03	4.01E+00	5.21E-03	1.60E+00	3.00E-04	N/A		2.29E-03	N/A
	Fluoranthene	N	3.20E-02	N/A	N/A	N/A	N/A	4.00E-02		N/A	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
a = Tissue concentration determined as described in Section 8 of the text; see Table 9-5.

$$CDI = \frac{EPC_t \times IR_t \times EF \times ED \times CF}{BW \times AT}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_t = Exposure point concentration in sediment (mg/kg).
IR_t = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = conversion factor (0.001 kg/g)
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:
IR_t = Fish tissue ingestion rate for sediment (recreational: 26 g/day; subsistence: 170 g/day).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Risk calculation equation, cancer:

$$Risk = CDI \times SF_{oral}$$

Risk calculation equation, non cancer:

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Table 10-5-31
Wetland 16 Phase II
2004 Surface Water Dermal Absorbed Dose – Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7440360	Antimony	N	N/A	N/A	1.1E+01	=	UG/L	041W150102	1 / 1	NAV	1.1E+01	1.1E-05	1.0E-03	2.86E-08	4.53E-07	6.05E-07
7440382	Arsenic	C	N/A	N/A	5.5E+00	=	UG/L	041W150103	1 / 1	NAV	5.5E+00	5.5E-06	1.0E-03	1.43E-08	3.23E-08	1.08E-07
7440393	Barium	N	N/A	N/A	4.3E+01	=	UG/L	041W150104	1 / 1	NAV	4.3E+01	4.3E-05	1.0E-03	1.12E-07	1.77E-06	2.37E-06
7439896	Iron	N	N/A	N/A	2.6E+03	=	UG/L	041W150105	1 / 1	NAV	2.6E+03	2.6E-03	2.5E-04	1.69E-06	2.68E-05	3.58E-05
7439965	Manganese	N	N/A	N/A	2.1E+02	=	UG/L	041W150106	1 / 1	NAV	2.1E+02	2.1E-04	1.0E-03	5.46E-07	8.64E-06	1.16E-05
7440280	Thallium	N	N/A	N/A	1.7E+01	=	UG/L	041W150107	1 / 1	NAV	1.7E+01	1.7E-05	1.0E-03	4.42E-08	7.00E-07	9.36E-07
7440666	Zinc	N	N/A	N/A	1.3E+01	=	UG/L	041W150108	1 / 1	NAV	1.3E+01	1.3E-05	6.0E-04	2.03E-08	3.21E-07	4.29E-07

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound,
calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 10-5-32
Wetland 16 Phase IV
2004 Surface Water Dermal Exposure Risk – Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
SW Dermal Risk	Antimony	N	1.1E-05	4.0E-04	N/A	2.0E-02	3	8.0E-06	N/A	5.7E-02	N/A	7.6E-02	N/A
	Arsenic	C	5.5E-06	3.0E-04	1.5E+00	4.1E-01	2	1.2E-04	3.7E+00	2.6E-04	1.2E-07	8.8E-04	4.0E-07
	Barium	N	4.3E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	3.6E-04	N/A	4.8E-04	N/A
	Iron	N	2.6E-03	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.1E-04	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	1.5E-03	N/A	2.1E-03	N/A
	Thallium	N	1.7E-05	6.6E-05	N/A	2.0E-01	3, 4	1.3E-05	N/A	5.3E-02	N/A	7.1E-02	N/A
	Zinc	N	1.3E-05	3.0E-01	N/A	2.0E-01	2, 4	6.0E-02	N/A	5.4E-06	N/A	7.2E-06	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-5-33
Wetland 16 Phase IV
2004 Surface Water Incidental Ingestion Exposure Risk – Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
SW Incidental Ingestion	Antimony	N	1.1E-05	4.0E-04	N/A	8.7E-07	N/A	5.6E-07	N/A
	Arsenic	C	5.5E-06	3.0E-04	1.5E+00	8.3E-08	3.7E-11	1.3E-07	6.0E-11
	Barium	N	4.3E-05	7.0E-02	N/A	1.9E-08	N/A	1.3E-08	N/A
	Iron	N	2.6E-03	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.1E-04	1.4E-01	N/A	4.7E-08	N/A	3.1E-08	N/A
	Thallium	N	1.7E-05	6.6E-05	N/A	8.2E-06	N/A	5.2E-06	N/A
	Zinc	N	1.3E-05	3.0E-01	N/A	1.4E-09	N/A	8.8E-10	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer – 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer – 25,550 days (child trespasser/adult maintenance worker).

10.6 Wetland 17 — Screening Level Problem Formulation

10.6.1 Site Description and Habitats Present at Wetland 17

Wetland 17 is along the northern portion of the base, along the eastern shore of Redoubt Bayou. A wooden gazebo used as a part of the Nature Trail sits adjacent to this wetland. Wetland 17 is approximately 1,200 feet northwest of the Site 1 landfill (Figure 10-1).

Photograph 1 Wetland 17 — Facing Southeast

Parsons and Pruitt (USEPA, 1991a) describe Wetland 17 as an estuarine system with emergent vegetation. This tidally influenced area is roughly two-thirds of an acre in size and dominated with *Juncus roemeranus*. This area contains standing water approximately 3 feet deep during high and low tides.

As described in Section 10, the landfill was used from the mid-1950s until 1976 as the predominant disposal site for all solid wastes generated on the base.

Based on the data collected during the Site 1 RI, the *Final ROD* issued on August 19, 1998, outlined three RAOs for the OU 1 site:

1. Protection of groundwater from leachable compounds

2. Restoration of groundwater and prevention of further contamination of shallow/intermediate groundwater

3. Prevention of further contamination of surface water in Wetland 17

The remedial actions selected for the site included:

1. Institutional controls to restrict groundwater use and intrusive activities

2. Implementation of a groundwater monitoring program to ensure that natural processes are effectively reducing the concentrations of organic compounds to attain performance standards

3. A groundwater interceptor system to treat the iron-contaminated groundwater that is migrating from the landfill and discharging to Wetland 3

The long-term monitoring plan was implemented by TtNUS. Groundwater was monitored for the following constituents: 1,1,2,2-tetrachlorethane, benzene, chlorobenzene, vinyl chloride, xylenes, aluminum, cadmium, chromium, iron, manganese, and nickel. Based upon collected data, the Third Annual Groundwater Monitoring Report recommended continued monitoring for benzene, vinyl chloride, xylenes, aluminum, cadmium, iron, and manganese (TtNUS, 2003b). The other constituents did not exceed MCLs any longer and were dropped from the monitoring plan. Treatment of iron at Wetland 3 is discussed in Section 10.2.

10.6.2 Wetland 17 — Sample Location Description

Phase II Sediment Sample Location Description

As outlined in the approved Site 41 work plans and SAPs, three sediment samples were collected in Wetland 17 in November 1995. Sediment locations were spaced throughout this small wetland, with two locations 041M170101 and 041M170201 closest to Site 1 (Figure 10-4). Table 10-6-1 (tables are located at the end of each section) provides a physical description of the Phase II sediments collected

at Wetland 17. Sediments at Wetland 17 were composed of very dark grayish brown poorly graded sand, fine, trace of silt (041M170201) with 0.167% TOC to very dark gray poorly graded sand, fine, trace of silt (041M170101) with 0.413% TOC.

Phase II Surface Water Sample Location Description

One surface water sample (041W170101) was collected at Wetland 17 during the Phase II investigation. This sample is co-located with sediment location 041M170101 (Figure 10-4). Table 10-6-2 provides a physical description of the surface water collected at Wetland 17. Surface water from Wetland 17 was found to be very hard and of neutral pH.

Phase IV/2004 Surface Water Sample Location Description

Due to elevated thallium concentrations detected in the Phase II surface water sample and the possible connection with sample turbidity, a confirmation sample (041W170102) was collected from Wetland 17 in 2004 for inorganic analysis (Figure 10-8). Due to a sampling error, physical parameters were not collected.

10.6.3 Wetland 17 — Nature and Extent of Contamination

Figure 10-4 presents the Phase II sediment and surface water sampling locations for Wetland 17.

Phase II Sediment

Table 10-6-3 summarizes the analytical results of the three Wetland 17 sediment samples.

Metals — Sixteen metals were detected during sediment sampling at Wetland 17. Each of the locations had 15 metals detected. None of the metals detected in the samples exhibited any estuarine reference value exceedances. The highest concentrations detected were at location 041M170301, with the exception of thallium, which was only detected at location 041M170101.

Pesticides and PCBs — Three pesticide compounds and aroclor–1260 were detected during sediment sampling at Wetland 17. Total DDT was calculated for each location by adding the concentrations of 4,4′-DDD, 4,4′-DDE and 4′,4-DDT. Likewise, a basewide total DDT reference concentration was calculated using the basewide concentrations for these same constituents. No pesticide compounds exceeded the applicable reference values.

The greatest number of pesticides detected in Wetland 17 sediment samples was at location 041M170101, which had two pesticide compounds present. Locations 041M170201 and 041M170301 had single detections of gamma-BHC. Aroclor–1260 was detected at all three sample locations. The highest concentration was detected at location 041M170101.

SVOCs — One SVOC, BHEP, was detected in sediment samples collected at Wetland 17. BEHP was reported at location 041M170201 at a relatively high concentration.

VOCs — Chlorobenzene was the only VOC detected in sediment samples collected from Wetland 17. It was detected at location 041M170101.

The distribution of metals and PCBs at Wetland 17 was uniform. Pesticides and VOCs were more common at location 041M170101. Location 041M170201 exhibited the only concentration of SVOCs in Wetland 17 sediment.

Phase II Surface Water

Figure 10-4 presents the surface water sampling locations for Wetland 17. Table 10-6-4 summarizes the analytical results of the single Wetland 17 surface water sample.

Metals — Ten metals were detected in the single surface water sample collected in Wetland 17 (041W170101). Six metals, barium, calcium, magnesium, potassium, sodium, and thallium were detected at concentrations exceeding their respective estuarine reference concentrations.

Pesticides and PCBs — No pesticide or PCB compounds were detected during surface water sampling at Wetland 17.

SVOCs — No SVOCs were detected during surface water sampling at Wetland 17.

VOCs — Methylene chloride was the only VOC detected in the Wetland 17 surface water sample.

Phase IV/2004 Surface Water

Because of the inorganic exceedances in surface water and the possible connection with sample turbidity, confirmation sampling was performed in 2004 (Figure 10-8). Table 10-6-5

summarizes the analytical results of the 2004 surface water sample, collected at location 041W170102. This sample was only analyzed for metals.

Metals — Twelve metals were detected in the 2004 Phase IV/surface water sample from Wetland 17. Nine metals, arsenic, barium, calcium, magnesium, manganese, potassium, selenium, sodium, and thallium were detected at concentrations exceeding their respective estuarine reference concentrations.

10.6.4 Ecological Risk Assessment

10.6.4.1 Phase II Investigation Summary — Wetland 17

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-6-6, the analytical results from the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were forward to COPC refinement. All COPCs remaining after screening evaluation are listed in Table 10-6-7.

Baseline Problem Formulation — Wetland 17 Sediment COPC Refinement

During the COPC refinement, additional information was used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. This risk assessment presents a statement of potential risk for each of the COPCs.

The COPC refinement process included:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to basewide (reference) concentrations for total DDT
- Comparison of inorganic constituents to reference wetland values
- Regression analysis for metals
- Comparison to Swartz consensus values
- Di Toro EqP SQGs for VOC
- Mean ERM quotients
- Description of exceedances of RVs and their extent

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum concentrations with refinement values are presented in Table 10-6-8.

No sediment COPCs remain after refinement at Wetland 17 (Table 10-6-9).

For Wetland 17, none of the inorganic constituents was above their Site 41 estuarine sediment reference concentrations; therefore, regression analysis was not evaluated. No inorganic constituents exceeded their SV either, so no inorganic COPCs were retained for Wetland 17.

As shown in Figure 10-5, total DDT was below the base-wide level, indicating that 4,4'-DDT and its daughter products are not a concern for this wetland. Chlorobenzene was detected at a concentration of 2 µg/kg. There are no screening values associated with this constituent; however, when normalized to detected TOC concentrations, it did not appear to be a concern for this wetland. PAHs were not detected at Wetland 17; therefore, concentrations were not compared to Swartz Consensus values.

Table 10-6-10 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Based on this approach, all three sample locations were determined to be Category 1, which indicates that sediments from this wetland are nontoxic. Figure 10-7 presents the Mean ERM Quotient Categories.

At Wetland 17, there is no sediment COPCs after the refinement process is completed.

Surface Water Screening — Level Risk-Estimation and Risk Calculation

As presented in Table 10-6-11, surface water samples were compared with screening values in accordance with the procedures described in Section 8.

All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement (Table 10-6-12).

Baseline Problem Formulation — Wetland 17 Surface Water COPC Refinement

During the surface water COPC refinement, additional information is used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs.

The COPC refinement process included:

- Comparison of maximum SV concentrations to average SV concentrations
- Comparison of inorganic constituents to reference wetland values
- Description of surface water exceedances and their extent

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 10-6-13. Phase II surface water COPCs retained after refinement are presented in Table 10-6-14.

At Wetland 17, barium and thallium exceeded their Site 41 estuarine reference concentrations and were carried forward in the ERA Process. Calcium, magnesium, potassium, and sodium also exceeded their reference concentrations but are considered essential nutrients and are not known to be associated with waste at Site 1. The essential nutrients are not carried forward. During the Phase II investigation at Wetland 17, none of the same constituents were retained in sediment and surface water samples.

10.6.4.2 Phase IV/2004 Surface Water Confirmation Sampling Event

Because of the elevated thallium concentrations detected in the Phase II surface water sample, a confirmation sample (041W170102) was collected from Wetland 17 in 2004 for inorganic analysis. Due to a sampling error, physical parameters were not collected for the 2004 surface water sample.

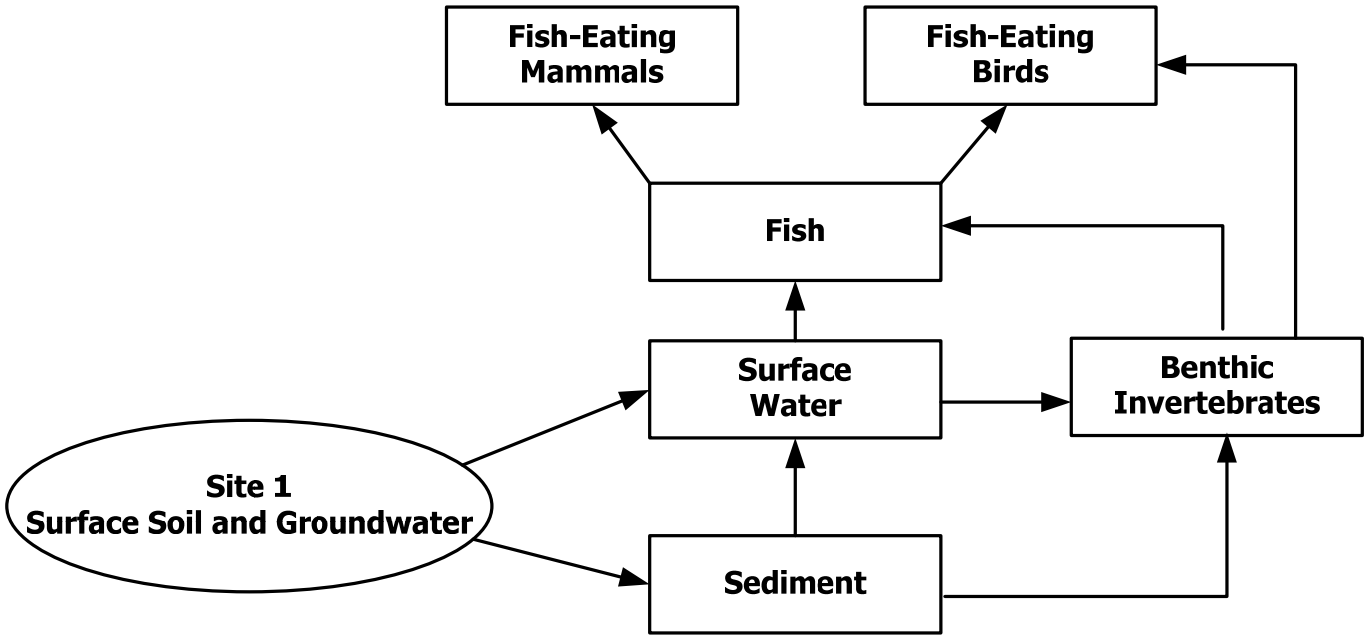
The analytical results for the surface water sample collected for Phase IV are presented in Table 10-6-15. Retained COPCs after screening are presented in Table 10-6-16. Table 10-6-17 compares maximum concentrations to RVs, and retained COPCs after refinement are presented in Table 10-6-18.

In 2004, the following inorganic constituents were detected above their reference concentrations: barium, calcium, magnesium, manganese, potassium, sodium, and thallium. As a whole, concentrations increased between 1996 and 2004.

Based on the Phase II results described above, Wetland 17 was identified as a Blue-Coded Wetland in the approved *Final RI/FS SAP Addendum* (E/A&H, 1997d), indicating that contaminants were present generally below screening values, and contaminants did not appear to be site related. Blue-Coded Wetlands were not assessed further in Phase III. To assess risks from contaminants that bioaccumulate, the results from Wetlands 17 will be used in the OU 1 food-chain model presented in Section 10.8.

The conceptual model below symbolizes which environmental habitats may be impacted by Wetland 17 Phase II and IV sampling constituents retained during the ERA process.

Wetland 17
Conceptual Site Model



10.6.5 Wetland 17 — Human Health Risk Assessment

Wetland 17 is described in Section 10.6.1, and the HHRA is summarized below.

10.6.5.1 Site Data

Surface water, sediment, and fish tissue data were collected at Wetland 17 during Phases II and IV of the RI. Section 10.6.3 summarizes the nature and extent of contamination for this wetland. Surface water and sediment are summarized in Tables 10-6-3 through 10-6-5.

10.6.5.2 Conceptual Site Model

As described in Section 10.6.1, Wetland 17 is an estuary near the Navy nature trail and could be accessed by Navy personnel or trespassers walking and/or wading through the area. Some sediment at this wetland is exposed for most of the year, so sediment exposure would be assessed using soil exposure models. Dermal contact could be a significant exposure pathway and was included in this HHRA. Based on the species present, depth of surface water, and available habitat, fishing could occur in a trespassing scenario, and wading would be the most likely exposure scenario.

COPCs were identified as described in Section 9. The following scenarios and exposure pathways were evaluated for this wetland:

Scenario	Medium	Ingestion	Dermal	Fish Tissue Ingestion
Maintenance	Sediment	√	√	
	Surface water	√	√	
Trespasser	Sediment	√	√	
	Surface water	√	√	
Fisherman	Fish Tissue Uptake from Sediment			√

10.6.5.3 Risk Characterization

The child trespasser, adult maintenance worker, and fisherman scenarios were assessed for this wetland.

Trespasser

Phase II Data

As shown in Tables 10-6-19 through 10-6-22, sediment dermal contact and ingestion risk estimates did not exceed FDEP's risk threshold of 1E-6. As shown in Tables 10-6-23 through 10-6-25, based on Phase II surface water data, the FDEP risk threshold of 1E-6 was not exceeded. Hazard indices were below 1.0.

Phase IV Data

As shown in Tables 10-6-26 through 10-6-28, based on Phase IV surface water data, the FDEP risk threshold of 1E-6 was not exceeded. Hazard indices for trespassers based on Phase IV data were below 1.0.

Maintenance Worker

Phase II Data

As shown in Tables 10-6-19 through 10-6-22, sediment ingestion and dermal contact risk estimates did not exceed FDEP's risk threshold of 1E-6. As shown in Tables 10-6-23 through 10-25, based on Phase II surface water data, the FDEP risk threshold of 1E-6 was not exceeded. Hazard indices were below 1.0.

Phase IV Data

As shown in Tables 10-6-26 through 10-6-28, based on Phase IV surface water data, the FDEP risk threshold of 1E-6 was not exceeded. Hazard indices for maintenance workers based on Phase IV data were below 1.0.

Fisherman

As shown in Table 10-6-22, fish tissue uptake from sediment risk estimates did not exceed FDEP's risk threshold of 1E-6.

Summary of Wetland 17 Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	2.28E-03	2.77E-08
	Surface water	6.87E-02	2.40E-07
Trespasser	Sediment	3.45E-03	1.66E-08
	Surface water	5.11E-02	7.18E-08
Fisherman	Fish Tissue Uptake from Sediment	7.91E-04	9.89E-07

Based on Phase II data, no COCs were identified.

Summary of Phase IV Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Surface water	3.77E-02	NA
Trespasser	Surface water	2.82E-02	NA

Based on Phase IV data, no COCs were identified.

Wetland 17 HHRA COC Summary

No COCs were identified for Wetland 17.

10.6.6 Wetland 17 — Fate and Transport Analysis

This wetland is to the northwest of Site 1. Four samples (three sediment samples and one surface water sample) were collected in this wetland. The wetland drains from the northeast towards Bayou Redoubt (see Figure 10-1).

The surface water COPCs retained after refinement for this wetland are summarized in Tables 10-6-14 and 10-6-18. There were no retained COPCs for Phase II sediment at Wetland 17. Provided below are

the associated soil borings and monitoring wells used for comparing data for the fate and transport analysis.

Associated Monitoring Wells: 001GS0001, 001GM033, 001GI059, 001GM035, 001GI028

Associated Borings: 001S0001, 001SI059, 001SI028

Surface Water/Sediment Transport into Wetland Media:

Surface Water — No storm water data are available from the area proximal to this wetland; therefore, no statement can be made regarding validation of the pathway via storm water runoff into the wetland. However, the vast majority of surface drainage to this wetland is from Site 1, the former municipal and industrial waste landfill. It is surrounded by unpaved area; therefore, the groundwater pathways are likely more significant than the storm water runoff pathways.

Sediment — No detected parameters were retained after refinement within sediment.

Groundwater to Wetland Media Pathways:

Surface Water — Based on the data from associated monitoring wells, the groundwater to surface water pathway is validated and significant for the following parameters:

Phase II	Phase IV
Barium	Barium
Manganese	Manganese

Surface Water/Sediment Transport within the Wetlands:

There was one surface water sample collected from Wetland 17; therefore, surface water transport within the wetland cannot be evaluated. Evaluation of the sediment transport pathway used upgradient location 041M1701 compared to downgradient location 041M1703).

Sediment — Evaluation of sediment locations 041M1701 (the most upstream sample location) and 041M1703 (the most downstream sample location) indicates that the number of parameter detections was not significantly different between the two (15 metals and 4 organics at location 041M1501 and 15 metals and 2 organics at location 041M1503). For the metals, one constituent was present downgradient that was not detected upgradient, and 13 exhibited slight increases in concentration. For

the organics, one compound was present downgradient that was not detected upgradient and one decreased.

Increases in parameters were generally slight; TOC increased downgradient as well. Increases in metals may be attributable to the increase in TOC, indicating transport within the wetland for these parameters is occurring to some degree.

Temporal Evaluation

Wetland 17 — Surface Water

One location (041W1701) was sampled as part of Phase II and IV/2004 activities. During Phase IV/2004 the sample was only collected for metals analysis.

An evaluation of both sets of data (2004 total results) indicates the following:

- Location 041W1701 — 10 metals were detected during Phase II versus 12 metals during Phase IV. Seven increased in concentration and two decreased; three were detected in Phase IV that was not detected in Phase II, and one was detected in Phase II that was not detected in Phase IV/2004. Generally, the fraction of inorganic parameter contamination increased from Phase II to IV, but the magnitude of increases was not generally remarkable.

Table 10-6-1
Wetland 17 Phase II
Sediment Physical Parameters

Parameter	041M170101	041M170201	041M170301
TOC (%)	0.413	0.167	0.223
Percent Solids (%)	75.3	81.3	78.3
Grain Size Analysis (percent of composition[1])			
medium sand	20	17	18
fine sand	77	81	79
silt and clay	3	2	3
Description	Very Dark Gray Poorly Graded Sand, Fine, Trace of Silt	Very Dark Grayish Brown Poorly Graded Sand, Fine, Trace of Silt	Very Dark Gray Poorly Graded Sand, Fine, Trace of Silt

Note:
[1] = Derived from sieve analyses.

Table 10-6-2
Wetland 17 Phase II
Surface Water Physical Parameters

Parameter	041W170101
Hardness as CaCO3 (mg/L)	1,730
pH	6.78
Specific Conductivity (mS/cm)	24.7
Turbidity (NTU)	0
Salinity (%)	1.49

Notes:

mg/L = Milligrams per liter
pH = Hydrogen ion content
MS/cm = MilliSiemens per centimeter
NTU = Nephelometric turbidity units
% = Percent

Table 10-6-3
Wetland 17 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
Metals (mg/kg)								
Aluminum	4,274.0	0	3	3	438.0	842.0	599.0	041M170301
Arsenic	2.140	0	3	3	0.270	0.580	0.397	041M170101
Barium	3.840	0	3	3	0.480	0.730	0.570	041M170301
Calcium	1,978.80	0	3	3	57.50	129.0	87.60	041M170301
Chromium	13.10	0	3	3	2.10	3.60	2.90	041M170301
Cobalt	0.910	0	2	3	0.140	0.170	0.125	041M170301
Copper	8.440	0	3	3	0.750	1.30	0.973	041M170301
Iron	2,684.40	0	3	3	467.0	1,190.0	795.0	041M170301
Lead	21.040	0	3	3	2.20	3.40	2.60	041M170301
Magnesium	2,943.60	0	3	3	114.0	320.0	198.0	041M170301
Manganese	9.810	0	3	3	0.80	2.40	1.630	041M170301
Potassium	899.720	0	3	3	39.10	119.0	72.30	041M170301
Sodium	11,439.60	0	3	3	275.0	1,350.0	713.0	041M170301
Thallium	0.390	0	1	3	0.310	0.310	0.188	041M170101
Vanadium	8.590	0	3	3	1.40	2.10	1.70	041M170301
Zinc	14.360	0	3	3	1.80	4.20	2.80	041M170301
Pesticides and PCBs (g/kg)								
Aroclor-1260	N/A	0	3	3	0.70	2.80	1.460	041M170101
Total PCBs	N/A	0	3	3	7.30	10.80	8.740	041M170101
gamma-BHC (Lindane)	N/A	0	2	3	0.20	0.510	0.255	041M170301
Total BHC	N/A	0	2	3	0.350	0.651	0.407	041M170301
4,4'-DDD	50.0	0	1	3	0.230	0.230	0.143	041M170101
4,4'-DDE	40.0	0	1	3	0.30	0.30	0.167	041M170101
Total DDT	110.0	0	1	3	0.645	0.645	0.415	041M170101
SVOCs (g/kg)								
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	1	3	2,300.0	2,300.0	903.0	041M170201
VOCs (g/kg)								
Chlorobenzene	N/A	0	1	3	2.0	2.0	4.830	041M170101

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 10-6-4
Wetland 17 Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Range of Detections: Average Detection	Maximum Detection Location
Metals (g/L)								
Arsenic	3.6	0	1	1	2.2	2.2	2.2	041W170101
Barium	9.43	1	1	1	10.6	10.6	10.6	041W170101
Calcium	76,800.0	1	1	1	106,000.0	106,000.0	106,000.0	041W170101
Iron	1,352.0	0	1	1	263.0	263.0	263.0	041W170101
Magnesium	243,650.0	1	1	1	356,000.0	356,000.0	356,000.0	041W170101
Manganese	12.15	0	1	1	7.4	7.4	7.4	041W170101
Potassium	81,250.0	1	1	1	109,000.0	109,000.0	109,000.0	041W170101
Sodium	1,952,000.0	1	1	1	3,040,000.0	3,040,000.0	3,040,000.0	041W170101
Thallium	2.55	1	1	1	16.3	16.3	16.3	041W170101
Zinc	12.88	0	1	1	4.7	4.7	4.7	041W170101
VOCs (g/L)								
Methylene chloride	N/A	0	1	1	38.0	38.0	38.0	041W170101

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 10-6-5
Wetland 17 Phase IV
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (g/L)								
Aluminum	2,927.5	0	1	1	66.0	66.0	66.0	041W170102
Arsenic	3.6	1	1	1	4.8	4.8	4.8	041W170102
Barium	9.43	1	1	1	18.0	18.0	18.0	041W170102
Beryllium	0.82	0	1	1	0.62	0.62	0.62	041W170102
Calcium	76,800.0	1	1	1	240,000.0	240,000.0	240,000.0	041W170102
Iron	1,352.0	0	1	1	110.0	110.0	110.0	041W170102
Magnesium	243,650.0	1	1	1	740,000.0	740,000.0	740,000.0	041W170102
Manganese	12.15	1	1	1	26.0	26.0	26.0	041W170102
Potassium	81,250.0	1	1	1	280,000.0	280,000.0	280,000.0	041W170102
Selenium	2.9	1	1	1	5.9	5.9	5.9	041W170102
Sodium	1,952,000.0	1	1	1	5,600,000.0	5,600,000.0	5,600,000.0	041W170102
Thallium	2.55	1	1	1	8.3	8.3	8.3	041W170102

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 10-6-6
Wetland 17 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	3	3			438	842	041M170301	842			N/A		Yes	No SV
Antimony	0	3	0.065	0.065			ND	0.065	UJ	12	2	0.01	No	Max SQL< SV
Arsenic	3	3			0.27	0.58	041M170101	0.58	J	7.24	1, 2	0.08	No	Max Detect < SV
Barium	3	3			0.48	0.73	041M170301	0.73	J		N/A		Yes	No SV
Beryllium	0	3	0.03	0.035			ND	0.035	U		N/A		Yes	No SV
Cadmium	0	3	0.065	0.09			ND	0.09	U	0.676	1	0.13	No	Max SQL< SV
Calcium	3	3			57.5	129	041M170301	129	J		N/A		Yes	No SV
Chromium	3	3			2.1	3.6	041M170301	3.6		52.3	1, 2	0.07	No	Max Detect < SV
Cobalt	2	3	0.065	0.065	0.14	0.17	041M170301	0.17	J		N/A		Yes	No SV
Copper	3	3			0.75	1.3	041M170301	1.3	J	18.7	1, 2	0.07	No	Max Detect < SV
Cyanide (CN)	0	3	0.295	0.315			ND	0.315	U		N/A		Yes	No SV
Iron	3	3			467	1,190	041M170301	1,190			N/A		Yes	No SV
Lead	3	3			2.2	3.4	041M170301	3.4		30.2	1, 2	0.11	No	Max Detect < SV
Magnesium	3	3			114	320	041M170301	320	J		N/A		Yes	No SV
Manganese	3	3			0.8	2.4	041M170301	2.4			N/A		Yes	No SV
Mercury	0	3	0.025	0.03			ND	0.03	U	0.13	1, 2	0.23	No	Max SQL< SV
Nickel	0	3	0.28	0.3			ND	0.3	U	15.9	1, 2	0.02	No	Max SQL< SV
Potassium	3	3			39.1	119	041M170301	119	J		N/A		Yes	No SV
Selenium	0	3	0.125	0.135			ND	0.135	UJ		N/A		Yes	No SV
Silver	0	3	0.155	0.17			ND	0.17	U	0.733	1	0.23	No	Max SQL< SV
Sodium	3	3			275	1,350	041M170301	1,350			N/A		Yes	No SV
Thallium	1	3	0.125	0.13	0.31	0.31	041M170101	0.31	J		N/A		Yes	No SV
Vanadium	3	3			1.4	2.1	041M170301	2.1	J		N/A		Yes	No SV
Zinc	3	3			1.8	4.2	041M170301	4.2		124	1, 2	0.03	No	Max Detect < SV
PAHs (g/kg)														
2-Methylnaphthalene	0	3	18.5	22.5			ND	22.5	U	20.2	1	1.11	No	TOC normalized PAHs < TEC
Acenaphthene	0	3	9	11			ND	11	U	6.71	1	1.64	No	TOC normalized PAHs < TEC
Acenaphthylene	0	3	18.5	22.5			ND	22.5	U	5.87	1	3.83	No	TOC normalized PAHs < TEC
Anthracene	0	3	18.5	22.5			ND	22.5	U	46.9	1	0.48	No	Max SQL< SV
Benzo(a)anthracene	0	3	18.5	22.5			ND	22.5	U	74.8	1	0.30	No	Max SQL< SV
Benzo(a)pyrene	0	3	18.5	22.5			ND	22.5	U	88.8	1	0.25	No	Max SQL< SV
Chrysene	0	3	18.5	22.5			ND	22.5	U	108	1	0.21	No	Max SQL< SV
Dibenz(a,h)anthracene	0	3	18.5	22.5			ND	22.5	U	6.22	1	3.62	No	TOC normalized PAHs < TEC
Fluoranthene	0	3	18.5	22.5			ND	22.5	U	113	1	0.20	No	Max SQL< SV
Fluorene	0	3	9	11			ND	11	U	21.2	1	0.52	No	Max SQL< SV
Naphthalene	0	3	18.5	22.5			ND	22.5	U	34.6	1	0.65	No	Max SQL< SV
Phenanthrene	0	3	18.5	22.5			ND	22.5	U	86.7	1	0.26	No	Max SQL< SV
Pyrene	0	3	18.5	22.5			ND	22.5	U	153	1	0.15	No	Max SQL< SV
Total PAHs	0	3	222	270			ND	270	U	1684	1, 2	0.16	No	Max SQL< SV
TOC Normalized PAHs	0	3	65.25	143.11			ND	143.11	U	290	3	0.49	No	Max SQL< SV
PCBs (g/kg)														
Aroclor-1016	0	3	0.95	1.15			ND	1.15	U	21.6	N/A	0.05	No	Max SQL< SV
Aroclor-1221	0	3	1.85	2.25			ND	2.25	U	67	2	0.03	No	Max SQL< SV
Aroclor-1232	0	3	0.95	1.15			ND	1.15	U	21.6	N/A	0.05	No	Max SQL< SV
Aroclor-1242	0	3	0.95	1.15			ND	1.15	U	21.6	N/A	0.05	No	Max SQL< SV
Aroclor-1248	0	3	0.95	1.15			ND	1.15	U	21.6	N/A	0.05	No	Max SQL< SV
Aroclor-1254	0	3	0.95	1.15			ND	1.15	U	21.6	N/A	0.05	No	Max SQL< SV
Aroclor-1260	3	3			0.7	2.8	041M170301	2.8	J	21.6	N/A	0.13	No	Max Detect < SV
Total PCBs	3	3			7.3	10.8	041M170301	10.8		21.6	1	0.5	No	Max Detect < SV
Pesticides (g/kg)														
Aldrin	0	3	0.047	0.055			ND	0.055	U		N/A		Yes	No SV
Dieldrin	0	3	0.095	0.115			ND	0.115	U	0.716	1	0.16	No	Max SQL< SV
Endosulfan I	0	3	0.047	0.055			ND	0.055	U		N/A		Yes	No SV
Endosulfan II	0	3	0.095	0.115			ND	0.115	U		N/A		Yes	No SV
Endosulfan sulfate	0	3	0.095	0.115			ND	0.115	U		N/A		Yes	No SV
Heptachlor	0	3	0.047	0.055			ND	0.055	U		N/A		Yes	No SV
Heptachlor epoxide	0	3	0.047	0.055			ND	0.055	U		N/A		Yes	No SV
Methoxychlor	0	3	0.47	0.55			ND	0.55	U		N/A		Yes	No SV
Toxaphene	0	3	9.5	11.5			ND	11.5	U		N/A		Yes	No SV
alpha-Chlordane	0	3	0.047	0.055			ND	0.055	U	1.7	1	0.03	No	Max SQL< SV
gamma-Chlordane	0	3	0.047	0.055			ND	0.055	U	1.7	1	0.03	No	Max SQL< SV
Total Chlordane	0	3	0.094	0.11			ND	0.11	U	1.7	1	0.06	No	Max SQL< SV
Endrin	0	3	0.095	0.115			ND	0.115	U	3.3	2	0.03	No	Max SQL< SV
Endrin aldehyde	0	3	0.095	0.115			ND	0.115	U	3.3	2	0.03	No	Max SQL< SV
Endrin ketone	0	3	0.095	0.115			ND	0.115	U	3.3	2	0.03	No	Max SQL< SV
Total Endrin	0	3	0.285	0.345			ND	0.345	U	3.3	2	0.11	No	Max SQL< SV
alpha-BHC	0	3	0.047	0.055			ND	0.055	UJ		N/A		Yes	No SV
beta-BHC	0	3	0.047	0.055			ND	0.055	U	0.32	N/A	0.17	No	Max SQL< SV
delta-BHC	0	3	0.047	0.055			ND	0.055	U	0.32	N/A	0.17	No	Max SQL< SV
gamma-BHC (Lindane)	**2**	**3**	**0.055**	**0.055**	**0.2**	**0.51**	**041M170301**	**0.51**		**0.32**	**1**	**1.59**	**Yes**	**Max Detect > SV**

Table 10-6-6
Wetland 17 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Pesticides (g/kg) - cont.														
Total BHC	**2**	**3**	**0.22**	**0.22**	**0.35**	**0.651**	**041M170301**	**0.651**		**0.32**	**2**	**2.03**	**Yes**	**Max Detect > SV**
4,4'-DDD	1	3	0.095	0.105	0.23	0.23	041M170101	0.23	J	1.22	1	0.19	No	Max Detect < SV
4,4'-DDE	1	3	0.095	0.105	0.3	0.3	041M170101	0.3		2.07	1	0.15	No	Max Detect < SV
4,4'-DDT	0	3	0.095	0.115			ND	0.115	U	1.19	1	0.10	No	Max SQL< SV
Total DDT	1	3	0.285	0.315	0.645	0.645	041M170101	0.645		3.3	2	0.20	No	Max Detect < SV
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	3	185	225			ND	225	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	3	185	225			ND	225	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	3	185	225			ND	225	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	3	185	225			ND	225	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	3	185	225			ND	225	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	3	450	550			ND	550	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	3	185	225			ND	225	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	3	185	225			ND	225	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	3	185	225			ND	225	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	3	450	550			ND	550	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	3	185	225			ND	225	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	3	185	225			ND	225	U		N/A		Yes	No SV
2-Chloronaphthalene	0	3	185	225			ND	225	U		N/A		Yes	No SV
2-Chlorophenol	0	3	185	225			ND	225	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	3	450	550			ND	550	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	3	185	225			ND	225	U		N/A		Yes	No SV
2-Nitroaniline	0	3	185	225			ND	225	U		N/A		Yes	No SV
2-Nitrophenol	0	3	185	225			ND	225	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	3	185	225			ND	225	U		N/A		Yes	No SV
3-Nitroaniline	0	3	450	550			ND	550	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	3	185	225			ND	225	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	3	185	225			ND	225	U		N/A		Yes	No SV
4-Chloroaniline	0	3	185	225			ND	225	UJ		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	3	185	225			ND	225	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	0	3	185	225			ND	225	U		N/A		Yes	No SV
4-Nitroaniline	0	3	450	550			ND	550	U		N/A		Yes	No SV
4-Nitrophenol	0	3	450	550			ND	550	U		N/A		Yes	No SV
Benzo(b)fluoranthene	0	3	18.5	22.5			ND	22.5	U		N/A		No	TOC normalized PAHs < TEC
Benzo(g,h,i)perylene	0	3	18.5	22.5			ND	22.5	U		N/A		No	TOC normalized PAHs < TEC
Benzo(k)fluoranthene	0	3	18.5	22.5			ND	22.5	U		N/A		No	TOC normalized PAHs < TEC
bis(2-Chloroethoxy)methane	0	3	185	225			ND	225	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	3	18.5	22.5			ND	22.5	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**1**	**3**	**185**	**225**	**2,300**	**2,300**	**041M170201**	**2,300**		**182**	**1, 2**	**12.6**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	0	3	185	225			ND	225	U	182	1, 2	1.24	Yes	Max SQL > SV
Carbazole	0	3	185	225			ND	225	U		N/A		Yes	No SV
Dibenzofuran	0	3	185	225			ND	225	U		N/A		Yes	No SV
Diethylphthalate	0	3	185	225			ND	225	U	182	1, 2	1.24	Yes	Max SQL > SV
Dimethylphthalate	0	3	185	225			ND	225	U	182	1, 2	1.24	Yes	Max SQL > SV
Di-n-butylphthalate	0	3	185	225			ND	225	U	182	1, 2	1.24	Yes	Max SQL > SV
Di-n-octylphthalate	0	3	185	225			ND	225	U	182	1, 2	1.24	Yes	Max SQL > SV
Hexachlorobenzene	0	3	185	225			ND	225	U		N/A		Yes	No SV
Hexachlorobutadiene	0	3	185	225			ND	225	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	3	185	225			ND	225	U		N/A		Yes	No SV
Hexachloroethane	0	3	185	225			ND	225	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	3	18.5	22.5			ND	22.5	U		N/A		No	TOC normalized PAHs < TEC
Isophorone	0	3	185	225			ND	225	U		N/A		Yes	No SV
Nitrobenzene	0	3	185	225			ND	225	U		N/A		Yes	No SV
N-Nitroso-di-n-propylaMine	0	3	18.5	22.5			ND	22.5	U		N/A		Yes	No SV
N-NitrosodiphenylaMine	0	3	185	225			ND	225	U		N/A		Yes	No SV
Pentachlorophenol	0	3	450	550			ND	550	U		N/A		Yes	No SV
Phenol	0	3	185	225			ND	225	U		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,1-Dichloroethane	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,2-Dichloropropane	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
2-Butanone (MEK)	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
2-Hexanone	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Acetone	0	3	6	7			ND	7	U		N/A		Yes	No SV

Table 10-6-6
Wetland 17 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
VOCs (g/kg) - cont.														
Benzene	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Bromodichloromethane	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Bromoform	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Bromomethane	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Carbon disulfide	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Carbon tetrachloride	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Chlorobenzene	1	3	6	6.5	2	2	041M170101	2	J		N/A		Yes	No SV
Chloroethane	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Chloroform	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Chloromethane	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Dibromochloromethane	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Ethylbenzene	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Methylene chloride	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Styrene	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Tetrachloroethene	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Toluene	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Trichloroethene	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV
Vinyl chloride	0	3	2	2			ND	2	U		N/A		Yes	No SV
Xylene (Total)	0	3	6	6.5			ND	6.5	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 10-6-7
Wetland 17 Phase II
Sediment COPCs Retained after Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	gamma-BHC (Lindane)	bis(2-Ethylhexyl)phthalate (BEHP)	Chlorobenzene
Barium	Total BHC		
Calcium			
Cobalt			
Iron			
Magnesium			
Manganese			
Potassium			
Sodium			
Thallium			
Vanadium			
		Not Detected Parameters	
Beryllium	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Cyanide (CN)	alpha-BHC	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
Selenium	Endosulfan I	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Endosulfan II	1,4-Dichlorobenzene	1,1-Dichloroethane
	Endosulfan sulfate	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Heptachlor	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Heptachlor epoxide	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
	Methoxychlor	2,4-Dichlorophenol	1,2-Dichloropropane
	Toxaphene	2,4-Dimethylphenol	2-Butanone (MEK)
		2,4-Dinitrophenol	2-Hexanone
		2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
		2,6-Dinitrotoluene	Acetone
		2-Chloronaphthalene	Benzene
		2-Chlorophenol	Bromodichloromethane
		2-Methyl-4,6-Dinitrophenol	Bromoform
		2-Methylphenol (o-Cresol)	Bromomethane
		2-Nitroaniline	Carbon disulfide
		2-Nitrophenol	Carbon tetrachloride
		3,3'-Dichlorobenzidine	Chloroethane
		3-Nitroaniline	Chloroform
		4-Bromophenyl-phenylether	Chloromethane
		4-Chloro-3-methylphenol	cis-1,3-Dichloropropene
		4-Chloroaniline	Dibromochloromethane
		4-Chlorophenylphenyl ether	Ethylbenzene
		4-Methylphenol (p-Cresol)	Methylene chloride
		4-Nitroaniline	Styrene
		4-Nitrophenol	Tetrachloroethene
		bis(2-Chloroethoxy)methane	Toluene
		bis(2-Chloroethyl)ether	trans-1,3-Dichloropropene
		Butylbenzylphthalate	Trichloroethene
		Carbazole	Vinyl chloride
		Dibenzofuran	Xylene (Total)
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 10-6-8
Wetland 17 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	3	3				599	438	842	842		041M170301			NA					0	4,274	0	No	EPC < RC
Barium	3	3				0.57	0.48	0.73	0.73	J	041M170301			NA					0	3.84	0	No	EPC < RC
Beryllium	0	3	0.0333	0.03	0.035	0.0333			0.035	U	ND			NA					0	0.13	0	No	Parameter Not Detected
Calcium	3	3				87.6	57.5	129	129	J	041M170301			NA					0	1,978.80	0	No	EPC < RC
Cobalt	2	3	0.065	0.065	0.065	0.125	0.14	0.17	0.17	J	041M170301			NA					0	0.91	0	No	EPC < RC
Cyanide (CN)	0	3	0.305	0.295	0.315	0.305			0.315	U	ND			NA					0	1.29	0	No	Parameter Not Detected
Iron	3	3				795	467	1,190	1,190		041M170301			NA					0	2,684.40	0	No	EPC < RC
Magnesium	3	3				198	114	320	320	J	041M170301			NA					0	2,943.60	0	No	EPC < RC
Manganese	3	3				1.63	0.8	2.4	2.4		041M170301			NA					0	9.81	0	No	EPC < RC
Potassium	3	3				72.3	39.1	119	119	J	041M170301			NA					0	899.72	0	No	EPC < RC
Selenium	0	3	0.13	0.125	0.135	0.13			0.135	UJ	ND			NA					0	0.66	0	No	Parameter Not Detected
Sodium	3	3				713	275	1,350	1,350		041M170301			NA					0	11,439.60	0	No	EPC < RC
Thallium	1	3	0.128	0.125	0.13	0.188	0.31	0.31	0.31	J	041M170101			NA					0	0.39	0	No	EPC < RC
Vanadium	3	3				1.7	1.4	2.1	2.1	J	041M170301			NA					0	8.59	0	No	EPC < RC
Pesticides (g/kg)																							
Aldrin	0	3	0.0507	0.047	0.055	0.0507			0.055	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan I	0	3	0.0507	0.047	0.055	0.0507			0.055	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	3	0.105	0.095	0.115	0.105			0.115	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	0	3	0.105	0.095	0.115	0.105			0.115	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor	0	3	0.0507	0.047	0.055	0.0507			0.055	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	3	0.0507	0.047	0.055	0.0507			0.055	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	3	0.507	0.47	0.55	0.507			0.55	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	3	10.5	9.5	11.5	10.5			11.5	U	ND			NA					0		0	No	Parameter Not Detected
alpha-BHC	0	3	0.0507	0.047	0.055	0.0507			0.055	UJ	ND		0.99	PEL			0.06	0.05	0		0	No	Parameter Not Detected
gamma-BHC (Lindane)	2	3	0.055	0.055	0.055	0.255	0.2	0.51	0.51		041M170301	0.32	0.99	PEL	1.59	0.80	0.52	0.26	0		0	No	RV HQ <1 and no RC
Total BHC	2	3	0.22	0.22	0.22	0.407	0.35	0.651	0.651		041M170301	0.32	0.99	PEL	2.03	1.27	0.66	0.41	0		0	No	RV HQ <1 and no RC
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	3	495	450	550	495			550	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	3	495	450	550	495			550	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	3	495	450	550	495			550	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	3	495	450	550	495			550	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	3	203	185	225	203			225	UJ	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	3	495	450	550	495			550	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	3	495	450	550	495			550	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	3	20.3	18.5	22.5	20.3			22.5	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	1	3	205	185	225	903	2,300	2,300	2,300		041M170201	182	2,647	PEL	12.6	4.96	0.87	0.34	0		0	No	RV HQ <1 and no RC
Butylbenzylphthalate	0	3	203	185	225	203			225	U	ND	182	2,647	PEL	1.24	1.12	0.09	0.08	0		0	No	Parameter Not Detected
Carbazole	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	0	3	203	185	225	203			225	U	ND	182	2,647	PEL	1.24	1.12	0.09	0.08	0		0	No	Parameter Not Detected
Dimethylphthalate	0	3	203	185	225	203			225	U	ND	182	2,647	PEL	1.24	1.12	0.09	0.08	0		0	No	Parameter Not Detected
Di-n-butylphthalate	0	3	203	185	225	203			225	U	ND	182	2,647	PEL	1.24	1.12	0.09	0.08	0		0	No	Parameter Not Detected
Di-n-octylphthalate	0	3	203	185	225	203			225	U	ND	182	2,647	PEL	1.24	1.12	0.09	0.08	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	3	20.3	18.5	22.5	20.3			22.5	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	3	495	450	550	495			550	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	3	203	185	225	203			225	U	ND			NA					0		0	No	Parameter Not Detected

Table 10-6-8
Wetland 17 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Hexanone	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	0	3	6.5	6	7	6.5			7	U	ND			NA					0		0	No	Parameter Not Detected
Benzene	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	1	3	6.25	6	6.5	4.83	2	2	2	J	041M170101			NA					0		0	Yes	No SV, no RV, and no RC
Chloroethane	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	3	2	2	2	2			2	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	3	6.33	6	6.5	6.33			6.5	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 10-6-9
Wetland 17 Phase II
Sediment COPCs Retained after Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
None	None	None	None

Table 10-6-10
Wetland 17 Phase I
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M170101	1/15/1996	mg/kg	0.58	J	Arsenic	8.2	70	0.01
041M170101	1/15/1996	mg/kg	0.065	U	Cadmium	1.2	9.6	0.01
041M170101	1/15/1996	mg/kg	2.1		Chromium	81	370	0.01
041M170101	1/15/1996	mg/kg	0.87	J	Copper	34	270	0.00
041M170101	1/15/1996	mg/kg	2.2		Lead	46.7	218	0.01
041M170101	1/15/1996	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M170101	1/15/1996	mg/kg	0.3	U	Nickel	20.9	51.6	0.01
041M170101	1/15/1996	mg/kg	0.17	U	Silver	1	3.7	0.05
041M170101	1/15/1996	mg/kg	2.4		Zinc	150	410	0.01
041M170101	1/15/1996	g/kg	0.3		4,4'-DDE	2.2	27	0.01
041M170101	1/15/1996	g/kg	0.115	U	4,4'-DDT	1.58	46.1	0.00
041M170101	1/15/1996	g/kg	10.8		Total PCBs	22.7	180	0.06
041M170101	1/15/1996	g/kg	22.5	U	2-Methylnaphthalene	70	670	0.03
041M170101	1/15/1996	g/kg	11	U	Acenaphthene	16	500	0.02
041M170101	1/15/1996	g/kg	22.5	U	Acenaphthylene	44	640	0.04
041M170101	1/15/1996	g/kg	22.5	U	Anthracene	85.3	1,100	0.02
041M170101	1/15/1996	g/kg	22.5	U	Benzo(a)anthracene	261	1,600	0.01
041M170101	1/15/1996	g/kg	22.5	U	Benzo(a)pyrene	430	1,600	0.01
041M170101	1/15/1996	g/kg	22.5	U	Chrysene	384	2,800	0.01
041M170101	1/15/1996	g/kg	22.5	U	Dibenz(a,h)anthracene	63.4	260	0.09
041M170101	1/15/1996	g/kg	22.5	U	Fluoranthene	600	5,100	0.00
041M170101	1/15/1996	g/kg	11	U	Fluorene	19	540	0.02
041M170101	1/15/1996	g/kg	22.5	U	Naphthalene	160	2,100	0.01
041M170101	1/15/1996	g/kg	22.5	U	Phenanthrene	240	1,500	0.02
041M170101	1/15/1996	g/kg	22.5	U	Pyrene	665	2,600	0.01
041M170101	1/15/1996				ERM Quotient Sum			0.49
041M170101	1/15/1996				Mean ERM Quotient			0.02
041M170101	1/15/1996				Mean ERM Quotient without ND			0.00
041M170101	1/15/1996				Mean ERM Quotient Category			1
041M170201	1/15/1996	mg/kg	0.34	J	Arsenic	8.2	70	0.00
041M170201	1/15/1996	mg/kg	0.065	U	Cadmium	1.2	9.6	0.01
041M170201	1/15/1996	mg/kg	3		Chromium	81	370	0.01
041M170201	1/15/1996	mg/kg	0.75	J	Copper	34	270	0.00
041M170201	1/15/1996	mg/kg	2.2		Lead	46.7	218	0.01
041M170201	1/15/1996	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M170201	1/15/1996	mg/kg	0.28	U	Nickel	20.9	51.6	0.01
041M170201	1/15/1996	mg/kg	0.155	U	Silver	1	3.7	0.04
041M170201	1/15/1996	mg/kg	1.8		Zinc	150	410	0.00
041M170201	1/15/1996	g/kg	0.105	U	4,4'-DDE	2.2	27	0.00
041M170201	1/15/1996	g/kg	0.105	U	4,4'-DDT	1.58	46.1	0.00
041M170201	1/15/1996	g/kg	8.12		Total PCBs	22.7	180	0.05
041M170201	1/15/1996	g/kg	20	U	2-Methylnaphthalene	70	670	0.03
041M170201	1/15/1996	g/kg	9.5	U	Acenaphthene	16	500	0.02
041M170201	1/15/1996	g/kg	20	U	Acenaphthylene	44	640	0.03
041M170201	1/15/1996	g/kg	20	U	Anthracene	85.3	1,100	0.02
041M170201	1/15/1996	g/kg	20	U	Benzo(a)anthracene	261	1,600	0.01
041M170201	1/15/1996	g/kg	20	U	Benzo(a)pyrene	430	1,600	0.01
041M170201	1/15/1996	g/kg	20	U	Chrysene	384	2,800	0.01
041M170201	1/15/1996	g/kg	20	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M170201	1/15/1996	g/kg	20	U	Fluoranthene	600	5,100	0.00
041M170201	1/15/1996	g/kg	9.5	U	Fluorene	19	540	0.02
041M170201	1/15/1996	g/kg	20	U	Naphthalene	160	2,100	0.01
041M170201	1/15/1996	g/kg	20	U	Phenanthrene	240	1,500	0.01
041M170201	1/15/1996	g/kg	20	U	Pyrene	665	2,600	0.01
041M170201	1/15/1996				ERM Quotient Sum			0.43
041M170201	1/15/1996				Mean ERM Quotient			0.02
041M170201	1/15/1996				Mean ERM Quotient without ND			0.00
041M170201	1/15/1996				Mean ERM Quotient Category			1
041M170301	1/15/1996	mg/kg	0.27	J	Arsenic	8.2	70	0.00
041M170301	1/15/1996	mg/kg	0.09	U	Cadmium	1.2	9.6	0.01
041M170301	1/15/1996	mg/kg	3.6		Chromium	81	370	0.01
041M170301	1/15/1996	mg/kg	1.3	J	Copper	34	270	0.00
041M170301	1/15/1996	mg/kg	3.4		Lead	46.7	218	0.02
041M170301	1/15/1996	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M170301	1/15/1996	mg/kg	0.295	U	Nickel	20.9	51.6	0.01
041M170301	1/15/1996	mg/kg	0.165	U	Silver	1	3.7	0.04
041M170301	1/15/1996	mg/kg	4.2		Zinc	150	410	0.01
041M170301	1/15/1996	g/kg	0.095	U	4,4'-DDE	2.2	27	0.00
041M170301	1/15/1996	g/kg	0.095	U	4,4'-DDT	1.58	46.1	0.00
041M170301	1/15/1996	g/kg	7.3		Total PCBs	22.7	180	0.04
041M170301	1/15/1996	g/kg	18.5	U	2-Methylnaphthalene	70	670	0.03
041M170301	1/15/1996	g/kg	9	U	Acenaphthene	16	500	0.02
041M170301	1/15/1996	g/kg	18.5	U	Acenaphthylene	44	640	0.03
041M170301	1/15/1996	g/kg	18.5	U	Anthracene	85.3	1,100	0.02
041M170301	1/15/1996	g/kg	18.5	U	Benzo(a)anthracene	261	1,600	0.01
041M170301	1/15/1996	g/kg	18.5	U	Benzo(a)pyrene	430	1,600	0.01
041M170301	1/15/1996	g/kg	18.5	U	Chrysene	384	2,800	0.01
041M170301	1/15/1996	g/kg	18.5	U	Dibenz(a,h)anthracene	63.4	260	0.07
041M170301	1/15/1996	g/kg	18.5	U	Fluoranthene	600	5,100	0.00
041M170301	1/15/1996	g/kg	9	U	Fluorene	19	540	0.02
041M170301	1/15/1996	g/kg	18.5	U	Naphthalene	160	2,100	0.01
041M170301	1/15/1996	g/kg	18.5	U	Phenanthrene	240	1,500	0.01
041M170301	1/15/1996	g/kg	18.5	U	Pyrene	665	2,600	0.01
041M170301	1/15/1996				ERM Quotient Sum			0.43
041M170301	1/15/1996				Mean ERM Quotient			0.02
041M170301	1/15/1996				Mean ERM Quotient without ND			0.00
041M170301	1/15/1996				Mean ERM Quotient Category			1

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 10-6-11
Wetland 17 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	0	1	27.2	27.15	27.15	27.2			ND	27.15	U		NA		Yes	No SV
Antimony	0	1	1	1	1	1			ND	1	UJ		NA		Yes	No SV
Arsenic	1	1				2.2	2.2	2.2	041W170101	2.2	J	36	EPA	0.06	No	Max Detect < SV
Barium	1	1				10.6	10.6	10.6	041W170101	10.6	J		NA		Yes	No SV
Beryllium	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Cadmium	0	1	1.3	1.3	1.3	1.3			ND	1.3	U	9.3	EPA	0.14	No	Max SQL< SV
Calcium	1	1				106,000	106,000	106,000	041W170101	106,000			NA		Yes	No SV
Chromium	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	50	EPA	0.05	No	Max SQL< SV
Cobalt	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Copper	0	1	2	2	2	2			ND	2	U	2.9	EPA	0.69	No	Max SQL< SV
Cyanide (CN)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	1	EPA	2.5	Yes	Max SQL > SV
Iron	1	1				263	263	263	041W170101	263			NA		Yes	No SV
Lead	0	1	1	1	1	1			ND	1	U	8.5	EPA	0.12	No	Max SQL< SV
Magnesium	1	1				356,000	356,000	356,000	041W170101	356,000			NA		Yes	No SV
Manganese	1	1				7.4	7.4	7.4	041W170101	7.4	J		NA		Yes	No SV
Mercury	0	1	0.065	0.065	0.065	0.065			ND	0.065	U	0.025	EPA	2.6	Yes	Max SQL > SV
Nickel	0	1	4.5	4.5	4.5	4.5			ND	4.5	U	8.3	EPA	0.54	No	Max SQL< SV
Potassium	1	1				109,000	109,000	109,000	041W170101	109,000			NA		Yes	No SV
Selenium	0	1	2	2	2	2			ND	2	U	71	EPA	0.03	No	Max SQL< SV
Silver	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	0.23	EPA	10.9	Yes	Max SQL > SV
Sodium	1	1				3,040,000	3,040,000	3,040,000	041W170101	3,040,000			NA		Yes	No SV
Thallium	**1**	**1**				**16.3**	**16.3**	**16.3**	**041W170101**	**16.3**		**6.3**	**FDEP**	**2.59**	**Yes**	**Max Detect > SV**
Vanadium	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Zinc	1	1				4.7	4.7	4.7	041W170101	4.7	J	86	EPA	0.05	No	Max Detect < SV
Pesticides (g/L)																
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0087	EPA	2.87	Yes	Max SQL > SV
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0036	EPA	6.94	Yes	Max SQL > SV
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.004	EPA	12.5	Yes	Max SQL > SV
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	UJ	0.005	FDEP	5	Yes	Max SQL > SV
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.016	EPA	1.56	Yes	Max SQL > SV
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	FDEP	35.7	Yes	Max SQL > SV
Total PCB	0	1	4	4	4	4			ND	4	U		NA		Yes	No SV

Table 10-6-11
Wetland 17 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Nitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Di-n-butylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	3.4	EPA	0.74	No	Max SQL< SV
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pentachlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chrysene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluorene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Naphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	23.5	EPA	0.02	No	Max SQL< SV
Phenanthrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Total PAH	0	1	6.5	6.5	6.5	6.5			ND	6.5	U		NA		Yes	No SV

Table 10-6-11
Wetland 17 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
VOCs (g/L)																
1,1,1-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	270	FDEP	0.00	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.16	No	Max SQL< SV
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	19.7	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	3	FDEP	0.17	No	Max SQL< SV
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	71.28	FDEP	0.01	No	Max SQL< SV
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	17	FDEP	0.03	No	Max SQL< SV
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	470.8	FDEP	0.00	No	Max SQL< SV
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	4.3	EPA	0.12	No	Max SQL< SV
Methylene chloride	1	1				38	38	38	041W170101	38	D	1,580	FDEP	0.02	No	Max Detect < SV
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	37	EPA	0.01	No	Max SQL< SV
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Vinyl chloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 10-6-12
Wetland 17 Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Barium	None	None	None
Calcium			
Iron			
Magnesium			
Manganese			
Potassium			
Sodium			
Thallium			
		Not Detected Parameters	
Aluminum	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Antimony	Dieldrin	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1,2-Trichloroethane
Beryllium	Endosulfan I	2,4,5-Trichlorophenol	1,1-Dichloroethane
Cobalt	Endosulfan II	2,4,6-Trichlorophenol	1,2-Dibromo-3-Chloropropane
Cyanide (CN)	Endosulfan sulfate	2,4-Dichlorophenol	1,2-Dibromoethane
Mercury	Heptachlor	2,4-Dimethylphenol	1,2-Dichloroethane
Silver	Heptachlor epoxide	2,4-Dinitrophenol	1,2-Dichloropropane
Vanadium	Methoxychlor	2,4-Dinitrotoluene	1,3-Dichlorobenzene
	Toxaphene	2,6-Dinitrotoluene	2-Hexanone
	alpha-Chlordane	2-Chloronaphthalene	4-Methyl-2-Pentanone (MIBK)
	gamma-Chlordane	2-Chlorophenol	Bromochloromethane
	Total Chlordane	2-Methyl-4,6-Dinitrophenol	Bromodichloromethane
	Endrin	2-Methylphenol (o-Cresol)	Bromoform
	Endrin aldehyde	2-Nitroaniline	Bromomethane
	Endrin ketone	2-Nitrophenol	Carbon disulfide
	Total Endrin	3,3'-Dichlorobenzidine	Carbon tetrachloride
	alpha-BHC	3-Nitroaniline	Chloroethane
	beta-BHC	4-Bromophenyl-phenylether	Chloromethane
	delta-BHC	4-Chloro-3-methylphenol	cis-1,2-Dichloroethene
	gamma-BHC (Lindane)	4-Chloroaniline	cis-1,3-Dichloropropene
	Total BHC	4-Chlorophenylphenyl ether	Dibromochloromethane
	4,4'-DDD	4-Methylphenol (p-Cresol)	Styrene
	4,4'-DDE	4-Nitroaniline	Tetrachloroethene
	4,4'-DDT	4-Nitrophenol	trans-1,2-Dichloroethene
	Total DDT	Benzo(b)fluoranthene	trans-1,3-Dichloropropene
	Aroclor-1016	Benzo(g,h,i)perylene	Trichloroethene
	Aroclor-1221	Benzo(k)fluoranthene	Vinyl chloride
	Aroclor-1232	bis(2-Chloroethoxy)methane	Xylene (Total)
	Aroclor-1242	bis(2-Chloroethyl)ether	
	Aroclor-1248	bis(2-Ethylhexyl)phthalate (BEHP)	
	Aroclor-1254	Butylbenzylphthalate	
	Aroclor-1260	Dibenzofuran	
	Total PCBs	Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 10-6-13
Wetland 17 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Metals (g/L)																			
Aluminum	0	1	27.2	27.15	27.15	27.2			ND	27.15	U		NA			2,927.50	0	No	Max SQL < Ref. Conc.
Antimony	0	1	1	1	1	1			ND	1	UJ		NA			4.15	0	No	Max SQL < Ref. Conc.
Barium	1	1				10.6	10.6	10.6	041W170101	10.6	J		NA			9.43	1	Yes	Max Result > Ref. Conc.
Beryllium	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA			0.82	0	No	Max SQL < Ref. Conc.
Calcium	1	1				106,000	106,000	106,000	041W170101	106,000			NA			76,800	1	No	Essential Nutrient
Cobalt	0	1	1	1	1	1			ND	1	U		NA			2.38	0	No	Max SQL < Ref. Conc.
Cyanide (CN)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	1	EPA	2.5	2.5	4.1	0	No	Max SQL < Ref. Conc.
Iron	1	1				263	263	263	041W170101	263			NA			1,352	0	No	Max Result < Ref. Conc.
Magnesium	1	1				356,000	356,000	356,000	041W170101	356,000			NA			243,650	1	No	Essential Nutrient
Manganese	1	1				7.4	7.4	7.4	041W170101	7.4	J		NA			12.15	0	No	Max Result < Ref. Conc.
Mercury	0	1	0.065	0.065	0.065	0.065			ND	0.065	U	0.025	EPA	3	2.6	0.21	0	No	Max SQL < Ref. Conc.
Potassium	1	1				109,000	109,000	109,000	041W170101	109,000			NA			81,250	1	No	Essential Nutrient
Silver	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	0.23	EPA	11	10.9	3.01	0	No	Max SQL < Ref. Conc.
Sodium	1	1				3,040,000	3,040,000	3,040,000	041W170101	3,040,000			NA			1,952,000	1	No	Essential Nutrient
Thallium	**1**	**1**				**16.3**	**16.3**	**16.3**	**041W170101**	**16.3**		**6.3**	**FDEP**	**3**	**2.59**	**2.55**	**1**	**Yes**	**Max Result > Ref. Conc.**
Vanadium	0	1	1	1	1	1			ND	1	U		NA			6.69	0	No	Max SQL < Ref. Conc.
Pesticides (g/L)																			
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan I	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0087	EPA	3	2.87		0	No	Parameter Not Detected
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0036	EPA	7	6.94		0	No	Parameter Not Detected
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	No	Parameter Not Detected
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	No	Parameter Not Detected
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.004	EPA	12.5	12.5		0	No	Parameter Not Detected
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22	21.7		0	No	Parameter Not Detected
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	UJ	0.005	FDEP	5	5		0	No	Parameter Not Detected
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
gamma-BHC (Lindane)	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.016	EPA	2	1.56		0	No	Parameter Not Detected
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	No	Parameter Not Detected
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	No	Parameter Not Detected
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	No	Parameter Not Detected
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85	84.7		0	No	Parameter Not Detected
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
PCBs (g/L)																			
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA				0	No	Parameter Not Detected
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	FDEP	36	35.7		0	No	Parameter Not Detected
Total PCB	0	1	4	4	4	4			ND	4	U		NA				0	No	Parameter Not Detected
SVOCs (g/L)																			
1,2,4-Trichlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected

Table 10-6-13
Wetland 17 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
SVOCs (g/L) - cont.																			
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Chlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Nitroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
3-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
4-Nitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	No	Parameter Not Detected
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Pentachlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
PAHs (g/L)																			
2-Methylnaphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Acenaphthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Acenaphthylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(a)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(a)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chrysene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Fluorene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Naphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	23.5	EPA	0.02	0.02		0	No	Parameter Not Detected
Phenanthrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Total PAH	0	1	6.5	6.5	6.5	6.5			ND	6.5	U		NA				0	No	Parameter Not Detected
VOCs (g/L)																			
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,1-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected

Table 10-6-13
Wetland 17 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
VOCs (g/L) - cont.																			
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
cis-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Trichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Vinyl chloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Xylene (Total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL

UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 10-6-14
Wetland 17 Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Thallium	None	None	None
Barium			

Table 10-6-15
Wetland 17 Phase IV
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Qual	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	1	1				66	66	66	041W170102	66	I		NA		Yes	No SV
Antimony	0	1	1.95	1.95	1.95	1.95			ND	1.95	U		NA		Yes	No SV
Arsenic	1	1				4.8	4.8	4.8	041W170102	4.8	I	36	EPA	0.13	No	Max Detect < SV
Barium	1	1				18	18	18	041W170102	18			NA		Yes	No SV
Beryllium	1	1				0.62	0.62	0.62	041W170102	0.62	I		NA		Yes	No SV
Cadmium	0	1	0.3	0.3	0.3	0.3			ND	0.3	U	9.3	EPA	0.03	No	Max SQL< SV
Calcium	1	1				240,000	240,000	240,000	041W170102	240,000			NA		Yes	No SV
Chromium	0	1	0.7	0.7	0.7	0.7			ND	0.7	U	50	EPA	0.01	No	Max SQL< SV
Cobalt	0	1	0.6	0.6	0.6	0.6			ND	0.6	U		NA		Yes	No SV
Copper	0	1	0.3	0.3	0.3	0.3			ND	0.3	U	2.9	EPA	0.10	No	Max SQL< SV
Iron	1	1				110	110	110	041W170102	110			NA		Yes	No SV
Lead	0	1	0.95	0.95	0.95	0.95			ND	0.95	U	8.5	EPA	0.11	No	Max SQL< SV
Magnesium	1	1				740,000	740,000	740,000	041W170102	740,000			NA		Yes	No SV
Manganese	1	1				26	26	26	041W170102	26			NA		Yes	No SV
Mercury	0	1	0.039	0.039	0.039	0.039			ND	0.039	U	0.025	EPA	1.56	Yes	Max SQL > SV
Nickel	0	1	0.75	0.75	0.75	0.75			ND	0.75	U	8.3	EPA	0.09	No	Max SQL< SV
Potassium	1	1				280,000	280,000	280,000	041W170102	280,000			NA		Yes	No SV
Selenium	1	1				5.9	5.9	5.9	041W170102	5.9	I	71	EPA	0.08	No	Max Detect < SV
Silver	0	1	0.55	0.55	0.55	0.55			ND	0.55	U	0.23	EPA	2.39	Yes	Max SQL > SV
Sodium	1	1				5,600,000	5,600,000	5,600,000	041W170102	5,600,000			NA		Yes	No SV
Thallium	**1**	**1**				**8.3**	**8.3**	**8.3**	**041W170102**	**8.3**	**I**	**6.3**	**FDEP**	**1.32**	**Yes**	**Max Detect > SV**
Vanadium	0	1	0.35	0.35	0.35	0.35			ND	0.35	U		NA		Yes	No SV
Zinc	0	1	0.3	0.3	0.3	0.3			ND	0.3	U	86	EPA	0.00	No	Max SQL< SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 10-6-16
Wetland 17 Phase IV
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Aluminum	Not Analyzed	Not Analyzed	Not Analyzed
Barium			
Beryllium			
Calcium			
Iron			
Magnesium			
Manganese			
Potassium			
Sodium			
Thallium			
Not Detected Parameters			
Antimony	Not Analyzed	Not Analyzed	Not Analyzed
Cobalt			
Mercury			
Silver			
Vanadium			

Table 10-6-17
Wetland 17 Phase IV
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Metals (µg/L)																			
Aluminum	1	1				66	66	66	041W170102	66	I		NA			2,927.50	0	No	Max Result < Ref. Conc.
Antimony	0	1	1.95	1.95	1.95	1.95			ND	1.95	U		NA			4.15	0	No	Parameter Not Detected
Barium	1	1				18	18	18	041W170102	18			NA			9.43	1	Yes	Max Result > Ref. Conc.
Beryllium	1	1				0.62	0.62	0.62	041W170102	0.62	I		NA			0.82	0	No	Max Result < Ref. Conc.
Calcium	1	1				240,000	240,000	240,000	041W170102	240,000			NA			76,800	1	No	Essential Nutrient
Cobalt	0	1	0.6	0.6	0.6	0.6			ND	0.6	U		NA			2.38	0	No	Parameter Not Detected
Iron	1	1				110	110	110	041W170102	110			NA			1352	0	No	Max Result < Ref. Conc.
Magnesium	1	1				740,000	740,000	740,000	041W170102	740,000			NA			243,650	1	No	Essential Nutrient
Manganese	1	1				26	26	26	041W170102	26			NA			12.15	1	Yes	Max Result > Ref. Conc.
Mercury	0	1	0.039	0.039	0.039	0.039			ND	0.039	U	0.025	EPA	2	1.56	0.21	0	No	Parameter Not Detected
Potassium	1	1				280,000	280,000	280,000	041W170102	280,000			NA			81,250	1	No	Essential Nutrient
Silver	0	1	0.55	0.55	0.55	0.55			ND	0.55	U	0.23	EPA	2.39	2.39	3.01	0	No	Parameter Not Detected
Sodium	1	1				5,600,000	5,600,000	5,600,000	041W170102	5,600,000			NA			1,952,000	1	No	Essential Nutrient
Thallium	**1**	**1**				**8.3**	**8.3**	**8.3**	**041W170102**	**8.3**	**I**	**6.3**	**FDEP**	**1.32**	**1.32**	**2.55**	**1**	**Yes**	**Max Result > Ref. Conc.**
Vanadium	0	1	0.35	0.35	0.35	0.35			ND	0.35	U		NA			6.69	0	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL

UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 10-6-18
Wetland 17 Phase IV
Surface Water COPCs Retained after Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Manganese	Not Analyzed	Not Analyzed	Not Analyzed
Thallium			
Barium			

Table 10-6-19
Wetland 17
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	4.4E+02	=	8.4E+02	=	MG/KG	041M170301	3 / 3	NAV	6.0E+02	1.0E-03	3	1.68E-07	8.42E-08	2.67E-06	1.78E-06
7440393	Barium	N	4.8E-01	J	7.3E-01	J	MG/KG	041M170301	3 / 3	NAV	5.7E-01	1.0E-03	3	1.46E-10	7.30E-11	2.31E-09	1.55E-09
7440484	Cobalt	C	1.4E-01	J	1.7E-01	J	MG/KG	041M170301	2 / 3	N/A / 1.3E-01	1.3E-01	1.0E-03	3	3.40E-11	1.70E-11	7.69E-11	1.29E-10
7439896	Iron	N	4.7E+02	=	1.2E+03	=	MG/KG	041M170301	3 / 3	NAV	7.9E+02	1.0E-03	3	2.38E-07	1.19E-07	3.77E-06	2.52E-06
7439965	Manganese	N	8.0E-01	J	2.4E+00	=	MG/KG	041M170301	3 / 3	NAV	1.6E+00	1.0E-03	3	4.80E-10	2.40E-10	7.60E-09	5.08E-09
7440280	Thallium	N	N/A	N/A	3.1E-01	J	MG/KG	041M170101	1 / 3	2.5E-01 / 2.6E-01	1.9E-01	1.0E-03	3	6.20E-11	3.10E-11	9.81E-10	6.56E-10
7440622	Vanadium	N	1.4E+00	J	2.1E+00	J	MG/KG	041M170301	3 / 3	NAV	1.7E+00	1.0E-03	3	4.20E-10	2.10E-10	6.65E-09	4.44E-09
72548	4,4'-DDD	C	N/A	N/A	2.3E-04	J	MG/KG	041M170101	1 / 3	1.9E-04 / 2.1E-04	1.4E-04	3.0E-02	1	1.38E-12	6.90E-13	3.12E-12	5.22E-12
72559	4,4'-DDE	C	N/A	N/A	3.0E-04	=	MG/KG	041M170101	1 / 3	1.9E-04 / 2.1E-04	1.7E-04	3.0E-02	1	1.80E-12	9.00E-13	4.07E-12	6.80E-12
11096825	Aroclor-1260	C	7.0E-04	J	2.8E-03	=	MG/KG	041M170101	3 / 3	NAV	1.5E-03	1.4E-02	3	7.73E-12	3.86E-12	1.75E-11	2.92E-11
58899	gamma-BHC (Lindane)	C	2.0E-04	J	5.1E-04	=	MG/KG	041M170301	2 / 3	N/A / 1.1E-04	2.6E-04	4.0E-02	2	4.08E-12	2.04E-12	9.23E-12	1.54E-11
117817	(BEHP)	C	N/A	N/A	2.3E+00	=	MG/KG	041M170201	1 / 3	3.7E-01 / 4.5E-01	9.0E-01	1.0E-01	1	4.60E-08	2.30E-08	1.04E-07	1.74E-07
85018	Chlorobenzene	N	N/A	N/A	2.0E-03	J	MG/KG	041M170101	1 / 3	1.2E-02 / 1.3E-02	4.8E-03	1.0E-02	3	4.00E-12	2.00E-12	6.33E-11	4.23E-11

Notes:

Equation for sediment risk:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Equation for DA_{event} for sediment contact:

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

Where:

C_{sd} = Chemical concentration in sediment (mg/kg).
CF = Conversion factor (10^{-6} kg/mg).
AF = Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;
(2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Table 10-6-20
Wetland 17
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABSGI	ABSGI Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser Dermal Hazard Quotient	Child Trespasser Dermal Cancer Risk	Maintenance Worker Dermal Hazard Quotient	Maintenance Worker Dermal Cancer Risk
Sediment Dermal Risk	Aluminum	N	8.4E+02	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	2.7E-05	N/A	1.8E-05	N/A
	Barium	N	7.3E-01	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	4.7E-07	N/A	3.2E-07	N/A
	Cobalt	C	1.7E-01	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	4.8E-09	N/A	8.0E-09	N/A
	Iron	N	1.2E+03	3.0E-01	N/A	1.5E-01	3	4.5E-02	N/A	8.4E-05	N/A	5.6E-05	N/A
	Manganese	N	2.4E+00	2.4E-02	N/A	4.0E-02	1, 3	9.6E-04	N/A	7.9E-06	N/A	5.3E-06	N/A
	Thallium	N	3.1E-01	6.6E-05	N/A	1.5E-01	3	9.9E-06	N/A	9.9E-05	N/A	6.6E-05	N/A
	Vanadium	N	2.1E+00	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	3.7E-05	N/A	2.4E-05	N/A
	4,4'-DDD	C	2.3E-04	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	2.5E-11	N/A	4.2E-11
	4,4'-DDE	C	3.0E-04	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	4.6E-11	N/A	7.7E-11
	Aroclor-1260	C	2.8E-03	N/A	2.0E+00	1.4E-01	2	N/A	1.4E+01	N/A	2.5E-10	N/A	4.2E-10
	gamma-BHC (Lindane)	C	5.1E-04	3.0E-04	1.3E+00	9.7E-01	3	2.9E-04	1.3E+00	3.2E-08	1.2E-11	5.3E-08	2.1E-11
	bis(2-Ethylhexyl)phthalate (BEHP)	C	2.3E+00	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	5.2E-05	1.5E-08	8.7E-05	2.4E-08
	Chlorobenzene	N	2.0E-03	2.0E-02	N/A	7.3E-02	3	1.5E-03	N/A	4.3E-08	N/A	2.9E-08	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfDdermal = Dermal reference dose.
RFDoral =Oral reference dose.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-6-21
Wetland 17
Sediment Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	8.4E+02	1.0E+00	N/A	2.67E-04	N/A	1.71E-04	N/A
	Barium	N	7.3E-01	7.0E-02	N/A	3.30E-06	N/A	2.12E-06	N/A
	Cobalt	C	1.7E-01	2.0E-02	N/A	3.84E-07	N/A	6.18E-07	N/A
	Iron	N	1.2E+03	3.0E-01	N/A	1.26E-03	N/A	8.07E-04	N/A
	Manganese	N	2.4E+00	2.4E-02	N/A	3.17E-05	N/A	2.04E-05	N/A
	Thallium	N	3.1E-01	6.6E-05	N/A	1.49E-03	N/A	9.56E-04	N/A
	Vanadium	N	2.1E+00	7.0E-03	N/A	9.50E-05	N/A	6.11E-05	N/A
	4,4'-DDD	C	2.3E-04	N/A	2.4E-01	N/A	2.50E-12	N/A	4.01E-12
	4,4'-DDE	C	3.0E-04	N/A	3.4E-01	N/A	4.61E-12	N/A	7.41E-12
	Aroclor-1260	C	2.8E-03	N/A	2.0E+00	N/A	2.53E-10	N/A	4.07E-10
	gamma-BHC (Lindane)	C	5.1E-04	3.0E-04	1.3E+00	7.69E-08	3.00E-11	1.24E-07	4.82E-11
	bis(2-Ethylhexyl)phthalate (BEHP)	C	2.3E+00	2.0E-02	1.4E-02	5.20E-06	1.46E-09	8.36E-06	2.34E-09
	Chlorobenzene	N	2.0E-03	2.0E-02	N/A	3.17E-08	N/A	2.04E-08	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = chronic daily intake (mg/kg-day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:

CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:

IRsd = 100 mg/day for age groups greater than 6-years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 10-6-22
Wetland 17
Fish Tissue Ingestion Exposure Recreational Fishermen

Exposure Route	COPC		Sediment Concentration (mg/kg)	BSAF	Estimated Tissue Concentration [a] (mg/kg)	Atrophic transfer factor	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Oral RfD/SF Source	Recreational Ingestion Hazard Quotient	Recreational Ingestion Cancer Risk
Fish Tissue Ingestion	Aluminum	N	8.4E+02	N/A	N/A	N/A	1.0E+00	N/A	2	N/A	N/A
	Barium	N	7.3E-01	N/A	N/A	N/A	7.0E-02	N/A	1, 2	N/A	N/A
	Cobalt	C	1.7E-01	N/A	N/A	N/A	2.0E-02	N/A	2	N/A	N/A
	Iron	N	1.2E+03	4.58E-04	5.45E-01	1.00E+00	3.0E-01	N/A	2	1.50E-04	N/A
	Manganese	N	2.4E+00	N/A	N/A	N/A	2.4E-02	N/A	1, 2	N/A	N/A
	Thallium	N	3.1E-01	N/A	N/A	N/A	6.6E-05	N/A	1, 2	N/A	N/A
	Vanadium	N	2.1E+00	N/A	N/A	N/A	7.0E-03	N/A	2	N/A	N/A
	4,4'-DDD	C	2.3E-04	1.93E+00	4.44E-04	3.08E+00	N/A	2.4E-01	2	N/A	3.86E-09
	4,4'-DDE	C	3.0E-04	1.93E+00	5.79E-04	3.64E+00	N/A	3.4E-01	2	N/A	8.42E-09
	Aroclor-1260	C	2.8E-03	3.21E+00	8.99E-03	3.73E+00	N/A	2.0E+00	2	N/A	7.89E-07
	gamma-BHC (Lindane)	C	5.1E-04	3.55E+00	1.81E-03	1.08E+00	3.0E-04	1.3E+00	1, 2	7.65E-05	2.98E-08
	bis(2-Ethylhexyl)phthalate (BEHP)	C	2.3E+00	1.84E-01	4.23E-01	2.27E+00	2.0E-02	1.4E-02	1, 2	5.65E-04	1.58E-07
	Chlorobenzene	N	2.0E-03	N/A	N/A	N/A	2.0E-02	N/A	2	N/A	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
a = Tissue concentration determined as described in Section 8 of the text; see Table 9.5.

$$CDI = \frac{EPC_t \times IR_t \times EF \times ED \times CF}{BW \times AT}$$

Where:

CDI = Chronic daily intake (mg/kg-day).
EPC_t = Exposure point concentration in sediment (mg/kg).
IR_t = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = conversion factor (0.001 kg/g)
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

IR_t = Fish tissue ingestion rate for sediment (recreational: 26 g/day; subsistence: 170 g/day).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Risk calculation equation, cancer:

$$Risk = CDI \times SF_{oral}$$

Risk calculation equation, non cancer:

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Table 10-6-23
Wetland 17 Phase II
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum Concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7440393	Barium	N	N/A	N/A	1.1E+01	J	UG/L	041W170101	1 / 1	NAV	1.1E+01	1.1E-05	1.0E-03	2.76E-08	4.36E-07	5.83E-07
7439965	Manganese	N	N/A	N/A	7.4E+00	J	UG/L	041W170101	1 / 1	NAV	7.4E+00	7.4E-06	1.0E-03	1.92E-08	3.05E-07	4.07E-07
7440280	Thallium	N	N/A	N/A	1.6E+01	=	UG/L	041W170101	1 / 1	NAV	1.6E+01	1.6E-05	1.0E-03	4.24E-08	6.71E-07	8.97E-07
75092	Methylene chloride	C	N/A	N/A	3.8E+01	D	UG/L	041W170101	1 / 1	NAV	3.8E+01	3.8E-05	3.5E-03	4.28E-07	9.68E-07	3.23E-06

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).

EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 10-6-24
Wetland 17 Phase II
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
	Barium	N	1.1E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	8.9E-05	N/A	1.2E-04	N/A
	Manganese	N	7.4E-06	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	5.4E-05	N/A	7.3E-05	N/A
	Thallium	N	1.6E-05	6.6E-05	N/A	2.0E-01	3, 4	1.3E-05	N/A	5.1E-02	N/A	6.8E-02	N/A
	Methylene chloride	C	3.8E-05	6.0E-02	7.5E-03	1.0E-01	3	6.1E-03	7.4E-02	1.6E-04	7.2E-08	5.3E-04	2.4E-07

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where: = Dermal reference dose.
RfD_{dermal} = Oral reference dose.
RFD_{oral} = Dermal slope factor.
SFdermal = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;
ABS_{GI} (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-6-25
Wetland 17 Phase II
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

						Child Trespasser		Maintenance Worker	
Exposure Route	**COPC**		**Maximum concentration (mg/cm^3)**	**Oral RfD (mg/kg-day)**	**Oral SF (mg/kg-day)-1**	**Ingestion Hazard Quotient**	**Ingestion Cancer Risk**	**Ingestion Hazard Quotient**	**Ingestion Cancer Risk**
	Barium	N	1.1E-05	7.0E-02	N/A	4.8E-09	N/A	3.1E-09	N/A
	Manganese	N	7.4E-06	1.4E-01	N/A	1.7E-09	N/A	1.1E-09	N/A
	Thallium	N	1.6E-05	6.6E-05	N/A	7.8E-06	N/A	5.0E-06	N/A
	Methylene chloride	C	3.8E-05	6.0E-02	7.5E-03	2.9E-09	1.3E-12	4.6E-09	2.1E-12

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from: (1) IRIS; or (2) RAIS.
CDI = Chronic Daily Intake

$$Risk = CDI \times SF_{oral}$$

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

= Chronic daily intake (mg/kg-day).
= Exposure point concentration in surface water (mg/L).
= Incidental ingestion rate for sediment (L/day).
= Exposure frequency (days/year).
= Exposure duration (years).
= Body weight (kg) 70 kg (adult) 45 kg (child).
= Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

= 0.01 L/day exposure to surface water during wading for adolescents and adults.
= 52 dys/yr (child trespasser/adult maintenance worker).
= 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
= 45 kg (child trespasser); 70 kg (adult maintenance worker).
= Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Table 10-6-26
Wetland 17 Phase III
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum Concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	N/A	N/A	6.6E+01	I	UG/L	041W170102	1 / 1	NAV	6.6E+01	6.6E-05	1.0E-03	1.72E-07	2.72E-06	3.63E-06
7440393	Barium	N	N/A	N/A	1.8E+01	=	UG/L	041W170102	1 / 1	NAV	1.8E+01	1.8E-05	1.0E-03	4.68E-08	7.41E-07	9.91E-07
7440417	Beryllium	N	N/A	N/A	6.2E-01	I	UG/L	041W170102	1 / 1	NAV	6.2E-01	6.2E-07	1.0E-03	1.61E-09	2.55E-08	3.41E-08
7439965	Manganese	N	N/A	N/A	2.6E+01	=	UG/L	041W170102	1 / 1	NAV	2.6E+01	2.6E-05	1.0E-03	6.76E-08	1.07E-06	1.43E-06
7782492	Selenium	N	N/A	N/A	5.9E+00	I	UG/L	041W170102	1 / 1	NAV	5.9E+00	5.9E-06	1.0E-03	1.53E-08	2.43E-07	3.25E-07
7440280	Thallium	N	N/A	N/A	8.3E+00	I	UG/L	041W170102	1 / 1	NAV	8.3E+00	8.3E-06	1.0E-03	2.16E-08	3.42E-07	4.57E-07

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).

EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr). Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr). Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr). Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker). Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker). Cancer - 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 10-6-27
Wetland 17 Phase III
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	6.6E-05	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	2.7E-05	N/A	3.6E-05	N/A
	Barium	N	1.8E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	1.5E-04	N/A	2.0E-04	N/A
	Beryllium	N	6.2E-07	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	1.8E-03	N/A	2.4E-03	N/A
	Manganese	N	2.6E-05	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	1.9E-04	N/A	2.6E-04	N/A
	Selenium	N	5.9E-06	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	8.8E-05	N/A	1.2E-04	N/A
	Thallium	N	8.3E-06	6.6E-05	N/A	2.0E-01	3, 4	1.3E-05	N/A	2.6E-02	N/A	3.5E-02	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-6-28
Wetland 17 Phase III
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	6.6E-05	1.0E+00	N/A	2.1E-09	N/A	1.3E-09	N/A
	Barium	N	1.8E-05	7.0E-02	N/A	8.1E-09	N/A	5.2E-09	N/A
	Beryllium	N	6.2E-07	2.0E-03	N/A	9.8E-09	N/A	6.3E-09	N/A
	Manganese	N	2.6E-05	1.4E-01	N/A	5.9E-09	N/A	3.8E-09	N/A
	Selenium	N	5.9E-06	5.0E-03	N/A	3.7E-08	N/A	2.4E-08	N/A
	Thallium	N	8.3E-06	6.6E-05	N/A	4.0E-06	N/A	2.6E-06	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

10.7 Wetland 18 — Screening Level Problem Formulation

10.7.1 Site Description and Habitats Present at Wetland 18

Wetland 18 is adjacent to the eastern shore of Redoubt Bayou, which is along the northern shoreline of Bayou Grande, situated at the midpoint of Pensacola NAS (Figure 10-1). Wetland 18 is influenced by Site 1 due to its proximity to that area. Parsons and Pruitt divided Wetland 18 into two parts, A and B. Wetland 18A is classified as a palustrine emergent system, and Wetland 18B is classified as an estuarine emergent system. Wetland 18A is fed by groundwater seeps from Site 1 to the east and is a long narrow finger-shaped wetland running east to west. Wetland 18A, which is no deeper than a foot, and has a maximum width of 2 feet, transitions to Wetland 18B via a stream, approximately 2-feet wide, and located to the west. Wetland 18B is at the mouth of Wetland 18 and Redoubt Bayou and ranges from 1-foot to 8 feet deep, with a maximum width of 50 feet. Redoubt Bayou borders Wetlands 18A and 18B to the west, and Site 1 borders the wetlands to the east. This entire system is very shallow with occasional surface flow due to the tides. A wetland also receives freshwater flow from a small surface water drainage pattern.

Photograph 1 Wetland 18B — Facing Southeast

As described in Section 10, the landfill was used from the mid-1950s until 1976 as the predominant disposal site for all solid wastes generated on the base. Based on the data collected

during the Site 1 RI, the *Final ROD* issued on August 19, 1998, outlined three RAOs for the OU 1 site:

- Protection of groundwater from leachable compounds
- Restoration of groundwater and prevention of further contamination of shallow/intermediate groundwater
- Prevention of further contamination of surface water in Wetland 3

The remedial actions selected for the site included:

- Institutional controls to restrict groundwater use and intrusive activities
- Implementation of a groundwater monitoring program to ensure that natural processes are effectively reducing the concentrations of organic compounds to attain performance standards
- A groundwater interceptor system to treat the iron-contaminated groundwater that is migrating from the landfill and discharging to Wetland 3

The long-term monitoring plan was implemented by TtNUS. Groundwater was monitored for the following constituents: 1,1,2,2-tetrachlorethane, benzene, chlorobenzene, vinyl chloride, xylenes, aluminum, cadmium, chromium, iron, manganese, and nickel. Based upon collected data, the Third Annual Groundwater Monitoring Report recommended continued monitoring for benzene, xylenes, vinyl chloride, aluminum, cadmium, iron, and manganese (TtNUS, 2003b). The other constituents no longer exceeded MCLs and were dropped from the monitoring plan. Treatment of iron at Wetland 3 is discussed in Section 10.2.

10.7.2 Wetland 18A — Sample Location Description

Phase II Sediment Sample Location Description

Samples from four sampling locations, across the length of Wetland 18A, were collected and analyzed for Wetland 18A ERA (Figure 10-4). Sample location 001M001801 was collected in 1994 as part of the OU 1 investigation. The other three sediment samples were collected in 1995. The sampling events were combined for use in this RI. Table 10-7-1 provides a physical description of the sediments collected at Wetland 18A. Sediments at Wetland 18A were composed of

black silty sand with organics (041M18A201) with 11.9% TOC to dark brown organic silt (041M18A301) with 34.3% TOC.

Phase II Surface Water Sample Location Description

Two surface water samples were collected at Wetland 18A and were collocated with sediment locations 001M001801 and 041M18A201 (Figure 10-4). Table 10-7-2 provides a physical description of the surface water collected at location 041W18A201. Physical parameters were not measured at location 001W001801. Surface water from Wetland 18A was found to be slightly hard and somewhat acidic pH. Sample location 041W18A201 had a turbidity reading of 188 NTUs, and salinity was 0% at this location.

10.7.3 Wetland 18A — Nature and Extent of Contamination

Figure 10-4 presents the sediment sampling locations for Wetland 18. Wetland 18 was investigated in two portions — 18A and 18B — due to differing constituents, Wetland 18A being considered freshwater and Wetland 18B being an estuarine environment.

Phase II Sediment

Table 10-7-3 summarizes the analytical results of the four Wetland 18A Phase II sediment samples.

Metals — Fifteen metals were detected during Phase II sediment sampling at Wetland 18A. The greatest number of metals detected were at locations 041M18A101 and 041M18A301, where all 15 were detected. Location 041M18A101 had barium, copper, and selenium detected at concentrations exceeding the freshwater reference values. At location 041M18A30, only the concentration of barium exceeded the freshwater reference value.

Locations 001M001801 and 041M18A201 had the highest number of reference value exceedances, with four each. Arsenic, barium, copper, iron, manganese, and selenium were the metals detected at Wetland 18A that exceeded their applicable freshwater reference values. The distribution of these metals illustrates no distinct pattern.

Pesticides and PCBs — Nine pesticide compounds were detected during Phase II sediment sampling at Wetland 18A. No PCBs were detected. Total DDT was calculated for each location by adding the concentrations of 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT. Likewise, a base-wide total DDT reference concentration was calculated using the base-wide concentrations for these same constituents.

The greatest number of pesticides detected in Wetland 18A sediment samples was at location 041M18A201, which had seven pesticide compounds reported. Of these, two exceeded the base-wide concentration. Location 001M001801 reported detections of five pesticide compounds; two of these exceeded the base-wide reference concentrations. The sample from 041M18A101 had three pesticides detected, all of which exceeded their reference values. Although pesticides were detected in all samples collected, location 041M18A101 had the highest concentrations.

SVOCs — Four SVOCs were detected in Phase II sediment samples collected at Wetland 18A. Location 041M18A201 had the greatest diversity of compounds, as well as the highest concentrations detected at the wetland.

VOCs — Six VOCs were detected in Phase II sediments collected from Wetland 18A. These compounds were detected in samples locations 041M18A201 and 041M18A301. The other two locations exhibited no detections of VOCs. Overall, the highest concentrations of VOCs were detected at 041M18A201, near the center of the wetland. Generally, lower concentrations were detected at location 041M18A301, also near the center of the wetland.

Phase II Surface Water

Figure 10-4 presents the Phase II surface water sampling locations for Wetland 18A. Table 10-7-4 summarizes the analytical results of the Wetland 18A surface water sample.

Metals — Twelve metals were detected in the surface water sample collected during Phase II sampling. All 12 parameters were reported at location 041W18A201. Aluminum, arsenic, barium, calcium, chromium, iron, lead, manganese, and vanadium were detected at concentrations exceeding their respective fresh water reference concentrations.

Pesticides and PCBs — No pesticide or PCB compounds were detected during Phase II surface water sampling at Wetland 18A.

SVOCs — A single SVOC—1,4-dichlorobenzen — was detected at location 041W18A201.

VOCs — Two VOCs, benzene and chlorobenzene, were detected in the Phase II surface water sample collected from location 041W18A201.

10.7.4 Wetland 18A — Ecological Risk Assessment

Phase II Investigation Summary — Wetland 18A

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-7-5, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-7-6.

Baseline Problem Formulation — Wetland 18A Sediment COPC Refinement

During the COPC refinement, additional information was used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. This risk assessment presents a statement of potential risk for each of the COPCs.

The COPC refinement process included:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to base-wide (reference) concentrations for total DDT
- Comparison of inorganic constituents to reference wetland values
- Interpretive tool for metals
- Di Toro EqP SQGs for VOCs
- Comparison to Swartz consensus values for PAH
- Mean ERM quotients
- Description of exceedances of RVs and their extent

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 10-7-7. Parameters retained after refinement are presented in Table 10-7-8.

For Wetland 18A, arsenic, barium, copper, iron, manganese, potassium, and selenium exceeded their Site 41 freshwater sediment reference concentrations. However, barium concentrations did not appear enriched when normalized to aluminum and iron concentrations using FDEP's interpretative tool (Appendix L). Potassium is an essential nutrient and is not carried forward in the ERA process. At Wetland 18A, barium, iron, manganese, and selenium were retained after the screening and refinement process.

Pesticide constituents were identified as a major concern for this wetland. At Wetland 18A, total DDT, and its daughter products 4,4'-DDD and 4,4'-DDT, were detected at location 041M18A101, and had the highest HQ values for this wetland (Figure 10-5). At Wetland 18A, total DDT was above the base-wide level, indicating that 4,4'-DDT and its daughter products were detected in ranges above regular pesticide application levels. The remaining pesticides detected throughout Wetland 18A include aldrin, total chlordane, total endrin, and total BHC. Pesticides detected in Wetland 18A are being included in the food chain models conducted for OU 1.

When normalized to detected TOC concentrations, both VOCs and PAHs do not appear to be risk drivers for Wetland 18A. Normalized PAHs are shown on Figure 10-6. Other organic constituents retained as COPCs after refinement, include 1,4–dichlorobenzene and 4–methylphenol.

Table 10-7-9 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Based on this approach, three sample locations (001M001801, 041M18A201, and 041M18A301) were determined to be Category 2, indicating sediments in these wetlands, according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this category also has the highest level of uncertainty in predicting toxicity. Location 041M18A101 fell into Category 3, indicating sediments are likely to cause adverse effects. Total DDTs concentrations play the most significant role in driving this location into Category 3. Figure 10-7 shows the Mean ERM category for each sediment sample location at Wetland 18A.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-7-10, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-7-11.

Baseline Problem Formulation — Wetland 18A Surface Water COPC Refinement

During the surface water COPC refinement, additional information was used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs.

The COPC refinement process included:

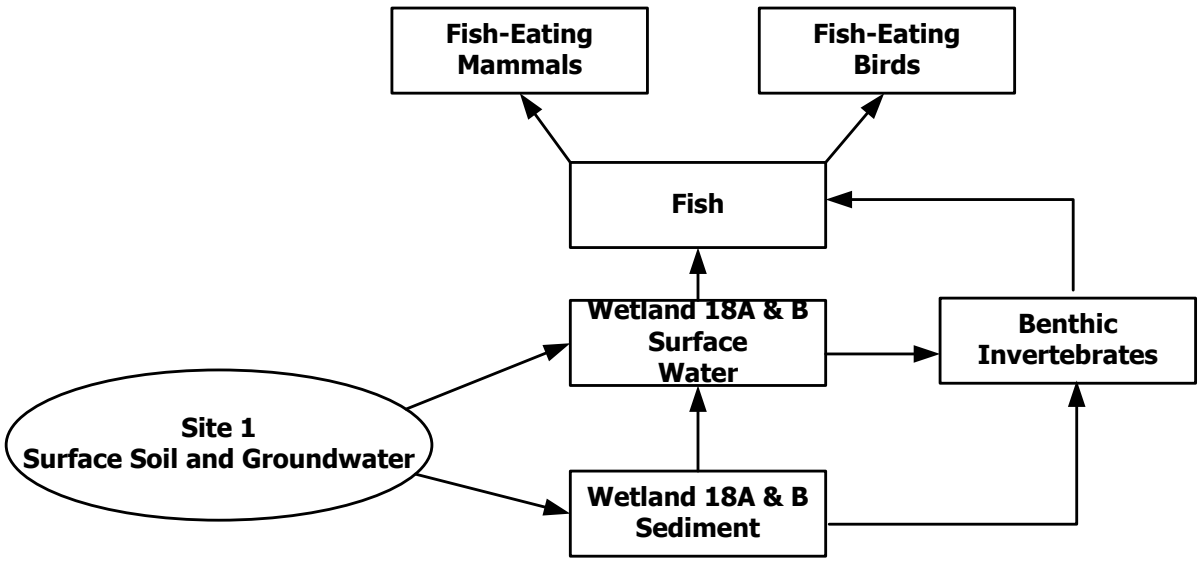
- Comparison of maximum SV concentrations to average SV concentration
- Comparison of inorganic constituents to reference wetland values
- Description of surface water exceedances and their extent

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Tables 10-7-12 and 10-7-13. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland.

For Wetland 18A, aluminum, barium, calcium, chromium, iron, lead, manganese, and vanadium exceeded their Site 41 freshwater reference surface water concentrations (Table 10-7-12) and were retained as potential COPCs. During the Phase II investigation, iron and manganese were retained in both sediment and surface water samples.

The conceptual model below symbolizes which environmental habitats may be impacted by Wetland 18 Phase II constituents retained during the ERA Process.

Wetland 18A & B
Conceptual Site Model



10.7.5 Wetland 18A — Human Health Risk Assessment

Wetland 18 is described in Section 10.7.1, and the HHRA is summarized below.

10.7.5.1 Site Data

Surface water and sediment data were collected at Wetland 18 during Phase II of the RI. Section 10.7.3 summarizes the nature and extent of contamination for this wetland. Surface water and sediment data are summarized in Tables 10-7-3 and 10-7-4.

10.7.5.2 Conceptual Site Model

Wetland 18A is an approximately 2-foot wide freshwater stream that transitions to estuarine Wetland 18B, which is influenced by Bayou Grande. Navy personnel and trespassers could walk and/or wade through the area. Some sediment at this wetland is exposed most of the year, so sediment exposure would be assessed using soil exposure models. Dermal contact could be a significant exposure pathway and was included in this HHRA. Based on the species present, depth of surface water, and available habitat, fishing would not likely occur, and wading would be the most likely exposure scenario.

COPCs were identified as described in Section 9. The following scenarios and exposure pathways were evaluated for this wetland:

Scenario	Medium	Ingestion	Dermal
Maintenance	Sediment	√	√
	Surface water	√	√
Trespasser	Sediment	√	√
	Surface water	√	√

10.7.5.3 Risk Characterization

The child trespasser and adult maintenance worker scenarios were assessed for this wetland.

Wetland 18A

Trespasser

As shown in Tables 10-7-14 through 10-7-16, sediment ingestion and dermal contact risk estimates exceed FDEP's risk threshold of 1E-6, and the only risk driver was arsenic.

As shown in Tables 10-7-17 through 10-7-19, surface water dermal contact estimates exceed FDEP's risk threshold of 1E-6 for arsenic. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 10-7-14 through 10-7-16, sediment ingestion and dermal contact risk estimates exceed FDEP's risk threshold of 1E-6, and the only risk driver was arsenic.

As shown in Tables 10-7-17 through 10-7-19, surface water dermal contact risk estimates for arsenic and benzene exceed FDEP's risk threshold of 1E-6. Hazard indices were below 1.0.

Summary of Wetland 18A Phase Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	5.65E-02	7.00E-06
	Surface water	5.35E-02	6.04E-06
Trespasser	Sediment	7.23E-02	4.27E-06
	Surface water	3.22E-02	1.81E-06

Based on the Phase II data, the COCs identified were arsenic and benzene for Wetland 18A.

Wetland 18A HHRA COC Summary

The following parameters were determined in the HHRA to be COCs for Wetland 18A:

- Arsenic
- Benzene

10.7.6 Wetland 18B — Sample Location Description

Phase II Sediment Sample Location Description

Sediment sample, 041M18B101 was collected during Phase II at Wetland 18B (Figure 10-4). Table 10-7-20 provides a physical description of the Phase II sediment collected at Wetland 18B. Phase II sediment at Wetland 18B was composed of black sandy organic silt with 11.8% TOC.

Phase III Sediment Sample Location Description

A sediment sample was collected for Wetland 18B during the Phase III sampling (Figure 10-8). The sediment at Wetland 18B was mostly composed of fine sand to very fine-grain silt and clay. The TOC concentration was 0.9%.

Phase II Surface Water Sample Location Description

One surface water sample was collected during the Phase II portion of the investigation (Figure 10-4). Table 10-7-22 provides a physical description of the Phase II surface water collected at Wetland 18B.

Phase II surface water from Wetland 18B was found to be slightly hard and somewhat acidic pH. At Wetland 18B, surface water had a turbidity reading of 9 NTUs, and salinity was 0.02%.

10.7.7 Wetland 18B — Nature and Extent of Contamination

Phase II Sediment

Table 10-7-23 summarizes the analytical results of the single Wetland 18B Phase II sediment sample.

Metals — Sixteen metals and cyanide were detected during Phase II sediment sampling at Wetland 18B. Sample 041M18B101 exhibited 12 detections at concentrations above their respective estuarine reference value screening values.

Pesticides and PCBs — Two pesticide compounds were detected during Phase II sediment sampling at Wetland 18B. Total DDT was calculated by adding the concentrations of 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT. Likewise, a base-wide total DDT reference concentration was calculated using the base-wide concentrations for these same constituents. Only 4,4′-DDD and 4,4′-DDT were detected. However, these compounds and total 4,4′-DDT were present at concentrations above their base-wide reference values.

SVOCs — No SVOCs were detected during Phase II sediment sampling at Wetland 18B.

VOCs — Two VOCs were detected in sediment collected from Wetland 18B. Acetone and 2-butanone (MEK) were each detected in this single sample.

Phase III Sediment

Because of the high metals and pesticide concentrations detected during Phase II, Phase III sampling was performed to assess impacts. Table 10-7-24 summarizes the analytical results of the single Phase III Wetland 18B sediment sample (Figure 10-8).

Metals — Sixteen metals were detected during Phase III sediment sampling at Wetland 18B. Cyanide was not detected during this sampling event. Sample location 041M18B101 exhibited the same metals as Phase II; however, during this most recent sampling, all concentrations were greatly reduced. In fact, arsenic, iron, manganese, and selenium concentrations exceeded their estuarine reference values as compared to 12 detected metals and cyanide during Phase II.

Pesticides and PCBs — Three pesticide compounds were detected during Phase III sediment sampling at Wetland 18B. These were 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT. The compound 4,4′-DDE was not detected during Phase II. The concentrations detected were lower than the Phase II concentrations. Only the concentrations of 4,4′-DDT and total DDT exceeded the estuarine reference values.

SVOCs — No SVOCs were detected during Phase III sediment sampling at Wetland 18B.

VOCs — Only acetone was detected in sediments collected during Phase III sampling. The concentration of acetone reported during Phase III was a magnitude less than the Phase II result.

In general, the same analytes and compounds were present in both phases of sampling; however, during Phase III, the concentrations detected were considerably lower.

Phase II Surface Water

Figure 10-4 presents the Phase II surface water sampling locations for Wetland 18B. Table 10-7-25 summarizes the Wetland 18B surface water sample results.

Metals — Seven metals were detected in the single surface water sample collected at location 041W18B101. Concentrations of iron and manganese exceeded their respective estuarine reference values. Detected concentrations of aluminum, calcium, magnesium, potassium, and sodium were below reference concentrations.

Pesticides and PCBs — No pesticides or PCBs were detected during Phase II surface water sampling at Wetland 18B.

SVOCs — A single SVOC, 1,4-dichlorobenzene, was detected at location 041W18B101.

VOCs — Two VOCs, benzene and chlorobenzene, were detected in the Phase II surface water sample collected from location 041W18B101.

10.7.8 Wetland 18B — Ecological Risk Assessment

10.7.8.1 Phase II Investigation Summary — Wetland 18B

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-7-26, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 10-7-27.

Baseline Problem Formulation — Sediment COPC Refinement

The same approach (Section 10.7.4) used to refine Wetland 18A Phase II sediments was applied to Wetland 18B Phase II sediments, except regression analysis was used to assess metals in sediment instead of the interpretative tool, since this wetland is estuarine.

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 10-7-28. COPCs retained after refinement are presented in Table 10-7-29.

For Wetland 18B, aluminum, arsenic, barium, beryllium, calcium, chromium, cyanide, iron, lead, magnesium, manganese, selenium, and vanadium exceeded their Site 41 estuarine sediment reference concentrations (Table 10-7-28). However, chromium and lead concentrations were less than the RVs. Based on regression analysis of the Phase II Wetland 18B data, when compared to aluminum concentrations, chromium was identified as an outlier for sample location 041M18B101. Barium, chromium, and lead were identified as outliers during the comparison of these constituents to iron concentrations. Calcium and magnesium are essential nutrients and are not carried forward in the ERA process. Of the metals detected, arsenic generated the highest HQs (SV HQ = 11.6 and RV HQ = 2).

At Wetland 18B, 4,4'-DDD, 4,4'-DDT, and total DDT were detected above base-wide levels, indicating total DDT and its daughter products are a concern for this wetland and will be carried forward as COPCs. No other pesticides or PCBs were detected in Wetland 18B during Phase II.

When normalized to detected TOC concentrations, both VOCs and PAHs do not appear to be risk drivers for Wetland 18B.

Table 10-7-30 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Figure 10-7 shows the Mean ERM Category of the sediment sample at Wetland 18B. Based on the methods and the approach detailed in Section 8, sample location 041M18B101 was determined to be Category 4, indicating sediments in this wetland have a high probability of causing adverse effects. The primary constituents detected at this location were arsenic and total DDT (both exceeded ERMs at this location).

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-7-31, the surface water sample was compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs retained after screening is included in Table 10-7-32.

Baseline Problem Formulation — Wetland 18B Surface Water COPC Refinement

The same approach (Section 10.7.4) used to refine Wetland 18A Phase II surface water was applied to Wetland 18B Phase II surface water.

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 10-7-33. COPCs retained after refinement are presented in Table 10-7-34. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland.

For Wetland 18B, iron and manganese exceeded their Site 41 reference concentrations (Table 10-7-33) and were carried forward as a COPC.

The conceptual model presented in Section 10.7.4 presents which environmental habitats may be impacted by Wetland 18B Phase II constituents retained during the ERA Process.

10.7.8.2 Phase III Investigation Summary — Wetland 18B

Based on the Phase II results presented above, Wetland 18 (A&B) was identified as a Red-Coded Wetland, indicating that contaminants were detected and the contamination appears to be directly related to nearby IR sites. As described in the approved *Final RI/FS SAP Addendum* (E/A&H, 1997d), Wetland 18 was categorized as a Group C wetland because of its similar contaminants and characteristics. Wetland 18 was selected for sampling in Phase III.

Other Group C wetlands are 4D, 15, 16, and 63A. The following assessment and measurement endpoints were selected:

Wetland Groups and Representative Wetland(s)	Assessment Endpoints	Measurement Endpoints
Wetland 18B	A) Survival of macroinvertebrates associated with the benthic environment (general benthic community)	A1) Polycheate, *Neanthes arenicola,* survival and growth. A2) 10-day amphipod exposure, *Leptocheirus plumulosus,* survival. A3) Benthic community indices
	B) Bioaccumulation in wading birds, mammals and predatory fish	B1) These endpoints will be evaluated in the food-chain model in Section 10.8

As detailed in the *Final RI/FS SAP Addendum* (E/A&H, 1997d), additional data were collected from location 041M18B101 within Wetland 18B, where COPC concentrations, especially pesticides, were high. This sample location was selected because of elevated pesticide concentrations in sediment, which were considered representative of the remainder of the wetlands in Group C. Wetland 18B drains into Bayou Grande and may have the greatest exposure to potential receptors.

This sample was analyzed for the following parameters:

- Laboratory analysis of full TAL/TCL list
- TOC and other physical parameters
- Sediment toxicity testing
- Benthic community indices

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 10-7-35, the sediment sample was compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs retained after screening is included in Table 10-7-36.

Baseline Problem Formulation — Phase III Sediment COPC Refinement

The same approach (Section 10.7.8) used to refine Wetland 18B Phase II sediments were applied to Wetland 18B Phase III sediments.

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 10-7-37. COPCs retained after refinement are presented in Table 10-7-38.

For Wetland 18B, iron, manganese, and selenium exceeded their Site 41 estuarine sediment reference concentrations (Table 10-7-37) and were carried forward as COPCs in the ERA Process. Arsenic was the only metal that generated a SV HQ greater than 1; however, it did not exceed the RV.

At Wetland 18B for Phase III sediment samples, total DDT was detected above base-wide levels, indicating total DDT continues to be a concern for this wetland and will be carried forward as COPCs. Total DDT (152 µg/kg) and 4,4'-DDT (110 µg/kg) were also detected at this sample location and retained as a COPCs. The VOC acetone was detected at a maximum detection of 53 µg/kg. When normalized to detected TOC concentrations, VOCs were not detected at levels expected to cause unacceptable ecological effects. SVOCs were not detected in Wetland 18B during Phase III.

Table 10-7-39 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Figure 10-7 shows the Mean ERM Category of the sediment sample at Wetland 18B. Based on the methods and the approach detailed in Section 8, sample location 041M18B101 was determined to be Category 2, indicating sediments in this wetland, according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this category also has the greatest uncertainty in predicting toxicity.

10.7.8.3 Comparison of Wetland 18B — Phase II and Phase III Sediment Results

Both the Phase II and III results indicate inorganic constituents and pesticides are the greatest concern for Wetland 18B. Concentrations decreased among constituents common to both.

The differences between the Phase II and Phase III sampling efforts are presented below:

Constituent	Phase II Sediment	Phase III Sediment	Difference
Metals mg/kg			
Iron	128,000 mg/kg	20,800 mg/kg	-107,200 mg/kg
Manganese	46.7 mg/kg	10.8 mg/kg	-35.9 mg/kg
Selenium	2.2 mg/kg	0.74 mg/kg	-1.46 mg/kg
Organics g/kg			
4,4'-DDT	1,800 µg/kg	110 µg/kg	-1,690 µg/kg
Total DDT	2,105 µg/kg	152.1 µg/kg	-1,952.9 µg/kg

Notes:
mg/kg = Milligrams per kilogram
µg/kg = Microgram per kilogram

10.7.8.4 Evaluation of Assessment Endpoints

In addition to the chemical analyses, one sediment sample in Wetland 18B was collected during Phase III sampling for whole sediment toxicity testing, species biodiversity analysis, and fish tissue collection (Figure 10-8). The results of these analyses were used as measurement endpoints to evaluate the assessment endpoints identified for Wetland 18B.

Assessment Endpoint A — Survival, Growth, and Emergence of Macroinvertebrates Associated with the Benthic Environment

The benthic invertebrate communities inhabiting the sediments in the fresh-and saltwater marshes included in Site 41 were selected as important biological resources to be evaluated in these habitats. This assessment endpoint is aimed at maintaining an ecologically viable benthic community and organism sustainability.

The benthic macroinvertebrate community was selected because:

- Their relatively sessile life habits cause potential for increased exposure to contaminated sediments.
- They are important component in aquatic food web.
- They are a food source for many species of fish and crustaceans harvested for recreational or commercial purposes.
- Benthos has been documented to be an excellent indicator of habitat condition.

Risk Questions

- Is the toxicity of COPCs to benthic macroinvertebrates in onsite sediments significantly greater than those of control sediments?
- Are the toxic responses lethal or sublethal?
- Do the results of this study show any stressor-response relationship?

To address the risk questions for this assessment endpoint, the following measurement endpoints were proposed:

- Measurement Endpoint A1: Identify sediment locations and concentrations that produce statistically significant reductions in growth (measured by weight) and survival to the polychaete, *Neanthes arenicola*.

- Measurement Endpoint A2: Identify sediment locations and concentrations that produce statistically significant reductions in survival to the amphipod (*Leptocheirus plumulosus*).

- Measurement Endpoint A3: Evaluate the health of the onsite benthic community utilizing benthic community indices.

Measurement Endpoints A1 and A2

The test results are shown and explained below:

Wetland 18B Phase III Sediment Sampling Location	*N. arenicola* Survival/100	*N. arenicola* growth by weight (mg)	*L. Plumulosus* Survival/100
Laboratory Control	100	8.5	99
041M18B101	100	8.4	100

The TAC are met when control survival rates are 90% or above for the control and 80% or above for the sediment being tested. A simple statistical T-test can be performed on sediment performance compared to the control performance once the TAC are met, to determine statistically significant differences between the control test and the sediment being tested.

The toxicity data reflects good results from this wetland sample and indicate that no statistically significant impacts from contaminants in this wetland have been observed.

Measurement Endpoint A3

In addition to collecting sediments for chemical characterization and toxicity tests, sediments were also collected for species identification from location 041M18B101 during the Phase III investigation process. Section 8 describes the process for diversity sampling and explains the importance of evenness and richness.

The diversity findings for Wetland 18 are:

Sample Location	Diversity Results
041M18B101	2.36 Diversity 1.03 Evenness 9.73 Richness

All three components of the biodiversity results (diversity, evenness, and richness) were on the high end of the spectrum. Species identified at Wetland 18B included polychaete worms and *Corbiculid* clams. The polychaete worm, *Capitella capitata*, which is commonly found in highly organic areas and areas suffering from human impact, was found in great abundance at this site.

Assessment Endpoint A: Conclusions

This assessment endpoint is reached by evaluating sediment chemistry, two toxicity test results and community analysis. The Wetland 18B Phase II investigation identified several constituents that were retained through the ERA Process. The Phase III sampling results indicated that sediment in Wetland 18B is not influencing flora and fauna in this wetland.

Assessment Endpoint B: Bioaccumulation in Wading Birds, Mammals and Predatory Fish

To assess risks from contaminants that bioaccumulate, the results from Wetlands 18A and 18B will be used in the OU 1 food-chain model presented in Section 10.8.

Wetland 18B Phase III Summary

Wetland 18B sediments have similar detected constituents, which were retained over time. The constituent levels have decreased over time, as have the TOC levels detected in the sediments.

Based on the selected measurement endpoints, constituents in sediments in Wetland 18B do not appear to be adversely impacting benthic community in this wetland. The impacts of pesticides detected in Wetland 18 on the food web will be evaluated separately on an OU-wide basis.

10.7.9 Wetland 18B — Human Health Risk Assessment

Wetland 18 is described in Section 10.7.1, and the HHRA is summarized below.

10.7.9.1 Site Data

Surface water and sediment data were collected at Wetland 18 during Phase II and Phase III of the RI. Section 10.7.3 summarizes the nature and extent of contamination for this wetland. Surface water and sediment data are summarized in Tables 10-7-23 and 10-7-25.

10.7.9.2 Conceptual Site Model

As described in Section 10.7.1, Wetland 18 is a part of the NAS Pensacola storm water drainage system. Wetland 18A is an approximately 2-foot wide freshwater stream that transitions to estuarine Wetland 18B, which is influenced by Bayou Grande. Navy personnel and trespassers could walk and/or wade through the area. Some sediment at this wetland is exposed most of the year, so sediment exposure would be assessed using soil exposure models. Dermal contact could be a significant exposure pathway and was included in this HHRA. Based on the species present, depth of surface water, and available habitat, fishing would not likely occur, and wading would be the most likely exposure scenario.

COPCs were identified as described in Section 9. The following scenarios and exposure pathways were evaluated for this wetland:

Scenario	Medium	Ingestion	Dermal
Maintenance	Sediment	√	√
	Surface water	√	√
Trespasser	Sediment	√	√
	Surface water	√	√

10.7.9.3 Risk Characterization

The child trespasser and adult maintenance worker scenarios were assessed for this wetland.

Wetland 18B

Phase II

Trespasser

As shown in Tables 10-7-40 through 10-7-42, sediment ingestion and dermal contact risk estimates for trespassers exceed the FDEP risk threshold of 1E-6 for arsenic.

As shown in Tables 10-7-43 through 10-7-45, surface water ingestion and dermal contact risk estimates for trespassers do not exceed the FDEP risk threshold of 1E-6. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 10-7-40 through 10-7-42, sediment ingestion and dermal contact risk estimates for maintenance workers exceed the FDEP risk threshold of 1E-6 for arsenic. As shown in Tables 10-7-43 through 10-7-45, surface water ingestion and dermal contact risk estimates for maintenance workers do not exceed the FDEP risk threshold of 1E-6. Hazard indices were below 1.0.

Phase III

Trespasser

As shown in Tables 10-7-46 through 10-7-48, sediment ingestion and dermal contact risk estimates for trespassers did not exceed the FDEP risk threshold of 1E-6. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 10-7-46 through 10-7-48, sediment ingestion and dermal contact risk estimates for maintenance workers exceed the FDEP risk threshold of 1E-6 for arsenic. Hazard indices were below 1.0.

Summary of Wetland 18B Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	1.35E-01	1.61E-05
	Surface water	9.33E-03	2.45E-07
Trespasser	Sediment	1.75E-01	9.88E-06
	Surface water	6.38E-03	7.34E-08

Based on the data, arsenic was identified as a COC for Wetland 18B phase II.

Summary of Wetland 18B Phase III Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	2.17E-02	2.69E-06
Trespasser	Sediment	2.80E-02	1.65E-06

Based on the data, arsenic was identified as COCs for Wetland 18B phase III.

Wetland 18B HHRA COC Summary

The following parameters were determined in the HHRA to be COCs for Wetland 18B:

- Arsenic

10.7.10 Wetlands 18A and 18B — Fate and Transport Analysis

These wetlands are evaluated together as a complex, because they are contiguous. The complex is located to the northwest and west of Site 1. Six samples from four locations (four sediments and two surface waters) were collected in this wetland complex. The wetland complex drains from the southeast towards Bayou Redoubt (see Figure 10-1).

The sediment COPCs retained after refinement are summarized in Table 10-7-8 for Wetland 18A and Tables 10-7-29 (Phase II) and 10-7-38 (Phase III) for Wetland 18B. The surface water COPCs retained after refinement are summarized in Table 10-7-13 for Wetland 18A and Table 10-7-34 (Phase II) for Wetland 18B. Provided below are the associated soil borings and monitoring wells used for comparing data for the fate and transport analysis.

Associated Wells: 001GI044, 001GM041, 001GS060, 001GI061, 001GI041, 001GI043, 001GS042, 001GM042, 001GS040, 001GS062, 001GI063, 001GI030, 001GM045, 001GM031

Associated Borings: 001SI044, 001SI060, 001S0042, 001SI041, 001SI043, 001S0062, 001SI030

Surface Water/Sediment Transport into Wetland Media:

Surface Water — Storm water data are not available from the area proximal to this wetland; therefore, no statement can be made regarding validation of the pathway via storm water runoff into the wetland. However, the surface drainage to this wetland is from Site 1, the former municipal and industrial waste landfill. The wetlands are surrounded by unpaved areas; therefore, it is likely that the groundwater pathway is more significant than the storm water runoff pathways.

Sediment — Based on soil data from associated borings, the following parameters are valid and significant for the storm water runoff pathway into the Wetland 18A/18B complex:

Wetland 18A — Phase II	Wetland 18B — Phase II	Wetland 18B — Phase III
Barium	Aluminum	Iron
Iron	Arsenic	Manganese
Manganese	Barium	Selenium
Selenium	Iron	4,4'-DDT
4,4'-DDD	Manganese	Total DDT
4,4'-DDT	Selenium	
Endrin	Vanadium	
Total BHCs	4,4'-DDD	
Total DDT	4,4'-DDT	
Total Endrin	Total DDT	

Groundwater to Wetland Media Pathways:

Surface Water — Based on the data from associated wells, the groundwater to surface water pathway is validated and significant for the following parameter (**note:** the 1993 metals data are not used for validation purposes due to potential bias introduced by the sampling methodology):

Wetland 18 A — Phase II	Wetland 18B — Phase II
Aluminum	Iron
Barium	Manganese
Chromium	
Iron	
Lead	
Manganese	

Sediment — Based on the data from associated wells, the groundwater to sediment pathway is validated and significant for the following parameters (**note:** the 1993 metals data are not used for validation purposes due to potential bias introduced by the sampling methodology):

Wetland 18A — Phase II	Wetland 18B — Phase II	Wetland 18B — Phase III
Barium	Aluminum	Iron
Iron	Barium	Manganese
Manganese	Manganese	
1,4-Dichlorobenzene		

Surface Water/Sediment Transport within the Wetlands:

Evaluation of this pathway was conducted by comparing upgradient surface water location 041W18A2 (the most upstream sample location) with 041W18B1 (the most downstream location). Evaluation of the sediment transport pathway was conducted using

upgradient 041M18A1 (the most upstream sample location) and downgradient 041M18B1 (the most downstream sample location).

Surface Water — Evaluation of upgradient location 041W18A2 with downgradient 041W18B1 indicates a decrease in detected parameters (11 metals and three organics) versus the downgradient location (seven metals and three organics). Six metals decreased in concentration, and one metal increased in concentration. All three organic parameters exhibited a decrease in concentration. The decreases in both constituent groups are likely due to dispersion and partitioning to sediment.

Sediment — Evaluation of Phase II results for upgradient location 041M18A1 and downgradient 041M18B1 indicates 15 metals and four organics upgradient versus 17 metals and four organics downgradient. Two metals were present downgradient that were not detected upgradient; two metals decreased in concentration; and 13 metals exhibited a moderate increase. Two organic parameters were present downgradient that were not detected upgradient. One organic parameter increased in concentration, and one organic parameter decreased. There was also a marked decrease exhibited in TOC, downgradient. Overall, the decrease in TOC coupled with the general increase in metals, suggests that sediment transport is occurring in the wetland.

Temporal Evaluation

Wetland 18B — Sediment

One location (041M18B1) was sampled as part of Phase II and Phase III activities. An evaluation of both sets of data indicates the following:

- Location 041M18B1 — 17 metals and four organics were detected during Phase II versus 16 metals and four organics during Phase III. All 16 metals decreased in concentration, and one metal was detected in Phase II that was not present in Phase III. Two organic parameters that were detected in Phase II were not detected in Phase III, and one was detected in Phase III that was not present in Phase II. Of the three organic parameters detected in both phases, all parameters decreased in concentration. Finally, TOC concentrations had decreased in Phase III. It can be concluded that the portion of both inorganic and organic fraction parameters decreased.

Table 10-7-1
Wetland 18A Phase II
Sediment Physical Parameters

Parameter	001M001801	041M18A101	041M18A201	041M18A301
TOC (%)	No Data	20.8	11.9	34.3
Percent Solids (%)	No Data	13.2	8.8	8.7
Grain Size Analysis (percent of composition[1])				
Medium Sand	No Data	22	3	2
Fine Sand	No Data	25	91	2
Silt and Clay	No Data	53	6	96
Description	N/A	Black Sandy Organic Silt	Black Silty Sand with Organics	Dark Brown Organic Silt

Note:
[1] = Derived from sieve analyses.

Table 10-7-2
Wetland 18A Phase II
Surface Water Physical Parameters

Parameter	041W18A201
Hardness as CaCO3 (mg/L)	31.1
pH	5.47
Specific Conductivity (mS/cm)	0.231
Turbidity (NTU)	188
Salinity (%)	0

Notes:
mg/L = Milligrams per liter
pH = Hydrogen ion content
MS/cm = MilliSiemens per centimeter
NTU = Nephelometric turbidity units
% = Percent

Table 10-7-3
Wetland 18A Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
Metals (mg/kg)								
Aluminum	13,610.0	0	4	4	1,550.0	9,540.0	5,480.0	041M18A101
Arsenic	6.62	2	4	4	2.9	31.4	11.4	041M18A201
Barium	14.0	4	4	4	17.9	35.9	24.5	001M001801
Calcium	10,756.67	0	4	4	228.0	6,840.0	3,790.0	001M001801
Chromium	39.37	0	3	4	5.8	8.9	6.64	041M18A201
Copper	19.5	1	3	4	5.2	22.6	12.7	041M18A101
Iron	11,911.67	2	4	4	805.0	48,200.0	18,900.0	041M18A201
Lead	82.47	0	4	4	45.4	70.1	61.2	041M18A101
Magnesium	7,513.33	0	4	4	206.0	1,890.0	889.0	041M18A301
Manganese	37.97	2	4	4	15.3	105.0	57.1	001M001801
Potassium	1,628.67	1	3	4	151.0	322.0	862.0	041M18A301
Selenium	3.45	2	2	4	2.9	3.8	2.93	041M18A101
Sodium	18,993.33	0	4	4	153.0	738.0	428.0	001M001801
Vanadium	28.67	0	3	4	7.3	9.0	8.13	041M18A101
Zinc	36.73	0	4	4	6.7	17.1	11.7	001M001801
PAHs (g/kg)								
Naphthalene	N/A	0	1	4	300.0	300.0	595.0	041M18A201
Total PAHs	N/A	0	1	4	2,880.0	2,880.0	7,410.0	041M18A201
Pesticides and PCBs (g/kg)								
Aldrin	N/A	0	1	4	3.7	3.7	3.77	041M18A201
alpha-Chlordane	N/A	0	2	4	4.8	12.0	4.67	001M001801
gamma-Chlordane	N/A	0	1	4	9.5	9.5	2.99	001M001801
Total Chlordane	N/A	0	2	4	5.4	21.5	7.65	001M001801
Endrin	N/A	0	1	4	13.0	13.0	4.51	001M001801
Endrin ketone	N/A	0	1	4	6.5	6.5	7.21	041M18A201
Total Endrin	N/A	0	2	4	8.9	50.0	17.60	001M001801
beta-BHC	N/A	0	1	4	1.3	1.3	3.17	041M18A201
Total BHC	N/A	0	1	4	3.1	3.1	12.1	041M18A201
4,4'-DDD	50.0	2	4	4	16.0	930.0	286.0	041M18A101
4,4'-DDE	40.0	3	4	4	14.0	270.0	123.0	041M18A101
4,4'-DDT	20.0	2	3	4	1.9	1,200.0	383.0	041M18A101
Total DDT	110.0	3	4	4	31.9	2,400.0	792.0	041M18A101
SVOCs (g/kg)								
1,4-Dichlorobenzene	N/A	0	1	4	1,100.0	1,100.0	1,430.0	041M18A201
4-Methylphenol (p-Cresol)	N/A	0	2	4	170.0	330.0	863.0	041M18A201
Di-n-butylphthalate	N/A	0	3	4	160.0	430.0	640.0	041M18A201
VOCs (g/kg)								
2-Butanone (MEK)	N/A	0	1	3	120.0	120.0	81.7	041M18A301
Acetone	N/A	0	2	3	480.0	750.0	427.0	041M18A201
Benzene	N/A	0	2	3	34.0	50.0	46.3	041M18A301
Chlorobenzene	N/A	0	2	3	46.0	430.0	177.0	041M18A201
Methylene chloride	N/A	0	1	3	750.0	750.0	283.0	041M18A201
Toluene	N/A	0	2	3	85.0	220.0	120.0	041M18A301

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 10-7-4
Wetland 18A Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (g/L)								
Aluminum	1,090.25	1	2	2	237.0	1,220.0	729.0	041W18A201
Arsenic	2.7	1	1	2	68.3	68.3	68.3	041W18A201
Barium	3.68	1	1	2	26.2	26.2	26.2	041W18A201
Calcium	7,675	1	2	2	3,060.0	9,420.0	6,240.0	041W18A201
Chromium	8	1	1	2	15.6	15.6	15.6	041W18A201
Iron	2,360.00	1	2	2	848.0	122,000.0	61,400.0	041W18A201
Lead	3.2	1	1	2	12.2	12.2	12.2	041W18A201
Magnesium	20,260	0	2	2	1,110.0	1,850.0	1,480.0	041W18A201
Manganese	13.2	2	2	2	47.6	144.0	95.8	041W18A201
Potassium	6,995.00	0	2	2	901.0	1,940.0	1,420.0	041W18A201
Sodium	182,200.00	0	2	2	5,340.0	6,160.0	5,750.0	041W18A201
Vanadium	4.7	1	1	2	10.0	10.0	10.0	041W18A201
VOCs (g/L)								
Benzene	N/A	0	1	2	5.0	5.0	5.0	041W18A201
Chlorobenzene	N/A	0	1	2	14.0	14.0	14.0	041W18A201
SVOCs (g/L)								
1,4-Dichlorobenzene	N/A	0	1	1	2.0	2.0	2.0	041W18A201

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 10-7-5
Wetland 18A Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	4	4			1,550	9,540	041M18A101	9,540			N/A		Yes	No SV
Antimony	0	4	0.385	32.1			ND	32.1	U	12	2	2.68	Yes	Max SQL> SV
Arsenic	**4**	**4**			**2.9**	**31.4**	**041M18A201**	**31.4**		**7.24**	**1, 2**	**4.34**	**Yes**	**Max Detect > SV**
Barium	4	4			17.9	35.9	001M001801	35.9			N/A		Yes	No SV
Beryllium	0	4	0.19	1.15			ND	1.15	U		N/A		Yes	No SV
Cadmium	0	4	0.6	3.6			ND	3.6	U	0.676	1	5.33	Yes	Max SQL> SV
Calcium	4	4			228	6,840	001M001801	6,840	J		N/A		Yes	No SV
Chromium	3	4	5.55	5.55	5.8	8.9	041M18A201	8.9		52.3	1, 2	0.17	No	Max Detect < SV
Cobalt	0	4	0.6	4.35			ND	4.35	U		N/A		Yes	No SV
Copper	**3**	**4**	**11.5**	**11.5**	**5.2**	**22.6**	**041M18A101**	**22.6**		**18.7**	**1, 2**	**1.21**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	4	1.85	2.85			ND	2.85	U		N/A		Yes	No SV
Iron	4	4			805	48,200	041M18A201	48,200			N/A		Yes	No SV
Lead	**4**	**4**			**45.4**	**70.1**	**041M18A101**	**70.1**		**30.2**	**1, 2**	**2.32**	**Yes**	**Max Detect > SV**
Magnesium	4	4			206	1,890	041M18A301	1,890	J		N/A		Yes	No SV
Manganese	4	4			15.3	105	001M001801	105			N/A		Yes	No SV
Mercury	0	4	0.15	0.55			ND	0.55	U	0.13	1, 2	4.23	Yes	Max SQL> SV
Nickel	0	4	2.3	42.5			ND	42.5	U	15.9	1, 2	2.67	Yes	Max SQL> SV
Potassium	3	4	2,720	2,720	151	322	041M18A301	322	J		N/A		Yes	No SV
Selenium	2	4	0.85	4.15	2.9	3.8	041M18A101	3.8			N/A		Yes	No SV
Silver	0	4	0.75	4.25			ND	4.25	U	0.733	1	5.8	Yes	Max SQL> SV
Sodium	4	4			153	738	001M001801	738			N/A		Yes	No SV
Thallium	0	4	0.6	3.85			ND	3.85	U		N/A		Yes	No SV
Vanadium	3	4	8	8	7.3	9	041M18A101	9	J		N/A		Yes	No SV
Zinc	4	4			6.7	17.1	001M001801	17.1		124	1, 2	0.14	No	Max Detect < SV
PAHs (g/kg)														
2-Methylnaphthalene	0	4	115	1,800			ND	1,800	U	20.2	1	89.1	No	TOC normalized PAHs < TEC
Acenaphthene	0	4	55	1,800			ND	1,800	U	6.71	1	268	No	TOC normalized PAHs < TEC
Acenaphthylene	0	4	115	1,800			ND	1,800	U	5.87	1	307	No	TOC normalized PAHs < TEC
Anthracene	0	4	115	1,800			ND	1,800	U	46.9	1	38.4	No	TOC normalized PAHs < TEC
Benzo(a)anthracene	0	4	115	1,800			ND	1,800	U	74.8	1	24.1	No	TOC normalized PAHs < TEC
Benzo(a)pyrene	0	4	115	1,800			ND	1,800	U	88.8	1	20.3	No	TOC normalized PAHs < TEC
Chrysene	0	4	115	1,800			ND	1,800	U	108	1	16.7	No	TOC normalized PAHs < TEC
Dibenz(a,h)anthracene	0	4	115	1,800			ND	1,800	U	6.22	1	289	No	TOC normalized PAHs < TEC
Fluoranthene	0	4	115	1,800			ND	1,800	U	113	1	15.9	No	TOC normalized PAHs < TEC
Fluorene	0	4	55	1,800			ND	1,800	U	21.2	1	84.9	No	TOC normalized PAHs < TEC
Naphthalene	1	4	115	1,800	300	300	041M18A201	300	J	34.6	1	8.67	No	TOC normalized PAHs < TEC
Phenanthrene	0	4	115	1,800			ND	1,800	U	86.7	1	20.8	No	TOC normalized PAHs < TEC
Pyrene	0	4	115	1,800			ND	1,800	U	153	1	11.8	No	TOC normalized PAHs < TEC
Total PAHs	1	4	1,380	23,400	2,880	2,880	041M18A201	2,880		1,684	1, 2	1.71	No	TOC normalized PAHs < TEC
TOC Normalized PAHs	1	4	5.76	196.64	24.2	24.2	041M18A201	24.2		290	3	0.08	No	Max Detect < SV
PCBs (g/kg)														
Aroclor-1016	0	4	8.5	185			ND	185	U	21.6	N/A	8.56	Yes	Max SQL> SV
Aroclor-1221	0	4	16.5	370			ND	370	U	67	2	5.52	Yes	Max SQL> SV
Aroclor-1232	0	4	8.5	185			ND	185	U	21.6	N/A	8.56	Yes	Max SQL> SV
Aroclor-1242	0	4	8.5	185			ND	185	U	21.6	N/A	8.56	Yes	Max SQL> SV
Aroclor-1248	0	4	8.5	185			ND	185	U	21.6	N/A	8.56	Yes	Max SQL> SV
Aroclor-1254	0	4	8.5	185			ND	185	U	21.6	N/A	8.56	Yes	Max SQL> SV
Aroclor-1260	0	4	8.5	185			ND	185	U	21.6	N/A	8.56	Yes	Max SQL> SV
Total PCBs	0	4	67.5	1,480			ND	1,480	U	21.6	1	68.5	Yes	Max SQL> SV
Pesticides (g/kg)														
Aldrin	1	4	0.41	9.5	3.7	3.7	041M18A201	3.7			N/A		Yes	No SV
Dieldrin	0	4	0.85	18.5			ND	18.5	U	0.716	1	25.8	Yes	Max SQL> SV
Endosulfan I	0	4	0.41	9.5			ND	9.5	U		N/A		Yes	No SV
Endosulfan II	0	4	0.85	18.5			ND	18.5	U		N/A		Yes	No SV
Endosulfan sulfate	0	4	0.85	18.5			ND	18.5	U		N/A		Yes	No SV
Heptachlor	0	4	0.41	9.5			ND	9.5	U		N/A		Yes	No SV
Heptachlor epoxide	0	4	0.41	9.5			ND	9.5	U		N/A		Yes	No SV
Methoxychlor	0	4	4.1	95			ND	95	U		N/A		Yes	No SV
Toxaphene	0	4	41	950			ND	950	U		N/A		Yes	No SV
alpha-Chlordane	**2**	**4**	**0.41**	**1.45**	**4.8**	**12**	**001M001801**	**12**	**J**	**1.7**	**1**	**7.06**	**Yes**	**Max Detect > SV**
gamma-Chlordane	**1**	**4**	**0.41**	**1.45**	**9.5**	**9.5**	**001M001801**	**9.5**	**J**	**1.7**	**1**	**5.59**	**Yes**	**Max Detect > SV**
Total Chlordane	**2**	**4**	**0.82**	**2.9**	**5.4**	**21.5**	**001M001801**	**21.5**		**1.7**	**1**	**12.6**	**Yes**	**Max Detect > SV**
Endrin	**1**	**4**	**0.85**	**3**	**13**	**13**	**001M001801**	**13**	**J**	**3.3**	**2**	**3.94**	**Yes**	**Max Detect > SV**
Endrin aldehyde	0	4	0.85	18.5			ND	18.5	U	3.3	2	5.61	Yes	Max SQL> SV
Endrin ketone	**1**	**4**	**0.85**	**18.5**	**6.5**	**6.5**	**041M18A201**	**6.5**	**J**	**3.3**	**2**	**1.97**	**Yes**	**Max Detect > SV**
Total Endrin	**2**	**4**	**2.55**	**9**	**8.9**	**50**	**001M001801**	**50**		**3.3**	**2**	**15.2**	**Yes**	**Max Detect > SV**
alpha-BHC	0	4	0.41	9.5			ND	9.5	UJ		N/A		Yes	No SV
beta-BHC	**1**	**4**	**0.41**	**9.5**	**1.3**	**1.3**	**041M18A201**	**1.3**	**J**	**0.32**	**N/A**	**4.06**	**Yes**	**Max Detect > SV**
delta-BHC	0	4	0.41	9.5			ND	9.5	U	0.32	N/A	29.7	Yes	Max SQL> SV
gamma-BHC (Lindane)	0	4	0.41	9.5			ND	9.5	U	0.32	1	29.7	Yes	Max SQL> SV
Total BHC	**1**	**4**	**1.64**	**38**	**3.1**	**3.1**	**041M18A201**	**3.1**		**0.32**	**2**	**9.69**	**Yes**	**Max Detect > SV**
4,4'-DDD	**4**	**4**			**16**	**930**	**041M18A101**	**930**	**D**	**1.22**	**1**	**762**	**Yes**	**Max Detect > SV**
4,4'-DDE	**4**	**4**			**14**	**270**	**041M18A101**	**270**	**D**	**2.07**	**1**	**130**	**Yes**	**Max Detect > SV**
4,4'-DDT	**3**	**4**	**18.5**	**18.5**	**1.9**	**1,200**	**041M18A101**	**1,200**	**D**	**1.19**	**1**	**1,010**	**Yes**	**Max Detect > SV**
Total DDT	**4**	**4**			**31.9**	**2,400**	**041M18A101**	**2,400**		**3.3**	**2**	**727**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
1,4-Dichlorobenzene	1	4	1,150	1,800	1,100	1,100	041M18A201	1,100	J		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	4	2,850	5,500			ND	5,500	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	4	2,850	5,500			ND	5,500	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
2-Chloronaphthalene	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
2-Chlorophenol	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	4	2,850	5,500			ND	5,500	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
2-Nitroaniline	0	4	1,150	4,400			ND	4,400	U		N/A		Yes	No SV
2-Nitrophenol	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
3-Nitroaniline	0	4	2,850	5,500			ND	5,500	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
4-Chloroaniline	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	2	4	1,150	1,800	170	330	041M18A201	330	J		N/A		Yes	No SV
4-Nitroaniline	0	4	2,850	5,500			ND	5,500	U		N/A		Yes	No SV
4-Nitrophenol	0	4	2,850	5,500			ND	5,500	U		N/A		Yes	No SV
Benzo(b)fluoranthene	0	4	115	1,800			ND	1,800	U		N/A		Yes	No SV
Benzo(g,h,i)perylene	0	4	115	1,800			ND	1,800	U		N/A		Yes	No SV
Benzo(k)fluoranthene	0	4	115	1,800			ND	1,800	U		N/A		Yes	No SV
bis(2-Chloroethoxy)methane	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	4	115	1,800			ND	1,800	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	4	1,150	2,350			ND	2,350	U	182	1, 2	12.9	Yes	Max SQL> SV
Butylbenzylphthalate	0	4	1,150	2,350			ND	2,350	U	182	1, 2	12.9	Yes	Max SQL> SV
Carbazole	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
Dibenzofuran	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
Diethylphthalate	0	4	1,150	2,350			ND	2,350	U	182	1, 2	12.9	Yes	Max SQL> SV
Dimethylphthalate	0	4	1,150	2,350			ND	2,350	U	182	1, 2	12.9	Yes	Max SQL> SV
Di-n-butylphthalate	**3**	**4**	**1,800**	**1,800**	**160**	**430**	**041M18A201**	**430**	**J**	**182**	**1, 2**	**2.36**	**Yes**	**Max Detect > SV**
Di-n-octylphthalate	0	4	1,150	2,350			ND	2,350	UJ	182	1, 2	12.9	Yes	Max SQL> SV

Table 10-7-5
Wetland 18A Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
Hexachlorobenzene	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
Hexachlorobutadiene	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
Hexachloroethane	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	4	115	1,800			ND	1,800	U		N/A		Yes	No SV
Isophorone	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
Nitrobenzene	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
N-Nitroso-di-n-propylaMine	0	4	115	1,800			ND	1,800	U		N/A		Yes	No SV
N-NitrosodiphenylaMine	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
Pentachlorophenol	0	4	2,850	5,500			ND	5,500	U		N/A		Yes	No SV
Phenol	0	4	1,150	2,350			ND	2,350	U		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	3	50	70			ND	70	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	3	50	70			ND	70	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	3	50	70			ND	70	U		N/A		Yes	No SV
1,1-Dichloroethane	0	3	50	70			ND	70	U		N/A		Yes	No SV
1,1-Dichloroethene	0	3	50	70			ND	70	U		N/A		Yes	No SV
1,2-Dichloroethane	0	3	50	70			ND	70	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	3	50	70			ND	70	U		N/A		Yes	No SV
1,2-Dichloropropane	0	3	50	70			ND	70	U		N/A		Yes	No SV
2-Butanone (MEK)	1	3	55	70	120	120	041M18A301	120	J		N/A		Yes	No SV
2-Hexanone	0	3	50	70			ND	70	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	3	50	70			ND	70	U		N/A		Yes	No SV
Acetone	2	3	50	50	480	750	041M18A201	750			N/A		Yes	No SV
Benzene	2	3	55	55	34	50	041M18A301	50	J		N/A		Yes	No SV
Bromodichloromethane	0	3	50	70			ND	70	U		N/A		Yes	No SV
Bromoform	0	3	50	70			ND	70	U		N/A		Yes	No SV
Bromomethane	0	3	50	70			ND	70	U		N/A		Yes	No SV
Carbon disulfide	0	3	50	70			ND	70	U		N/A		Yes	No SV
Carbon tetrachloride	0	3	50	70			ND	70	U		N/A		Yes	No SV
Chlorobenzene	2	3	55	55	46	430	041M18A201	430			N/A		Yes	No SV
Chloroethane	0	3	50	70			ND	70	U		N/A		Yes	No SV
Chloroform	0	3	50	70			ND	70	U		N/A		Yes	No SV
Chloromethane	0	3	50	70			ND	70	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	3	50	70			ND	70	U		N/A		Yes	No SV
Dibromochloromethane	0	3	50	70			ND	70	U		N/A		Yes	No SV
Ethylbenzene	0	3	50	70			ND	70	U		N/A		Yes	No SV
Methylene chloride	1	3	50	50	750	750	041M18A201	750			N/A		Yes	No SV
Styrene	0	3	50	70			ND	70	U		N/A		Yes	No SV
Tetrachloroethene	0	3	50	70			ND	70	U		N/A		Yes	No SV
Toluene	2	3	55	55	85	220	041M18A301	220	J		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	3	50	70			ND	70	U		N/A		Yes	No SV
Trichloroethene	0	3	50	70			ND	70	U		N/A		Yes	No SV
Vinyl chloride	0	3	15	55			ND	55	U		N/A		Yes	No SV
Xylene (Total)	0	3	50	70			ND	70	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 10-7-6
Wetland 18A Phase II
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDD	1,4-Dichlorobenzene	2-Butanone (MEK)
Arsenic	4,4'-DDE	4-Methylphenol (p-Cresol)	Acetone
Barium	4,4'-DDT	Di-n-butylphthalate	Benzene
Calcium	Aldrin		Chlorobenzene
Copper	alpha-Chlordane		Methylene chloride
Iron	beta-BHC		Toluene
Lead	Endrin		
Magnesium	Endrin ketone		
Manganese	gamma-Chlordane		
Potassium	Total BHC		
Selenium	Total Chlordane		
Sodium	Total DDT		
Vanadium	Total Endrin		
		Not Detected Parameters	
Antimony	Dieldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Beryllium	Endosulfan I	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
Cadmium	Endosulfan II	1,3-Dichlorobenzene	1,1,2-Trichloroethane
Cobalt	Endosulfan sulfate	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethane
Cyanide (CN)	Heptachlor	2,4,5-Trichlorophenol	1,1-Dichloroethene
Mercury	Heptachlor epoxide	2,4,6-Trichlorophenol	1,2-Dichloroethane
Nickel	Methoxychlor	2,4-Dichlorophenol	1,2-Dichloroethene (total)
Silver	Toxaphene	2,4-Dimethylphenol	1,2-Dichloropropane
Thallium	Endrin aldehyde	2,4-Dinitrophenol	2-Hexanone
	alpha-BHC	2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
	delta-BHC	2,6-Dinitrotoluene	Bromodichloromethane
	gamma-BHC (Lindane)	2-Chloronaphthalene	Bromoform
	Aroclor-1016	2-Chlorophenol	Bromomethane
	Aroclor-1221	2-Methyl-4,6-Dinitrophenol	Carbon disulfide
	Aroclor-1232	2-Methylphenol (o-Cresol)	Carbon tetrachloride
	Aroclor-1242	2-Nitroaniline	Chloroethane
	Aroclor-1248	2-Nitrophenol	Chloroform
	Aroclor-1254	3,3'-Dichlorobenzidine	Chloromethane
	Aroclor-1260	3-Nitroaniline	cis-1,3-Dichloropropene
	Total PCBs	4-Bromophenyl-phenylether	Dibromochloromethane
		4-Chloro-3-methylphenol	Ethylbenzene
		4-Chloroaniline	Styrene
		4-Chlorophenylphenyl ether	Tetrachloroethene
		4-Nitroaniline	trans-1,3-Dichloropropene
		4-Nitrophenol	Trichloroethene
		bis(2-Chloroethoxy)methane	Vinyl chloride
		bis(2-Chloroethyl)ether	Xylene (Total)
		bis(2-Ethylhexyl)phthalate (BEHP)	
		Butylbenzylphthalate	
		Carbazole	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 10-7-7
Wetland 18A Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	4	4				5,480	1,550	9,540	9,540		041M18A101			NA					0	13,610	0	No	EPC < RC
Antimony	0	4	9.01	0.385	32.1	9.01			32.1	U	ND	12			2.68	0.75			0	4.43	1	No	Parameter Not Detected
Arsenic	4	4				11.4	2.9	31.4	31.4		041M18A201	7.24	41.6	PEL	4.34	1.57	0.76	0.27	0	6.62	2	No	EPC > RC, but < RV
Barium	4	4				24.5	17.9	35.9	35.9		001M001801			NA					0	14	4	Yes	EPC > RC and no RV
Beryllium	0	4	0.484	0.19	1.15	0.484			1.15	U	ND			NA					0	0.84	1	No	Parameter Not Detected
Cadmium	0	4	1.49	0.6	3.6	1.49			3.6	U	ND	0.676	4.21	PEL	5.33	2.20	0.86	0.35	0	1.8	1	No	Parameter Not Detected
Calcium	4	4				3,790	228	6,840	6,840	J	001M001801			NA					0	10,756.67	0	No	EPC < RC; Essential Nutrient
Cobalt	0	4	1.68	0.6	4.35	1.68			4.35	U	ND			NA					0	2.8	1	No	Parameter Not Detected
Copper	3	4	11.5	11.5	11.5	12.7	5.2	22.6	22.6		041M18A101	18.7	108	PEL	1.21	0.68	0.21	0.12	0	19.5	1	No	EPC > RC, but < RV
Cyanide (CN)	0	4	2.54	1.85	2.85	2.54			2.85	U	ND			NA					0	5.22	0	No	Parameter Not Detected
Iron	4	4				18,900	805	48,200	48,200		041M18A201			NA					0	11,911.67	2	Yes	EPC > RC and no RV
Lead	4	4				61.2	45.4	70.1	70.1		041M18A101	30.2	112	PEL	2.32	2.03	0.63	0.55	0	82.47	0	No	EPC < RC and RV
Magnesium	4	4				889	206	1,890	1,890	J	041M18A301			NA					0	7,513.33	0	No	EPC < RC; Essential Nutrient
Manganese	4	4				57.1	15.3	105	105		001M001801			NA					0	37.97	2	Yes	EPC > RC and no RV
Mercury	0	4	0.302	0.15	0.55	0.302			0.55	U	ND	0.13	0.696	PEL	4.23	2.33	0.79	0.44	0	0.55	1	No	Parameter Not Detected
Nickel	0	4	12.98	2.3	42.5	12.98			42.5	U	ND	15.9	42.8	PEL	2.67	0.82	0.99	0.30	0	9.28	1	No	Parameter Not Detected
Potassium	3	4	2,720	2,720	2,720	862	151	322	322	J	041M18A301			NA					0	1,628.67	1	No	Essential Nutrient
Selenium	2	4	2.5	0.85	4.15	2.93	2.9	3.8	3.8		041M18A101			NA					0	3.45	2	Yes	EPC > RC and no RV
Silver	0	4	1.84	0.75	4.25	1.84			4.25	U	ND	0.733	1.77	PEL	5.8	2.51	2.4	1.04	0	2.1	1	No	Parameter Not Detected; Max SQL > 1
Sodium	4	4				428	153	738	738		001M001801			NA					0	18,993.33	0	No	EPC < RC; Essential Nutrient
Thallium	0	4	1.55	0.6	3.85	1.55			3.85	U	ND			NA					0	1.57	1	No	Parameter Not Detected
Vanadium	3	4	8	8	8	8.13	7.3	9	9	J	041M18A101			NA					0	28.67	0	No	EPC < RC
PCBs (g/kg)																							
Aroclor-1016	0	4	58.9	8.5	185	58.9			185	U	ND	21.6	189	PEL	8.56	2.73	0.98	0.31	0		0	No	Parameter Not Detected
Aroclor-1221	0	4	118	16.5	370	118			370	U	ND	67	189	PEL	5.52	1.75	1.96	0.62	0		0	No	Parameter Not Detected; Max SQL > 1
Aroclor-1232	0	4	58.9	8.5	185	58.9			185	U	ND	21.6	189	PEL	8.56	2.73	0.98	0.31	0		0	No	Parameter Not Detected
Aroclor-1242	0	4	58.9	8.5	185	58.9			185	U	ND	21.6	189	PEL	8.56	2.73	0.98	0.31	0		0	No	Parameter Not Detected
Aroclor-1248	0	4	58.9	8.5	185	58.9			185	U	ND	21.6	189	PEL	8.56	2.73	0.98	0.31	0		0	No	Parameter Not Detected
Aroclor-1254	0	4	58.9	8.5	185	58.9			185	U	ND	21.6	189	PEL	8.56	2.73	0.98	0.31	0		0	No	Parameter Not Detected
Aroclor-1260	0	4	58.9	8.5	185	58.9			185	U	ND	21.6	189	PEL	8.56	2.73	0.98	0.31	0		0	No	Parameter Not Detected
Total PCBs	0	4	471	67.5	1,480	471			1,480	U	ND	21.6	189	PEL	68.5	21.8	7.83	2.49	0		0	No	Parameter Not Detected; Max SQL > 1
Pesticides (g/kg)																							
Aldrin	1	4	3.79	0.41	9.5	3.76	3.7	3.7	3.7		041M18A201			NA					0		0	Yes	No SV, no RV, and no RC
Dieldrin	0	4	5.89	0.85	18.5	5.89			18.5	U	ND	0.716	4.3	PEL	25.8	8.22	4.3	1.37	0		0	No	Parameter Not Detected; Max SQL > 1
Endosulfan I	0	4	2.99	0.41	9.5	2.99			9.5	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	4	5.89	0.85	18.5	5.89			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	0	4	5.89	0.85	18.5	5.89			18.5	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor	0	4	2.99	0.41	9.5	2.99			9.5	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	4	2.99	0.41	9.5	2.99			9.5	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	4	29.9	4.1	95	29.9			95	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	4	299	41	950	299			950	U	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	**2**	**4**	**0.93**	**0.41**	**1.45**	**4.67**	**4.8**	**12**	**12**	**J**	**001M001801**	**1.7**	**4.79**	**PEL**	**7.06**	**2.74**	**2.51**	**0.97**	**2**		**0**	**Yes**	**RV HQ > 1 and no RC**
gamma-Chlordane	**1**	**4**	**0.82**	**0.41**	**1.45**	**2.99**	**9.5**	**9.5**	**9.5**	**J**	**001M001801**	**1.7**	**4.79**	**PEL**	**5.59**	**1.76**	**1.98**	**0.62**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Total Chlordane	**2**	**4**	**1.86**	**0.82**	**2.9**	**7.65**	**5.4**	**21.5**	**21.5**		**001M001801**	**1.7**	**4.79**	**PEL**	**12.6**	**4.5**	**4.49**	**1.6**	**2**		**0**	**Yes**	**RV HQ > 1 and no RC**
Endrin	1	4	1.68	0.85	3	4.51	13	13	13	J	001M001801	3.3		NA	3.94	1.37			0		0	Yes	No RV or RC and EPC > SV
Endrin aldehyde	0	4	5.89	0.85	18.5	5.89			18.5	U	ND	3.3		NA	5.61	1.78			0		0	No	Parameter Not Detected
Endrin ketone	1	4	7.45	0.85	18.5	7.21	6.5	6.5	6.5	J	041M18A201	3.3		NA	1.97	2.19			0		0	Yes	No RV or RC and EPC > SV
Total Endrin	2	4	5.78	2.55	9	17.6	8.9	50	50		001M001801	3.3		NA	15.2	5.34			0		0	Yes	No RV or RC and EPC > SV
alpha-BHC	0	4	2.99	0.41	9.5	2.99			9.5	UJ	ND		0.99	PEL			9.6	3.02	0		0	No	Parameter Not Detected; Max SQL > 1
beta-BHC	**1**	**4**	**3.79**	**0.41**	**9.5**	**3.17**	**1.3**	**1.3**	**1.3**	**J**	**041M18A201**	**0.32**	**0.99**	**PEL**	**4.06**	**9.89**	**1.31**	**3.2**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
delta-BHC	0	4	2.99	0.41	9.5	2.99			9.5	U	ND	0.32	0.99	PEL	29.7	9.34	9.6	3.02	0		0	No	Parameter Not Detected; Max SQL > 1
gamma-BHC (Lindane)	0	4	2.99	0.41	9.5	2.99			9.5	U	ND	0.32	0.99	PEL	29.7	9.34	9.6	3.02	0		0	No	Parameter Not Detected; Max SQL > 1
Total BHC	**1**	**4**	**15.1**	**1.64**	**38**	**12.1**	**3.1**	**3.1**	**3.1**		**041M18A201**	**0.32**	**0.99**	**PEL**	**9.69**	**37.9**	**3.13**	**12.3**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	**4**	**4**				**286**	**16**	**930**	**930**	**D**	**041M18A101**	**1.22**	**7.81**	**PEL**	**762**	**235**	**119**	**36.7**	**4**	**50**	**2**	**Yes**	**EPC > RV and RC**
4,4'-DDE	4	4				123	14	270	270	D	041M18A101	2.07	374	PEL	130	59.3	0.72	0.33	0	40	3	No	EPC > RC, but < RV
4,4'-DDT	**3**	**4**	**18.5**	**18.5**	**18.5**	**383**	**1.9**	**1,200**	**1,200**	**D**	**041M18A101**	**1.19**	**4.77**	**PEL**	**1,010**	**322**	**252**	**80.2**	**2**	**20**	**2**	**Yes**	**EPC > RV and RC**
Total DDT	**4**	**4**				**792**	**31.9**	**2,400**	**2,400**		**041M18A101**	**3.3**	**51.7**	**PEL**	**727**	**240**	**46.4**	**15.3**	**3**	**110**	**3**	**Yes**	**EPC > RV and RC**
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	1	4	1,530	1,150	1,800	1,430	1,100	1,100	1,100	J	041M18A201			NA					0		0	Yes	No SV, no RV, and no RC
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	4	4,180	2,850	5,500	4,180			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	4	4,180	2,850	5,500	4,180			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	4	4,180	2,850	5,500	4,180			5,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	4	2,390	1,150	4,400	2,390			4,400	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	4	4,180	2,850	5,500	4,180			5,500	U	ND			NA					0		0	No	Parameter Not Detected

Table 10-7-7
Wetland 18A Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
4-Bromophenyl-phenylether	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	2	4	1,480	1,150	1,800	863	170	330	330	J	041M18A201			NA					0		0	Yes	No SV, no RV, and no RC
4-Nitroaniline	0	4	4,180	2,850	5,500	4,180			5,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	4	4,180	2,850	5,500	4,180			5,500	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	4	579	115	1,800	579			1,800	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	4	1,740	1,150	2,350	1,740			2,350	U	ND	182	2,647	PEL	12.9	9.55	0.89	0.66	0		0	No	Parameter Not Detected
Butylbenzylphthalate	0	4	1,740	1,150	2,350	1,740			2,350	U	ND	182	2,647	PEL	12.9	9.55	0.89	0.66	0		0	No	Parameter Not Detected
Carbazole	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	0	4	1,740	1,150	2,350	1,740			2,350	U	ND	182	2,647	PEL	12.9	9.55	0.89	0.66	0		0	No	Parameter Not Detected
Dimethylphthalate	0	4	1,740	1,150	2,350	1,740			2,350	U	ND	182	2,647	PEL	12.9	9.55	0.89	0.66	0		0	No	Parameter Not Detected
Di-n-butylphthalate	3	4	1,800	1,800	1,800	640	160	430	430	J	041M18A201	182	2,647	PEL	2.36	3.52	0.16	0.24	0		0	No	RV HQ <1 and no RC
Di-n-octylphthalate	0	4	1,740	1,150	2,350	1,740			2,350	UJ	ND	182	2,647	PEL	12.9	9.55	0.89	0.66	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	4	579	115	1,800	579			1,800	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	4	4,180	2,850	5,500	4,180			5,500	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	4	1,740	1,150	2,350	1,740			2,350	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	1	3	62.5	55	70	81.7	120	120	120	J	041M18A301			NA					0		0	Yes	No SV, no RV, and no RC
2-Hexanone	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	2	3	50	50	50	427	480	750	750		041M18A201			NA					0		0	Yes	No SV, no RV, and no RC
Benzene	2	3	55	55	55	46.3	34	50	50	J	041M18A301			NA					0		0	Yes	No SV, no RV, and no RC
Bromodichloromethane	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	2	3	55	55	55	177	46	430	430		041M18A201			NA					0		0	Yes	No SV, no RV, and no RC
Chloroethane	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	1	3	50	50	50	283	750	750	750		041M18A201			NA					0		0	Yes	No SV, no RV, and no RC
Styrene	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	2	3	55	55	55	120	85	220	220	J	041M18A301			NA					0		0	Yes	No SV, no RV, and no RC
trans-1,3-Dichloropropene	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	3	30.5	15	55	30.5			55	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	3	58.3	50	70	58.3			70	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 10-7-8
Wetland 18A Phase II
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
	Detected Parameters		
Barium	Aldrin	1,4-Dichlorobenzene	None
Iron	alpha-Chlordane	4-Methylphenol (p-Cresol)	
Manganese	gamma-Chlordane		
Selenium	Total Chlordane		
	Endrin		
	Endrin ketone		
	Total Endrin		
	beta-BHC		
	Total BHC		
	4,4'-DDD		
	4,4'-DDT		
	Total DDT		

Table 10-7-9
Wetland 18A Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
001M001801	6/29/1994	mg/kg	8.4	J	Arsenic	8.2	70	0.12
001M001801	6/29/1994	mg/kg	3.6	U	Cadmium	1.2	9.6	0.38
001M001801	6/29/1994	mg/kg	5.55	U	Chromium	81	370	0.02
001M001801	6/29/1994	mg/kg	11.5	U	Copper	34	270	0.04
001M001801	6/29/1994	mg/kg	63.3	J	Lead	46.7	218	0.29
001M001801	6/29/1994	mg/kg	0.55	U	Mercury	0.15	0.71	0.77
001M001801	6/29/1994	mg/kg	42.45	U	Nickel	20.9	51.6	0.82
001M001801	6/29/1994	mg/kg	4.25	U	Silver	1	3.7	1.15
001M001801	6/29/1994	mg/kg	17.1		Zinc	150	410	0.04
001M001801	**6/29/1994**	**g/kg**	**150**		**4,4'-DDE**	**2.2**	**27**	**5.56**
001M001801	6/29/1994	g/kg	18.5	U	4,4'-DDT	1.58	46.1	0.40
001M001801	6/29/1994	g/kg	1,480	U	Total PCBs	22.7	180	8.22
001M001801	6/29/1994	g/kg	1,800	U	2-Methylnaphthalene	70	670	2.69
001M001801	6/29/1994	g/kg	1,800	U	Acenaphthene	16	500	3.60
001M001801	6/29/1994	g/kg	1,800	U	Acenaphthylene	44	640	2.81
001M001801	6/29/1994	g/kg	1,800	U	Anthracene	85.3	1,100	1.64
001M001801	6/29/1994	g/kg	1,800	U	Benzo(a)anthracene	261	1,600	1.13
001M001801	6/29/1994	g/kg	1,800	U	Benzo(a)pyrene	430	1,600	1.13
001M001801	6/29/1994	g/kg	1,800	U	Chrysene	384	2,800	0.64
001M001801	6/29/1994	g/kg	1,800	U	Dibenz(a,h)anthracene	63.4	260	6.92
001M001801	6/29/1994	g/kg	1,800	U	Fluoranthene	600	5,100	0.35
001M001801	6/29/1994	g/kg	1,800	U	Fluorene	19	540	3.33
001M001801	6/29/1994	g/kg	1,800	U	Naphthalene	160	2,100	0.86
001M001801	6/29/1994	g/kg	1,800	U	Phenanthrene	240	1,500	1.20
001M001801	6/29/1994	g/kg	1,800	U	Pyrene	665	2,600	0.69
001M001801	6/29/1994				ERM Quotient Sum			44.80
001M001801	6/29/1994				Mean ERM Quotient			1.79
001M001801	6/29/1994				Mean ERM Quotient without ND			0.24
001M001801	6/29/1994				Mean ERM Quotient Category			2.00
041M18A101	12/15/1995	mg/kg	2.9	J	Arsenic	8.2	70	0.04
041M18A101	12/15/1995	mg/kg	0.6	U	Cadmium	1.2	9.6	0.06
041M18A101	12/15/1995	mg/kg	5.8		Chromium	81	370	0.02
041M18A101	12/15/1995	mg/kg	22.6		Copper	34	270	0.08
041M18A101	12/15/1995	mg/kg	70.1		Lead	46.7	218	0.32
041M18A101	12/15/1995	mg/kg	0.15	U	Mercury	0.15	0.71	0.21
041M18A101	12/15/1995	mg/kg	2.3	U	Nickel	20.9	51.6	0.04
041M18A101	12/15/1995	mg/kg	0.75	U	Silver	1	3.7	0.20
041M18A101	12/15/1995	mg/kg	6.7	J	Zinc	150	410	0.02
041M18A101	**12/15/1995**	**g/kg**	**270**	**D**	**4,4'-DDE**	**2.2**	**27**	**10**
041M18A101	**12/15/1995**	**g/kg**	**1,200**	**D**	**4,4'-DDT**	**1.58**	**46.1**	**26.03**
041M18A101	12/15/1995	g/kg	240	U	Total PCBs	22.7	180	1.33
041M18A101	12/15/1995	g/kg	115	U	2-Methylnaphthalene	70	670	0.17
041M18A101	12/15/1995	g/kg	55	U	Acenaphthene	16	500	0.11
041M18A101	12/15/1995	g/kg	115	U	Acenaphthylene	44	640	0.18
041M18A101	12/15/1995	g/kg	115	U	Anthracene	85.3	1,100	0.10
041M18A101	12/15/1995	g/kg	115	U	Benzo(a)anthracene	261	1,600	0.07
041M18A101	12/15/1995	g/kg	115	U	Benzo(a)pyrene	430	1,600	0.07
041M18A101	12/15/1995	g/kg	115	U	Chrysene	384	2,800	0.04
041M18A101	12/15/1995	g/kg	115	U	Dibenz(a,h)anthracene	63.4	260	0.44
041M18A101	12/15/1995	g/kg	115	U	Fluoranthene	600	5,100	0.02
041M18A101	12/15/1995	g/kg	55	U	Fluorene	19	540	0.10
041M18A101	12/15/1995	g/kg	115	U	Naphthalene	160	2,100	0.05
041M18A101	12/15/1995	g/kg	115	U	Phenanthrene	240	1,500	0.08
041M18A101	12/15/1995	g/kg	115	U	Pyrene	665	2,600	0.04
041M18A101	12/15/1995				ERM Quotient Sum			39.86
041M18A101	12/15/1995				Mean ERM Quotient			1.59
041M18A101	12/15/1995				Mean ERM Quotient without ND			1.46
041M18A101	12/15/1995				Mean ERM Quotient Category			3
041M18A201	12/15/1995	mg/kg	31.4		Arsenic	8.2	70	0.45
041M18A201	12/15/1995	mg/kg	0.85	U	Cadmium	1.2	9.6	0.09
041M18A201	12/15/1995	mg/kg	8.9		Chromium	81	370	0.02
041M18A201	12/15/1995	mg/kg	5.2	J	Copper	34	270	0.02
041M18A201	12/15/1995	mg/kg	45.4		Lead	46.7	218	0.21
041M18A201	12/15/1995	mg/kg	0.27	U	Mercury	0.15	0.71	0.38
041M18A201	12/15/1995	mg/kg	3.5	U	Nickel	20.9	51.6	0.07
041M18A201	12/15/1995	mg/kg	1.15	U	Silver	1	3.7	0.31
041M18A201	12/15/1995	mg/kg	10.4	J	Zinc	150	410	0.03
041M18A201	**12/15/1995**	**g/kg**	**57**	**DJ**	**4,4'-DDE**	**2.2**	**27**	**2.11**
041M18A201	**12/15/1995**	**g/kg**	**310**	**D**	**4,4'-DDT**	**1.58**	**46.1**	**6.72**
041M18A201	12/15/1995	g/kg	95.5	U	Total PCBs	22.7	180	0.53
041M18A201	12/15/1995	g/kg	235	U	2-Methylnaphthalene	70	670	0.35
041M18A201	12/15/1995	g/kg	115	U	Acenaphthene	16	500	0.23
041M18A201	12/15/1995	g/kg	235	U	Acenaphthylene	44	640	0.37
041M18A201	12/15/1995	g/kg	235	U	Anthracene	85.3	1,100	0.21
041M18A201	12/15/1995	g/kg	235	U	Benzo(a)anthracene	261	1,600	0.15
041M18A201	12/15/1995	g/kg	235	UJ	Benzo(a)pyrene	430	1,600	0.15
041M18A201	12/15/1995	g/kg	235	U	Chrysene	384	2,800	0.08
041M18A201	12/15/1995	g/kg	235	UJ	Dibenz(a,h)anthracene	63.4	260	0.90
041M18A201	12/15/1995	g/kg	235	U	Fluoranthene	600	5,100	0.05
041M18A201	12/15/1995	g/kg	115	U	Fluorene	19	540	0.21
041M18A201	12/15/1995	g/kg	300	J	Naphthalene	160	2,100	0.14

Table 10-7-9
Wetland 18A Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M18A201	12/15/1995	g/kg	235	U	Phenanthrene	240	1,500	0.16
041M18A201	12/15/1995	g/kg	235	U	Pyrene	665	2,600	0.09
041M18A201	12/15/1995				ERM Quotient Sum			14.03
041M18A201	12/15/1995				Mean ERM Quotient			0.56
041M18A201	12/15/1995				Mean ERM Quotient without ND			0.39
041M18A201	12/15/1995				Mean ERM Quotient Category			2
041M18A301	12/14/1995	mg/kg	2.9	J	Arsenic	8.2	70	0.04
041M18A301	12/14/1995	mg/kg	0.9	U	Cadmium	1.2	9.6	0.09
041M18A301	12/14/1995	mg/kg	6.3		Chromium	81	370	0.02
041M18A301	12/14/1995	mg/kg	11.5	J	Copper	34	270	0.04
041M18A301	12/14/1995	mg/kg	66		Lead	46.7	218	0.30
041M18A301	12/14/1995	mg/kg	0.24	U	Mercury	0.15	0.71	0.34
041M18A301	12/14/1995	mg/kg	3.65	U	Nickel	20.9	51.6	0.07
041M18A301	12/14/1995	mg/kg	1.2	U	Silver	1	3.7	0.32
041M18A301	12/14/1995	mg/kg	12.7		Zinc	150	410	0.03
041M18A301	12/14/1995	g/kg	14	J	4,4'-DDE	2.2	27	0.52
041M18A301	12/14/1995	g/kg	1.9	J	4,4'-DDT	1.58	46.1	0.04
041M18A301	12/14/1995	g/kg	67.5	U	Total PCBs	22.7	180	0.38
041M18A301	12/14/1995	g/kg	165	U	2-Methylnaphthalene	70	670	0.25
041M18A301	12/14/1995	g/kg	80	U	Acenaphthene	16	500	0.16
041M18A301	12/14/1995	g/kg	165	U	Acenaphthylene	44	640	0.26
041M18A301	12/14/1995	g/kg	165	U	Anthracene	85.3	1,100	0.15
041M18A301	12/14/1995	g/kg	165	U	Benzo(a)anthracene	261	1,600	0.10
041M18A301	12/14/1995	g/kg	165	U	Benzo(a)pyrene	430	1,600	0.10
041M18A301	12/14/1995	g/kg	165	U	Chrysene	384	2,800	0.06
041M18A301	12/14/1995	g/kg	165	U	Dibenz(a,h)anthracene	63.4	260	0.63
041M18A301	12/14/1995	g/kg	165	U	Fluoranthene	600	5,100	0.03
041M18A301	12/14/1995	g/kg	80	U	Fluorene	19	540	0.15
041M18A301	12/14/1995	g/kg	165	U	Naphthalene	160	2,100	0.08
041M18A301	12/14/1995	g/kg	165	U	Phenanthrene	240	1,500	0.11
041M18A301	12/14/1995	g/kg	165	U	Pyrene	665	2,600	0.06
041M18A301	12/14/1995				ERM Quotient Sum			4.34
041M18A301	12/14/1995				Mean ERM Quotient			0.17
041M18A301	12/14/1995				Mean ERM Quotient without ND			0.04
041M18A301	12/14/1995				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 10-7-10
Wetland 18A Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	**2**	**2**				**729**	**237**	**1,220**	**041W18A201**	**1,220**		**13**	**FDEP**	**93.8**	**Yes**	**Max Detect > SV**
Antimony	0	2	16.5	5	27.95	16.5			ND	27.95	U	160	EPA	0.18	No	Max SQL< SV
Arsenic	**1**	**2**	**1.4**	**1.4**	**1.4**	**34.9**	**68.3**	**68.3**	**041W18A201**	**68.3**		**50**	**FDEP**	**1.37**	**Yes**	**Max Detect > SV**
Barium	1	2	2.6	2.6	2.6	14.4	26.2	26.2	041W18A201	26.2	J		NA		Yes	No SV
Beryllium	0	2	0.375	0.25	0.5	0.375			ND	0.5	U	0.13	FDEP	3.85	Yes	Max SQL > SV
Cadmium	0	2	1.9	1.5	2.3	1.9			ND	2.3	UJ	0.66	EPA	3.48	Yes	Max SQL > SV
Calcium	2	2				6,240	3,060	9,420	041W18A201	9,420			NA		Yes	No SV
Chromium	**1**	**2**	**4.6**	**4.6**	**4.6**	**10.1**	**15.6**	**15.6**	**041W18A201**	**15.6**		**11**	**EPA**	**1.42**	**Yes**	**Max Detect > SV**
Cobalt	0	2	2.58	1.5	3.65	2.58			ND	3.65	U		NA		Yes	No SV
Copper	0	2	2.13	2	2.25	2.13			ND	2.25	U	6.54	EPA	0.34	No	Max SQL< SV
Cyanide (CN)	0	2	3.75	2.5	5	3.75			ND	5	U	5.2	EPA	0.96	No	Max SQL< SV
Iron	2	2				61,400	848	122,000	041W18A201	122,000			NA		Yes	No SV
Lead	**1**	**2**	**0.8**	**0.8**	**0.8**	**6.5**	**12.2**	**12.2**	**041W18A201**	**12.2**		**1.32**	**EPA**	**9.24**	**Yes**	**Max Detect > SV**
Magnesium	2	2				1,480	1,110	1,850	041W18A201	1,850	J		NA		Yes	No SV
Manganese	2	2				95.8	47.6	144	041W18A201	144			NA		Yes	No SV
Mercury	0	2	0.0825	0.065	0.1	0.0825			ND	0.1	U	0.012	EPA	8.33	Yes	Max SQL > SV
Nickel	0	2	7.1	6	8.2	7.1			ND	8.2	U	87.71	EPA	0.09	No	Max SQL< SV
Potassium	2	2				1,420	901	1,940	041W18A201	1,940	J		NA		Yes	No SV
Selenium	0	2	1.73	1.5	1.95	1.73			ND	1.95	U	5	EPA	0.39	No	Max SQL< SV
Silver	0	2	1.9	1.8	2	1.9			ND	2	U	0.012	EPA	167	Yes	Max SQL > SV
Sodium	2	2				5,750	5,340	6,160	041W18A201	6,160			NA		Yes	No SV
Thallium	0	2	1.65	1.5	1.8	1.65			ND	1.8	UJ	4	EPA	0.45	No	Max SQL< SV
Vanadium	1	2	2.2	2.2	2.2	6.1	10	10	041W18A201	10	J		NA		Yes	No SV
Zinc	0	2	3.05	1.5	4.6	3.05			ND	4.6	U	58.91	EPA	0.08	No	Max SQL< SV
Pesticides (g/L)																
Aldrin	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.056	EPA	0.45	No	Max SQL< SV
Endosulfan II	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	6.58	Yes	Max SQL > SV
Heptachlor epoxide	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	2	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	11.6	Yes	Max SQL > SV
Endrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
beta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	No	Max SQL< SV
Total BHC	0	2	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	2	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	35.7	Yes	Max SQL > SV
Total PCB	0	2	4	4	4	4			ND	4	U		NA		Yes	No SV
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	1	5	5	5	5			ND	5	U	15.8	EPA	0.32	No	Max SQL< SV
1,3-Dichlorobenzene	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	1	5	5	5	5			ND	5	U	3	FDEP	1.67	Yes	Max SQL > SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	2	11.3	10	12.5	11.3			ND	12.5	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	2	11.3	10	12.5	11.3			ND	12.5	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
2-Chloronaphthalene	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
2-Chlorophenol	0	2	3.75	2.5	5	3.75			ND	5	U	43.8	EPA	0.11	No	Max SQL< SV
2-Methyl-4,6-Dinitrophenol	0	2	11.3	10	12.5	11.3			ND	12.5	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV

Table 10-7-10
Wetland 18A Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L) - cont.																
2-Nitroaniline	0	2	7.5	2.5	12.5	7.5			ND	12.5	U		NA		Yes	No SV
2-Nitrophenol	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
3-Nitroaniline	0	2	11.3	10	12.5	11.3			ND	12.5	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
4-Chloroaniline	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
4-Nitroaniline	0	2	11.3	10	12.5	11.3			ND	12.5	U		NA		Yes	No SV
4-Nitrophenol	0	2	11.3	10	12.5	11.3			ND	12.5	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	0.3	EPA	8.33	Yes	Max SQL > SV
Butylbenzylphthalate	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
Carbazole	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Dibenzofuran	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
Diethylphthalate	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
Dimethylphthalate	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
Di-n-butylphthalate	0	2	3.75	2.5	5	3.75			ND	5	U	9.4	EPA	0.53	No	Max SQL< SV
Di-n-octylphthalate	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
Hexachlorobenzene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Hexachlorobutadiene	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
Hexachloroethane	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Isophorone	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
Nitrobenzene	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
Pentachlorophenol	0	2	7.5	2.5	12.5	7.5			ND	12.5	U		NA		Yes	No SV
Phenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Acenaphthene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Acenaphthylene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Anthracene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Benzo(a)anthracene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Benzo(a)pyrene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Chrysene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Fluoranthene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Fluorene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Naphthalene	0	2	2.75	0.5	5	2.75			ND	5	U	26	FDEP	0.19	No	Max SQL< SV
Phenanthrene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Pyrene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Total PAH	0	2	35.8	6.5	65	35.8			ND	65	U		NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	0	2	2.75	0.5	5	2.75			ND	5	U	270	FDEP	0.02	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
1,1-Dichloroethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
1,1-Dichloroethene	0	2	2.75	0.5	5	2.75			ND	5	U	3.2	FDEP	1.56	Yes	Max SQL > SV
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	15.8	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
1,2-Dichloroethene (total)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
1,2-Dichloropropane	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	1	1				2	2	2	041W18A201	2		3	FDEP	0.67	No	Max Detect < SV
2-Butanone (MEK)	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Hexanone	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	2	3.75	2.5	5	3.75			ND	5	U		NA		Yes	No SV
Acetone	0	1	5	5	5	5			ND	5	U		NA		Yes	No SV
Benzene	1	2	5	5	5	5	5	5	041W18A201	5		53	EPA	0.09	No	Max Detect < SV
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Bromoform	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Bromomethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Carbon disulfide	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Carbon tetrachloride	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Chlorobenzene	1	2	5	5	5	9.5	14	14	041W18A201	14		17	FDEP	0.82	No	Max Detect < SV
Chloroethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV

Table 10-7-10
Wetland 18A Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
VOCs (g/L) - cont.																
Chloroform	0	2	2.75	0.5	5	2.75			ND	5	U	289	EPA	0.02	No	Max SQL< SV
Chloromethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
cis-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Dibromochloromethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Ethylbenzene	0	2	2.75	0.5	5	2.75			ND	5	U	453	EPA	0.01	No	Max SQL< SV
Methylene chloride	0	2	1.25	1	1.5	1.25			ND	1.5	U	1,580	FDEP	0.00	No	Max SQL< SV
Styrene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Tetrachloroethene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Toluene	0	2	2.75	0.5	5	2.75			ND	5	U	175	EPA	0.03	No	Max SQL< SV
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Trichloroethene	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Vinyl chloride	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Xylene (Total)	0	2	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 10-7-11
Wetland 18A Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	None	None
Arsenic			
Barium			
Calcium			
Chromium			
Iron			
Lead			
Magnesium			
Manganese			
Potassium			
Sodium			
Vanadium			
		Not Detected Parameters	
Beryllium	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Cadmium	Dieldrin	1,3-Dichlorobenzene	1,1,2-Trichloroethane
Cobalt	Endosulfan II	1,4-Dichlorobenzene	1,1-Dichloroethane
Mercury	Endosulfan sulfate	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
Silver	Heptachlor	2,4,5-Trichlorophenol	1,2-Dibromo-3-Chloropropane
	Heptachlor epoxide	2,4,6-Trichlorophenol	1,2-Dibromoethane
	Methoxychlor	2,4-Dichlorophenol	1,2-Dichloroethane
	Toxaphene	2,4-Dimethylphenol	1,2-Dichloroethene (total)
	alpha-Chlordane	2,4-Dinitrophenol	1,2-Dichloropropane
	gamma-Chlordane	2,4-Dinitrotoluene	1,3-Dichlorobenzene
	Total Chlordane	2,6-Dinitrotoluene	2-Butanone (MEK)
	Endrin	2-Chloronaphthalene	2-Hexanone
	Endrin aldehyde	2-Methyl-4,6-Dinitrophenol	4-Methyl-2-Pentanone (MIBK)
	Endrin ketone	2-Methylphenol (o-Cresol)	Acetone
	Total Endrin	2-Nitroaniline	Bromochloromethane
	alpha-BHC	2-Nitrophenol	Bromodichloromethane
	beta-BHC	3,3'-Dichlorobenzidine	Bromoform
	delta-BHC	3-Nitroaniline	Bromomethane
	Total BHC	4-Bromophenyl-phenylether	Carbon disulfide
	4,4'-DDD	4-Chloro-3-methylphenol	Carbon tetrachloride
	4,4'-DDE	4-Chloroaniline	Chloroethane
	4,4'-DDT	4-Chlorophenylphenyl ether	Chloromethane
	Total DDT	4-Methylphenol (p-Cresol)	cis-1,2-Dichloroethene
	Aroclor-1016	4-Nitroaniline	cis-1,3-Dichloropropene
	Aroclor-1221	4-Nitrophenol	Dibromochloromethane
	Aroclor-1232	Benzo(b)fluoranthene	Styrene
	Aroclor-1242	Benzo(g,h,i)perylene	Tetrachloroethene
	Aroclor-1248	Benzo(k)fluoranthene	trans-1,2-Dichloroethene
	Aroclor-1254	bis(2-Chloroethoxy)methane	trans-1,3-Dichloropropene
	Aroclor-1260	bis(2-Chloroethyl)ether	Trichloroethene
	Total PCBs	bis(2-Ethylhexyl)phthalate (BEHP)	Vinyl chloride
		Butylbenzylphthalate	Xylene (Total)
		Carbazole	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 10-7-12
Wetland 18A Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Screening HQ	Ref. Conc.	Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
Metals (µg/L)																				
Aluminum	**2**	**2**				**729**	**237**	**1,220**	**041W18A201**	**1,220**		**13**	**FDEP**	**94**	**56**	**1,090.25**	**1**	**2**	**Yes**	**Max Result > Ref. Conc.**
Arsenic	**1**	**2**	**1.4**	**1.4**	**1.4**	**34.9**	**68.3**	**68.3**	**041W18A201**	**68.3**		**50**	**FDEP**	**1.37**	**0.70**	**2.7**	**1**	**2**	**Yes**	**Max Result > Ref. Conc.**
Barium	1	2	2.6	2.6	2.6	14.4	26.2	26.2	041W18A201	26.2	J		NA			3.68	1	2	Yes	Max Result > Ref. Conc.
Beryllium	0	2	0.375	0.25	0.5	0.375			ND	0.5	U	0.13	FDEP	4	2.88	1	0	2	No	Parameter Not Detected; Max SQL > SV
Cadmium	0	2	1.9	1.5	2.3	1.9			ND	2.3	UJ	0.66	EPA	3.48	2.88	3	0	2	No	Parameter Not Detected; Max SQL > SV
Calcium	2	2				6,240	3,060	9,420	041W18A201	9,420			NA			7,675	1	2	No	Essential Nutrient
Chromium	**1**	**2**	**4.6**	**4.6**	**4.6**	**10.1**	**15.6**	**15.6**	**041W18A201**	**15.6**		**11**	**EPA**	**1.42**	**1.42**	**8**	**1**	**2**	**Yes**	**Max Result > Ref. Conc.**
Cobalt	0	2	2.58	1.5	3.65	2.58			ND	3.65	U		NA			3	1	2	No	Max SQL < Ref. Conc.
Iron	2	2				61,400	848	122,000	041W18A201	122,000			NA			2,360	1	2	Yes	Max Result > Ref. Conc.
Lead	**1**	**2**	**0.8**	**0.8**	**0.8**	**6.5**	**12.2**	**12.2**	**041W18A201**	**12.2**		**1.32**	**EPA**	**9.24**	**4.92**	**3.2**	**1**	**2**	**Yes**	**Max Result > Ref. Conc.**
Magnesium	2	2				1,480	1,110	1,850	041W18A201	1,850	J		NA			20260	0	2	No	Max Result < Ref. Conc.
Manganese	2	2				95.8	47.6	144	041W18A201	144			NA			13	2	2	Yes	Max Result > Ref. Conc.
Mercury	0	2	0.0825	0.065	0.1	0.0825			ND	0.1	U	0.012	EPA	8.33	6.88	0.13	0	2	No	Parameter Not Detected; Max SQL > SV
Potassium	2	2				1420	901	1940	041W18A201	1940	J		NA			6,995	0	2	No	Max Result < Ref. Conc.
Silver	0	2	1.9	1.8	2	1.9			ND	2	U	0.012	EPA	167	158	4	0	2	No	Parameter Not Detected; Max SQL > SV
Sodium	2	2				5,750	5,340	6,160	041W18A201	6,160			NA			182,200	0	2	No	Max Result < Ref. Conc.
Vanadium	1	2	2.2	2.2	2.2	6.1	10	10	041W18A201	10	J		NA			4.7	1	2	Yes	Max Result > Ref. Conc.
Pesticides (µg/L)																				
Aldrin	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	2	No	Parameter Not Detected
Dieldrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	2	No	Parameter Not Detected
Endosulfan II	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	2	No	Parameter Not Detected
Endosulfan sulfate	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	2	No	Parameter Not Detected
Heptachlor	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	7	6.58		0	2	No	Parameter Not Detected; Max SQL > SV
Heptachlor epoxide	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	2	No	Parameter Not Detected; Max SQL > SV
Methoxychlor	0	2	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	2	No	Parameter Not Detected
Toxaphene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
alpha-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	2	No	Parameter Not Detected
gamma-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	2	No	Parameter Not Detected
Total Chlordane	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	12	11.6		0	2	No	Parameter Not Detected; Max SQL > SV
Endrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	2	No	Parameter Not Detected
Endrin aldehyde	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	2	No	Parameter Not Detected
Endrin ketone	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22	21.7		0	2	No	Parameter Not Detected; Max SQL > SV
Total Endrin	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	2	No	Parameter Not Detected
alpha-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	2	No	Parameter Not Detected
beta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	2	No	Parameter Not Detected
delta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	2	No	Parameter Not Detected
gamma-BHC (Lindane)	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	0.31		0	2	No	Max SQL < SV
Total BHC	0	2	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	2	No	Parameter Not Detected
4,4'-DDD	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	2	No	Parameter Not Detected; Max SQL > SV
4,4'-DDE	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	2	No	Parameter Not Detected; Max SQL > SV
4,4'-DDT	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	65	84.7		0	2	No	Parameter Not Detected; Max SQL > SV
Total DDT	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	2	No	Parameter Not Detected
PCBs (µg/L)																				
Aroclor-1016	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Aroclor-1221	0	2	1	1	1	1			ND	1	U		NA				0	2	No	Parameter Not Detected
Aroclor-1232	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Aroclor-1242	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Aroclor-1248	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Aroclor-1254	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	2	No	Parameter Not Detected
Aroclor-1260	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	36	35.7		0	2	No	Parameter Not Detected; Max SQL > SV
Total PCB	0	2	4	4	4	4			ND	4	U		NA				0	2	No	Parameter Not Detected
SVOCs (µg/L)																				
1,2,4-Trichlorobenzene	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
1,4-Dichlorobenzene	0	1	5	5	5	5			ND	5	U	3	FDEP	2	1.67		0	1	No	Parameter Not Detected; Max SQL > SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	2	11.3	10	12.5	11.3			ND	12.5	U		NA				0	2	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
2,4-Dichlorophenol	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
2,4-Dimethylphenol	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
2,4-Dinitrophenol	0	2	11.3	10	12.5	11.3			ND	12.5	U		NA				0	2	No	Parameter Not Detected
2,4-Dinitrotoluene	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
2,6-Dinitrotoluene	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
2-Chloronaphthalene	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	2	11.3	10	12.5	11.3			ND	12.5	U		NA				0	2	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
2-Nitroaniline	0	2	7.5	2.5	12.5	7.5			ND	12.5	U		NA				0	2	No	Parameter Not Detected
2-Nitrophenol	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
3-Nitroaniline	0	2	11.3	10	12.5	11.3			ND	12.5	U		NA				0	2	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
4-Chloroaniline	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
4-Nitroaniline	0	2	11.3	10	12.5	11.3			ND	12.5	U		NA				0	2	No	Parameter Not Detected
4-Nitrophenol	0	2	11.3	10	12.5	11.3			ND	12.5	U		NA				0	2	No	Parameter Not Detected

Table 10-7-12
Wetland 18A Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Screening HQ	Ref. Conc.	Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
Benzo(b)fluoranthene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
SVOCs (µg/L) - cont.																				
Benzo(g,h,i)perylene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Benzo(k)fluoranthene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	0.3	EPA	8.33	8.33		0	2	No	Parameter Not Detected; Max SQL > SV
Butylbenzylphthalate	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Carbazole	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Dibenzofuran	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Diethylphthalate	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Dimethylphthalate	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Di-n-octylphthalate	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Hexachlorobenzene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Hexachlorobutadiene	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Hexachloroethane	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Isophorone	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Nitrobenzene	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Pentachlorophenol	0	2	7.5	2.5	12.5	7.5			ND	12.5	U		NA				0	2	No	Parameter Not Detected
Phenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	2	No	Parameter Not Detected
PAHs (µg/L)																				
2-Methylnaphthalene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Acenaphthene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Acenaphthylene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Anthracene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Benzo(a)anthracene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Benzo(a)pyrene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Chrysene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Fluoranthene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Fluorene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Naphthalene	0	2	2.75	0.5	5	2.75			ND	5	U	26	FDEP	0.19	0.11		0	2	No	Max SQL < SV
Phenanthrene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Pyrene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Total PAH	0	2	35.8	6.5	65	35.8			ND	65	U		NA				0	2	No	Parameter Not Detected
VOCs (µg/L)																				
1,1,2,2-Tetrachloroethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
1,1,2-Trichloroethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
1,1-Dichloroethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloroethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloropropane	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
2-Butanone (MEK)	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
2-Hexanone	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	2	3.75	2.5	5	3.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Acetone	0	1	5	5	5	5			ND	5	U		NA				0	1	No	Parameter Not Detected
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Bromodichloromethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Bromoform	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Bromomethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Carbon disulfide	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Carbon tetrachloride	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Chloroethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Chloromethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
cis-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Dibromochloromethane	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Styrene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Tetrachloroethene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Trichloroethene	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Vinyl chloride	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected
Xylene (Total)	0	2	2.75	0.5	5	2.75			ND	5	U		NA				0	2	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL

UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not
parameters. As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 10-7-13
Wetland 18A Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	None	None
Arsenic			
Iron			
Lead			
Manganese			
Barium			
Chromium			
Vanadium			

Table 10-7-14
Wetland 18A
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	1.6E+03	=	9.5E+03	=	MG/KG	041M18A101	4 / 4	NAV	5.5E+03	1.0E-03	3	1.91E-06	9.54E-07	3.02E-05	2.02E-05
7440382	Arsenic	C	2.9E+00	J	3.1E+01	=	MG/KG	041M18A201	4 / 4	NAV	1.1E+01	3.0E-02	2	1.88E-07	9.42E-08	4.26E-07	7.12E-07
7440393	Barium	N	1.8E+01	J	3.6E+01	=	MG/KG	001M001801	4 / 4	NAV	2.5E+01	1.0E-03	3	7.18E-09	3.59E-09	1.14E-07	7.60E-08
7440508	Copper	N	5.2E+00	J	2.3E+01	=	MG/KG	041M18A101	3 / 4	N/A / 2.3E+01	1.3E+01	1.0E-03	3	4.52E-09	2.26E-09	7.15E-08	4.78E-08
7439896	Iron	N	8.1E+02	=	4.8E+04	=	MG/KG	041M18A201	4 / 4	NAV	1.9E+04	1.0E-03	3	9.64E-06	4.82E-06	1.53E-04	1.02E-04
7439921	Lead	N	4.5E+01	=	7.0E+01	=	MG/KG	041M18A101	4 / 4	NAV	6.1E+01	1.0E-03	3	1.40E-08	7.01E-09	2.22E-07	1.48E-07
7439965	Manganese	N	1.5E+01	=	1.1E+02	=	MG/KG	001M001801	4 / 4	NAV	5.7E+01	1.0E-03	3	2.10E-08	1.05E-08	3.32E-07	2.22E-07
7782492	Selenium	N	2.9E+00	J	3.8E+00	=	MG/KG	041M18A101	2 / 4	1.7E+00 / 8.3E+00	2.9E+00	1.0E-03	3	7.60E-10	3.80E-10	1.20E-08	8.04E-09
7440622	Vanadium	N	7.3E+00	J	9.0E+00	J	MG/KG	041M18A101	3 / 4	N/A / 1.6E+01	8.1E+00	1.0E-03	3	1.80E-09	9.00E-10	2.85E-08	1.90E-08
72548	4,4'-DDD	C	1.6E-02	=	9.3E-01	D	MG/KG	041M18A101	4 / 4	NAV	2.9E-01	3.0E-02	1	5.58E-09	2.79E-09	1.26E-08	2.11E-08
72559	4,4'-DDE	C	1.4E-02	J	2.7E-01	D	MG/KG	041M18A101	4 / 4	NAV	1.2E-01	3.0E-02	1	1.62E-09	8.10E-10	3.66E-09	6.12E-09
50293	4,4'-DDT	C	1.9E-03	J	1.2E+00	D	MG/KG	041M18A101	3 / 4	N/A / 3.7E-02	3.8E-01	3.0E-02	1	7.20E-09	3.60E-09	1.63E-08	2.72E-08
309002	Aldrin	C	N/A	N/A	3.7E-03	=	MG/KG	041M18A201	1 / 4	8.2E-04 / 1.9E-02	3.8E-03	1.0E-01	2	7.40E-11	3.70E-11	1.67E-10	2.80E-10
5103719	alpha-Chlordane	C	4.8E-03	J	1.2E-02	J	MG/KG	001M001801	2 / 4	8.2E-04 / 2.9E-03	4.7E-03	4.0E-02	2	9.60E-11	4.80E-11	2.17E-10	3.63E-10
319857	beta-BHC	C	N/A	N/A	1.3E-03	J	MG/KG	041M18A201	1 / 4	8.2E-04 / 1.9E-02	3.2E-03	4.0E-02	2	1.04E-11	5.20E-12	2.35E-11	3.93E-11
72208	Endrin	N	N/A	N/A	1.3E-02	J	MG/KG	001M001801	1 / 4	1.7E-03 / 6.0E-03	4.5E-03	1.0E-01	2	2.60E-10	1.30E-10	4.12E-09	2.75E-09
53494705	Endrin ketone	N	N/A	N/A	6.5E-03	J	MG/KG	041M18A201	1 / 4	1.7E-03 / 3.7E-02	7.2E-03	1.0E-01	2	1.30E-10	6.50E-11	2.06E-09	1.38E-09
57749	gamma-Chlordane	C	N/A	N/A	9.5E-03	J	MG/KG	001M001801	1 / 4	8.2E-04 / 2.9E-03	3.0E-03	4.0E-02	2	7.60E-11	3.80E-11	1.72E-10	2.87E-10
106467	1,4-Dichlorobenzene	C	N/A	N/A	1.1E+00	J	MG/KG	041M18A201	1 / 4	2.3E+00 / 3.6E+00	1.4E+00	1.0E-02	3	2.20E-09	1.10E-09	4.97E-09	8.32E-09
106445	4-Methylphenol (p-Cresol)	N	1.7E-01	J	3.3E-01	J	MG/KG	041M18A201	2 / 4	2.3E+00 / 3.6E+00	8.6E-01	1.0E-01	2	6.60E-09	3.30E-09	1.04E-07	6.98E-08
84742	Di-n-butylphthalate	N	1.6E-01	J	4.3E-01	J	MG/KG	041M18A201	3 / 4	N/A / 3.6E+00	6.4E-01	1.0E-01	2	8.60E-09	4.30E-09	1.36E-07	9.10E-08
91203	Naphthalene	N	N/A	N/A	3.0E-01	J	MG/KG	041M18A201	1 / 4	2.3E-01 / 3.6E+00	6.0E-01	1.0E-02	3	6.00E-10	3.00E-10	9.50E-09	6.35E-09
78933	2-Butanone (MEK)	N	N/A	N/A	1.2E-01	J	MG/KG	041M18A301	1 / 3	1.1E-01 / 1.4E-01	8.2E-02	1.0E-02	3	2.40E-10	1.20E-10	3.80E-09	2.54E-09
67641	Acetone	N	4.8E-01	J	7.5E-01	=	MG/KG	041M18A201	2 / 3	N/A / 1.0E-01	4.3E-01	1.0E-02	3	1.50E-09	7.50E-10	2.37E-08	1.59E-08
71432	Benzene	C	3.4E-02	J	5.0E-02	J	MG/KG	041M18A301	2 / 3	N/A / 1.1E-01	4.6E-02	1.0E-02	3	1.00E-10	5.00E-11	2.26E-10	3.78E-10
85018	Chlorobenzene	N	4.6E-02	J	4.3E-01	=	MG/KG	041M18A201	2 / 3	N/A / 1.1E-01	1.8E-01	1.0E-02	3	8.60E-10	4.30E-10	1.36E-08	9.10E-09
75092	Methylene chloride	C	N/A	N/A	7.5E-01	=	MG/KG	041M18A201	1 / 3	1.0E-01 / 1.0E-01	2.8E-01	1.0E-02	3	1.50E-09	7.50E-10	3.39E-09	5.67E-09
129000	Toluene	N	8.5E-02	J	2.2E-01	J	MG/KG	041M18A301	2 / 3	N/A / 1.1E-01	1.2E-01	1.0E-02	3	4.40E-10	2.20E-10	6.96E-09	4.66E-09

Notes:

Equation for sediment risk:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Equation for DA_{event} for sediment contact:

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

Where:

C_{sd} = Chemical concentration in sediment (mg/kg).
CF = Conversion factor (10^{-6} kg/mg).
AF = Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;
(2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Table 10-7-15
Wetland 18A
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABSGI	ABSGISource	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
Sediment Dermal Risk	Aluminum	N	9.5E+03	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	3.0E-04	N/A	2.0E-04	N/A
	Arsenic	C	3.1E+01	3.0E-04	1.5E+00	4.1E-01	3	1.2E-04	3.7E+00	3.5E-03	**1.6E-06**	5.8E-03	**2.6E-06**
	Barium	N	3.6E+01	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	2.3E-05	N/A	1.6E-05	N/A
	Copper	N	2.3E+01	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	6.0E-06	N/A	4.0E-06	N/A
	Iron	N	4.8E+04	3.0E-01	N/A	1.5E-01	3	4.5E-02	N/A	3.4E-03	N/A	2.3E-03	N/A
	Lead	N	7.0E+01	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.1E+02	2.4E-02	N/A	4.0E-02	1, 3	9.6E-04	N/A	3.5E-04	N/A	2.3E-04	N/A
	Selenium	N	3.8E+00	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	4.4E-06	N/A	2.9E-06	N/A
	Vanadium	N	9.0E+00	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	1.6E-04	N/A	1.0E-04	N/A
	4,4'-DDD	C	9.3E-01	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	1.0E-07	N/A	1.7E-07
	4,4'-DDE	C	2.7E-01	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	4.2E-08	N/A	6.9E-08
	4,4'-DDT	C	1.2E+00	5.0E-04	3.4E-01	3.0E-02	2	1.5E-05	1.1E+01	1.1E-03	1.8E-07	1.8E-03	3.1E-07
	Aldrin	C	3.7E-03	3.0E-05	1.7E+01	1.3E-02	3	4.0E-07	1.3E+03	4.2E-04	2.2E-07	7.1E-04	3.6E-07
	alpha-Chlordane	C	1.2E-02	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	5.4E-07	9.5E-11	9.1E-07	1.6E-10
	beta-BHC	C	1.3E-03	2.0E-04	1.8E+00	1.4E-02	3	2.8E-06	1.3E+02	8.3E-06	3.0E-09	1.4E-05	5.0E-09
	Endrin	N	1.3E-02	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	1.1E-03	N/A	7.3E-04	N/A
	Endrin ketone	N	6.5E-03	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	5.5E-04	N/A	3.7E-04	N/A
	gamma-Chlordane	C	9.5E-03	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	4.3E-07	7.5E-11	7.2E-07	1.3E-10
	1,4-Dichlorobenzene	C	1.1E+00	3.0E-02	2.4E-02	9.0E-01	3	2.7E-02	2.7E-02	1.8E-07	1.3E-10	3.1E-07	2.2E-10
	4-Methylphenol (p-Cresol)	N	3.3E-01	5.0E-03	N/A	7.4E-02	3	3.7E-04	N/A	2.8E-04	N/A	1.9E-04	N/A
	Di-n-butylphthalate	N	4.3E-01	1.0E-01	N/A	3.1E-01	3	3.1E-02	N/A	4.4E-06	N/A	2.9E-06	N/A
	Naphthalene	N	3.0E-01	2.0E-02	N/A	5.9E-02	3	1.2E-03	N/A	8.0E-06	N/A	5.4E-06	N/A
	2-Butanone (MEK)	N	1.2E-01	6.0E-01	N/A	1.0E-01	2	6.0E-02	N/A	6.3E-08	N/A	4.2E-08	N/A
	Acetone	N	7.5E-01	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	2.4E-06	N/A	1.6E-06	N/A
	Benzene	C	5.0E-02	3.0E-03	5.5E-02	8.8E-02	3	2.6E-04	6.3E-01	8.6E-07	1.4E-10	1.4E-06	2.4E-10
	Chlorobenzene	N	4.3E-01	2.0E-02	N/A	7.3E-02	3	1.5E-03	N/A	9.3E-06	N/A	6.2E-06	N/A
	Methylene chloride	C	7.5E-01	6.0E-02	7.5E-03	1.0E-01	3	6.1E-03	7.4E-02	5.6E-07	2.5E-10	9.4E-07	4.2E-10
	Toluene	N	2.2E-01	2.0E-01	N/A	3.1E-01	3	6.2E-02	N/A	1.1E-07	N/A	7.5E-08	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfDdermal = Dermal reference dose.
RFDoral = Oral reference dose.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-7-16
Wetland 18A
Sediment Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	9.5E+03	1.0E+00	N/A	3.02E-03	N/A	1.94E-03	N/A
	Arsenic	C	3.1E+01	3.0E-04	1.5E+00	4.73E-03	**2.13E-06**	7.61E-03	**3.42E-06**
	Barium	N	3.6E+01	7.0E-02	N/A	1.62E-04	N/A	1.04E-04	N/A
	Copper	N	2.3E+01	4.0E-02	N/A	1.79E-04	N/A	1.15E-04	N/A
	Iron	N	4.8E+04	3.0E-01	N/A	5.09E-02	N/A	3.27E-02	N/A
	Lead	N	7.0E+01	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.1E+02	2.4E-02	N/A	1.39E-03	N/A	8.90E-04	N/A
	Selenium	N	3.8E+00	5.0E-03	N/A	2.41E-04	N/A	1.55E-04	N/A
	Vanadium	N	9.0E+00	7.0E-03	N/A	4.07E-04	N/A	2.62E-04	N/A
	4,4'-DDD	C	9.3E-01	N/A	2.4E-01	N/A	1.01E-08	N/A	1.62E-08
	4,4'-DDE	C	2.7E-01	N/A	3.4E-01	N/A	4.15E-09	N/A	6.67E-09
	4,4'-DDT	C	1.2E+00	5.0E-04	3.4E-01	1.09E-04	1.85E-08	1.74E-04	2.97E-08
	Aldrin	C	3.7E-03	3.0E-05	1.7E+01	5.58E-06	2.84E-09	8.96E-06	4.57E-09
	alpha-Chlordane	C	1.2E-02	5.0E-04	3.5E-01	1.09E-06	1.90E-10	1.74E-06	3.05E-10
	beta-BHC	C	1.3E-03	2.0E-04	1.8E+00	2.94E-07	1.06E-10	4.72E-07	1.70E-10
	Endrin	N	1.3E-02	3.0E-04	N/A	1.37E-05	N/A	8.82E-06	N/A
	Endrin ketone	N	6.5E-03	3.0E-04	N/A	6.86E-06	N/A	4.41E-06	N/A
	gamma-Chlordane	C	9.5E-03	5.0E-04	3.5E-01	8.59E-07	1.50E-10	1.38E-06	2.42E-10
	1,4-Dichlorobenzene	C	1.1E+00	3.0E-02	2.4E-02	1.66E-06	1.19E-09	2.67E-06	1.92E-09
	4-Methylphenol (p-Cresol)	N	3.3E-01	5.0E-03	N/A	2.09E-05	N/A	1.34E-05	N/A
	Di-n-butylphthalate	N	4.3E-01	1.0E-01	N/A	1.36E-06	N/A	8.75E-07	N/A
	Naphthalene	N	3.0E-01	2.0E-02	N/A	4.75E-06	N/A	3.05E-06	N/A
	2-Butanone (MEK)	N	1.2E-01	6.0E-01	N/A	6.33E-08	N/A	4.07E-08	N/A
	Acetone	N	7.5E-01	1.0E-01	N/A	2.37E-06	N/A	1.53E-06	N/A
	Benzene	C	5.0E-02	3.0E-03	5.5E-02	7.54E-07	1.24E-10	1.21E-06	2.00E-10
	Chlorobenzene	N	4.3E-01	2.0E-02	N/A	6.81E-06	N/A	4.38E-06	N/A
	Methylene chloride	C	7.5E-01	6.0E-02	7.5E-03	5.65E-07	2.54E-10	9.09E-07	4.09E-10
	Toluene	N	2.2E-01	2.0E-01	N/A	3.48E-07	N/A	2.24E-07	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = chronic daily intake (mg/kg-day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
IRsd = 100 mg/day for age groups greater than 6-years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 10-7-17
Wetland 18A
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum Concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	2.4E+02	=	1.2E+03	=	UG/L	041W18A201	2 / 2	NAV	7.3E+02	1.2E-03	1.0E-03	3.17E-06	5.02E-05	6.71E-05
7440382	Arsenic	C	N/A	N/A	6.8E+01	=	UG/L	041W18A201	1 / 2	N/A / 2.8E+00	3.5E+01	6.8E-05	1.0E-03	1.78E-07	4.02E-07	1.34E-06
7440393	Barium	N	N/A	N/A	2.6E+01	J	UG/L	041W18A201	1 / 2	N/A / 5.2E+00	1.4E+01	2.6E-05	1.0E-03	6.81E-08	1.08E-06	1.44E-06
7440473	Chromium	N	N/A	N/A	1.6E+01	=	UG/L	041W18A201	1 / 2	N/A / 9.2E+00	1.0E+01	1.6E-05	1.0E-03	4.06E-08	6.42E-07	8.59E-07
7439896	Iron	N	8.5E+02	=	1.2E+05	=	UG/L	041W18A201	2 / 2	NAV	6.1E+04	1.2E-01	2.5E-04	7.93E-05	1.26E-03	1.68E-03
7439921	Lead	N	N/A	N/A	1.2E+01	=	UG/L	041W18A201	1 / 2	N/A / 1.6E+00	6.5E+00	1.2E-05	3.4E-04	1.08E-08	1.71E-07	2.28E-07
7439965	Manganese	N	4.8E+01	=	1.4E+02	=	UG/L	041W18A201	2 / 2	NAV	9.6E+01	1.4E-04	1.0E-03	3.74E-07	5.93E-06	7.92E-06
7440622	Vanadium	N	N/A	N/A	1.0E+01	J	UG/L	041W18A201	1 / 2	N/A / 4.4E+00	6.1E+00	1.0E-05	1.0E-03	2.60E-08	4.12E-07	5.50E-07
106467	1,4-Dichlorobenzene	C	N/A	N/A	2.0E+00	=	UG/L	041W18A201	1 / 2	N/A / 1.0E+01	3.5E+00	2.0E-06	4.2E-02	3.24E-07	7.34E-07	2.45E-06
71432	Benzene	C	N/A	N/A	5.0E+00	=	UG/L	041W18A201	1 / 2	N/A / 1.0E+01	5.0E+00	5.0E-06	1.5E-02	2.25E-07	5.09E-07	1.70E-06
85018	Chlorobenzene	N	N/A	N/A	1.4E+01	=	UG/L	041W18A201	1 / 2	N/A / 1.0E+01	9.5E+00	1.4E-05	2.8E-02	1.32E-06	2.09E-05	2.80E-05

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).

EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer – 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer – 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 10-7-18
Wetland 18A
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	1.2E-03	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	5.0E-04	N/A	6.7E-04	N/A
	Arsenic	C	6.8E-05	3.0E-04	1.5E+00	4.1E-01	2	1.2E-04	3.7E+00	3.3E-03	**1.5E-06**	1.1E-02	**4.9E-06**
	Barium	N	2.6E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	2.2E-04	N/A	2.9E-04	N/A
	Chromium	N	1.6E-05	3.0E-03	N/A	2.5E-02	1	7.5E-05	N/A	8.6E-03	N/A	1.1E-02	N/A
	Iron	N	1.2E-01	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	1.2E-05	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.4E-04	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	1.1E-03	N/A	1.4E-03	N/A
	Vanadium	N	1.0E-05	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	2.3E-03	N/A	3.0E-03	N/A
	1,4-Dichlorobenzene	C	2.0E-06	3.0E-02	2.4E-02	9.0E-01	3	2.7E-02	2.7E-02	2.7E-05	2.0E-08	9.1E-05	6.5E-08
	Benzene	C	5.0E-06	3.0E-03	5.5E-02	8.8E-02	3	2.6E-04	6.3E-01	1.9E-03	3.2E-07	6.4E-03	**1.1E-06**
	Chlorobenzene	N	1.4E-05	2.0E-02	N/A	7.3E-02	3	1.5E-03	N/A	1.4E-02	N/A	1.9E-02	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-7-19
Wetland 18A
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/cm^3)	Oral RfD (mg/kg·	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	1.2E-03	1.0E+00	N/A	3.9E-08	N/A	2.5E-08	N/A
	Arsenic	C	6.8E-05	3.0E-04	1.5E+00	1.0E-06	4.6E-10	1.7E-06	7.4E-10
	Barium	N	2.6E-05	7.0E-02	N/A	1.2E-08	N/A	7.6E-09	N/A
	Chromium	N	1.6E-05	3.0E-03	N/A	1.6E-07	N/A	1.1E-07	N/A
	Iron	N	1.2E-01	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	1.2E-05	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.4E-04	1.4E-01	N/A	3.3E-08	N/A	2.1E-08	N/A
	Vanadium	N	1.0E-05	7.0E-03	N/A	4.5E-08	N/A	2.9E-08	N/A
	1,4-Dichlorobenzene	C	2.0E-06	3.0E-02	2.4E-02	3.0E-10	2.2E-13	4.8E-10	3.5E-13
	Benzene	C	5.0E-06	3.0E-03	5.5E-02	7.5E-09	1.2E-12	1.2E-08	2.0E-12
	Chlorobenzene	N	1.4E-05	2.0E-02	N/A	2.2E-08	N/A	1.4E-08	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:

CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:

Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 10-7-20
Wetland 18B Phase II
Sediment Physical Parameters

Parameter	041M18B101
TOC (%)	11.8
Percent Solids (%)	15.2
Grain Size Analysis (percent of composition[1])	
Coarse Sand	0
Medium Sand	6
Fine Sand	36
Silt and Clay	58
Description	Black Sandy Organic Silt

Note:
[1] = Derived from sieve analyses.

Table 10-7-21
Wetland 18B Phase III
Sediment Physical Parameters

Parameter	041M18B0101
TOC (%)	0.9
Percent Solids (%)	No Data
Grain Size Analysis	
(percent of composition[1])	
Fine Gravel	9.4
Coarse Sand	3.6
Medium Sand	17.1
Fine Sand	42.6
Silt and Clay	27.3

Note:
[1] = Derived from sieve analyses

Table 10-7-22
Wetland 18B Phase II

Surface Water Physical Parameters

Parameter	041W18B101
Hardness as CaCO3 (mg/L)	49.3
pH	5.02
Specific Conductivity (mS/cm)	0.55
Turbidity (NTU)	9
Salinity (%)	0.02

Notes:

mg/L = Milligrams per liter
pH = Hydrogen ion content
MS/cm = MillSiemens per certimeter
NTU = Nephelometric turbidity units
% = Percent

Table 10-7-23
Wetland 18B Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	4,274.0	1	1	1	11,100.0	11,100.0	11,100.0	041M18B101
Arsenic	2.140	1	1	1	83.80	83.80	83.80	041M18B101
Barium	3.840	1	1	1	10.90	10.90	10.90	041M18B101
Beryllium	0.130	1	1	1	0.730	0.730	0.730	041M18B101
Calcium	1,978.80	1	1	1	3,100.0	3,100.0	3,100.0	041M18B101
Chromium	13.10	1	1	1	66.20	66.20	66.20	041M18B101
Copper	8.440	1	1	1	17.90	17.90	17.90	041M18B101
Cyanide (CN)	1.290	1	1	1	8.80	8.80	8.80	041M18B101
Iron	2,684.40	1	1	1	128,000.0	128,000.0	128,000.0	041M18B101
Lead	21.040	1	1	1	111.0	111.0	111.0	041M18B101
Magnesium	2,943.60	1	1	1	3,420.0	3,420.0	3,420.0	041M18B101
Manganese	9.810	1	1	1	46.70	46.70	46.70	041M18B101
Potassium	899.720	0	1	1	846.0	846.0	846.0	041M18B101
Selenium	0.660	1	1	1	2.20	2.20	2.20	041M18B101
Sodium	11,439.60	0	1	1	3,300.0	3,300.0	3,300.0	041M18B101
Vanadium	8.590	1	1	1	50.90	50.90	50.90	041M18B101
Zinc	14.360	1	1	1	49.30	49.30	49.30	041M18B101
Pesticides and PCBs (g/kg)								
4,4'-DDD	50.0	1	1	1	280.0	280.0	280.0	041M18B101
4,4'-DDT	20.0	1	1	1	1,800.0	1,800.0	1,800.0	041M18B101
Total DDT	110.0	1	1	1	2,105.0	2,105.0	2,110.0	041M18B101
VOCs (g/kg)								
2-Butanone (MEK)	N/A	0	1	1	98.0	98.0	98.0	041M18B101
Acetone	N/A	0	1	1	440.0	440.0	440.0	041M18B101

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 10-7-24
Wetland 18B Phase III
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	4,274.0	0	1	1	605.0	605.0	605.0	041M18B101
Arsenic	2.140	1	1	1	13.80	13.80	13.80	041M18B101
Barium	3.840	0	1	1	1.80	1.80	1.80	041M18B101
Beryllium	0.130	0	1	1	0.070	0.070	0.070	041M18B101
Calcium	1,978.80	0	1	1	1,050.0	1,050.0	1,050.0	041M18B101
Chromium	13.10	0	1	1	3.60	3.60	3.60	041M18B101
Copper	8.440	0	1	1	1.70	1.70	1.70	041M18B101
Iron	2,684.40	1	1	1	20,800.0	20,800.0	20,800.0	041M18B101
Lead	21.040	0	1	1	5.90	5.90	5.90	041M18B101
Magnesium	2,943.60	0	1	1	869.0	869.0	869.0	041M18B101
Manganese	9.810	1	1	1	10.80	10.80	10.80	041M18B101
Potassium	899.720	0	1	1	220.0	220.0	220.0	041M18B101
Selenium	0.660	1	1	1	0.740	0.740	0.740	041M18B101
Sodium	11,439.60	0	1	1	3,750.0	3,750.0	3,750.0	041M18B101
Vanadium	8.590	0	1	1	6.30	6.30	6.30	041M18B101
Zinc	14.360	0	1	1	5.70	5.70	5.70	041M18B101
Pesticides and PCBs (g/kg)								
4,4'-DDD	50.0	0	1	1	36.0	36.0	36.0	041M18B101
4,4'-DDE	40.0	0	1	1	6.10	6.10	6.10	041M18B101
4,4'-DDT	20.0	1	1	1	110.0	110.0	110.0	041M18B101
Total DDT	110.0	1	1	1	152.10	152.10	152.0	041M18B101
VOCs (g/kg)								
Acetone	N/A	0	1	1	53.0	53.0	53.0	041M18B101

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 10-7-25
Wetland 18B Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
Metals (g/L)								
Aluminum	2,927.5	0	1	1	119.0	119.0	119.0	041W18B101
Calcium	76,800.0	0	1	1	7,760.0	7,760.0	7,760.0	041W18B101
Iron	1,352.0	1	1	1	10,900.0	10,900.0	10,900.0	041W18B101
Magnesium	243,650.0	0	1	1	7,280.0	7,280.0	7,280.0	041W18B101
Manganese	12.15	1	1	1	110.0	110.0	110.0	041W18B101
Potassium	81,250.0	0	1	1	3,600.0	3,600.0	3,600.0	041W18B101
Sodium	1,952,000.0	0	1	1	48,300.0	48,300.0	48,300.0	041W18B101
VOCs (g/L)								
Benzene	N/A	0	1	1	1.0	1.0	1.0	041W18B101
Chlorobenzene	N/A	0	1	1	5.0	5.0	5.0	041W18B101
SVOCs (g/L)								
1,4-Dichlorobenzene	N/A	0	1	1	1.0	1.0	1.0	041W18B101

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 10-7-26
Wetland 18B Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	1	1			11,100	11,100	041M18B101	11,100			N/A		Yes	No SV
Antimony	0	1	0.34	0.34			ND	0.34	UJ	12	2	0.03	No	Max SQL< SV
Arsenic	**1**	**1**			**83.8**	**83.8**	**041M18B101**	**83.8**		**7.24**	**1, 2**	**11.6**	**Yes**	**Max Detect > SV**
Barium	1	1			10.9	10.9	041M18B101	10.9	J		N/A		Yes	No SV
Beryllium	1	1			0.73	0.73	041M18B101	0.73	J		N/A		Yes	No SV
Cadmium	0	1	0.5	0.5			ND	0.5	U	0.676	1	0.74	No	Max SQL< SV
Calcium	1	1			3,100	3,100	041M18B101	3,100			N/A		Yes	No SV
Chromium	**1**	**1**			**66.2**	**66.2**	**041M18B101**	**66.2**		**52.3**	**1, 2**	**1.27**	**Yes**	**Max Detect > SV**
Cobalt	0	1	0.5	0.5			ND	0.5	U		N/A		Yes	No SV
Copper	1	1			17.9	17.9	041M18B101	17.9		18.7	1, 2	0.96	No	Max Detect < SV
Cyanide (CN)	1	1			8.8	8.8	041M18B101	8.8	J		N/A		Yes	No SV
Iron	1	1			128,000	128,000	041M18B101	128,000			N/A		Yes	No SV
Lead	**1**	**1**			**111**	**111**	**041M18B101**	**111**		**30.2**	**1, 2**	**3.68**	**Yes**	**Max Detect > SV**
Magnesium	1	1			3,420	3,420	041M18B101	3,420			N/A		Yes	No SV
Manganese	1	1			46.7	46.7	041M18B101	46.7			N/A		Yes	No SV
Mercury	0	1	0.165	0.165			ND	0.165	U	0.13	1, 2	1.27	Yes	Max SQL > SV
Nickel	0	1	2.05	2.05			ND	2.05	U	15.9	1, 2	0.13	No	Max SQL< SV
Potassium	1	1			846	846	041M18B101	846	J		N/A		Yes	No SV
Selenium	1	1			2.2	2.2	041M18B101	2.2			N/A		Yes	No SV
Silver	0	1	0.7	0.7			ND	0.7	U	0.733	1	0.96	No	Max SQL< SV
Sodium	1	1			3,300	3,300	041M18B101	3,300			N/A		Yes	No SV
Thallium	0	1	0.5	0.5			ND	0.5	UJ		N/A		Yes	No SV
Vanadium	1	1			50.9	50.9	041M18B101	50.9			N/A		Yes	No SV
Zinc	1	1			49.3	49.3	041M18B101	49.3		124	1, 2	0.40	No	Max Detect < SV
PAHs (µg/kg)														
2-Methylnaphthalene	0	1	95	95			ND	95	U	20.2	1	4.7	No	TOC normalized PAHs < TEC
Acenaphthene	0	1	47	47			ND	47	U	6.71	1	7	No	TOC normalized PAHs < TEC
Acenaphthylene	0	1	95	95			ND	95	U	5.87	1	16.2	No	TOC normalized PAHs < TEC
Anthracene	0	1	95	95			ND	95	U	46.9	1	2.03	No	TOC normalized PAHs < TEC
Benzo(a)anthracene	0	1	95	95			ND	95	U	74.8	1	1.27	No	TOC normalized PAHs < TEC
Benzo(a)pyrene	0	1	95	95			ND	95	U	88.8	1	1.07	No	TOC normalized PAHs < TEC
Chrysene	0	1	95	95			ND	95	U	108	1	0.88	No	Max SQL< SV
Dibenz(a,h)anthracene	0	1	95	95			ND	95	U	6.22	1	15.3	No	TOC normalized PAHs < TEC
Fluoranthene	0	1	95	95			ND	95	U	113	1	0.84	No	Max SQL< SV
Fluorene	0	1	47	47			ND	47	U	21.2	1	2.22	No	TOC normalized PAHs < TEC
Naphthalene	0	1	95	95			ND	95	U	34.6	1	2.75	No	TOC normalized PAHs < TEC
Phenanthrene	0	1	95	95			ND	95	U	86.7	1	1.1	No	TOC normalized PAHs < TEC
Pyrene	0	1	95	95			ND	95	U	153	1	0.62	No	Max SQL< SV
Total PAHs	0	1	1,140	1,140			ND	1,140	U	1,684	1, 2	0.68	No	Max SQL< SV
TOC Normalized PAHs	0	1	9.65	9.65			ND	9.65	U	290	3	0.03	No	Max SQL< SV
PCBs (µg/kg)														
Aroclor-1016	0	1	250	250			ND	250	U	21.6	N/A	11.6	Yes	Max SQL > SV
Aroclor-1221	0	1	250	250			ND	250	U	67	2	3.73	Yes	Max SQL > SV
Aroclor-1232	0	1	250	250			ND	250	U	21.6	N/A	11.6	Yes	Max SQL > SV
Aroclor-1242	0	1	250	250			ND	250	U	21.6	N/A	11.6	Yes	Max SQL > SV
Aroclor-1248	0	1	250	250			ND	250	U	21.6	N/A	11.6	Yes	Max SQL > SV
Aroclor-1254	0	1	250	250			ND	250	U	21.6	N/A	11.6	Yes	Max SQL > SV
Aroclor-1260	0	1	250	250			ND	250	U	21.6	N/A	11.6	Yes	Max SQL > SV
Total PCBs	0	1	1,750	1,750			ND	1,750	U	21.6	1	81	Yes	Max SQL > SV
Pesticides (µg/kg)														
Aldrin	0	1	12	12			ND	12	U		N/A		Yes	No SV
Dieldrin	0	1	25	25			ND	25	U	0.716	1	34.9	Yes	Max SQL > SV
Endosulfan I	0	1	12	12			ND	12	U		N/A		Yes	No SV
Endosulfan II	0	1	25	25			ND	25	U		N/A		Yes	No SV
Endosulfan sulfate	0	1	25	25			ND	25	U		N/A		Yes	No SV
Heptachlor	0	1	12	12			ND	12	U		N/A		Yes	No SV
Heptachlor epoxide	0	1	12	12			ND	12	U		N/A		Yes	No SV
Methoxychlor	0	1	120	120			ND	120	U		N/A		Yes	No SV
Toxaphene	0	1	1,200	1,200			ND	1,200	U		N/A		Yes	No SV
alpha-Chlordane	0	1	12	12			ND	12	U	1.7	1	7.06	Yes	Max SQL > SV
gamma-Chlordane	0	1	12	12			ND	12	U	1.7	1	7.06	Yes	Max SQL > SV
Total Chlordane	0	1	24	24			ND	24	U	1.7	1	14.1	Yes	Max SQL > SV
Endrin	0	1	25	25			ND	25	U	3.3	2	7.58	Yes	Max SQL > SV

Table 10-7-26
Wetland 18B Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Pesticides (µg/kg)														
Endrin aldehyde	0	1	25	25			ND	25	U	3.3	2	7.58	Yes	Max SQL > SV
Endrin ketone	0	1	25	25			ND	25	U	3.3	2	7.58	Yes	Max SQL > SV
Total Endrin	0	1	75	75			ND	75	U	3.3	2	22.7	Yes	Max SQL > SV
alpha-BHC	0	1	12	12			ND	12	UJ		N/A		Yes	No SV
beta-BHC	0	1	12	12			ND	12	U	0.32	N/A	37.5	Yes	Max SQL > SV
delta-BHC	0	1	12	12			ND	12	U	0.32	N/A	37.5	Yes	Max SQL > SV
gamma-BHC (Lindane)	0	1	12	12			ND	12	U	0.32	1	37.5	Yes	Max SQL > SV
Total BHC	0	1	48	48			ND	48	U	0.32	2	150	Yes	Max SQL > SV
4,4'-DDD	**1**	**1**			**280**	**280**	**041M18B101**	**280**	**D**	**1.22**	**1**	**230**	**Yes**	**Max Detect > SV**
4,4'-DDE	0	1	25	25			ND	25	U	2.07	1	12.1	Yes	Max SQL > SV
4,4'-DDT	**1**	**1**			**1,800**	**1,800**	**041M18B101**	**1,800**	**D**	**1.19**	**1**	**1,510**	**Yes**	**Max Detect > SV**
Total DDT	**1**	**1**			**2,110**	**2,110**	**041M18B101**	**2,110**		**3.3**	**2**	**638**	**Yes**	**Max Detect > SV**
SVOCs (µg/kg)														
1,2,4-Trichlorobenzene	0	1	950	950			ND	950	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	1	950	950			ND	950	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	1	950	950			ND	950	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	1	950	950			ND	950	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	950	950			ND	950	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	1	2,350	2,350			ND	2,350	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	1	950	950			ND	950	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	1	950	950			ND	950	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	1	950	950			ND	950	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	1	2,350	2,350			ND	2,350	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	1	950	950			ND	950	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	1	950	950			ND	950	U		N/A		Yes	No SV
2-Chloronaphthalene	0	1	950	950			ND	950	U		N/A		Yes	No SV
2-Chlorophenol	0	1	950	950			ND	950	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	1	2,350	2,350			ND	2,350	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	1	950	950			ND	950	U		N/A		Yes	No SV
2-Nitroaniline	0	1	950	950			ND	950	U		N/A		Yes	No SV
2-Nitrophenol	0	1	950	950			ND	950	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	1	950	950			ND	950	U		N/A		Yes	No SV
3-Nitroaniline	0	1	2,350	2,350			ND	2,350	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	1	950	950			ND	950	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	1	950	950			ND	950	U		N/A		Yes	No SV
4-Chloroaniline	0	1	950	950			ND	950	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	1	950	950			ND	950	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	0	1	950	950			ND	950	U		N/A		Yes	No SV
4-Nitroaniline	0	1	2,350	2,350			ND	2,350	U		N/A		Yes	No SV
4-Nitrophenol	0	1	2,350	2,350			ND	2,350	U		N/A		Yes	No SV
Benzo(b)fluoranthene	0	1	95	95			ND	95	U		N/A		No	TOC normalized PAHs < TEC
Benzo(g,h,i)perylene	0	1	95	95			ND	95	U		N/A		No	TOC normalized PAHs < TEC
Benzo(k)fluoranthene	0	1	95	95			ND	95	U		N/A		No	TOC normalized PAHs < TEC
bis(2-Chloroethoxy)methane	0	1	950	950			ND	950	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	1	95	95			ND	95	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	950	950			ND	950	U	182	1, 2	5.22	Yes	Max SQL > SV
Butylbenzylphthalate	0	1	950	950			ND	950	U	182	1, 2	5.22	Yes	Max SQL > SV
Carbazole	0	1	950	950			ND	950	U		N/A		Yes	No SV
Dibenzofuran	0	1	950	950			ND	950	U		N/A		Yes	No SV
Diethylphthalate	0	1	950	950			ND	950	U	182	1, 2	5.22	Yes	Max SQL > SV
Dimethylphthalate	0	1	950	950			ND	950	U	182	1, 2	5.22	Yes	Max SQL > SV
Di-n-butylphthalate	0	1	950	950			ND	950	U	182	1, 2	5.22	Yes	Max SQL > SV
Di-n-octylphthalate	0	1	950	950			ND	950	U	182	1, 2	5.22	Yes	Max SQL > SV
Hexachlorobenzene	0	1	950	950			ND	950	U		N/A		Yes	No SV
Hexachlorobutadiene	0	1	950	950			ND	950	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	1	950	950			ND	950	U		N/A		Yes	No SV
Hexachloroethane	0	1	950	950			ND	950	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	1	95	95			ND	95	U		N/A		No	TOC normalized PAHs < TEC
Isophorone	0	1	950	950			ND	950	U		N/A		Yes	No SV
Nitrobenzene	0	1	950	950			ND	950	U		N/A		Yes	No SV
N-Nitroso-di-n-propylaMine	0	1	95	95			ND	95	U		N/A		Yes	No SV
N-NitrosodiphenylaMine	0	1	950	950			ND	950	U		N/A		Yes	No SV
Pentachlorophenol	0	1	2350	2350			ND	2,350	U		N/A		Yes	No SV
Phenol	0	1	950	950			ND	950	U		N/A		Yes	No SV

Table 10-7-26
Wetland 18B Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
VOCs (µg/kg)														
1,1,1-Trichloroethane	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
1,1-Dichloroethane	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
1,2-Dichloropropane	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
2-Butanone (MEK)	1	1			98	98	041M18B101	98	J		N/A		Yes	No SV
2-Hexanone	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Acetone	1	1			440	440	041M18B101	440	J		N/A		Yes	No SV
Benzene	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Bromodichloromethane	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Bromoform	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Bromomethane	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Carbon disulfide	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Carbon tetrachloride	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Chlorobenzene	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Chloroethane	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Chloroform	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Chloromethane	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Dibromochloromethane	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Ethylbenzene	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Methylene chloride	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Styrene	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Tetrachloroethene	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Toluene	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Trichloroethene	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV
Vinyl chloride	0	1	6.5	6.5			ND	6.5	U		N/A		Yes	No SV
Xylene (Total)	0	1	21.5	21.5			ND	21.5	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 10-7-27
Wetland 18B Phase II
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDD	None	2-Butanone (MEK)
Arsenic	4,4'-DDT		Acetone
Barium	Total DDT		
Beryllium			
Calcium			
Chromium			
Cyanide (CN)			
Iron			
Lead			
Magnesium			
Manganese			
Potassium			
Selenium			
Sodium			
Vanadium			
		Not Detected Parameters	
Cobalt	4,4'-DDE	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Mercury	Aldrin	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
Thallium	alpha-BHC	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	alpha-Chlordane	1,4-Dichlorobenzene	1,1-Dichloroethane
	beta-BHC	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	delta-BHC	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Dieldrin	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
	Endosulfan I	2,4-Dichlorophenol	1,2-Dichloropropane
	Endosulfan II	2,4-Dimethylphenol	2-Hexanone
	Endosulfan sulfate	2,4-Dinitrophenol	4-Methyl-2-Pentanone (MIBK)
	Endrin	2,4-Dinitrotoluene	Benzene
	Endrin aldehyde	2,6-Dinitrotoluene	Bromodichloromethane
	Endrin ketone	2-Chloronaphthalene	Bromoform
	gamma-BHC (Lindane)	2-Chlorophenol	Bromomethane
	gamma-Chlordane	2-Methyl-4,6-Dinitrophenol	Carbon disulfide
	Heptachlor	2-Methylphenol (o-Cresol)	Carbon tetrachloride
	Heptachlor epoxide	2-Nitroaniline	Chlorobenzene
	Methoxychlor	2-Nitrophenol	Chloroethane
	Total BHC	3,3'-Dichlorobenzidine	Chloroform
	Total Chlordane	3-Nitroaniline	Chloromethane
	Total Endrin	4-Bromophenyl-phenylether	cis-1,3-Dichloropropene
	Toxaphene	4-Chloro-3-methylphenol	Dibromochloromethane
	Aroclor-1016	4-Chloroaniline	Ethylbenzene
	Aroclor-1221	4-Chlorophenylphenyl ether	Methylene chloride
	Aroclor-1232	4-Methylphenol (p-Cresol)	Styrene
	Aroclor-1242	4-Nitroaniline	Tetrachloroethene
	Aroclor-1248	4-Nitrophenol	Toluene
	Aroclor-1254	bis(2-Chloroethoxy)methane	trans-1,3-Dichloropropene
	Aroclor-1260	bis(2-Chloroethyl)ether	Trichloroethene
	Total PCBs	bis(2-Ethylhexyl)phthalate (BEHP)	Vinyl chloride
		Butylbenzylphthalate	Xylene (Total)
		Carbazole	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 10-7-28
Wetland 18B Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result HQ	SV	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																								
Aluminum	1	1				11,100	11,100	11,100	11,100		041M18B101			NA						0	4274	1	Yes	EPC > RC and no RV
Arsenic	**1**	**1**				**83.8**	**83.8**	**83.8**	**83.8**		**041M18B101**	**7.24**	**41.6**	**PEL**	**11.6**		**11.6**	**2.01**	**2.01**	**1**	**2.14**	**1**	**Yes**	**EPC > RV and RC**
Barium	1	1				10.9	10.9	10.9	10.9	J	041M18B101			NA						0	3.84	1	Yes	EPC > RC and no RV
Beryllium	1	1				0.73	0.73	0.73	0.73	J	041M18B101			NA						0	0.13	1	Yes	EPC > RC and no RV
Calcium	1	1				3,100	3,100	3,100	3,100		041M18B101			NA						0	1,978.80	1	No	Essential Nutrient
Chromium	1	1				66.2	66.2	66.2	66.2		041M18B101	52.3	160	PEL	1.27		1.27	0.41	0.41	0	13.1	1	No	EPC > RC, but < RV
Cobalt	0	1	0.5	0.5	0.5	0.5			0.5	U	ND			NA						0	0.91	0	No	Parameter Not Detected
Cyanide (CN)	1	1				8.8	8.8	8.8	8.8	J	041M18B101			NA						0	1.29	1	Yes	EPC > RC and no RV
Iron	1	1				128,000	128,000	128,000	128,000		041M18B101			NA						0	2,684.40	1	Yes	EPC > RC and no RV
Lead	1	1				111	111	111	111		041M18B101	30.2	112	PEL	3.68		3.68	0.99	0.99	0	21.04	1	No	EPC > RC, but < RV
Magnesium	1	1				3420	3,420	3,420	3,420		041M18B101			NA						0	2,943.60	1	No	Essential Nutrient
Manganese	1	1				46.7	46.7	46.7	46.7		041M18B101			NA						0	9.81	1	Yes	EPC > RC and no RV
Mercury	0	1	0.165	0.165	0.165	0.165			0.165	U	ND	0.13	0.696	PEL	1.27		1.27	0.24	0.24	0	0.11	0	No	Parameter Not Detected
Potassium	1	1				846	846	846	846	J	041M18B101			NA						0	899.72	0	No	EPC < RC; Essential Nutrient
Selenium	1	1				2.2	2.2	2.2	2.2		041M18B101			NA						0	0.66	1	Yes	EPC > RC and no RV
Sodium	1	1				3,300	3,300	3,300	3,300		041M18B101			NA						0	11,439.60	0	No	EPC < RC; Essential Nutrient
Thallium	0	1	0.5	0.5	0.5	0.5			0.5	UJ	ND			NA						0	0.39	0	No	Parameter Not Detected
Vanadium	1	1				50.9	50.9	50.9	50.9		041M18B101			NA						0	8.59	1	Yes	EPC > RC and no RV
PCBs (g/kg)																								
Aroclor-1016	0	1	250	250	250	250			250	U	ND	21.6	189	PEL	11.6		11.6	1.32	1.32	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1221	0	1	250	250	250	250			250	U	ND	67	189	PEL	3.73		3.73	1.32	1.32	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1232	0	1	250	250	250	250			250	U	ND	21.6	189	PEL	11.6		11.6	1.32	1.32	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1242	0	1	250	250	250	250			250	U	ND	21.6	189	PEL	11.6		11.6	1.32	1.32	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1248	0	1	250	250	250	250			250	U	ND	21.6	189	PEL	11.6		11.6	1.32	1.32	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1254	0	1	250	250	250	250			250	U	ND	21.6	189	PEL	11.6		11.6	1.32	1.32	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1260	0	1	250	250	250	250			250	U	ND	21.6	189	PEL	11.6		11.6	1.32	1.32	0		0	No	Parameter Not Detected; Max SQL > RV
Total PCBs	0	1	1,750	1,750	1,750	1,750			1750	U	ND	21.6	189	PEL	81		81	9.26	9.26	0		0	No	Parameter Not Detected; Max SQL > RV
Pesticides (g/kg)																								
Aldrin	0	1	12	12	12	12			12	U	ND			NA						0		0	No	Parameter Not Detected
Dieldrin	0	1	25	25	25	25			25	U	ND	0.716	4.3	PEL	34.9		34.9	5.81	5.81	0		0	No	Parameter Not Detected; Max SQL > RV
Endosulfan I	0	1	12	12	12	12			12	U	ND			NA						0		0	No	Parameter Not Detected
Endosulfan II	0	1	25	25	25	25			25	U	ND			NA						0		0	No	Parameter Not Detected
Endosulfan sulfate	0	1	25	25	25	25			25	U	ND			NA						0		0	No	Parameter Not Detected
Heptachlor	0	1	12	12	12	12			12	U	ND			NA						0		0	No	Parameter Not Detected
Heptachlor epoxide	0	1	12	12	12	12			12	U	ND			NA						0		0	No	Parameter Not Detected
Methoxychlor	0	1	120	120	120	120			120	U	ND			NA						0		0	No	Parameter Not Detected
Toxaphene	0	1	1,200	1,200	1,200	1,200			1,200	U	ND			NA						0		0	No	Parameter Not Detected
alpha-Chlordane	0	1	12	12	12	12			12	U	ND	1.7	4.79	PEL	7.06		7.06	2.51	2.51	0		0	No	Parameter Not Detected; Max SQL > RV
gamma-Chlordane	0	1	12	12	12	12			12	U	ND	1.7	4.79	PEL	7.06		7.06	2.51	2.51	0		0	No	Parameter Not Detected; Max SQL > RV
Total Chlordane	0	1	24	24	24	24			24	U	ND	1.7	4.79	PEL	14.1		14.1	5.01	5.01	0		0	No	Parameter Not Detected; Max SQL > RV
Endrin	0	1	25	25	25	25			25	U	ND	3.3		NA	7.58		7.58			0		0	No	Parameter Not Detected
Endrin aldehyde	0	1	25	25	25	25			25	U	ND	3.3		NA	7.58		7.58			0		0	No	Parameter Not Detected
Endrin ketone	0	1	25	25	25	25			25	U	ND	3.3		NA	7.58		7.58			0		0	No	Parameter Not Detected
Total Endrin	0	1	75	75	75	75			75	U	ND	3.3		NA	22.7		22.7			0		0	No	Parameter Not Detected
alpha-BHC	0	1	12	12	12	12			12	UJ	ND		0.99	PEL				12.1	12.1	0		0	No	Parameter Not Detected; Max SQL > RV
beta-BHC	0	1	12	12	12	12			12	U	ND	0.32	0.99	PEL	37.5		37.5	12.1	12.1	0		0	No	Parameter Not Detected; Max SQL > RV
delta-BHC	0	1	12	12	12	12			12	U	ND	0.32	0.99	PEL	37.5		37.5	12.1	12.1	0		0	No	Parameter Not Detected; Max SQL > RV
gamma-BHC (Lindane)	0	1	12	12	12	12			12	U	ND	0.32	0.99	PEL	37.5		37.5	12.1	12.1	0		0	No	Parameter Not Detected; Max SQL > RV
Total BHC	0	1	48	48	48	48			48	U	ND	0.32	0.99	PEL	150		150	48.5	48.5	0		0	No	Parameter Not Detected; Max SQL > RV
4,4'-DDD	**1**	**1**				**280**	**280**	**280**	**280**	**D**	**041M18B101**	**1.22**	**7.81**	**PEL**	**230**		**230**	**35.9**	**35.9**	**1**	**50**	**1**	**Yes**	**EPC > RV and RC**
4,4'-DDE	0	1	25	25	25	25			25	U	ND	2.07	374	PEL	12.1		12.1	0.07	0.07	0	40	0	No	Parameter Not Detected
4,4'-DDT	**1**	**1**				**1,800**	**1,800**	**1,800**	**1,800**	**D**	**041M18B101**	**1.19**	**4.77**	**PEL**	**1510**		**1510**	**377**	**377**	**1**	**20**	**1**	**Yes**	**EPC > RV and RC**
Total DDT	**1**	**1**				**2,110**	**2,110**	**2,110**	**2,110**		**041M18B101**	**3.3**	**51.7**	**PEL**	**638**		**638**	**40.7**	**40.7**	**1**	**110**	**1**	**Yes**	**EPC > RV and RC**
SVOCs (g/kg)																								
1,2,4-Trichlorobenzene	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	1	2,350	2,350	2,350	2,350			2,350	U	ND			NA						0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	1	2,350	2,350	2,350	2,350			2,350	U	ND			NA						0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
2-Chlorophenol	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	1	2,350	2,350	2,350	2,350			2,350	U	ND			NA						0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
2-Nitroaniline	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
2-Nitrophenol	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
3-Nitroaniline	0	1	2,350	2,350	2,350	2,350			2,350	U	ND			NA						0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
4-Chloroaniline	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
4-Nitroaniline	0	1	2,350	2,350	2,350	2,350			2,350	U	ND			NA						0		0	No	Parameter Not Detected

Table 10-7-28
Wetland 18B Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result HQ	SV	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																								
4-Nitrophenol	0	1	2,350	2,350	2,350	2,350			2,350	U	ND			NA						0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	1	95	95	95	95			95	U	ND			NA						0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	950	950	950	950			950	U	ND	182	2,647	PEL	5.22		5.22	0.36	0.36	0		0	No	Parameter Not Detected
Butylbenzylphthalate	0	1	950	950	950	950			950	U	ND	182	2,647	PEL	5.22		5.22	0.36	0.36	0		0	No	Parameter Not Detected
Carbazole	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
Dibenzofuran	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
Diethylphthalate	0	1	950	950	950	950			950	U	ND	182	2,647	PEL	5.22		5.22	0.36	0.36	0		0	No	Parameter Not Detected
Dimethylphthalate	0	1	950	950	950	950			950	U	ND	182	2,647	PEL	5.22		5.22	0.36	0.36	0		0	No	Parameter Not Detected
Di-n-butylphthalate	0	1	950	950	950	950			950	U	ND	182	2,647	PEL	5.22		5.22	0.36	0.36	0		0	No	Parameter Not Detected
Di-n-octylphthalate	0	1	950	950	950	950			950	U	ND	182	2,647	PEL	5.22		5.22	0.36	0.36	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
Hexachloroethane	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
Isophorone	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
Nitrobenzene	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	1	95	95	95	95			95	U	ND			NA						0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
Pentachlorophenol	0	1	2,350	2,350	2,350	2,350			2,350	U	ND			NA						0		0	No	Parameter Not Detected
Phenol	0	1	950	950	950	950			950	U	ND			NA						0		0	No	Parameter Not Detected
VOCs (g/kg)																								
1,1,1-Trichloroethane	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
2-Butanone (MEK)	1	1				98	98	98	98	J	041M18B101			NA						0		0	Yes	No SV, no RV, and no RC
2-Hexanone	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Acetone	1	1				440	440	440	440	J	041M18B101			NA						0		0	Yes	No SV, no RV, and no RC
Benzene	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Bromodichloromethane	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Bromoform	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Bromomethane	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Carbon disulfide	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Carbon tetrachloride	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Chlorobenzene	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Chloroethane	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Chloroform	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Chloromethane	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Dibromochloromethane	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Ethylbenzene	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Methylene chloride	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Styrene	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Tetrachloroethene	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Toluene	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Trichloroethene	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected
Vinyl chloride	0	1	6.5	6.5	6.5	6.5			6.5	U	ND			NA						0		0	No	Parameter Not Detected
Xylene (Total)	0	1	21.5	21.5	21.5	21.5			21.5	U	ND			NA						0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections

Table 10-7-29
Wetland 18B Phase II
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Aluminum	4,4'-DDD	None	None
Arsenic	4,4'-DDT		
Barium	Total DDT		
Beryllium			
Cyanide (CN)			
Iron			
Manganese			
Selenium			
Vanadium			

Table 10-7-30
Wetland 18B Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M18B101	**12/14/1995**	**mg/kg**	**83.8**		**Arsenic**	**8.2**	**70**	**1.20**
041M18B101	12/14/1995	mg/kg	0.5	U	Cadmium	1.2	9.6	0.05
041M18B101	12/14/1995	mg/kg	66.2		Chromium	81	370	0.18
041M18B101	12/14/1995	mg/kg	17.9		Copper	34	270	0.07
041M18B101	12/14/1995	mg/kg	111		Lead	46.7	218	0.51
041M18B101	12/14/1995	mg/kg	0.165	U	Mercury	0.15	0.71	0.23
041M18B101	12/14/1995	mg/kg	2.05	U	Nickel	20.9	51.6	0.04
041M18B101	12/14/1995	mg/kg	0.7	U	Silver	1	3.7	0.19
041M18B101	12/14/1995	mg/kg	49.3		Zinc	150	410	0.12
041M18B101	12/14/1995	g/kg	25	U	4,4'-DDE	2.2	27	0.93
041M18B101	**12/14/1995**	**g/kg**	**1,800**	**D**	**4,4'-DDT**	**1.58**	**46.1**	**39.05**
041M18B101	12/14/1995	g/kg	1,750	U	Total PCBs	22.7	180	9.72
041M18B101	12/14/1995	g/kg	95	U	2-Methylnaphthalene	70	670	0.14
041M18B101	12/14/1995	g/kg	47	U	Acenaphthene	16	500	0.09
041M18B101	12/14/1995	g/kg	95	U	Acenaphthylene	44	640	0.15
041M18B101	12/14/1995	g/kg	95	U	Anthracene	85.3	1,100	0.09
041M18B101	12/14/1995	g/kg	95	U	Benzo(a)anthracene	261	1,600	0.06
041M18B101	12/14/1995	g/kg	95	U	Benzo(a)pyrene	430	1,600	0.06
041M18B101	12/14/1995	g/kg	95	U	Chrysene	384	2,800	0.03
041M18B101	12/14/1995	g/kg	95	U	Dibenz(a,h)anthracene	63.4	260	0.37
041M18B101	12/14/1995	g/kg	95	U	Fluoranthene	600	5,100	0.02
041M18B101	12/14/1995	g/kg	47	U	Fluorene	19	540	0.09
041M18B101	12/14/1995	g/kg	95	U	Naphthalene	160	2,100	0.05
041M18B101	12/14/1995	g/kg	95	U	Phenanthrene	240	1,500	0.06
041M18B101	12/14/1995	g/kg	95	U	Pyrene	665	2,600	0.04
041M18B101	12/14/1995				ERM Quotient Sum			53.52
041M18B101	12/14/1995				Mean ERM Quotient			2.14
041M18B101	12/14/1995				Mean ERM Quotient without ND			1.64
041M18B101	12/14/1995				Mean ERM Quotient Category			4

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 10-7-31
Wetland 18B Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement ?	Rationale
Metals (g/L)																
Aluminum	1	1				119	119	119	041W18B101	119	J		NA		Yes	No SV
Antimony	0	1	1	1	1	1			ND	1	UJ		NA		Yes	No SV
Arsenic	0	1	2.8	2.8	2.8	2.8			ND	2.8	U	36	EPA	0.08	No	Max SQL< SV
Barium	0	1	3.1	3.1	3.1	3.1			ND	3.1	U		NA		Yes	No SV
Beryllium	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Cadmium	0	1	1.5	1.5	1.5	1.5			ND	1.5	U	9.3	EPA	0.16	No	Max SQL< SV
Calcium	1	1				7,760	7,760	7,760	041W18B101	7,760			NA		Yes	No SV
Chromium	0	1	4	4	4	4			ND	4	U	50	EPA	0.08	No	Max SQL< SV
Cobalt	0	1	1.5	1.5	1.5	1.5			ND	1.5	U		NA		Yes	No SV
Copper	0	1	2	2	2	2			ND	2	U	2.9	EPA	0.69	No	Max SQL< SV
Cyanide (CN)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	1	EPA	2.5	Yes	Max SQL > SV
Iron	1	1				10,900	10,900	10,900	041W18B101	10,900			NA		Yes	No SV
Lead	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	8.5	EPA	0.06	No	Max SQL< SV
Magnesium	1	1				7,280	7,280	7,280	041W18B101	7,280			NA		Yes	No SV
Manganese	1	1				110	110	110	041W18B101	110			NA		Yes	No SV
Mercury	0	1	0.07	0.07	0.07	0.07			ND	0.07	U	0.025	EPA	2.8	Yes	Max SQL > SV
Nickel	0	1	6	6	6	6			ND	6	U	8.3	EPA	0.72	No	Max SQL< SV
Potassium	1	1				3,600	3,600	3,600	041W18B101	3,600	J		NA		Yes	No SV
Selenium	0	1	1.5	1.5	1.5	1.5			ND	1.5	U	71	EPA	0.02	No	Max SQL< SV
Silver	0	1	2	2	2	2			ND	2	U	0.23	EPA	8.7	Yes	Max SQL > SV
Sodium	1	1				48,300	48,300	48,300	041W18B101	48,300			NA		Yes	No SV
Thallium	0	1	1.5	1.5	1.5	1.5			ND	1.5	U	6.3	FDEP	0.24	No	Max SQL< SV
Vanadium	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Zinc	0	1	1.5	1.5	1.5	1.5			ND	1.5	U	86	EPA	0.02	No	Max SQL< SV
Pesticides (g/L)																
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0087	EPA	2.87	Yes	Max SQL > SV
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0036	EPA	6.94	Yes	Max SQL > SV
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.004	EPA	12.5	Yes	Max SQL > SV
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.005	FDEP	5	Yes	Max SQL > SV
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.016	EPA	1.56	Yes	Max SQL > SV
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	FDEP	35.7	Yes	Max SQL > SV
Total PCB	0	1	4	4	4	4			ND	4	U		NA		Yes	No SV

Table 10-7-31
Wetland 18B Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement ?	Rationale
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Nitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Di-n-butylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	3.4	EPA	0.74	No	Max SQL< SV
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pentachlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chrysene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluorene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Naphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	23.5	EPA	0.02	No	Max SQL< SV
Phenanthrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Total PAH	0	1	6.5	6.5	6.5	6.5			ND	6.5	U		NA		Yes	No SV

Table 10-7-31
Wetland 18B Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement ?	Rationale
VOCs (g/L)																
1,1,1-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	270	FDEP	0.00	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.16	No	Max SQL< SV
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	19.7	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	1	1				1	1	1	041W18B101	1		3	FDEP	0.33	No	Max Detect < SV
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzene	1	1				1	1	1	041W18B101	1		71.28	FDEP	0.01	No	Max Detect < SV
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	1	1				5	5	5	041W18B101	5		17	FDEP	0.29	No	Max Detect < SV
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	470.8	FDEP	0.00	No	Max SQL< SV
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	4.3	EPA	0.12	No	Max SQL< SV
Methylene chloride	0	1	1	1	1	1			ND	1	U	1580	FDEP	0.00	No	Max SQL< SV
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	37	EPA	0.01	No	Max SQL< SV
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Vinyl chloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 10-7-32
Wetland 18B Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	None	None
Calcium			
Iron			
Magnesium			
Manganese			
Potassium			
Sodium			
		Not Detected Parameters	
Antimony	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Barium	Dieldrin	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1,2-Trichloroethane
Beryllium	Endosulfan I	2,4,5-Trichlorophenol	1,1-Dichloroethane
Cobalt	Endosulfan II	2,4,6-Trichlorophenol	1,2-Dibromo-3-Chloropropane
Cyanide (CN)	Endosulfan sulfate	2,4-Dichlorophenol	1,2-Dibromoethane
Mercury	Heptachlor	2,4-Dimethylphenol	1,2-Dichloroethane
Silver	Heptachlor epoxide	2,4-Dinitrophenol	1,2-Dichloropropane
Vanadium	Methoxychlor	2,4-Dinitrotoluene	1,3-Dichlorobenzene
	Toxaphene	2,6-Dinitrotoluene	2-Hexanone
	alpha-Chlordane	2-Chloronaphthalene	4-Methyl-2-Pentanone (MIBK)
	gamma-Chlordane	2-Chlorophenol	Bromochloromethane
	Total Chlordane	2-Methyl-4,6-Dinitrophenol	Bromodichloromethane
	Endrin	2-Methylphenol (o-Cresol)	Bromoform
	Endrin aldehyde	2-Nitroaniline	Bromomethane
	Endrin ketone	2-Nitrophenol	Carbon disulfide
	Total Endrin	3,3'-Dichlorobenzidine	Carbon tetrachloride
	alpha-BHC	3-Nitroaniline	Chloroethane
	beta-BHC	4-Bromophenyl-phenylether	Chloromethane
	delta-BHC	4-Chloro-3-methylphenol	cis-1,2-Dichloroethene
	gamma-BHC (Lindane)	4-Chloroaniline	cis-1,3-Dichloropropene
	Total BHC	4-Chlorophenylphenyl ether	Dibromochloromethane
	4,4'-DDD	4-Methylphenol (p-Cresol)	Styrene
	4,4'-DDE	4-Nitroaniline	Tetrachloroethene
	4,4'-DDT	4-Nitrophenol	trans-1,2-Dichloroethene
	Total DDT	Benzo(b)fluoranthene	trans-1,3-Dichloropropene
	Aroclor-1016	Benzo(g,h,i)perylene	Trichloroethene
	Aroclor-1221	Benzo(k)fluoranthene	Vinyl chloride
	Aroclor-1232	bis(2-Chloroethoxy)methane	Xylene (Total)
	Aroclor-1242	bis(2-Chloroethyl)ether	
	Aroclor-1248	bis(2-Ethylhexyl)phthalate (BEHP)	
	Aroclor-1254	Butylbenzylphthalate	
	Aroclor-1260	Dibenzofuran	
	Total PCBs	Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 10-7-33
Wetland 18B Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
Metals (µg/L)																				
Aluminum	1	1				119	119	119	041W18B101	119	J		NA			2,927.50	0	1	No	Max Result < Ref. Conc.
Antimony	0	1	1	1	1	1			ND	1	UJ		NA			4.15	0	1	No	Max SQL < Ref. Conc.
Barium	0	1	3.1	3.1	3.1	3.1			ND	3.1	U		NA			9.43	0	1	No	Max SQL < Ref. Conc.
Beryllium	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA			0.82	0	1	No	Max SQL < Ref. Conc.
Calcium	1	1				7,760	7,760	7,760	041W18B101	7,760			NA			76,800	0	1	No	Max Result < Ref. Conc.
Cobalt	0	1	1.5	1.5	1.5	1.5			ND	1.5	U		NA			2.38	0	1	No	Max SQL < Ref. Conc.
Cyanide (CN)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	1	EPA	2.5	2.5	4.1	0	1	No	Max SQL < Ref. Conc.
Iron	1	1				10,900	10,900	10,900	041W18B101	10,900			NA			1,352	1	1	Yes	Max Result > Ref. Conc.
Magnesium	1	1				7,280	7,280	7,280	041W18B101	7,280			NA			243,650	0	1	No	Max Result < Ref. Conc.
Manganese	1	1				110	110	110	041W18B101	110			NA			12.15	1	1	Yes	Max Result > Ref. Conc.
Mercury	0	1	0.07	0.07	0.07	0.07			ND	0.07	U	0.025	EPA	2.8	2.8	0.21	0	1	No	Max SQL < Ref. Conc.
Potassium	1	1				3,600	3,600	3,600	041W18B101	3,600	J		NA			81,250	0	1	No	Max Result < Ref. Conc.
Silver	0	1	2	2	2	2			ND	2	U	0.23	EPA	9	8.7	3.01	0	1	No	Max SQL < Ref. Conc.
Sodium	1	1				48,300	48,300	48,300	041W18B101	48,300			NA			1,952,000	0	1	No	Max Result < Ref. Conc.
Vanadium	0	1	1	1	1	1			ND	1	U		NA			6.69	0	1	No	Max SQL < Ref. Conc.
Pesticides (µg/L)																				
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endosulfan I	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0087	EPA	3	2.87		0	1	No	Parameter Not Detected; Max SQL > SV
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0036	EPA	7	6.94		0	1	No	Parameter Not Detected; Max SQL > SV
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	1	No	Parameter Not Detected; Max SQL > SV
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	1	No	Parameter Not Detected
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.004	EPA	12.5	12.5		0	1	No	Parameter Not Detected; Max SQL > SV
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22	21.7		0	1	No	Parameter Not Detected; Max SQL > SV
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	1	No	Parameter Not Detected
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.005	FDEP	5	5		0	1	No	Parameter Not Detected; Max SQL > SV
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
gamma-BHC (Lindane)	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.016	EPA	2	1.56		0	1	No	Parameter Not Detected; Max SQL > SV
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	1	No	Parameter Not Detected
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	1	No	Parameter Not Detected; Max SQL > SV
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	1	No	Parameter Not Detected; Max SQL > SV
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85	84.7		0	1	No	Parameter Not Detected; Max SQL > SV
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	1	No	Parameter Not Detected
PCBs (µg/L)																				
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA				0	1	No	Parameter Not Detected
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	FDEP	36	35.7		0	1	No	Parameter Not Detected; Max SQL > SV
Total PCB	0	1	4	4	4	4			ND	4	U		NA				0	1	No	Parameter Not Detected
SVOCs (µg/L)																				
1,2,4-Trichlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Chlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Nitroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
3-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
4-Nitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
Benzo(b)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Benzo(k)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected

Table 10-7-33
Wetland 18B Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
SVOCs (µg/L) - cont.																				
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Hexachlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Pentachlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
PAHs (µg/L)																				
2-Methylnaphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Acenaphthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Acenaphthylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Benzo(a)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Benzo(a)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Chrysene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Fluorene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Naphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	23.5	EPA	0.02	0.02		0	1	No	Max SQL < SV
Phenanthrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Total PAH	0	1	6.5	6.5	6.5	6.5			ND	6.5	U		NA				0	1	No	Parameter Not Detected
VOCs (µg/L)																				
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,1-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
cis-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Trichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Vinyl chloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Xylene (Total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 10-7-34
Wetland 18B Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Iron Manganese	None	None	None

Table 10-7-35
Wetland 18B Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	1	1			605	605	041M18B101	605			N/A		Yes	No SV
Antimony	0	1	1	1			ND	1	UJ	12	2	0.08	No	Max SQL< SV
Arsenic	**1**	**1**			**13.8**	**13.8**	**041M18B101**	**13.8**		**7.24**	**1, 2**	**1.91**	**Yes**	**Max Detect > SV**
Barium	1	1			1.8	1.8	041M18B101	1.8	J		N/A		Yes	No SV
Beryllium	1	1			0.07	0.07	041M18B101	0.07	J		N/A		Yes	No SV
Cadmium	0	1	0.2	0.2			ND	0.2	UJ	0.676	1	0.30	No	Max SQL< SV
Calcium	1	1			1,050	1,050	041M18B101	1,050			N/A		Yes	No SV
Chromium	1	1			3.6	3.6	041M18B101	3.6		52.3	1, 2	0.07	No	Max Detect < SV
Cobalt	0	1	0.135	0.135			ND	0.135	UJ		N/A		Yes	No SV
Copper	1	1			1.7	1.7	041M18B101	1.7		18.7	1, 2	0.09	No	Max Detect < SV
Cyanide (CN)	0	1	0.6	0.6			ND	0.6	UJ		N/A		Yes	No SV
Iron	1	1			20,800	20,800	041M18B101	20,800			N/A		Yes	No SV
Lead	1	1			5.9	5.9	041M18B101	5.9		30.2	1, 2	0.20	No	Max Detect < SV
Magnesium	1	1			869	869	041M18B101	869			N/A		Yes	No SV
Manganese	1	1			10.8	10.8	041M18B101	10.8			N/A		Yes	No SV
Mercury	0	1	0.01	0.01			ND	0.01	U	0.13	1, 2	0.08	No	Max SQL< SV
Nickel	0	1	0.275	0.275			ND	0.275	U	15.9	1, 2	0.02	No	Max SQL< SV
Potassium	1	1			220	220	041M18B101	220			N/A		Yes	No SV
Selenium	1	1			0.74	0.74	041M18B101	0.74	J		N/A		Yes	No SV
Silver	0	1	0.06	0.06			ND	0.06	UJ	0.733	1	0.08	No	Max SQL< SV
Sodium	1	1			3,750	3,750	041M18B101	3,750			N/A		Yes	No SV
Thallium	0	1	0.4	0.4			ND	0.4	U		N/A		Yes	No SV
Vanadium	1	1			6.3	6.3	041M18B101	6.3			N/A		Yes	No SV
Zinc	1	1			5.7	5.7	041M18B101	5.7		124	1, 2	0.05	No	Max Detect < SV
PAHs (g/kg)														
2-Methylnaphthalene	0	1	335	335			ND	335	U	20.2	1	16.6	Yes	Max SQL > SV
Acenaphthene	0	1	335	335			ND	335	U	6.71	1	49.9	Yes	Max SQL > SV
Acenaphthylene	0	1	335	335			ND	335	U	5.87	1	57.1	Yes	Max SQL > SV
Anthracene	0	1	335	335			ND	335	U	46.9	1	7.14	Yes	Max SQL > SV
Benzo(a)anthracene	0	1	335	335			ND	335	U	74.8	1	4.48	Yes	Max SQL > SV
Benzo(a)pyrene	0	1	335	335			ND	335	U	88.8	1	3.77	Yes	Max SQL > SV
Chrysene	0	1	335	335			ND	335	U	108	1	3.1	Yes	Max SQL > SV
Dibenz(a,h)anthracene	0	1	335	335			ND	335	U	6.22	1	53.9	Yes	Max SQL > SV
Fluoranthene	0	1	335	335			ND	335	U	113	1	2.96	Yes	Max SQL > SV
Fluorene	0	1	335	335			ND	335	U	21.2	1	15.8	Yes	Max SQL > SV
Naphthalene	0	1	335	335			ND	335	U	34.6	1	9.68	Yes	Max SQL > SV
Phenanthrene	0	1	335	335			ND	335	U	86.7	1	3.86	Yes	Max SQL > SV
Pyrene	0	1	335	335			ND	335	U	153	1	2.19	Yes	Max SQL > SV
Total PAHs	0	1	4,360	4,360			ND	4,360	U	1,684	1, 2	2.59	Yes	Max SQL > SV
TOC Normalized PAHs	0	1	483.9	483.89			ND	483.89	U	290	3	1.67	Yes	Max SQL > SV
PCBs (g/kg)														
Aroclor-1016	0	1	33.5	33.5			ND	33.5	U	21.6	N/A	1.55	Yes	Max SQL > SV
Aroclor-1221	0	1	70	70			ND	70	U	67	2	1.04	Yes	Max SQL > SV
Aroclor-1232	0	1	33.5	33.5			ND	33.5	U	21.6	N/A	1.55	Yes	Max SQL > SV
Aroclor-1242	0	1	33.5	33.5			ND	33.5	U	21.6	N/A	1.55	Yes	Max SQL > SV
Aroclor-1248	0	1	33.5	33.5			ND	33.5	U	21.6	N/A	1.55	Yes	Max SQL > SV
Aroclor-1254	0	1	33.5	33.5			ND	33.5	U	21.6	N/A	1.55	Yes	Max SQL > SV
Aroclor-1260	0	1	33.5	33.5			ND	33.5	U	21.6	N/A	1.55	Yes	Max SQL > SV
Total PCBs	0	1	271	271			ND	271	U	21.6	1	12.5	Yes	Max SQL > SV

Table 10-7-35
Wetland 18B Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Pesticides (g/kg)														
Aldrin	0	1	1.75	1.75			ND	1.75	U		N/A		Yes	No SV
Dieldrin	0	1	3.35	3.35			ND	3.35	U	0.716	1	4.68	Yes	Max SQL > SV
Endosulfan I	0	1	1.75	1.75			ND	1.75	U		N/A		Yes	No SV
Endosulfan II	0	1	3.35	3.35			ND	3.35	U		N/A		Yes	No SV
Endosulfan sulfate	0	1	3.35	3.35			ND	3.35	U		N/A		Yes	No SV
Heptachlor	0	1	1.75	1.75			ND	1.75	U		N/A		Yes	No SV
Heptachlor epoxide	0	1	1.75	1.75			ND	1.75	U		N/A		Yes	No SV
Methoxychlor	0	1	17.5	17.5			ND	17.5	U		N/A		Yes	No SV
Toxaphene	0	1	175	175			ND	175	U		N/A		Yes	No SV
alpha-Chlordane	0	1	1.75	1.75			ND	1.75	U	1.7	1	1.03	Yes	Max SQL > SV
gamma-Chlordane	0	1	1.75	1.75			ND	1.75	U	1.7	1	1.03	Yes	Max SQL > SV
Total Chlordane	0	1	3.5	3.5			ND	3.5	U	1.7	1	2.06	Yes	Max SQL > SV
Endrin	0	1	3.35	3.35			ND	3.35	U	3.3	2	1.02	Yes	Max SQL > SV
Endrin aldehyde	0	1	3.35	3.35			ND	3.35	U	3.3	2	1.02	Yes	Max SQL > SV
Endrin ketone	0	1	3.35	3.35			ND	3.35	U	3.3	2	1.02	Yes	Max SQL > SV
Total Endrin	0	1	10.1	10.1			ND	10.1	U	3.3	2	3.05	Yes	Max SQL > SV
alpha-BHC	0	1	1.75	1.75			ND	1.75	U		N/A		Yes	No SV
beta-BHC	0	1	1.75	1.75			ND	1.75	U	0.32	N/A	5.47	Yes	Max SQL > SV
delta-BHC	0	1	1.75	1.75			ND	1.75	U	0.32	N/A	5.47	Yes	Max SQL > SV
gamma-BHC (Lindane)	0	1	1.75	1.75			ND	1.75	U	0.32	1	5.47	Yes	Max SQL > SV
Total BHC	0	1	7	7			ND	7	U	0.32	2	21.9	Yes	Max SQL > SV
4,4'-DDD	**1**	**1**			**36**	**36**	**041M18B101**	**36**		**1.22**	**1**	**29.5**	**Yes**	**Max Detect > SV**
4,4'-DDE	**1**	**1**			**6.1**	**6.1**	**041M18B101**	**6.1**	**J**	**2.07**	**1**	**2.95**	**Yes**	**Max Detect > SV**
4,4'-DDT	**1**	**1**			**110**	**110**	**041M18B101**	**110**	**D**	**1.19**	**1**	**92.4**	**Yes**	**Max Detect > SV**
Total DDT	**1**	**1**			**152**	**152**	**041M18B101**	**152**		**3.3**	**2**	**46.1**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	1	335	335			ND	335	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	1	335	335			ND	335	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	1	335	335			ND	335	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	1	335	335			ND	335	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	335	335			ND	335	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	1	335	335			ND	335	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	1	335	335			ND	335	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	1	335	335			ND	335	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	1	335	335			ND	335	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	1	800	800			ND	800	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	1	335	335			ND	335	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	1	335	335			ND	335	U		N/A		Yes	No SV
2-Chloronaphthalene	0	1	335	335			ND	335	U		N/A		Yes	No SV
2-Chlorophenol	0	1	335	335			ND	335	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	1	800	800			ND	800	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	1	335	335			ND	335	U		N/A		Yes	No SV
2-Nitroaniline	0	1	800	800			ND	800	U		N/A		Yes	No SV
2-Nitrophenol	0	1	335	335			ND	335	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	1	650	650			ND	650	U		N/A		Yes	No SV
3-Methylphenol/4-Methylphenol	0	1	335	335			ND	335	U				Yes	No SV
3-Nitroaniline	0	1	800	800			ND	800	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	1	335	335			ND	335	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	1	335	335			ND	335	U		N/A		Yes	No SV
4-Chloroaniline	0	1	335	335			ND	335	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	1	335	335			ND	335	U		N/A		Yes	No SV
4-Nitroaniline	0	1	800	800			ND	800	U		N/A		Yes	No SV
4-Nitrophenol	0	1	800	800			ND	800	U		N/A		Yes	No SV
Benzo(b)fluoranthene	0	1	335	335			ND	335	U		N/A		Yes	No SV
Benzo(g,h,i)perylene	0	1	335	335			ND	335	U		N/A		Yes	No SV
Benzo(k)fluoranthene	0	1	335	335			ND	335	U		N/A		Yes	No SV
bis(2-Chloroethoxy)methane	0	1	335	335			ND	335	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	1	335	335			ND	335	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	335	335			ND	335	U	182	1, 2	1.84	Yes	Max SQL > SV
Butylbenzylphthalate	0	1	335	335			ND	335	U	182	1, 2	1.84	Yes	Max SQL > SV
Carbazole	0	1	335	335			ND	335	U		N/A		Yes	No SV
Dibenzofuran	0	1	335	335			ND	335	U		N/A		Yes	No SV

Table 10-7-35
Wetland 18B Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
Diethylphthalate	0	1	335	335			ND	335	U	182	1, 2	1.84	Yes	Max SQL > SV
Dimethylphthalate	0	1	335	335			ND	335	U	182	1, 2	1.84	Yes	Max SQL > SV
Di-n-butylphthalate	0	1	335	335			ND	335	U	182	1, 2	1.84	Yes	Max SQL > SV
Di-n-octylphthalate	0	1	335	335			ND	335	U	182	1, 2	1.84	Yes	Max SQL > SV
Hexachlorobenzene	0	1	335	335			ND	335	U		N/A		Yes	No SV
Hexachlorobutadiene	0	1	335	335			ND	335	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	1	335	335			ND	335	U		N/A		Yes	No SV
Hexachloroethane	0	1	335	335			ND	335	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	1	335	335			ND	335	U		N/A		Yes	No SV
Isophorone	0	1	335	335			ND	335	U		N/A		Yes	No SV
Nitrobenzene	0	1	335	335			ND	335	U		N/A		Yes	No SV
N-Nitroso-di-n-propylaMine	0	1	335	335			ND	335	U		N/A		Yes	No SV
N-NitrosodiphenylaMine	0	1	335	335			ND	335	U		N/A		Yes	No SV
Pentachlorophenol	0	1	800	800			ND	800	U		N/A		Yes	No SV
Phenol	0	1	335	335			ND	335	U		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	1	5	5			ND	5	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	1	5	5			ND	5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	1	5	5			ND	5	U		N/A		Yes	No SV
1,1-Dichloroethane	0	1	5	5			ND	5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	1	5	5			ND	5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	1	5	5			ND	5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	1	5	5			ND	5	U		N/A		Yes	No SV
1,2-Dichloropropane	0	1	5	5			ND	5	U		N/A		Yes	No SV
2-Butanone (MEK)	0	1	10	10			ND	10	U		N/A		Yes	No SV
2-Hexanone	0	1	10	10			ND	10	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	10	10			ND	10	U		N/A		Yes	No SV
Acetone	1	1			53	53	041M18B101	53			N/A		Yes	No SV
Benzene	0	1	5	5			ND	5	U		N/A		Yes	No SV
Bromodichloromethane	0	1	5	5			ND	5	U		N/A		Yes	No SV
Bromoform	0	1	5	5			ND	5	U		N/A		Yes	No SV
Bromomethane	0	1	10	10			ND	10	U		N/A		Yes	No SV
Carbon disulfide	0	1	5	5			ND	5	U		N/A		Yes	No SV
Carbon tetrachloride	0	1	5	5			ND	5	U		N/A		Yes	No SV
Chlorobenzene	0	1	5	5			ND	5	U		N/A		Yes	No SV
Chloroethane	0	1	10	10			ND	10	U		N/A		Yes	No SV
Chloroform	0	1	5	5			ND	5	U		N/A		Yes	No SV
Chloromethane	0	1	10	10			ND	10	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	1	5	5			ND	5	U		N/A		Yes	No SV
Dibromochloromethane	0	1	5	5			ND	5	U		N/A		Yes	No SV
Ethylbenzene	0	1	5	5			ND	5	U		N/A		Yes	No SV
Methylene chloride	0	1	5	5			ND	5	U		N/A		Yes	No SV
Styrene	0	1	5	5			ND	5	U		N/A		Yes	No SV
Tetrachloroethene	0	1	5	5			ND	5	U		N/A		Yes	No SV
Toluene	0	1	5	5			ND	5	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	1	5	5			ND	5	U		N/A		Yes	No SV
Trichloroethene	0	1	5	5			ND	5	U		N/A		Yes	No SV
Vinyl chloride	0	1	10	10			ND	10	U		N/A		Yes	No SV
Xylene (Total)	0	1	5	5			ND	5	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
 g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 10-7-36
Wetland 18B Phase III
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDD	None	Acetone
Arsenic	4,4'-DDE		
Barium	4,4'-DDT		
Beryllium	Total DDT		
Calcium			
Iron			
Magnesium			
Manganese			
Potassium			
Selenium			
Sodium			
Vanadium			
		Not Detected Parameters	
Cobalt	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Cyanide (CN)	alpha-BHC	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
Thallium	alpha-Chlordane	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	beta-BHC	1,4-Dichlorobenzene	1,1-Dichloroethane
	delta-BHC	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Dieldrin	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Endosulfan I	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
	Endosulfan II	2,4-Dichlorophenol	1,2-Dichloropropane
	Endosulfan sulfate	2,4-Dimethylphenol	2-Butanone (MEK)
	Endrin	2,4-Dinitrophenol	2-Hexanone
	Endrin aldehyde	2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
	Endrin ketone	2,6-Dinitrotoluene	Benzene
	gamma-BHC (Lindane)	2-Chloronaphthalene	Bromodichloromethane
	gamma-Chlordane	2-Chlorophenol	Bromoform
	Heptachlor	2-Methyl-4,6-Dinitrophenol	Bromomethane
	Heptachlor epoxide	2-Methylnaphthalene	Carbon disulfide
	Methoxychlor	2-Methylphenol (o-Cresol)	Carbon tetrachloride
	Total BHC	2-Nitroaniline	Chlorobenzene
	Total Chlordane	2-Nitrophenol	Chloroethane
	Total Endrin	3,3'-Dichlorobenzidine	Chloroform
	Toxaphene	3-Methylphenol/4-Methylphenol	Chloromethane
	Aroclor-1016	3-Nitroaniline	cis-1,3-Dichloropropene
	Aroclor-1221	4-Bromophenyl-phenylether	Dibromochloromethane
	Aroclor-1232	4-Chloro-3-methylphenol	Ethylbenzene
	Aroclor-1242	4-Chloroaniline	Methylene chloride
	Aroclor-1248	4-Chlorophenylphenyl ether	Styrene
	Aroclor-1254	4-Nitroaniline	Tetrachloroethene
	Aroclor-1260	4-Nitrophenol	Toluene
	Total PCBs	Acenaphthene	trans-1,3-Dichloropropene
		Acenaphthylene	Trichloroethene
		Anthracene	Vinyl chloride
		Benzo(a)anthracene	Xylene (Total)
		Benzo(a)pyrene	
		Benzo(b)fluoranthene	
		Benzo(g,h,i)perylene	
		Benzo(k)fluoranthene	
		bis(2-Chloroethoxy)methane	
		bis(2-Chloroethyl)ether	
		bis(2-Ethylhexyl)phthalate (BEHP)	
		Butylbenzylphthalate	
		Carbazole	
		Chrysene	
		Dibenz(a,h)anthracene	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		Fluoranthene	
		Fluorene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Naphthalene	
		Nitrobenzene	
		N-Nitroso-di-n-propylaMine	
		N-NitrosodiphenylaMine	
		Pentachlorophenol	
		Phenanthrene	
		Phenol	
		Pyrene	
		TOC Normalized PAHs	
		Total PAHs	

Table 10-7-37
Wetland 18B Phase III
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	1	1				605	605	605	605		041M18B101			NA					0	4,274	0	No	EPC < RC
Arsenic	1	1				13.8	13.8	13.8	13.8		041M18B101	7.24	41.6	PEL	1.91	1.91	0.33	0.33	0	2.14	1	No	EPC > RC, but < RV
Barium	1	1				1.8	1.8	1.8	1.8	J	041M18B101			NA					0	3.84	0	No	EPC < RC
Beryllium	1	1				0.07	0.07	0.07	0.07	J	041M18B101			NA					0	0.13	0	No	EPC < RC
Calcium	1	1				1,050	1,050	1,050	1,050		041M18B101			NA					0	1,978.80	0	No	EPC < RC
Cobalt	0	1	0.135	0.135	0.135	0.135			0.135	UJ	ND			NA					0	0.91	0	No	Parameter Not Detected
Cyanide (CN)	0	1	0.6	0.6	0.6	0.6			0.6	UJ	ND			NA					0	1.29	0	No	Parameter Not Detected
Iron	1	1				20,800	20,800	20,800	20,800		041M18B101			NA					0	2,684.40	1	Yes	EPC > RC and no RV
Magnesium	1	1				869	869	869	869		041M18B101			NA					0	2,943.60	0	No	EPC < RC
Manganese	1	1				10.8	10.8	10.8	10.8		041M18B101			NA					0	9.81	1	Yes	EPC > RC and no RV
Potassium	1	1				220	220	220	220		041M18B101			NA					0	899.72	0	No	EPC < RC
Selenium	1	1				0.74	0.74	0.74	0.74	J	041M18B101			NA					0	0.66	1	Yes	EPC > RC and no RV
Sodium	1	1				3,750	3,750	3,750	3,750		041M18B101			NA					0	11,439.60	0	No	EPC < RC
Thallium	0	1	0.4	0.4	0.4	0.4			0.4	U	ND			NA					0	0.39	1	No	Parameter Not Detected
Vanadium	1	1				6.3	6.3	6.3	6.3		041M18B101			NA					0	8.59	0	No	EPC < RC
PAHs (g/kg)																							
2-Methylnaphthalene	0	1	335	335	335	335			335	U	ND	20.2	201	PEL	16.6	16.6	1.67	1.67	0		0	No	Parameter Not Detected; Max SQL > 1
Acenaphthene	0	1	335	335	335	335			335	U	ND	6.71	88.9	PEL	49.9	49.9	3.77	3.77	0		0	No	Parameter Not Detected; Max SQL > 1
Acenaphthylene	0	1	335	335	335	335			335	U	ND	5.87	128	PEL	57.1	57.1	2.62	2.62	0		0	No	Parameter Not Detected; Max SQL > 1
Anthracene	0	1	335	335	335	335			335	U	ND	46.9	245	PEL	7.14	7.14	1.37	1.37	0		0	No	Parameter Not Detected; Max SQL > 1
Benzo(a)anthracene	0	1	335	335	335	335			335	U	ND	74.8	693	PEL	4.48	4.48	0.48	0.48	0		0	No	Parameter Not Detected
Benzo(a)pyrene	0	1	335	335	335	335			335	U	ND	88.8	763	PEL	3.77	3.77	0.44	0.44	0		0	No	Parameter Not Detected
Chrysene	0	1	335	335	335	335			335	U	ND	108	846	PEL	3.1	3.1	0.40	0.40	0		0	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	1	335	335	335	335			335	U	ND	6.22	135	PEL	53.9	53.9	2.48	2.48	0		0	No	Parameter Not Detected; Max SQL > 1
Fluoranthene	0	1	335	335	335	335			335	U	ND	113	1,494	PEL	2.96	2.96	0.22	0.22	0		0	No	Parameter Not Detected
Fluorene	0	1	335	335	335	335			335	U	ND	21.2	144	PEL	15.8	15.8	2.33	2.33	0		0	No	Parameter Not Detected; Max SQL > 1
Naphthalene	0	1	335	335	335	335			335	U	ND	34.6	391	PEL	9.68	9.68	0.86	0.86	0		0	No	Parameter Not Detected
Phenanthrene	0	1	335	335	335	335			335	U	ND	86.7	544	PEL	3.86	3.86	0.62	0.62	0		0	No	Parameter Not Detected
Pyrene	0	1	335	335	335	335			335	U	ND	153	1,398	PEL	2.19	2.19	0.24	0.24	0		0	No	Parameter Not Detected
Total PAHs	0	1	4,360	4,360	4,360	4,360			4,360	U	ND	1,684	16,770	PEL	2.59	2.59	0.26	0.26	0		0	No	Parameter Not Detected
TOC Normalized PAHs	0	1	483.89	483.89	483.89	483.89			483.89	U	ND	290	1,800	MEC	1.67	1.67	0.27	0.27	0		0	No	Parameter Not Detected
PCBS (g/kg)																							
Aroclor-1016	0	1	33.5	33.5	33.5	33.5			33.5	U	ND	21.6	189	PEL	1.55	1.55	0.18	0.18	0		0	No	Parameter Not Detected
Aroclor-1221	0	1	70	70	70	70			70	U	ND	67	189	PEL	1.04	1.04	0.37	0.37	0		0	No	Parameter Not Detected
Aroclor-1232	0	1	33.5	33.5	33.5	33.5			33.5	U	ND	21.6	189	PEL	1.55	1.55	0.18	0.18	0		0	No	Parameter Not Detected
Aroclor-1242	0	1	33.5	33.5	33.5	33.5			33.5	U	ND	21.6	189	PEL	1.55	1.55	0.18	0.18	0		0	No	Parameter Not Detected
Aroclor-1248	0	1	33.5	33.5	33.5	33.5			33.5	U	ND	21.6	189	PEL	1.55	1.55	0.18	0.18	0		0	No	Parameter Not Detected
Aroclor-1254	0	1	33.5	33.5	33.5	33.5			33.5	U	ND	21.6	189	PEL	1.55	1.55	0.18	0.18	0		0	No	Parameter Not Detected
Aroclor-1260	0	1	33.5	33.5	33.5	33.5			33.5	U	ND	21.6	189	PEL	1.55	1.55	0.18	0.18	0		0	No	Parameter Not Detected
Total PCBs	0	1	271	271	271	271			271	U	ND	21.6	189	PEL	12.5	12.5	1.43	1.43	0		0	No	Parameter Not Detected; Max SQL > 1
Pesticides (g/kg)																							
Aldrin	0	1	1.75	1.75	1.75	1.75			1.75	U	ND			NA					0		0	No	Parameter Not Detected
Dieldrin	0	1	3.35	3.35	3.35	3.35			3.35	U	ND	0.716	4.3	PEL	4.68	4.68	0.78	0.78	0		0	No	Parameter Not Detected
Endosulfan I	0	1	1.75	1.75	1.75	1.75			1.75	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	1	3.35	3.35	3.35	3.35			3.35	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	0	1	3.35	3.35	3.35	3.35			3.35	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor	0	1	1.75	1.75	1.75	1.75			1.75	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	1	1.75	1.75	1.75	1.75			1.75	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	1	17.5	17.5	17.5	17.5			17.5	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	1	175	175	175	175			175	U	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	0	1	1.75	1.75	1.75	1.75			1.75	U	ND	1.7	4.79	PEL	1.03	1.03	0.37	0.37	0		0	No	Parameter Not Detected
gamma-Chlordane	0	1	1.75	1.75	1.75	1.75			1.75	U	ND	1.7	4.79	PEL	1.03	1.03	0.37	0.37	0		0	No	Parameter Not Detected
Total Chlordane	0	1	3.5	3.5	3.5	3.5			3.5	U	ND	1.7	4.79	PEL	2.06	2.06	0.73	0.73	0		0	No	Parameter Not Detected
Endrin	0	1	3.35	3.35	3.35	3.35			3.35	U	ND	3.3		NA	1.02	1.02			0		0	No	Parameter Not Detected
Endrin aldehyde	0	1	3.35	3.35	3.35	3.35			3.35	U	ND	3.3		NA	1.02	1.02			0		0	No	Parameter Not Detected
Endrin ketone	0	1	3.35	3.35	3.35	3.35			3.35	U	ND	3.3		NA	1.02	1.02			0		0	No	Parameter Not Detected
Total Endrin	0	1	10.1	10.1	10.1	10.1			10.1	U	ND	3.3		NA	3.05	3.05			0		0	No	Parameter Not Detected
alpha-BHC	0	1	1.75	1.75	1.75	1.75			1.75	U	ND		0.99	PEL			1.77	1.77	0		0	No	Parameter Not Detected; Max SQL > 1
beta-BHC	0	1	1.75	1.75	1.75	1.75			1.75	U	ND	0.32	0.99	PEL	5.47	5.47	1.77	1.77	0		0	No	Parameter Not Detected; Max SQL > 1
delta-BHC	0	1	1.75	1.75	1.75	1.75			1.75	U	ND	0.32	0.99	PEL	5.47	5.47	1.77	1.77	0		0	No	Parameter Not Detected; Max SQL > 1
gamma-BHC (Lindane)	0	1	1.75	1.75	1.75	1.75			1.75	U	ND	0.32	0.99	PEL	5.47	5.47	1.77	1.77	0		0	No	Parameter Not Detected; Max SQL > 1
Total BHC	0	1	7	7	7	7			7	U	ND	0.32	0.99	PEL	21.9	21.9	7.07	7.07	0		0	No	Parameter Not Detected; Max SQL > 1
4,4'-DDD	1	1				36	36	36	36		041M18B101	1.22	7.81	PEL	29.5	29.5	4.61	4.61	1	50	0	No	EPC > RV, but < RC
4,4'-DDE	1	1				6.1	6.1	6.1	6.1	J	041M18B101	2.07	374	PEL	2.95	2.95	0.02	0.02	0	40	0	No	EPC < RC and RV
4,4'-DDT	**1**	**1**				**110**	**110**	**110**	**110**	**D**	**041M18B101**	**1.19**	**4.77**	**PEL**	**92.4**	**92.4**	**23.1**	**23.1**	**1**	**20**	**1**	**Yes**	**EPC > RV and RC**
Total DDT	**1**	**1**				**152**	**152**	**152**	**152**		**041M18B101**	**3.3**	**51.7**	**PEL**	**46.1**	**46.1**	**2.94**	**2.94**	**1**	**110**	**1**	**Yes**	**EPC > RV and RC**
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	1	800	800	800	800			800	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected

Table 10-7-37
Wetland 18B Phase III
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg)																							
2-Chlorophenol	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	1	800	800	800	800			800	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	1	800	800	800	800			800	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	1	650	650	650	650			650	U	ND			NA					0		0	No	Parameter Not Detected
3-Methylphenol/4-Methylphenol	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	1	800	800	800	800			800	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	1	800	800	800	800			800	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	1	800	800	800	800			800	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	335	335	335	335			335	U	ND	182	2,647	PEL	1.84	1.84	0.13	0.13	0		0	No	Parameter Not Detected
Butylbenzylphthalate	0	1	335	335	335	335			335	U	ND	182	2,647	PEL	1.84	1.84	0.13	0.13	0		0	No	Parameter Not Detected
Carbazole	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	0	1	335	335	335	335			335	U	ND	182	2,647	PEL	1.84	1.84	0.13	0.13	0		0	No	Parameter Not Detected
Dimethylphthalate	0	1	335	335	335	335			335	U	ND	182	2,647	PEL	1.84	1.84	0.13	0.13	0		0	No	Parameter Not Detected
Di-n-butylphthalate	0	1	335	335	335	335			335	U	ND	182	2,647	PEL	1.84	1.84	0.13	0.13	0		0	No	Parameter Not Detected
Di-n-octylphthalate	0	1	335	335	335	335			335	U	ND	182	2,647	PEL	1.84	1.84	0.13	0.13	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	1	800	800	800	800			800	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	1	335	335	335	335			335	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	1	10	10	10	10			10	U	ND			NA					0		0	No	Parameter Not Detected
2-Hexanone	0	1	10	10	10	10			10	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	10	10	10	10			10	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	1	1				53	53	53	53		041M18B101			NA					0		0	Yes	No SV, no RV, and no RC
Benzene	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	1	10	10	10	10			10	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroethane	0	1	10	10	10	10			10	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	1	10	10	10	10			10	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	1	10	10	10	10			10	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	1	5	5	5	5			5	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 10-7-38
Wetland 18B Phase III
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Iron	4,4'-DDT	None	None
Manganese	Total DDT		
Selenium			

Table 10-7-39
Wetland 18B Phase III
Mean ERM Quotients

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M18B101	8/29/1997	mg/kg	13.8		Arsenic	8.2	70	0.20
041M18B101	8/29/1997	mg/kg	0.2	UJ	Cadmium	1.2	9.6	0.02
041M18B101	8/29/1997	mg/kg	3.6		Chromium	81	370	0.01
041M18B101	8/29/1997	mg/kg	1.7		Copper	34	270	0.01
041M18B101	8/29/1997	mg/kg	5.9		Lead	46.7	218	0.03
041M18B101	8/29/1997	mg/kg	0.01	U	Mercury	0.15	0.71	0.01
041M18B101	8/29/1997	mg/kg	0.275	U	Nickel	20.9	51.6	0.01
041M18B101	8/29/1997	mg/kg	0.06	UJ	Silver	1	3.7	0.02
041M18B101	8/29/1997	mg/kg	5.7		Zinc	150	410	0.01
041M18B101	8/29/1997	g/kg	6.1	J	4,4'-DDE	2.2	27	0.23
041M18B101	**8/29/1997**	**g/kg**	**110**	**D**	**4,4'-DDT**	**1.58**	**46.1**	**2.39**
041M18B101	8/29/1997	g/kg	271	U	Total PCBs	22.7	180	1.51
041M18B101	8/29/1997	g/kg	335	U	2-Methylnaphthalene	70	670	0.50
041M18B101	8/29/1997	g/kg	335	U	Acenaphthene	16	500	0.67
041M18B101	8/29/1997	g/kg	335	U	Acenaphthylene	44	640	0.52
041M18B101	8/29/1997	g/kg	335	U	Anthracene	85.3	1,100	0.30
041M18B101	8/29/1997	g/kg	335	U	Benzo(a)anthracene	261	1,600	0.21
041M18B101	8/29/1997	g/kg	335	U	Benzo(a)pyrene	430	1,600	0.21
041M18B101	8/29/1997	g/kg	335	U	Chrysene	384	2,800	0.12
041M18B101	8/29/1997	g/kg	335	U	Dibenz(a,h)anthracene	63.4	260	1.29
041M18B101	8/29/1997	g/kg	335	U	Fluoranthene	600	5,100	0.07
041M18B101	8/29/1997	g/kg	335	U	Fluorene	19	540	0.62
041M18B101	8/29/1997	g/kg	335	U	Naphthalene	160	2,100	0.16
041M18B101	8/29/1997	g/kg	335	U	Phenanthrene	240	1,500	0.22
041M18B101	8/29/1997	g/kg	335	U	Pyrene	665	2,600	0.13
041M18B101	8/29/1997				ERM Quotient Sum			9.45
041M18B101	8/29/1997				Mean ERM Quotient			0.38
041M18B101	8/29/1997				Mean ERM Quotient without ND			0.11
041M18B101	8/29/1997				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 10-7-40
Wetland 18B Phase II
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	N/A	N/A	1.1E+04	=	MG/KG	041M18B101	1 / 1	NAV	1.1E+04	1.0E-03	3	2.22E-06	1.11E-06	3.51E-05	2.35E-05
7440382	Arsenic	C	N/A	N/A	8.4E+01	=	MG/KG	041M18B101	1 / 1	NAV	8.4E+01	3.0E-02	2	5.03E-07	2.51E-07	1.14E-06	1.90E-06
7440393	Barium	N	N/A	N/A	1.1E+01	J	MG/KG	041M18B101	1 / 1	NAV	1.1E+01	1.0E-03	3	2.18E-09	1.09E-09	3.45E-08	2.31E-08
7440417	Beryllium	N	N/A	N/A	7.3E-01	J	MG/KG	041M18B101	1 / 1	NAV	7.3E-01	1.0E-03	3	1.46E-10	7.30E-11	2.31E-09	1.55E-09
7440473	Chromium	N	N/A	N/A	6.6E+01	=	MG/KG	041M18B101	1 / 1	NAV	6.6E+01	1.0E-03	3	1.32E-08	6.62E-09	2.10E-07	1.40E-07
57125	Cyanide (CN)	N	N/A	N/A	8.8E+00	J	MG/KG	041M18B101	1 / 1	NAV	8.8E+00	1.0E-01	2	1.76E-07	8.80E-08	2.79E-06	1.86E-06
7439896	Iron	N	N/A	N/A	1.3E+05	=	MG/KG	041M18B101	1 / 1	NAV	1.3E+05	1.0E-03	3	2.56E-05	1.28E-05	4.05E-04	2.71E-04
7439921	Lead	N	N/A	N/A	1.1E+02	=	MG/KG	041M18B101	1 / 1	NAV	1.1E+02	1.0E-03	3	2.22E-08	1.11E-08	3.51E-07	2.35E-07
7439965	Manganese	N	N/A	N/A	4.7E+01	=	MG/KG	041M18B101	1 / 1	NAV	4.7E+01	1.0E-03	3	9.34E-09	4.67E-09	1.48E-07	9.88E-08
7782492	Selenium	N	N/A	N/A	2.2E+00	=	MG/KG	041M18B101	1 / 1	NAV	2.2E+00	1.0E-03	3	4.40E-10	2.20E-10	6.96E-09	4.66E-09
7440622	Vanadium	N	N/A	N/A	5.1E+01	=	MG/KG	041M18B101	1 / 1	NAV	5.1E+01	1.0E-03	3	1.02E-08	5.09E-09	1.61E-07	1.08E-07
72548	4,4'-DDD	C	N/A	N/A	2.8E-01	D	MG/KG	041M18B101	1 / 1	NAV	2.8E-01	3.0E-02	1	1.68E-09	8.40E-10	3.80E-09	6.35E-09
78933	2-Butanone (MEK)	N	N/A	N/A	9.8E-02	J	MG/KG	041M18B101	1 / 1	NAV	9.8E-02	1.0E-02	3	1.96E-10	9.80E-11	3.10E-09	2.07E-09
67641	Acetone	N	N/A	N/A	4.4E-01	J	MG/KG	041M18B101	1 / 1	NAV	4.4E-01	1.0E-02	3	8.80E-10	4.40E-10	1.39E-08	9.31E-09

Notes:

Equation for sediment risk:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Equation for DA_{event} for sediment contact:

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

Where:

C_{sd} = Chemical concentration in sediment (mg/kg).
CF = Conversion factor (10^{-6} kg/mg).
AF = Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;
(2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Table 10-7-41
Wetland 18B Phase II
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABSGI	ABSGI Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
Sediment Dermal Risk	Aluminum	N	1.1E+04	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	3.5E-04	N/A	2.3E-04	N/A
	Arsenic	C	8.4E+01	3.0E-04	1.5E+00	4.1E-01	3	1.2E-04	3.7E+00	9.2E-03	**4.2E-06**	1.5E-02	**7.0E-06**
	Barium	N	1.1E+01	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	7.0E-06	N/A	4.7E-06	N/A
	Beryllium	N	7.3E-01	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	1.7E-04	N/A	1.1E-04	N/A
	Chromium	N	6.6E+01	N/A	N/A	2.5E-02	1	N/A	N/A	N/A	N/A	N/A	N/A
	Cyanide (CN)	N	8.8E+00	2.0E-02	N/A	1.7E-01	3	3.4E-03	N/A	8.2E-04	N/A	5.5E-04	N/A
	Iron	N	1.3E+05	3.0E-01	N/A	1.5E-01	3	4.5E-02	N/A	9.0E-03	N/A	6.0E-03	N/A
	Lead	N	1.1E+02	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	4.7E+01	2.4E-02	N/A	4.0E-02	1, 3	9.6E-04	N/A	1.5E-04	N/A	1.0E-04	N/A
	Selenium	N	2.2E+00	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	2.5E-06	N/A	1.7E-06	N/A
	Vanadium	N	5.1E+01	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	8.9E-04	N/A	5.9E-04	N/A
	4,4'-DDD	C	2.8E-01	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	3.0E-08	N/A	5.1E-08
	2-Butanone (MEK)	N	9.8E-02	6.0E-01	N/A	1.0E-01	2	6.0E-02	N/A	5.2E-08	N/A	3.5E-08	N/A
	Acetone	N	4.4E-01	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	1.4E-06	N/A	9.3E-07	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfDdermal = Dermal reference dose.
RFDoral = Oral reference dose.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-7-42
Wetland 18B Phase II
Sediment Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	1.1E+04	1.0E+00	N/A	3.51E-03	N/A	2.26E-03	N/A
	Arsenic	C	8.4E+01	3.0E-04	1.5E+00	1.26E-02	5.69E-06	2.03E-02	9.14E-06
	Barium	N	1.1E+01	7.0E-02	N/A	4.93E-05	N/A	3.17E-05	N/A
	Beryllium	N	7.3E-01	2.0E-03	N/A	1.16E-04	N/A	7.43E-05	N/A
	Chromium	N	6.6E+01	N/A	N/A	N/A	N/A	N/A	N/A
	Cyanide (CN)	N	8.8E+00	2.0E-02	N/A	1.39E-04	N/A	8.95E-05	N/A
	Iron	N	1.3E+05	3.0E-01	N/A	1.35E-01	N/A	8.68E-02	N/A
	Lead	N	1.1E+02	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	4.7E+01	2.4E-02	N/A	6.16E-04	N/A	3.96E-04	N/A
	Selenium	N	2.2E+00	5.0E-03	N/A	1.39E-04	N/A	8.95E-05	N/A
	Vanadium	N	5.1E+01	7.0E-03	N/A	2.30E-03	N/A	1.48E-03	N/A
	4,4'-DDD	C	2.8E-01	N/A	2.4E-01	N/A	3.04E-09	N/A	4.88E-09
	2-Butanone (MEK)	N	9.8E-02	6.0E-01	N/A	5.17E-08	N/A	3.32E-08	N/A
	Acetone	N	4.4E-01	1.0E-01	N/A	1.39E-06	N/A	8.95E-07	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from: (1) IRIS; or (2) RAIS.
CDI = chronic daily intake (mg/kg-day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
IRsd = 100 mg/day for age groups greater than 6-years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 10-7-43
Wetland 18B
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum Concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	N/A	N/A	1.2E+02	J	UG/L	041W18B101	1 / 1	NAV	1.2E+02	1.2E-04	1.0E-03	3.09E-07	4.90E-06	6.55E-06
7439896	Iron	N	N/A	N/A	1.1E+04	=	UG/L	041W18B101	1 / 1	NAV	1.1E+04	1.1E-02	2.5E-04	7.09E-06	1.12E-04	1.50E-04
7439965	Manganese	N	N/A	N/A	1.1E+02	=	UG/L	041W18B101	1 / 1	NAV	1.1E+02	1.1E-04	1.0E-03	2.86E-07	4.53E-06	6.05E-06
106467	1,4-Dichlorobenzene	C	N/A	N/A	1.0E+00	=	UG/L	041W18B101	1 / 1	NAV	1.0E+00	1.0E-06	4.2E-02	1.62E-07	3.67E-07	1.23E-06
71432	Benzene	C	N/A	N/A	1.0E+00	=	UG/L	041W18B101	1 / 1	NAV	1.0E+00	1.0E-06	1.5E-02	4.50E-08	1.02E-07	3.40E-07
85018	Chlorobenzene	N	N/A	N/A	5.0E+00	=	UG/L	041W18B101	1 / 1	NAV	5.0E+00	5.0E-06	2.8E-02	4.72E-07	7.48E-06	1.00E-05

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).

EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 10-7-44
Wetland 18B
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	1.2E-04	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	4.9E-05	N/A	6.5E-05	N/A
	Iron	N	1.1E-02	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.1E-04	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	8.1E-04	N/A	1.1E-03	N/A
	1,4-Dichlorobenzene	C	1.0E-06	3.0E-02	2.4E-02	9.0E-01	3	2.7E-02	2.7E-02	1.4E-05	9.8E-09	4.5E-05	3.3E-08
	Benzene	C	1.0E-06	3.0E-03	5.5E-02	8.8E-02	3	2.6E-04	6.3E-01	3.9E-04	6.4E-08	1.3E-03	2.1E-07
	Chlorobenzene	N	5.0E-06	2.0E-02	N/A	7.3E-02	3	1.5E-03	N/A	5.1E-03	N/A	6.8E-03	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-7-45
Wetland 18B
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	1.2E-04	1.0E+00	N/A	3.8E-09	N/A	2.4E-09	N/A
	Iron	N	1.1E-02	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.1E-04	1.4E-01	N/A	2.5E-08	N/A	1.6E-08	N/A
	1,4-Dichlorobenzene	C	1.0E-06	3.0E-02	2.4E-02	1.5E-10	1.1E-13	2.4E-10	1.7E-13
	Benzene	C	1.0E-06	3.0E-03	5.5E-02	1.5E-09	2.5E-13	2.4E-09	4.0E-13
	Chlorobenzene	N	5.0E-06	2.0E-02	N/A	7.9E-09	N/A	5.1E-09	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:

CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:

Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 10-7-46
Wetland 18B Phase III
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	N/A	N/A	6.1E+02	=	MG/KG	041M18B101	1 / 1	NAV	6.1E+02	1.0E-03	3	1.21E-07	6.05E-08	1.92E-06	1.28E-06
7440382	Arsenic	C	N/A	N/A	1.4E+01	=	MG/KG	041M18B101	1 / 1	NAV	1.4E+01	3.0E-02	2	8.28E-08	4.14E-08	1.87E-07	3.13E-07
7440393	Barium	N	N/A	N/A	1.8E+00	J	MG/KG	041M18B101	1 / 1	NAV	1.8E+00	1.0E-03	3	3.60E-10	1.80E-10	5.70E-09	3.81E-09
7440417	Beryllium	N	N/A	N/A	7.0E-02	J	MG/KG	041M18B101	1 / 1	NAV	7.0E-02	1.0E-03	3	1.40E-11	7.00E-12	2.22E-10	1.48E-10
7439896	Iron	N	N/A	N/A	2.1E+04	=	MG/KG	041M18B101	1 / 1	NAV	2.1E+04	1.0E-03	3	4.16E-06	2.08E-06	6.59E-05	4.40E-05
7439965	Manganese	N	N/A	N/A	1.1E+01	=	MG/KG	041M18B101	1 / 1	NAV	1.1E+01	1.0E-03	3	2.16E-09	1.08E-09	3.42E-08	2.29E-08
7782492	Selenium	N	N/A	N/A	7.4E-01	J	MG/KG	041M18B101	1 / 1	NAV	7.4E-01	1.0E-03	3	1.48E-10	7.40E-11	2.34E-09	1.57E-09
7440622	Vanadium	N	N/A	N/A	6.3E+00	=	MG/KG	041M18B101	1 / 1	NAV	6.3E+00	1.0E-03	3	1.26E-09	6.30E-10	1.99E-08	1.33E-08
72548	4,4'-DDD	C	N/A	N/A	3.6E-02	=	MG/KG	041M18B101	1 / 1	NAV	3.6E-02	3.0E-02	1	2.16E-10	1.08E-10	4.88E-10	8.16E-10
72559	4,4'-DDE	C	N/A	N/A	6.1E-03	J	MG/KG	041M18B101	1 / 1	NAV	6.1E-03	3.0E-02	1	3.66E-11	1.83E-11	8.28E-11	1.38E-10
50293	4,4'-DDT	C	N/A	N/A	1.1E-01	D	MG/KG	041M18B101	1 / 1	NAV	1.1E-01	3.0E-02	1	6.60E-10	3.30E-10	1.49E-09	2.49E-09
67641	Acetone	N	N/A	N/A	5.3E-02	=	MG/KG	041M18B101	1 / 1	NAV	5.3E-02	1.0E-02	3	1.06E-10	5.30E-11	1.68E-09	1.12E-09

Notes:

Equation for sediment risk:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Equation for DA_{event} for sediment contact:

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

Where:

C_{sd} = Chemical concentration in sediment (mg/kg).
CF = Conversion factor (10^{-6} kg/mg).
AF = Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;
(2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Table 10-7-47
Wetland 18B Phase III
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABSGI	ABSGI Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
Sediment Dermal Risk	Aluminum	N	6.1E+02	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	1.9E-05	N/A	1.3E-05	N/A
	Arsenic	C	1.4E+01	3.0E-04	1.5E+00	4.1E-01	3	1.2E-04	3.7E+00	1.5E-03	6.9E-07	2.5E-03	**1.1E-06**
	Barium	N	1.8E+00	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	1.2E-06	N/A	7.8E-07	N/A
	Beryllium	N	7.0E-02	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	1.6E-05	N/A	1.1E-05	N/A
	Iron	N	2.1E+04	3.0E-01	N/A	1.5E-01	3	4.5E-02	N/A	1.5E-03	N/A	9.8E-04	N/A
	Manganese	N	1.1E+01	2.4E-02	N/A	4.0E-02	1, 3	9.6E-04	N/A	3.6E-05	N/A	2.4E-05	N/A
	Selenium	N	7.4E-01	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	8.5E-07	N/A	5.7E-07	N/A
	Vanadium	N	6.3E+00	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	1.1E-04	N/A	7.3E-05	N/A
	4,4'-DDD	C	3.6E-02	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	3.9E-09	N/A	6.5E-09
	4,4'-DDE	C	6.1E-03	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	9.4E-10	N/A	1.6E-09
	4,4'-DDT	C	1.1E-01	5.0E-04	3.4E-01	3.0E-02	2	1.5E-05	1.1E+01	9.9E-05	1.7E-08	1.7E-04	2.8E-08
	Acetone	N	5.3E-02	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	1.7E-07	N/A	1.1E-07	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfDdermal = Dermal reference dose.
RFDoral = Oral reference dose.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 10-7-48
Wetland 18B Phase III
Sediment Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	6.1E+02	1.0E+00	N/A	1.92E-04	N/A	1.23E-04	N/A
	Arsenic	C	1.4E+01	3.0E-04	1.5E+00	2.08E-03	9.36E-07	3.34E-03	**1.50E-06**
	Barium	N	1.8E+00	7.0E-02	N/A	8.14E-06	N/A	5.23E-06	N/A
	Beryllium	N	7.0E-02	2.0E-03	N/A	1.11E-05	N/A	7.12E-06	N/A
	Iron	N	2.1E+04	3.0E-01	N/A	2.20E-02	N/A	1.41E-02	N/A
	Manganese	N	1.1E+01	2.4E-02	N/A	1.42E-04	N/A	9.16E-05	N/A
	Selenium	N	7.4E-01	5.0E-03	N/A	4.69E-05	N/A	3.01E-05	N/A
	Vanadium	N	6.3E+00	7.0E-03	N/A	2.85E-04	N/A	1.83E-04	N/A
	4,4'-DDD	C	3.6E-02	N/A	2.4E-01	N/A	3.91E-10	N/A	6.28E-10
	4,4'-DDE	C	6.1E-03	N/A	3.4E-01	N/A	9.38E-11	N/A	1.51E-10
	4,4'-DDT	C	1.1E-01	5.0E-04	3.4E-01	9.95E-06	1.69E-09	1.60E-05	2.72E-09
	Acetone	N	5.3E-02	1.0E-01	N/A	1.68E-07	N/A	1.08E-07	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = chronic daily intake (mg/kg-day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
IRsd = 100 mg/day for age groups greater than 6-years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

10.8 OU 1 — Wide Evaluation

All the OU 1 wetlands are evaluated collectively to help determine where the highest probabilities of unacceptable risk may occur and whether risk is likely to be related to exposure from IR sites at NAS Pensacola. For OU 1, the tools that best evaluate risk on an OU-wide basis include:

- **Food-Chain Models:** Many of the upper-level predators likely to be present within Site 41 wetlands, could be exposed to constituents from more than one wetland. To evaluate this scenario, food-chain models were conducted on an OU-wide basis.

- **Mean ERM Quotients:** This methodology is an effective way to pinpoint areas of potential excess risk from a mixture of constituents. It is also useful in identifying locations most likely to be impacted by direct toxicity. Mean ERM Quotient Categories and parameters exceeding ERMs are shown on Figure 10-7.

- **Basewide Total DDT-Level Comparison:** A base-wide level for total DDT was established at NAS Pensacola. A comparison of site concentrations to the basewide level is presented in Figure 10-5 and will be discussed as a whole unit in this section.

- **TOC-Normalized PAH Concentrations:** PAHs are widespread across NAS Pensacola and have been evaluated based on their potential for adverse effects, when the TOC at each sample location is taken into account. This method has been summarized in Figure 10-6 to identify locations, where PAHs may occur at levels most likely to cause adverse effects.

10.8.1 OU 1 Food-Chain Modeling

To evaluate the potential for risk to upper-trophic-level receptors that forage within the wetlands surrounding OU 1, food-chain models were prepared as presented in Section 8. The wetlands in this evaluation include:

- Wetland 1
- Wetland 3*
- Wetland 4D
- Wetland 15
- Wetland 16*
- Wetland 17
- Wetland 18A and 18B*

Those wetlands with an asterisk were resampled and evaluated using both the original Phase II data, as well as the Phase III data. During Phase III, fish tissue was collected at Wetland 18B and was included in the food-chain models. The following constituents were evaluated in these food-chain models:

- Pesticides (total BHCs, total DDT, total chlordanes, total endrin, and dieldrin)
- Total PCBs
- Mercury

The exposure concentrations used in the food-chain models are presented in Appendix M.

Tables 10-8-1 through 10-8-6 show the results of the food-chain models for the following receptor groups:

- Piscivorous Birds (green heron) (Tables 10-8-1 and 10-8-4)
- Piscivorous Mammals (mink) (Tables 10-8-2 and 10-8-5)
- Predatory Fish (red drum) (Tables 10-8-3 and 10-8-6)

10.8.1.1 Food-Chain Modeling Results

Assessment Endpoint 1 — Health and Viability of Piscivorous Bird Communities, that Forage in OU 1 Wetland

Phase II Evaluation

The Phase II data indicated estimated daily doses of mercury and total DDT generate HQs greater than 1. Based on this exposure, there is some potential for unacceptable risk to piscivorous bird communities that feed exclusively from wetlands within OU 1. The daily dose for piscivorous birds was calculated, using the site-specific sediment and surface water concentrations and an estimated prey concentration based on literature BSAFs.

Total DDT HQs for piscivorous birds ranged from 9.68 (max concentration/NOAEL) to less than 1 (average concentration/LOAEL). The maximum concentration of total DDT (2.4 mg/kg) was detected in Wetland 18A at sample location 041M18A101. Total DDT was detected in each of the OU 1 wetlands, with the exception of Wetland 17. The two highest concentrations of total DDT were both located in Wetland 18 (2.4 mg/kg at 041M18A101 and 2.1 mg/kg at 041M18B101). Wetland 18 was selected as a wetland for sampling during Phase III. During this round of sampling, fish tissue was collected from nearby location 041M18B101 to evaluate the site-specific bioaccumulation of constituents detected in sediments.

No other constituents generated food-chain model HQs greater than 1 based on estimated exposure to piscivorous birds.

Phase III Evaluation

During Phase III, another round of sediment and surface water sampling was conducted along with fish tissue collection. During Phase III, Wetlands 3, 16, and 18B were resampled. Forage fish were collected at Wetland 18B; this site-specific tissue data replaced the estimates utilized in the Phase II food-chain models. Using the site-specific data collected during Phase III, no constituents generated food-chain model HQs greater than 1.

Assessment Endpoint 2 — Health and Viability of Piscivorous Mammal Communities that Forage in OU 1 Wetland

Phase II Evaluation

The Phase II data indicate concentrations of mercury generating HQs greater than 1 based on an estimated daily dose. Based on this exposure, there is some potential for unacceptable risk to piscivorous bird communities that feed exclusively from wetlands within OU 1. The daily dose for piscivorous birds was calculated, using the site-specific sediment and surface water concentrations and an estimated prey concentration based on literature BSAFs.

The mercury HQs for piscivorous mammals exceeds 1 and indicates the potential for unacceptable risk. Mercury HQs range from 4.51 (maximum concentration/NOAEL) to 0.17 (average concentration/LOAEL). Mercury was detected in Wetlands 1, 4D, and 16, with the maximum concentration detected in Wetland 16 (0.41 mg/kg at sample location 041M16020a). Dieldrin generated a HQ of 1.2 (max concentration/NOAEL) and .005 (average concentration/LOAEL). The maximum sediment concentration of dieldrin was detected at Wetland 1A. No other constituents generated an HQ greater than 1 for piscivorous mammals within OU 1.

Phase III Evaluation

During Phase III, mercury was detected in three of the four sediment samples collected, with the maximum concentration of (0.1 mg/kg in Wetland 3 (041M030201). The fish tissue collected for the *Final RI/FS Work Plan Site 41* (E/A&H, 1995f) was not analyzed for mercury; therefore, fish tissue samples collected in the area of Wetland 18B for the *Final RI Report, Site 40* (EnSafe, 1999), have been used to fill this data gap. No COPCs generated any FCM HQs greater than 1 for piscivorous mammals.

Assessment Endpoint 3 — Health and Viability of Predatory Fish Communities that Forage in OU 1 Wetland

This assessment endpoint was evaluated using the Evans and Engels food-chain model for mercury. Utilizing the Phase II sediment concentrations, this model generated HQs for mercury ranging from 7.02 (max concentration/NOAEL) to 1.88 (average concentration/LOAEL), indicating the potential for unacceptable risk to predatory fish.

Mercury concentrations identified during the Phase III sampling event were put into the food-chain models. The mercury HQs for OU 1 wetlands range from 1.31 to 0.37, indicating that the maximum concentration still poses unacceptable risk. However, according to the food-chain models, the max concentration location is the only sample location that poses unacceptable risk to predatory fish, using the most recent data.

10.8.1.2 Food-Chain Modeling Summary for OU 1

Based on the site-specific biota tissue sampling conducted at Wetlands 3, 16, and 18, the assessment endpoint identified with the potential for risk was predatory fish. The maximum NOAEL HQ for this endpoint was 1.37 and the maximum LOAEL HQ is 0.65, assuming that all exposure occurred at the location of the maximum concentrations. However, evaluating exposure at the average concentration measured in the OU 1 wetlands generates a NOAEL HQ of only 0.74.

10.8.2 Mean ERM Quotients

Figure 10-7 shows the mean ERM categories and all ERM exceedances for all OU 1 sediments. According to the figure showing Phase II locations, there were Category 3 sample locations in Wetlands 1B, 4D, 15, 16, and 18A. The primary constituents exceeding individual ERMs included total DDT (and daughter products) within each wetland, cadmium (limited to Wetland 3), and several others only detected once (lead and PCBs). However, when the Phase III sampling was conducted, reductions in constituent levels resulted in the Phase II Category 3 locations being reduced to Category 2. While several ERM exceedances are noted in the Phase II samples, only one constituent — (total DDT) — exceeded its ERM during the Phase III sampling event and only at one location. These results indicate direct toxicity resulting from exposure to OU 1 wetland sediments is not likely (although it is possible) at any of the Phase III sampling locations.

During Phase II, the constituent most frequently exceeding its ERM was total DDT (and its daughter products). Cadmium also exceeded its ERM in Phase II in one of 10 sample locations. Of the four sample locations selected for sediment toxicity testing in Wetlands 3, 16, and 18B during Phase III — 041M030201, 041M030701, 041M160301, and 041M18B101 — the only statistically

significant toxic effect noted was in Wetland 3 (sample location 041M030701). The two constituents that generated the highest screening and refinement HQs in Wetland 3 were cadmium (9.3 mg/kg) and total DDT (69.3 g/kg).

Wetland 3 was the only wetland with detections of cadmium generating screening HQs greater than 1, which indicates exposure to cadmium is not an issue at any other wetland in OU 1.

The organics identified in Figure 10-5 exceeding their ERMs (total DDT and PCBs) are evaluated using the food-chain model presented in the previous section.

10.8.3 Basewide Total DDT Levels

Figure 10-5 shows a distribution throughout OU 1 of samples exceeding the base-wide level of total DDTs. During Phase II sampling, Wetlands 3, 4D, 15, 18A, and 18B all had at least one sample exceeding the base-wide total DDT level. Since Phase III sampling was not focused on total DDT results, many of these exceedances were not resampled. Of the OU 1 locations that were resampled during Phase III, the only location sampled exceeding the base-wide level was in Wetland 18B.

10.8.4 TOC-Normalized PAH Concentrations

Figure 10-6 shows the locations, where TOC-normalized PAH concentrations in OU 1 sediment exceeded the Swartz TEC. TOC-normalized PAH concentrations below the TEC are unlikely to cause adverse effects on benthic ecosystems. During the Phase II sampling, the only wetlands with locations exceeding the TEC were Wetlands 1B (two locations) and 4D (one location). None of the locations exceeded the Swartz EEC, which indicates a virtual certainty of adverse effects. During the Phase III sampling event, only Wetland 16 had a sample location exceeding the Swartz TEC. However, in the site-specific toxicity testing conducted in Wetland 16 at sample location 041M1603, no statistically significant differences were noted, when compared to the control.

10.8.5 Conclusions

Using all the lines of evidence provided for in this risk assessment, unacceptable risk has been identified at Wetland 3 for direct toxicity. Based on these results, an FS is recommended for Wetland 3. No further investigation is necessary at the other wetlands included in this OU.

Table 10-8-1
OU 1 Wetlands FCM (1994 and 1995 Data)
Receptor: Green Heron (Butorides virescens)

Sediment Ingestion Rate[a] : 0.00023 kg/day
Surface Water Ingestion Rate[b]: 0.0227 L/day
Food Ingestion Rate[c]: 0.0115 kg/day

Body Weight[d]: 0.241 kg

Contaminant		Sediment Concentrations mg/kg	Surface Water Concentrations mg/L	Tissue Concentrations mg/kg	Sediment Exposure mg/day	Water Exposure mg/day	Prey Exposure mg/day	Total Exposure mg/day	Daily Dose mg/kgBW/day	NOAEL mg/kdBW/day	LOAEL mg/kdBW/day	NOAEL HQ	LOAEL HQ
Mercury													
	Max	0.41	0.94	0.82	0.0000943	0.0213	0.0094	0.0308623	0.1281	0.44	0.86	2.91E-01	1.49E-01
	Average	0.13	0.12	0.26	0.0000299	0.0027	0.0030	0.0057439	0.0238	0.44	0.86	5.42E-02	2.77E-02
Total BHC													
	Max	0.01651	0	0.01651	3.7973E-06	0.0000	0.0002	0.000193662	0.0008	0.563	2.25	1.43E-03	3.57E-04
	Average	0.00549	0.0001	0.00549	1.2627E-06	0.0000	0.0001	6.66677E-05	0.0003	0.563	2.25	4.91E-04	1.23E-04
Total Chlordane													
	Max	0.0215	0	0.050525	0.000004945	0.0000	0.0006	0.000585983	0.0024	2.14	10.7	1.14E-03	2.27E-04
	Average	0.0034	0.00005	0.00799	0.000000782	0.0000	0.0001	0.000093802	0.0004	2.14	10.7	1.82E-04	3.64E-05
Dieldrin													
	Max	0.069	0	0.33327	0.00001587	0.0000	0.0038	0.003848475	0.0160	0.044	0.44	3.63E-01	3.63E-02
	Average	0.027	0.0001	0.13041	0.00000621	0.0000	0.0015	0.001508195	0.0063	0.044	0.44	1.42E-01	1.42E-02
Total DDT													
	Max	2.4	0.0003	10.296	0.000552	0.0000	0.1184	0.11896281	0.4936	0.051	0.512	**9.68E+00**	9.64E-01
	Average	0.2098	0.0002	0.900042	0.000048254	0.0000	0.0104	0.010403277	0.0432	0.051	0.512	8.46E-01	8.43E-02
Total Endrin													
	Max	0.087	0.00025	0.087	0.00002001	0.0000	0.0010	0.001026185	0.0043	0.01	0.1	4.26E-01	4.26E-02
	Average	0.009	0.0002	0.009	0.00000207	0.0000	0.0001	0.00011011	0.0005	0.01	0.1	4.57E-02	4.57E-03
Total PCB													
	Max	0.455	0.0005	0.746	0.00010465	0.0000	0.0086	0.0086973	0.0361	0.112	1.12	3.22E-01	3.22E-02
	Average	0.1986	0.0038	0.326	0.000045678	0.0001	0.0037	0.003877534	0.0161	0.112	1.12	1.44E-01	1.44E-02

Notes:
Sediment Exposure = Sediment Concentration * Sediment Ingestion Rate (mg/day)
Surface Water Exposure = Surface Water Concentration * Water Ingestion Rate (mg/day)
Prey Exposure = Tissue Concentration * Food Ingestion Rate (mg/day)
Total Exposure = Sediment Exposure + Surface Water Exposure + Prey Exposure (mg/day)

Daily Dose = Total Exposure / Body Weight (mg/kgBW/day)

NOAEL HQ = Daily Dose/NOAEL (mg/kgBW/day)
LOAEL HQ = Daily Dose/LOAEL (mg/kgBW/day)

a Estimated based on the results of Beyer et al 1994.
b Calder and Braun 1983.
c Kushlan 1978
d Niethammer and Kaiser 1983.

Tissue data collected from Wetland 18B

Table 10-8-2
OU 1 Wetlands FCM (1994 and 1995 Data)
Receptor: Mink (*Mustella vison*)

Sediment Ingestion Rate[a] : 0.003 kg/day
Surface Water Ingestion Rate[b]: 0.0578 L/day
Food Ingestion Rate[c]: 0.029 kg/day

Body Weight[d]: 0.55 kg

Contaminant		Sediment Concentrations mg/kg	Surface Water Concentrations mg/L	Tissue Concentrations mg/kg	Sediment Exposure mg/day	Water Exposure mg/day	Prey Exposure mg/day	Total Exposure mg/day	Daily Dose mg/kgBW/day	NOAEL mg/kdBW/day	LOAEL mg/kdBW/day	NOAEL HQ	LOAEL HQ
Mercury													
	Max	0.41	0.94	0.82	0.00123	0.0543	0.0238	0.079342	0.1443	0.032	0.16	**4.51E+00**	9.02E-01
	Average	0.13	0.12	0.26	0.00039	0.0069	0.0075	0.014866	0.0270	0.032	0.16	8.45E-01	1.69E-01
Total BHC													
	Max	0.01651	0	0.01651	0.00004953	0.0000	0.0005	0.00052832	0.0010	0.014	0.14	6.86E-02	6.86E-03
	Average	0.00549	0.0001	0.00549	0.00001647	0.0000	0.0002	0.00018146	0.0003	0.014	0.14	2.36E-02	2.36E-03
Total Chlordane													
	Max	0.0215	0	0.050525	0.0000645	0.0000	0.0015	0.001529725	0.0028	3.9	7.8	7.13E-04	3.57E-04
	Average	0.0034	0.00005	0.00799	0.0000102	0.0000	0.0002	0.0002448	0.0004	3.9	7.8	1.14E-04	5.71E-05
Dieldrin													
	Max	0.069	0	0.33327	0.000207	0.0000	0.0097	0.00987183	0.0179	0.015	0.15	**1.20E+00**	1.20E-01
	Average	0.027	0.0001	0.13041	0.000081	0.0000	0.0038	0.00386867	0.0070	0.015	0.15	4.69E-01	4.69E-02
Total DDT													
	Max	2.4	0.0003	10.296	0.0072	0.0000	0.2986	0.30580134	0.5560	0.8	4	6.95E-01	1.39E-01
	Average	0.2098	0.0002	0.900042	0.0006294	0.0000	0.0261	0.026742178	0.0486	0.8	4	6.08E-02	1.22E-02
Total Endrin													
	Max	0.087	0.00025	0.087	0.000261	0.0000	0.0025	0.00279845	0.0051	0.092	0.92	5.53E-02	5.53E-03
	Average	0.009	0.0002	0.009	0.000027	0.0000	0.0003	0.00029956	0.0005	0.092	0.92	5.92E-03	5.92E-04
Total PCB													
	Max	0.455	0.0005	0.746	0.001365	0.0000	0.0216	0.0230337	0.0419	0.15	0.31	2.79E-01	1.35E-01
	Average	0.1986	0.0038	0.326	0.0005958	0.0002	0.0094	0.010260856	0.0187	0.15	0.31	1.24E-01	6.02E-02

Notes:
Sediment Exposure = Sediment Concentration * Sediment Ingestion Rate (mg/day)
Surface Water Exposure = Surface Water Concentration * Water Ingestion Rate (mg/day)
Prey Exposure = Tissue Concentration * Food Ingestion Rate (mg/day)
Total Exposure = Sediment Exposure + Surface Water Exposure + Prey Exposure (mg/day)

Daily Dose = Total Exposure / Body Weight (mg/kgBW/day)

NOAEL HQ = Daily Dose/NOAEL (mg/kgBW/day)
LOAEL HQ = Daily Dose/LOAEL (mg/kgBW/day)

a Guilday 1957.
b Based on Morrison 1957.
c Chew 1951.
d Estimated based on the results of Beyer et al. 1994.

Tissue data collected from Wetland 18B

Table 10-8-3
OU1 Phase II Data
Red Drum Exposure Model

	Me in Sediment (Cs) (ppm)	MeHg in Forage Fish (Cf) (ppm)A	MeHg in Crustaceans (Ccr) (ppm)	MeHg in Invertebrates (Cinv) (ppm)	MeHg in Red Drum Tissue (ppm)	NOAEL HQ	LOAEL HQ
OU1 Maximum	0.41	0.492	0.1148	0.041	1.05	**7.02**	**3.51**
OU1 Average	0.22	0.264	0.0616	0.022	0.57	**3.77**	**1.88**

Note:

A = Forage Fish tissue concentrations calculated BSAF of 2.0 from Evans and Engel 1994.

Table 10-8-4
OU 1 Wetlands FCM (1997 Data)
Receptor: Green Heron (*Butorides virescens*)

Sediment Ingestion Rate[a] : 0.00023 kg/day
Surface Water Ingestion Rate[b]: 0.0227 L/day
Food Ingestion Rate[c]: 0.0115 kg/day

Body Weight[d]: 0.241 kg

Contaminant		Sediment Concentrations mg/kg	Surface Water Concentrations mg/L	Tissue Concentrations mg/kg	Sediment Exposure mg/day	Water Exposure mg/day	Prey Exposure mg/day	Total Exposure mg/day	Daily Dose mg/kgBW/day	NOAEL mg/kgBW/day	LOAEL mg/kgBW/day	NOAEL HQ	LOAEL HQ
Mercury													
	Max	0.1	0.000025	0.2	0.000023	0.0000	0.0023	0.002323568	0.0096	0.44	0.86	2.19E-02	1.12E-02
	Average	0.06	0.000025	0.12	0.0000138	0.0000	0.0014	0.001394368	0.0058	0.44	0.86	1.31E-02	6.73E-03
Total BHC													
	Max	0.0151	0.0001	0.034	0.000003473	0.0000	0.0004	0.000396743	0.0016	0.563	2.25	2.92E-03	7.32E-04
	Average	0.00958	0.0001	0.034	2.2034E-06	0.0000	0.0004	0.000395473	0.0016	0.563	2.25	2.91E-03	7.29E-04
Total Chlordane													
	Max	0.0043	0.00005	0.0099	0.000000989	0.0000	0.0001	0.000115974	0.0005	2.14	10.7	2.25E-04	4.50E-05
	Average	0.0052	0.00005	0.0099	0.000001196	0.0000	0.0001	0.000116181	0.0005	2.14	10.7	2.25E-04	4.51E-05
Dieldrin													
	Max	0	0	0	0	0.0000	0.0000	0	0.0000	0.044	0.44	0.00E+00	0.00E+00
	Average	0.004	0.0001	0.0017	0.0000	0.0000	0.0000	0.00002274	0.0001	0.044	0.44	2.14E-03	2.14E-04
Total DDT													
	Max	0.1521	0.00015	0.1329	0.000034983	0.0000	0.0015	0.001566163	0.0065	0.051	0.512	1.27E-01	1.27E-02
	Average	0.0707	0.00015	0.1329	0.000016261	0.0000	0.0015	0.001547441	0.0064	0.051	0.512	1.26E-01	1.25E-02
Total Endrin													
	Max	0.0348	0.00015	0.0495	0.000008004	0.0000	0.0006	0.000580659	0.0024	0.01	0.1	2.41E-01	2.41E-02
	Average	0.0185	0.00015	0.0495	0.000004255	0.0000	0.0006	0.00057691	0.0024	0.01	0.1	2.39E-01	2.39E-02
Total PCB													
	Max	0	0.004	1.247	0	0.0001	0.0143	0.0144313	0.0599	0.112	1.12	5.35E-01	5.35E-02
	Average	0.388	0.004	1.247	0.00008924	0.0001	0.0143	0.01452054	0.0603	0.112	1.12	5.38E-01	5.38E-02

Notes:
Sediment Exposure = Sediment Concentration * Sediment Ingestion Rate (mg/day)
Surface Water Exposure = Surface Water Concentration * Water Ingestion Rate (mg/day)
Prey Exposure = Tissue Concentration * Food Ingestion Rate (mg/day)
Total Exposure = Sediment Exposure + Surface Water Exposure + Prey Exposure (mg/day)

Daily Dose = Total Exposure / Body Weight (mg/kgBW/day)

NOAEL HQ = Daily Dose/NOAEL (mg/kgBW/day)
LOAEL HQ = Daily Dose/LOAEL (mg/kgBW/day)

a	Estimated based on the results of Beyer et al 1994.
b	Calder and Braun 1983.
c	Kushlan 1978
d	Niethammer and Kaiser 1983.

Tissue data collected from Wetland 18B

Table 10-8-5
OU 1 Wetlands FCM (1997 Data)
Receptor: Mink (*Mustella vison*)

Surface Water Ingestion Rate[b]: 0.0578 L/day
Food Ingestion Rate[c]: 0.029 kg/day

Body Weight[d]: 0.55 kg

Contaminant		Sediment Concentrations mg/kg	Surface Water Concentrations mg/L	Tissue Concentrations mg/kg	Sediment Exposure mg/day	Water Exposure mg/day	Prey Exposure mg/day	Total Exposure mg/day	Daily Dose mg/kgBW/day	NOAEL mg/kdBW/day	LOAEL mg/kdBW/day	NOAEL HQ	LOAEL HQ
Mercury													
	Max	0.1	0.000025	0.2	0.0003	0.0000	0.0058	0.006101445	0.0111	0.032	0.16	3.47E-01	6.93E-02
	Average	0.06	0.000025	0.12	0.00018	0.0000	0.0035	0.003661445	0.0067	0.032	0.16	2.08E-01	4.16E-02
Total BHC													
	Max	0.0151	0.0001	0.034	0.0000453	0.0000	0.0010	0.00103708	0.0019	0.014	0.14	1.35E-01	1.35E-02
	Average	0.00958	0.0001	0.034	0.00002874	0.0000	0.0010	0.00102052	0.0019	0.014	0.14	1.33E-01	1.33E-02
Total Chlordane													
	Max	0.0043	0.00005	0.0099	0.0000129	0.0000	0.0003	0.00030289	0.0006	3.9	7.8	1.41E-04	7.06E-05
	Average	0.0052	0.00005	0.0099	0.0000156	0.0000	0.0003	0.00030559	0.0006	3.9	7.8	1.42E-04	7.12E-05
Dieldrin													
	Max	0	0	0	0	0.0000	0.0000	0	0.0000	0.015	0.15	0.00E+00	0.00E+00
	Average	0.004	0.0001	0.0017	0.0000	0.0000	0.0000	0.00006708	0.0001	0.015	0.15	8.13E-03	8.13E-04
Total DDT													
	Max	0.1521	0.00015	0.1329	0.0004563	0.0000	0.0039	0.00431762	0.0079	0.8	4	9.81E-03	1.96E-03
	Average	0.0707	0.00015	0.1329	0.0002121	0.0000	0.0039	0.00407342	0.0074	0.8	4	9.26E-03	1.85E-03
Total Endrin													
	Max	0.0348	0.00015	0.0495	0.0001044	0.0000	0.0014	0.00154857	0.0028	0.092	0.92	3.06E-02	3.06E-03
	Average	0.0185	0.00015	0.0495	0.0000555	0.0000	0.0014	0.00149967	0.0027	0.092	0.92	2.96E-02	2.96E-03
Total PCB													
	Max	0	0.004	1.247	0	0.0002	0.0362	0.0363942	0.0662	0.15	0.31	4.41E-01	2.13E-01
	Average	0.388	0.004	1.247	0.001164	0.0002	0.0362	0.0375582	0.0683	0.15	0.31	4.55E-01	2.20E-01

Notes:
Sediment Exposure = Sediment Concentration * Sediment Ingestion Rate (mg/day)
Surface Water Exposure = Surface Water Concentration * Water Ingestion Rate (mg/day)
Prey Exposure = Tissue Concentration * Food Ingestion Rate (mg/day)
Total Exposure = Sediment Exposure + Surface Water Exposure + Prey Exposure (mg/day)

Daily Dose = Total Exposure / Body Weight (mg/kgBW/day)

NOAEL HQ = Daily Dose/NOAEL (mg/kgBW/day)
LOAEL HQ = Daily Dose/LOAEL (mg/kgBW/day)

a Guilday 1957.
b Based on Morrison 1957.
c Chew 1951.
d Estimated based on the results of Beyer et al. 1994.

Table 10-8-6
OU 1 Phase III Data
Red Drum Exposure Model

	Me in Sediment (Cs) (ppm)	MeHg in Forage Fish (Cf) (ppm)A	MeHg in Crustaceans (Ccr) (ppm)	MeHg in Invertebrates (Cinv) (ppm)	MeHg in Red Drum Tissue (ppm)	NOAEL HQ	LOAEL HQ
OU1 Maximum	0.1	0.0768	0.028	0.01	0.20	**1.31**	0.65
OU1 Average	0.08	0.02912	0.0224	0.008	0.11	0.74	0.37

Note:
A = Forage Fish tissue concentrations taken from site specific biota collected to support Site 41 RI.

FINAL REMEDIAL INVESTIGATION REPORT
SITE 41 — OPERABLE UNIT 16 — NAS PENSACOLA WETLANDS

NAVAL AIR STATION
PENSACOLA, FLORIDA

SOUTHNAVFACENGCOM
CONTRACT NUMBER: N62467-89-D-0318

CTO-036

VOLUME IV OF XI
SECTION 11

Prepared for:

Comprehensive Long-Term
Environmental Action Navy
Naval Air Station
Pensacola, Florida

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August 17, 2005
Revised November 16, 2007

11.0 OU 2 — WETLANDS

OU 2 is located in the northeastern portion of the base and is roughly 300 acres in size (Figure 11-1). OU 2 includes Sites 11 (North Chevalier Disposal Area), 12 (Scrap Bins), 25 (Radium Spill Area), 26 (Supply Department Outside Storage Area), 27 (Radium Dial Shop), and 30 (Building 649 Complex). The investigation also included a portion of the former IWTP sewer line (Site 36) serving the OU 2 area. The assessments were conducted to evaluate the nature and extent of contamination in these areas. The OU 2 site topography is presented in Figure 11-2 and the shallow surficial potentiometric map is presented in Figure 11-3. Sample locations for OU 2 are presented on Figure 11-4.

Chronology of Events and Previous Investigations

The following is a chronology of events and previous investigations at OU 2.

1993-1995 Remedial Investigation

The *RI Report OU 2* (EnSafe, 1997b) identified several areas of contamination at the various RI sites within OU 2. Appendix A contains terrestrial site investigation summary tables including data tables from OU 2.

Site 11 is a former landfill where trenching revealed evidence of a "seam" of blackened debris at the water table containing oily metallic debris. Soil inorganic COPCs at Site 11 included arsenic, beryllium, cadmium, chromium, and iron. Soil organic COPCs included aroclor-1260 and BEQs. Groundwater inorganic COPCs included arsenic and beryllium. Groundwater organic COPCs included 1,2-DCE, aldrin, chloroform, 1,2-DCA, dieldrin, 1,1,2,2-tetrachloroethane, PCE, TCE, and vinyl chloride (EnSafe, 1997b).

At Site 12, a storage area for scrap materials, soil exceedances mainly included primary/secondary metals, PCBs, and SVOCs. Additionally, various pieces of radioactive metal debris including a radium dial were recovered during soil sampling at locations SE0101, SE0201, and SE0301 (located south of Building 455). COPCs identified in groundwater included PCBs and VOCs (EnSafe, 1997b).

At Site 25, a radium spill area that includes the area surrounding Building 780, no radium was found. However, Building 780, which formerly housed the Joint Oil Analysis Laboratory, is the source of contamination found at Site 25. Soil samples collected at this building revealed a wide range of primary and secondary metals and SVOC contamination. Adjacent wells contained primary and secondary metals and VOCs. Site 25 also includes the storage yard behind

Building 225, once used as a metal prefabricating shop by the NAS Pensacola PWC. Wells located near Building 225 contained primary and secondary metals, and VOCs. COPCs identified for Site 25 included metals, pesticides, PCBs, BEQs, and VOCs (EnSafe, 1997b).

No significant contamination was detected at Site 26. Inorganic constituents did not contribute to risk identified in Site 26 soil. Organic COPCs were limited to BEQs. Groundwater COPCs included metals, pesticides and VOCs (EnSafe, 1997b).

At Site 27, the Radium Dial Shop at the former Building 709, SVOC exceedances were noted from wells previously installed by ABB, Inc., in support of UST removals at this location. The former UST locations are likely contributors of contamination in these wells. Soil COPCs included metals, pesticides, and BEQs. Groundwater COPCs included chlorinated solvents (EnSafe, 1997b).

At Site 30 (the Building 649 complex, and Buildings 3220 and 3450), numerous former ABB, Inc., wells, which were associated with previous UST removals at the site, revealed the presence of chlorinated solvents, benzene, and phenols. Above ground storage tanks, the former USTs, and associated buried piping are considered sources for this contamination. Soil COPCs at Site 30 included metals, BEQs, and PCBs. Groundwater COPCs included metals and VOCs (EnSafe, 1997b).

For Site 36, at various places along the IWTP sewer where it parallels Wetlands 5B and 6, wells contained primary/secondary metals, pesticides, and VOCs (EnSafe, 1997b).

Site 23 Investigation

At Site 23, an area of Chevalier Field near Wetland 6 where an underground aviation gasoline pipeline leak occurred, the pipeline and several nearby USTs were removed in 1994 and the adjacent soil and groundwater were investigated by ABB, Inc. A 1998 Site Assessment Report prepared by the Navy Public Works Center determined the source of contamination had been removed and the site area was recommended for NFA (Navy Public Works Center, 1998).

OU 2 RI Addendum Sampling

At the request of the Tier 1 NAS Partnering Team, the existing data from the *RI Report OU 2* (EnSafe, 1997b) were reviewed, and a focused sampling plan was developed to assess the current state of contamination at OU 2. In 2003, new soil and groundwater data were collected and compared to previous analytical data to document changes from 1993-1995 and to support the FS. The data are summarized in the *RI Addendum OU 2 Report* (EnSafe, 2004c).

The metals data collected during this investigation indicate there continues to be a soil leachability problem at Site 11. Groundwater metals data indicate migration to surface water continues to be a problem for Wetlands 5A and 5B, 6, and 7 for a number of metals, including cadmium, chromium, iron, and manganese (EnSafe, 2004c).

For pesticides and PCBs, since the 1993-1995 RI sampling, there has been a decrease in both soil and groundwater concentrations. The pesticide and PCB data do not indicate a continuing problem with respect to the soil-to-groundwater pathway, nor the groundwater-to-surface water pathway (EnSafe, 2004c).

The soil data for SVOCs indicate there may be a continuing problem with the soil-to-groundwater pathway at isolated locations on Sites 11 and 27. The groundwater data indicate there continues to be a problem for SVOCs with respect to the groundwater-to-surface water pathway at Site 11 (Wetlands 6 and 7), the southeast corner of Site 30 (Wetlands 5B and 6), and Site 30 near Wetlands 5A and 5B. For VOCs, the soil data indicate there is not a continuing problem with the soil-to-groundwater pathway (EnSafe, 2004c).

The groundwater data indicate there continues to be a problem for VOCs with respect to the groundwater-to-surface water pathway at OU 2 on Sites 30 and 11 at following wells: 030GS111 and 030GI111 adjacent to the southern end of Wetland 6; 030GS18, adjacent to Wetland 5A; 030GS06, adjacent to Wetland 5A; 030GI170, adjacent to Wetland 5B; 011GS52, adjacent to the central portion of Wetland 6; 011GI114, adjacent to the northern portion of Wetland 6; 011GI12, adjacent to the northern portion of Wetland 6; 011GI10, adjacent to the southern portion of Wetland 7; and 011GS47 and 011GS28, both adjacent to Wetland 7 (EnSafe, 2004c).

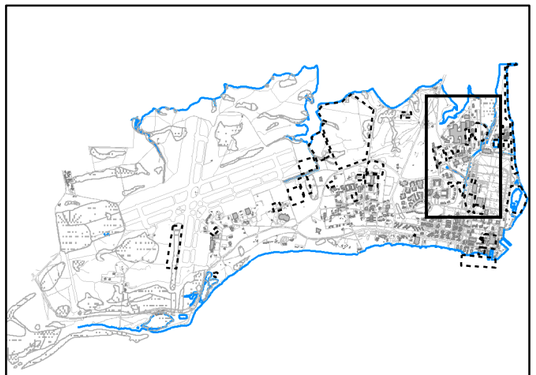
This investigation found a number of wells on Sites 11 and 30 lie immediately adjacent to surface water bodies and have concentrations above appropriate GCTLs for protection of surface water. This is being considered for groundwater alternative development for OU 2 (EnSafe, 2004c).

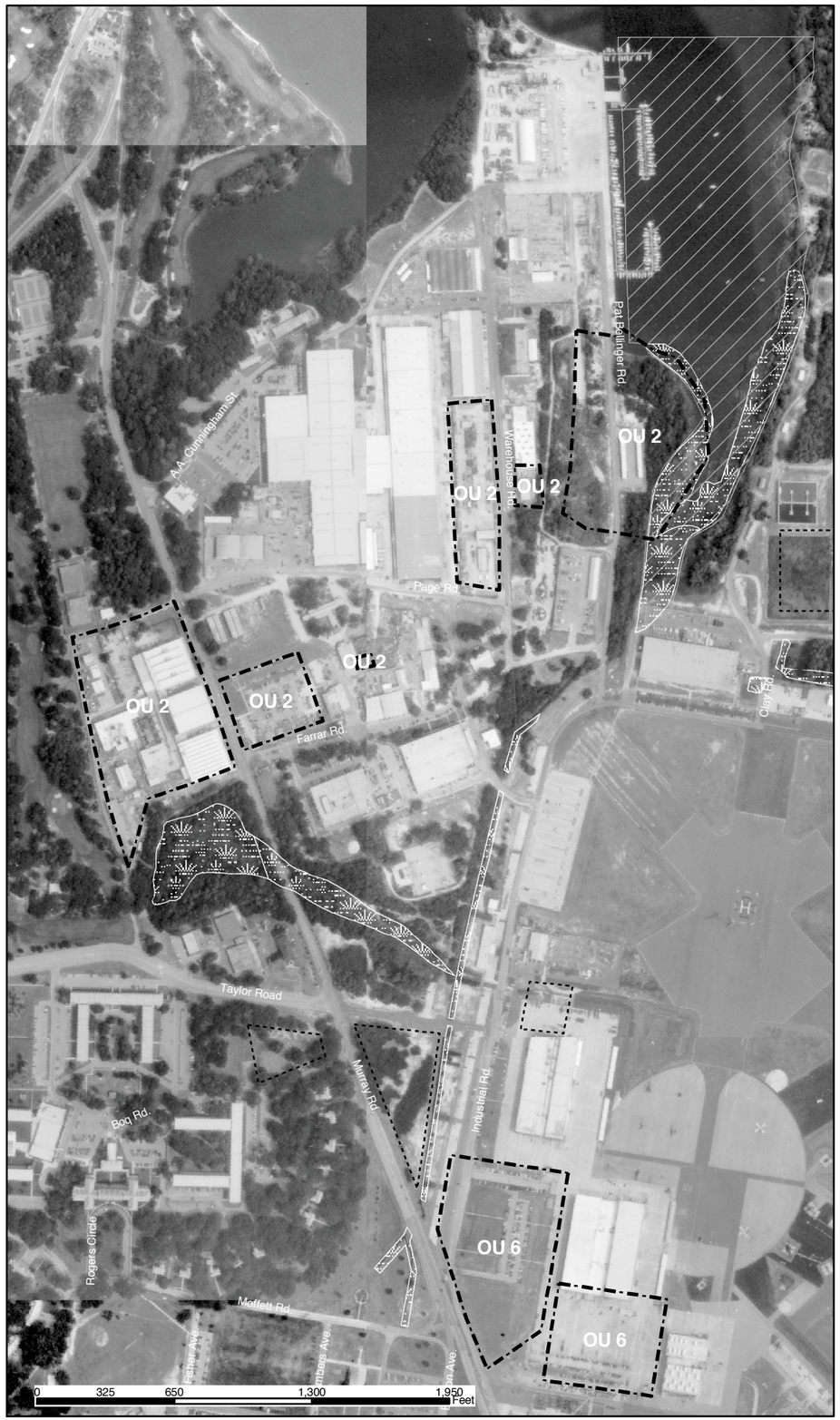
OU 2 Wetlands

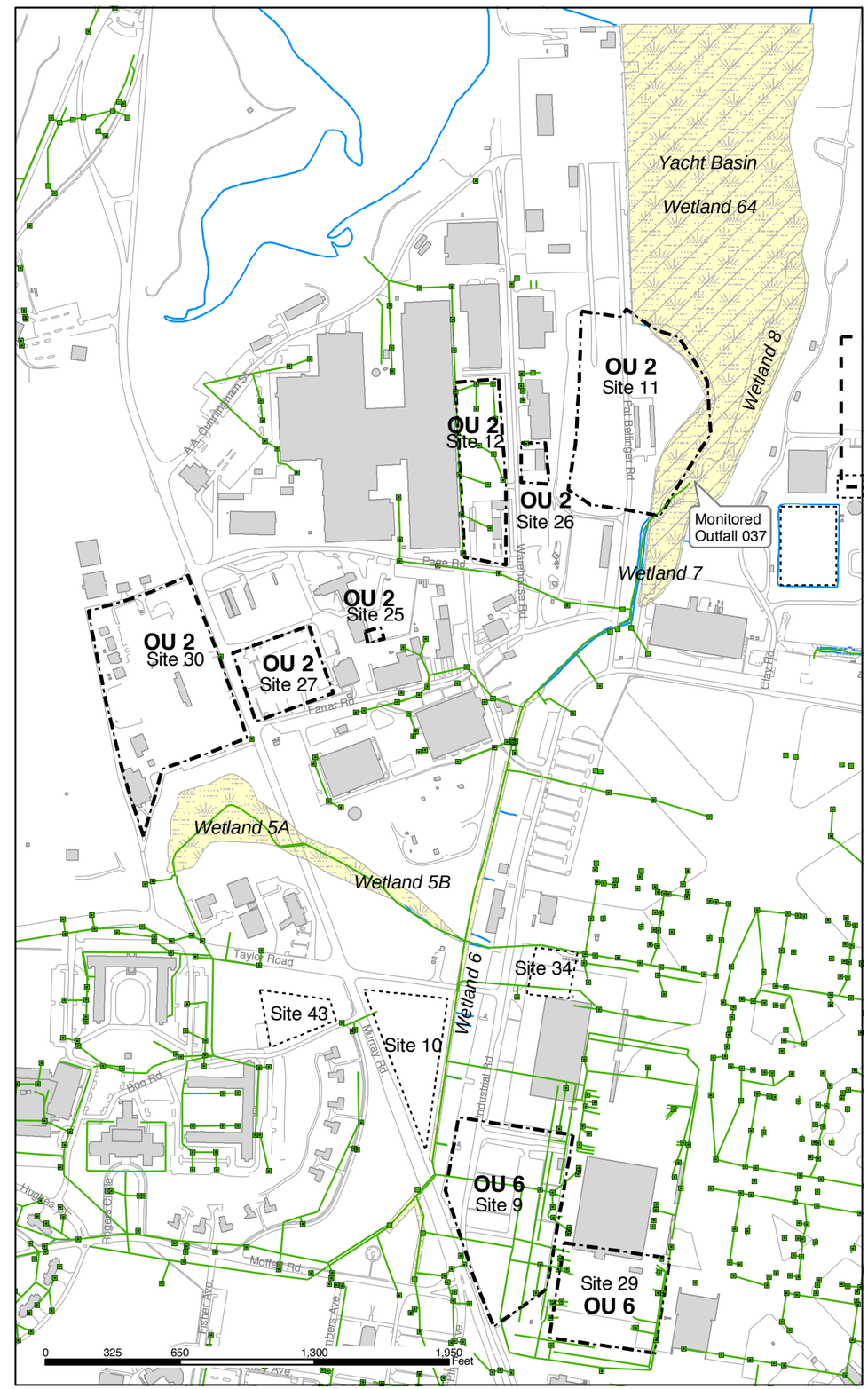
The Site 41 wetlands associated with OU 2 include Wetlands 5A, 5B, 6, and 64. Figure 11-1 shows where these wetlands are located. Wetland 5A is located south of the Building 649 complex. Wetland 5B is a drainage ditch that drains surface water from Wetland 5A to Wetland 6. Wetland 6 is a tidally influenced drainage ditch that drains surface water from the area near the

NAS Pensacola Chapel to the Yacht Basin (Wetland 64). The investigation for Wetland 64 included the Yacht Basin and Wetlands 7, 8 and 64.

This section presents the nature and extent of contamination, ecological risk assessment, fate and transport analysis, and human health risk assessment by wetland. To assist in the data evaluation, Figure 11-5 presents OU 2 Total DDT for sediment, Figure 11-6 presents the Swartz TOC normalized PAHs, and 11-7 presents the Mean ERM quotient categories. Figure 11-8 presents the chemistry and toxicity samples collected during Phases III and IV. To assess effects to selected measurement endpoints, such as the green heron, a food-chain model for all the wetlands associated with OU 2 is presented in Section 11.4.







Legend

- Operable Unit (OU)
- Site
- Wetland- Approximate
- Consolidated Wetland 64
- OU2 Wetland- Approximate
- Building
- Shoreline
- Road
- Storm water Inlet
- Storm water Headwall
- Storm water Pipe

Note: Only the wetlands associated with OU2 have labels.

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FIGURE 11-1
Operable Unit 2 Wetlands and Nearby Sites

Final Remedial Investigation Report
Site 41
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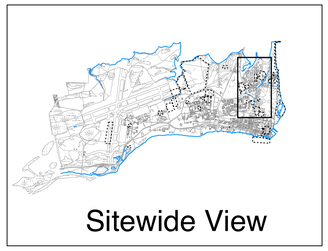

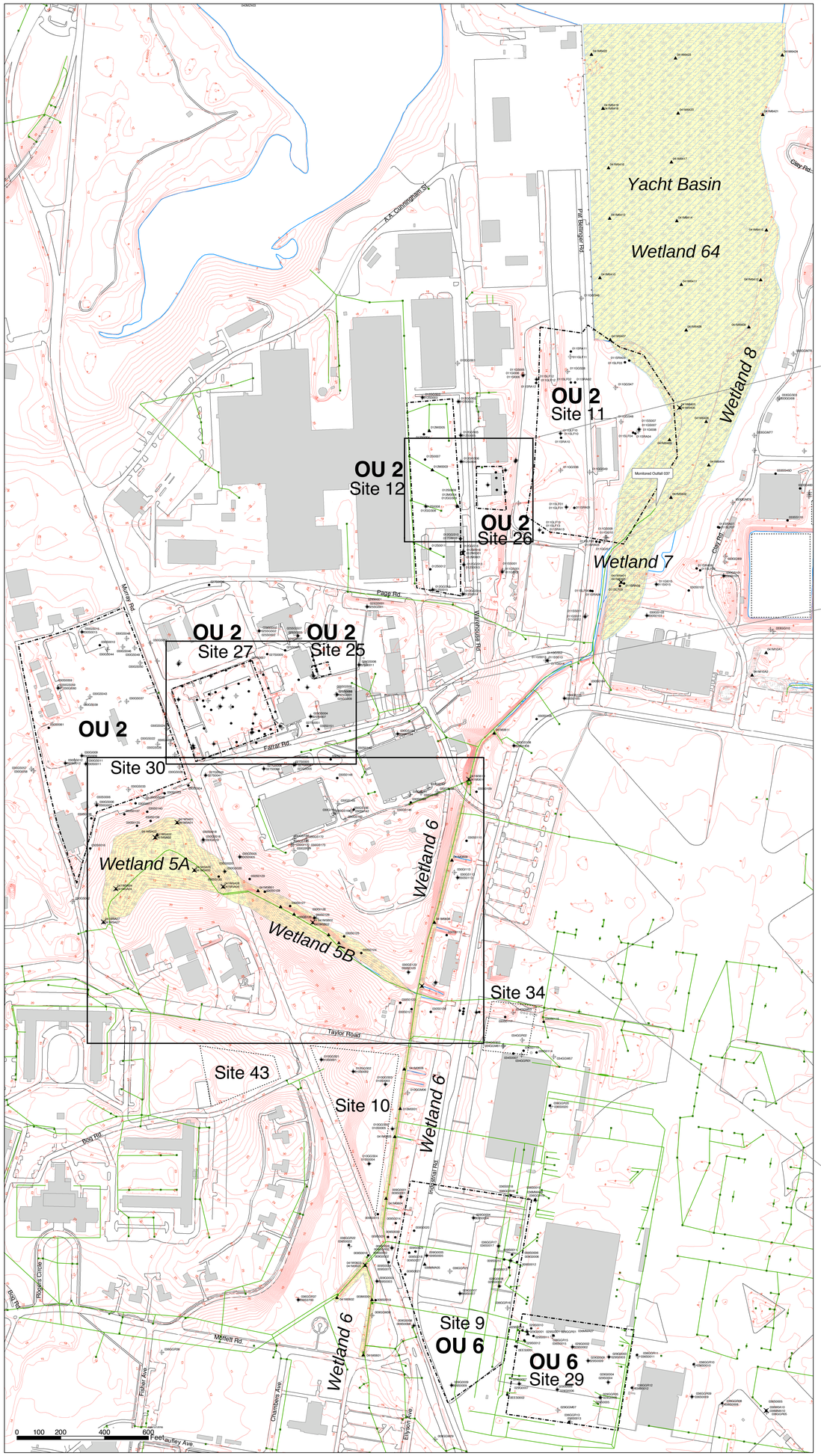

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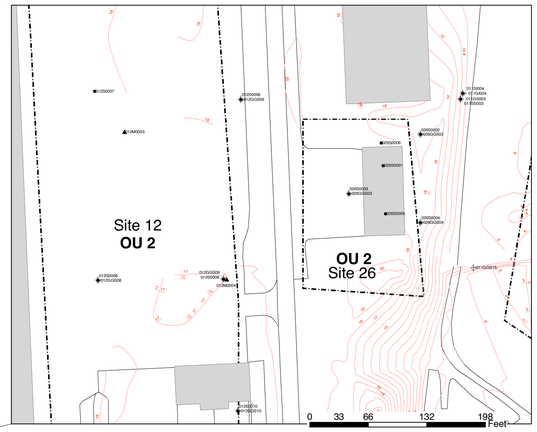

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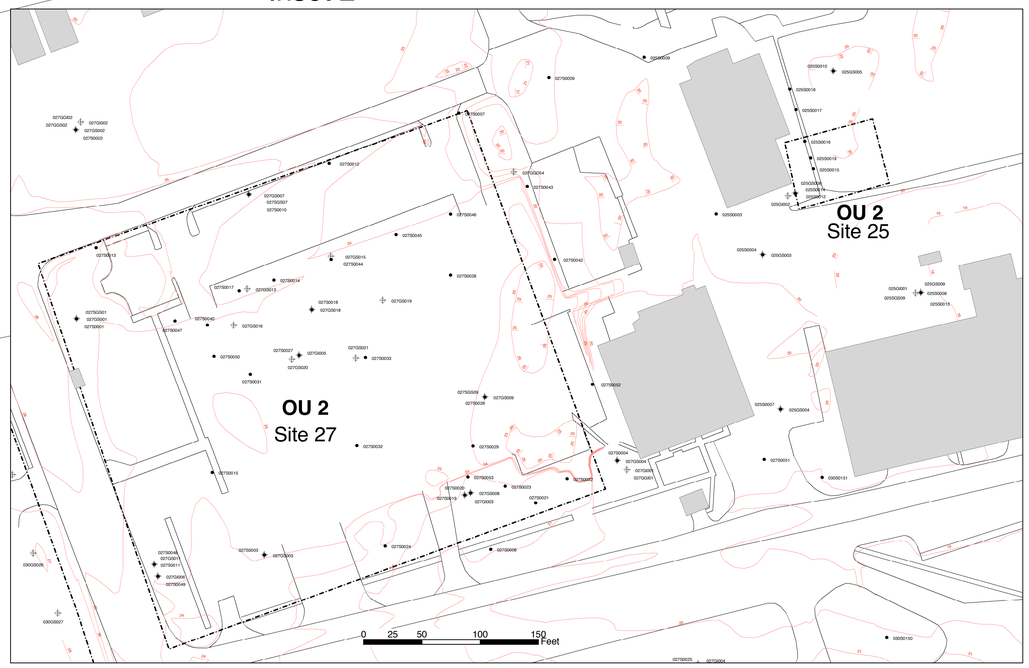

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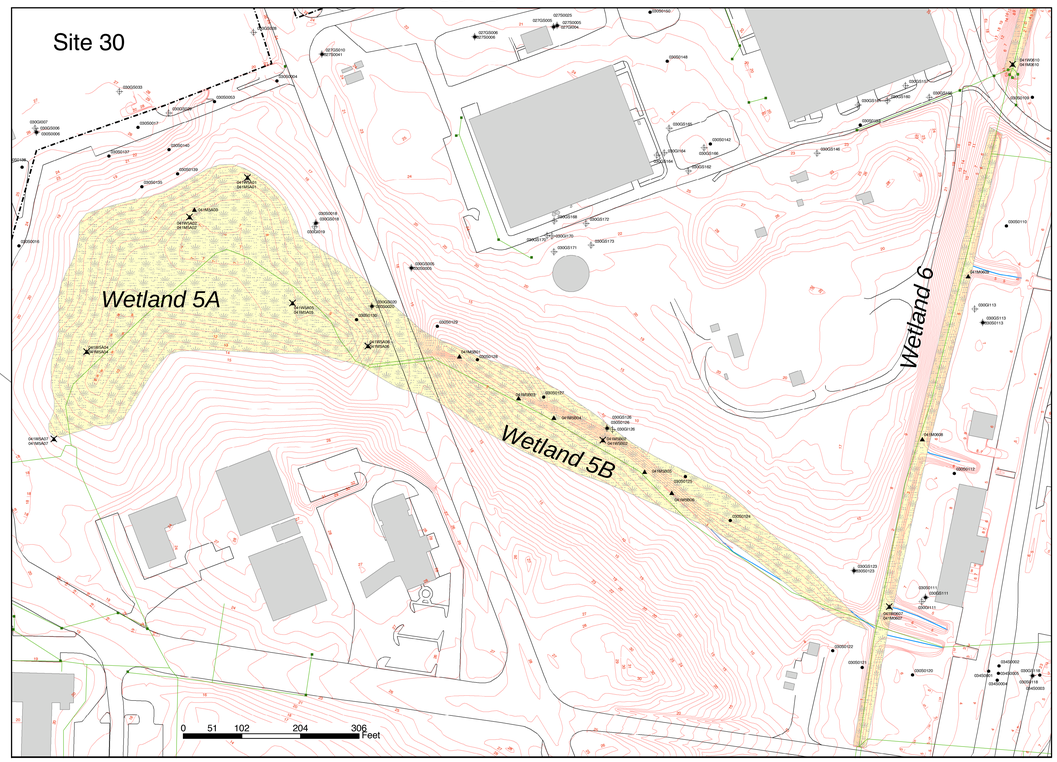

Legend

Sitewide Sample Locations

- Soil
- Site 41 RI Sediment
- Site 41 RI Surface Water
- Groundwater
- Operable Unit (OU)
- Site
- Wetland- Approximate
- Consolidated Wetland 64
- OU2 Wetland- Approximate
- Building
- Shoreline
- Road
- Topographic Contour(ft)
- Storm water Inlet
- Storm water Headwall
- Storm water Pipe

Note: Only the wetlands associated with OU2 have labels.

NAVFAC Naval Facilities Engineering Command SOUTHERN DIVISION

FIGURE 11-2
Operable Unit 2
Study Area Topography

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Site 41
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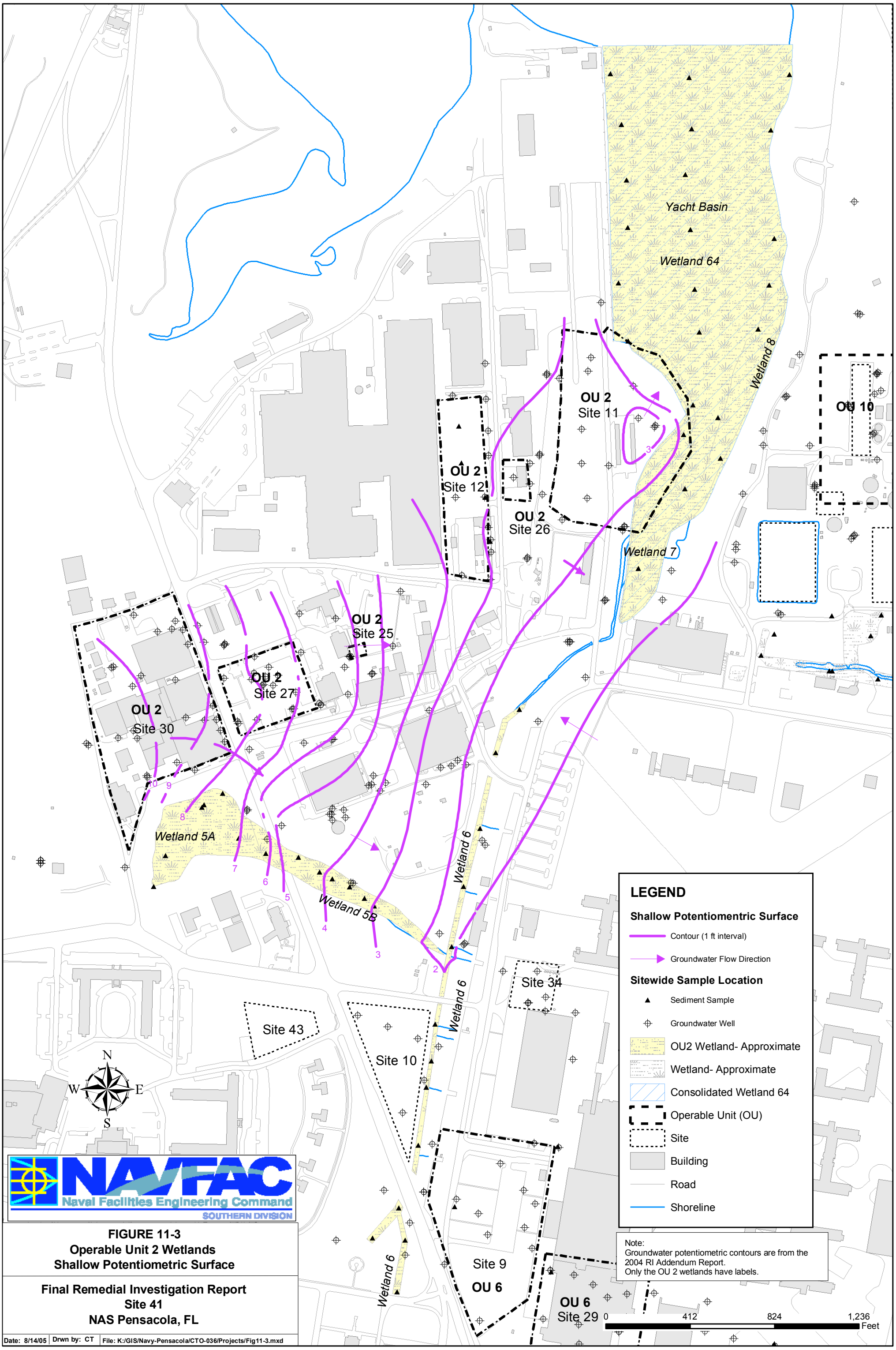

FIGURE 11-3
Operable Unit 2 Wetlands
Shallow Potentiometric Surface

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Site 41
NAS Pensacola, FL

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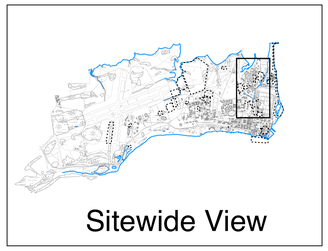

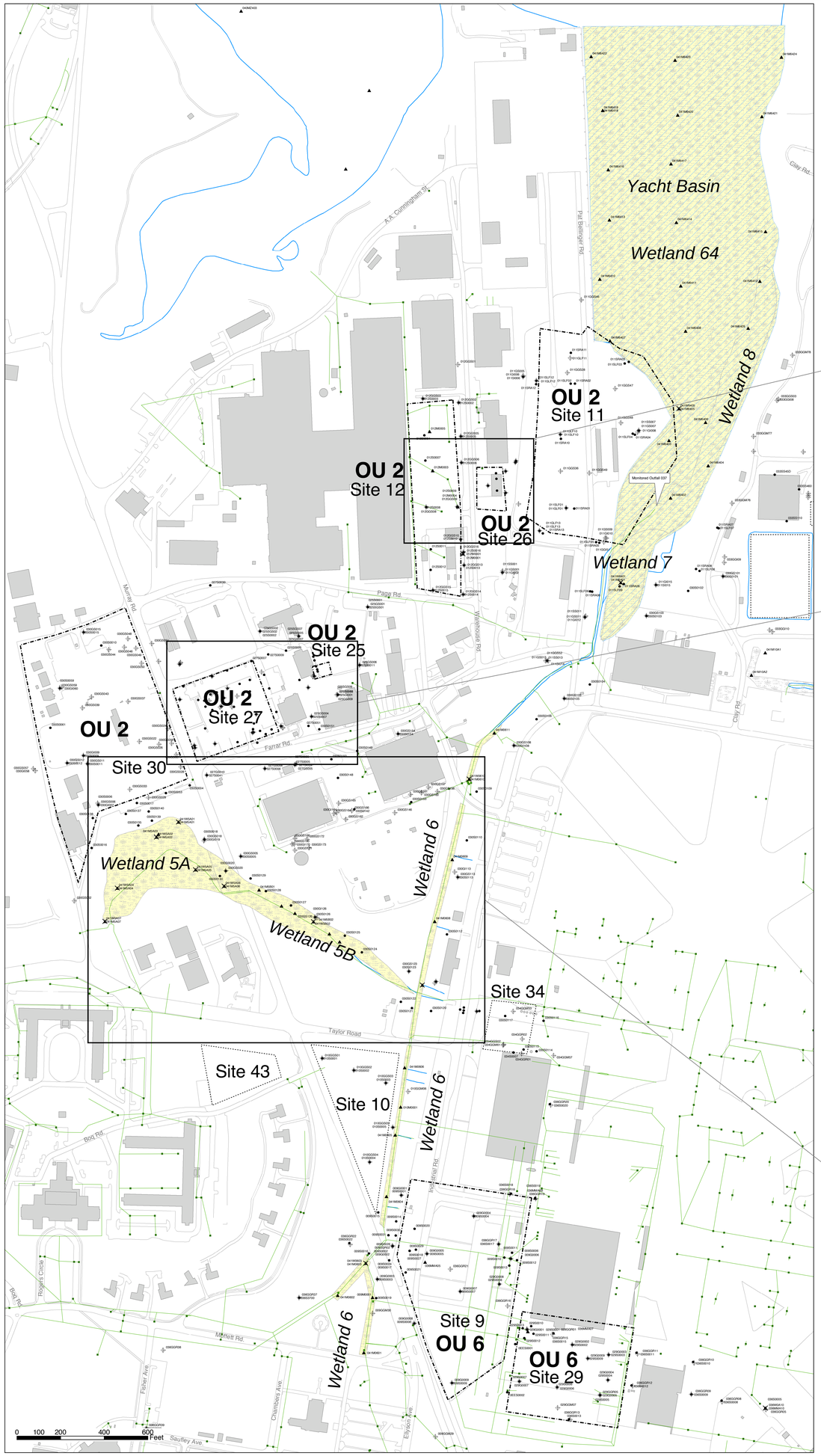

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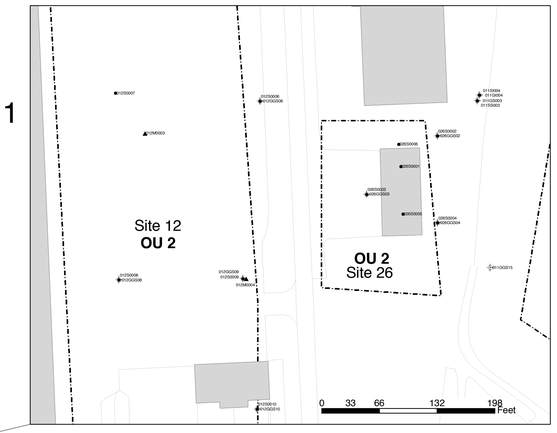

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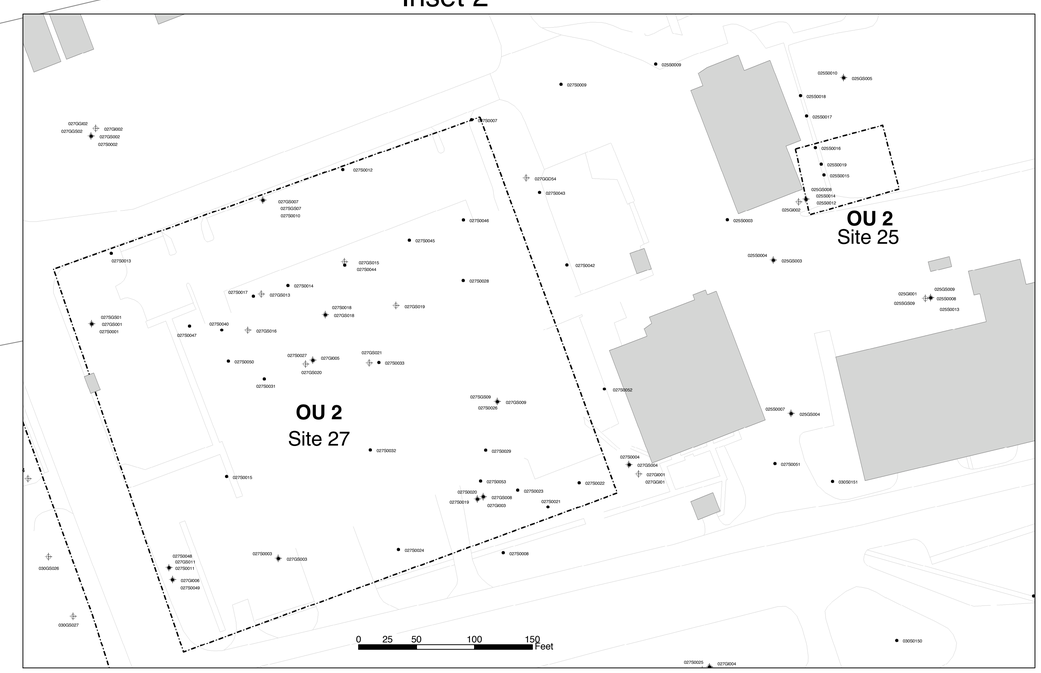

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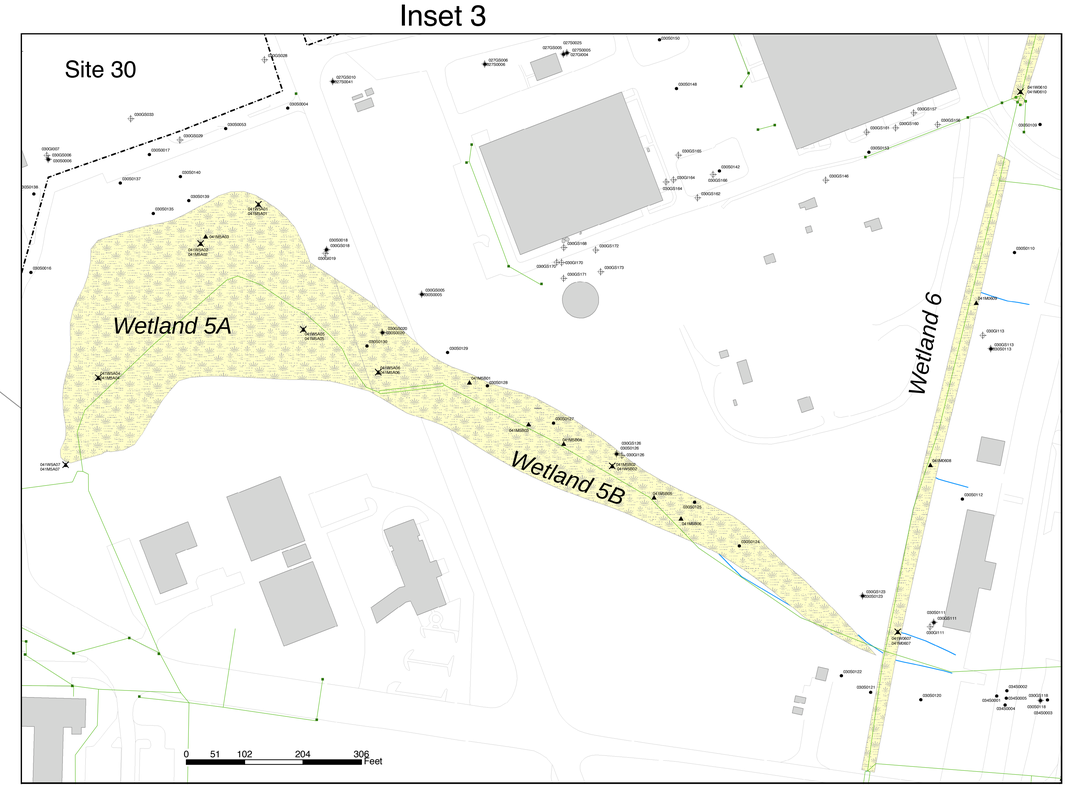

Legend

Sitewide Sample Locations

- Soil
- Site 41 RI Sediment
- Site 41 RI Surface Water
- Groundwater
- Operable Unit (OU)
- Site
- Wetland- Approximate
- Consolidated Wetland 64
- OU2 Wetland- Approximate
- Building
- Shoreline
- Road
- Storm water Inlet
- Storm water Headwall
- Storm water Pipe

Note: Only the wetlands associated with OU2 have labels.

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FIGURE 11-4
Operable Unit 2 Wetlands, Nearby Sites, and Adjacent Soil Borings and Monitoring Wells

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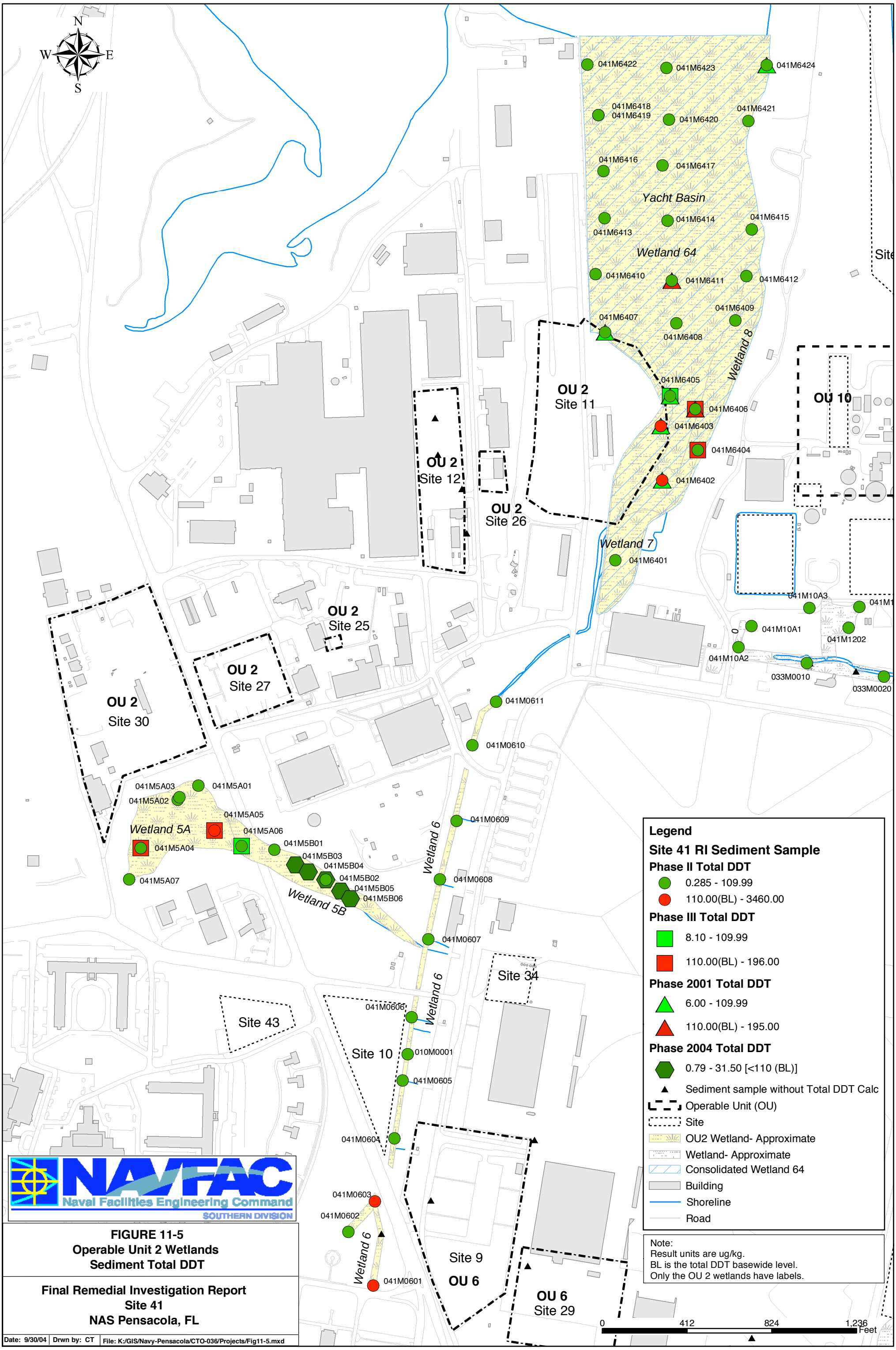

FIGURE 11-5
Operable Unit 2 Wetlands
Sediment Total DDT

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NAS Pensacola, FL

Date: 9/30/04 | Drwn by: CT | File: K:/GIS/Navy-Pensacola/CTO-036/Projects/Fig11-5.mxd

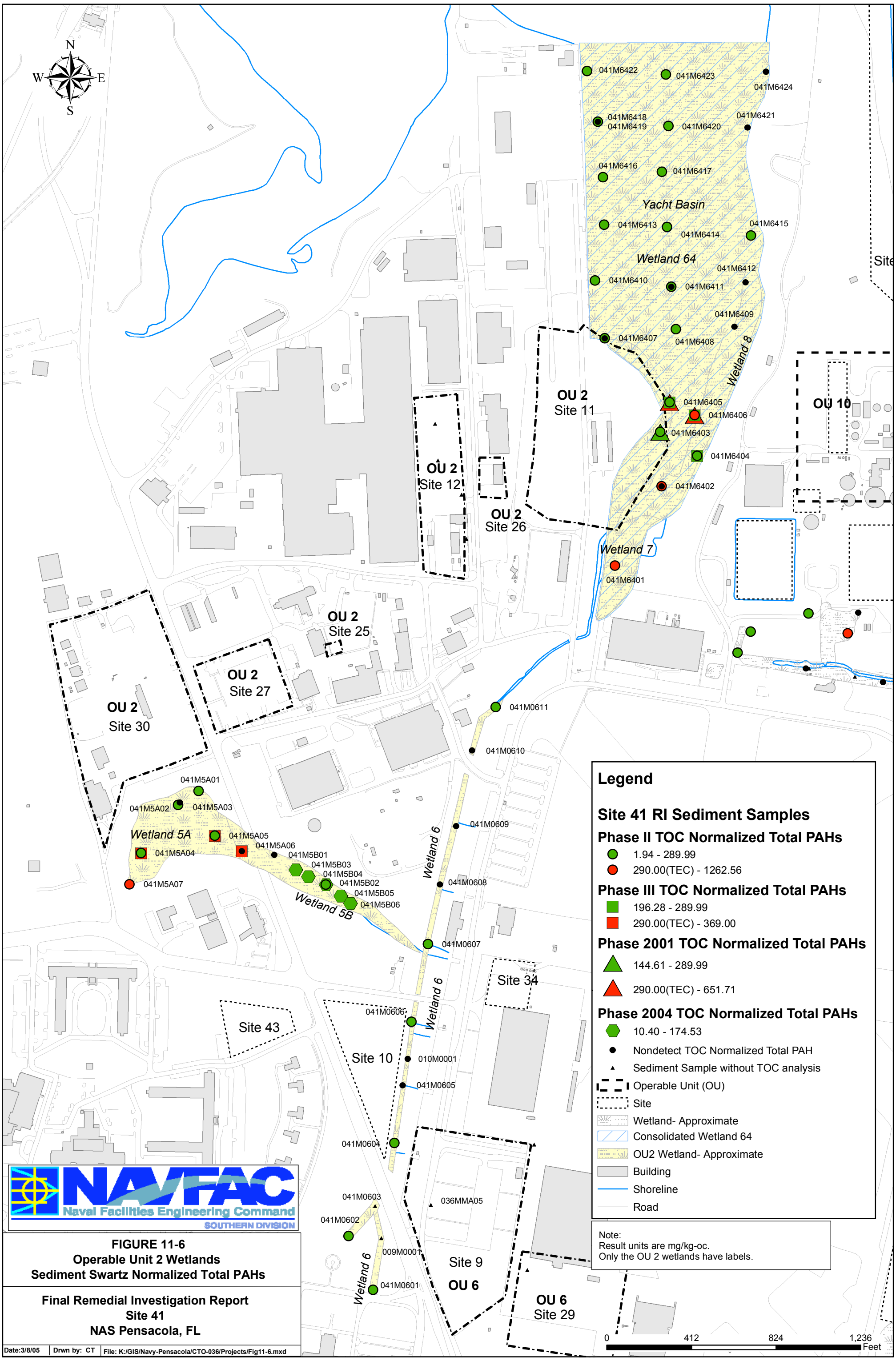

FIGURE 11-6
Operable Unit 2 Wetlands
Sediment Swartz Normalized Total PAHs

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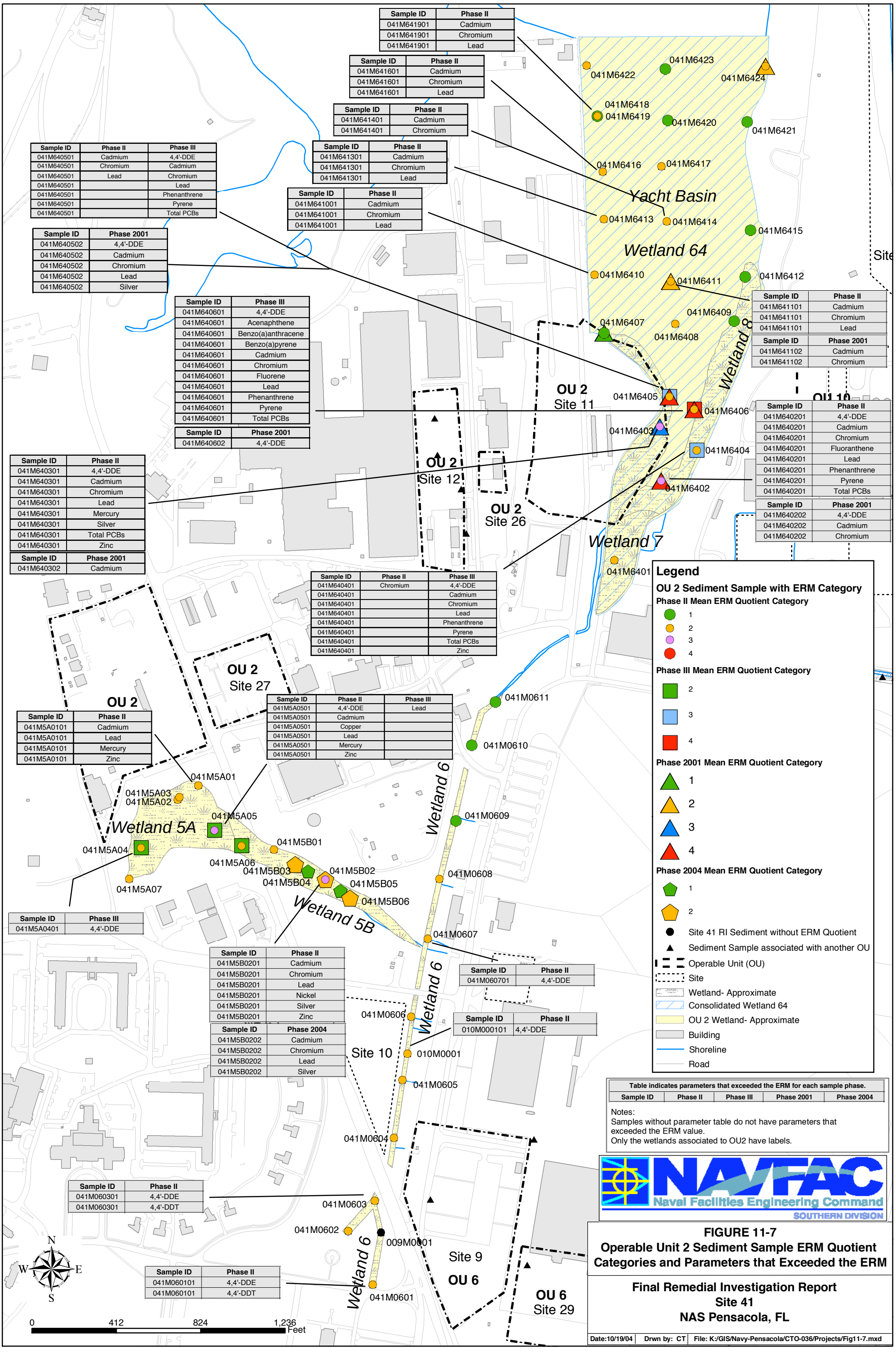
Site 41
NAS Pensacola, FL

Date:3/8/05 | Drwn by: CT | File: K:/GIS/Navy-Pensacola/CTO-036/Projects/Fig11-6.mxd



Sample ID	Phase II
041M641901	Cadmium
041M641901	Chromium
041M641901	Lead

Sample ID	Phase II
041M641601	Cadmium
041M641601	Chromium
041M641601	Lead

Sample ID	Phase II
041M641401	Cadmium
041M641401	Chromium

Sample ID	Phase II
041M641301	Cadmium
041M641301	Chromium
041M641301	Lead

Sample ID	Phase II
041M641001	Cadmium
041M641001	Chromium
041M641001	Lead

Sample ID	Phase II	Phase III
041M640501	Cadmium	4,4'-DDE
041M640501	Chromium	Cadmium
041M640501	Lead	Chromium
041M640501		Lead
041M640501		Phenanthrene
041M640501		Pyrene
041M640501		Total PCBs

Sample ID	Phase 2001
041M640502	4,4'-DDE
041M640502	Cadmium
041M640502	Chromium
041M640502	Lead
041M640502	Silver

Sample ID	Phase III
041M640601	4,4'-DDE
041M640601	Acenaphthene
041M640601	Benzo(a)anthracene
041M640601	Benzo(a)pyrene
041M640601	Cadmium
041M640601	Chromium
041M640601	Fluorene
041M640601	Lead
041M640601	Phenanthrene
041M640601	Pyrene
041M640601	Total PCBs

Sample ID	Phase 2001
041M640602	4,4'-DDE

Sample ID	Phase II
041M641101	Cadmium
041M641101	Chromium
041M641101	Lead

Sample ID	Phase 2001
041M641102	Cadmium
041M641102	Chromium

Sample ID	Phase II
041M640201	4,4'-DDE
041M640201	Cadmium
041M640201	Chromium
041M640201	Fluoranthene
041M640201	Lead
041M640201	Phenanthrene
041M640201	Pyrene
041M640201	Total PCBs

Sample ID	Phase 2001
041M640202	4,4'-DDE
041M640202	Cadmium
041M640202	Chromium

Sample ID	Phase II
041M640301	4,4'-DDE
041M640301	Cadmium
041M640301	Chromium
041M640301	Lead
041M640301	Mercury
041M640301	Silver
041M640301	Total PCBs
041M640301	Zinc

Sample ID	Phase 2001
041M640302	Cadmium

Sample ID	Phase II	Phase III
041M640401	Chromium	4,4'-DDE
041M640401		Cadmium
041M640401		Chromium
041M640401		Lead
041M640401		Phenanthrene
041M640401		Pyrene
041M640401		Total PCBs
041M640401		Zinc

Sample ID	Phase II
041M5A0101	Cadmium
041M5A0101	Lead
041M5A0101	Mercury
041M5A0101	Zinc

Sample ID	Phase II	Phase III
041M5A0501	4,4'-DDE	Lead
041M5A0501	Cadmium	
041M5A0501	Copper	
041M5A0501	Lead	
041M5A0501	Mercury	
041M5A0501	Zinc	

Sample ID	Phase III
041M5A0401	4,4'-DDE

Sample ID	Phase II
041M5B0201	Cadmium
041M5B0201	Chromium
041M5B0201	Lead
041M5B0201	Nickel
041M5B0201	Silver
041M5B0201	Zinc

Sample ID	Phase 2004
041M5B0202	Cadmium
041M5B0202	Chromium
041M5B0202	Lead
041M5B0202	Silver

Sample ID	Phase II
041M060701	4,4'-DDE

Sample ID	Phase II
010M000101	4,4'-DDE

Sample ID	Phase II
041M060301	4,4'-DDE
041M060301	4,4'-DDT

Sample ID	Phase II
041M060101	4,4'-DDE
041M060101	4,4'-DDT

Table indicates parameters that exceeded the ERM for each sample phase.				
Sample ID	Phase II	Phase III	Phase 2001	Phase 2004

Notes:
Samples without parameter table do not have parameters that exceeded the ERM value.
Only the wetlands associated to OU2 have labels.

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FIGURE 11-7
Operable Unit 2 Sediment Sample ERM Quotient Categories and Parameters that Exceeded the ERM

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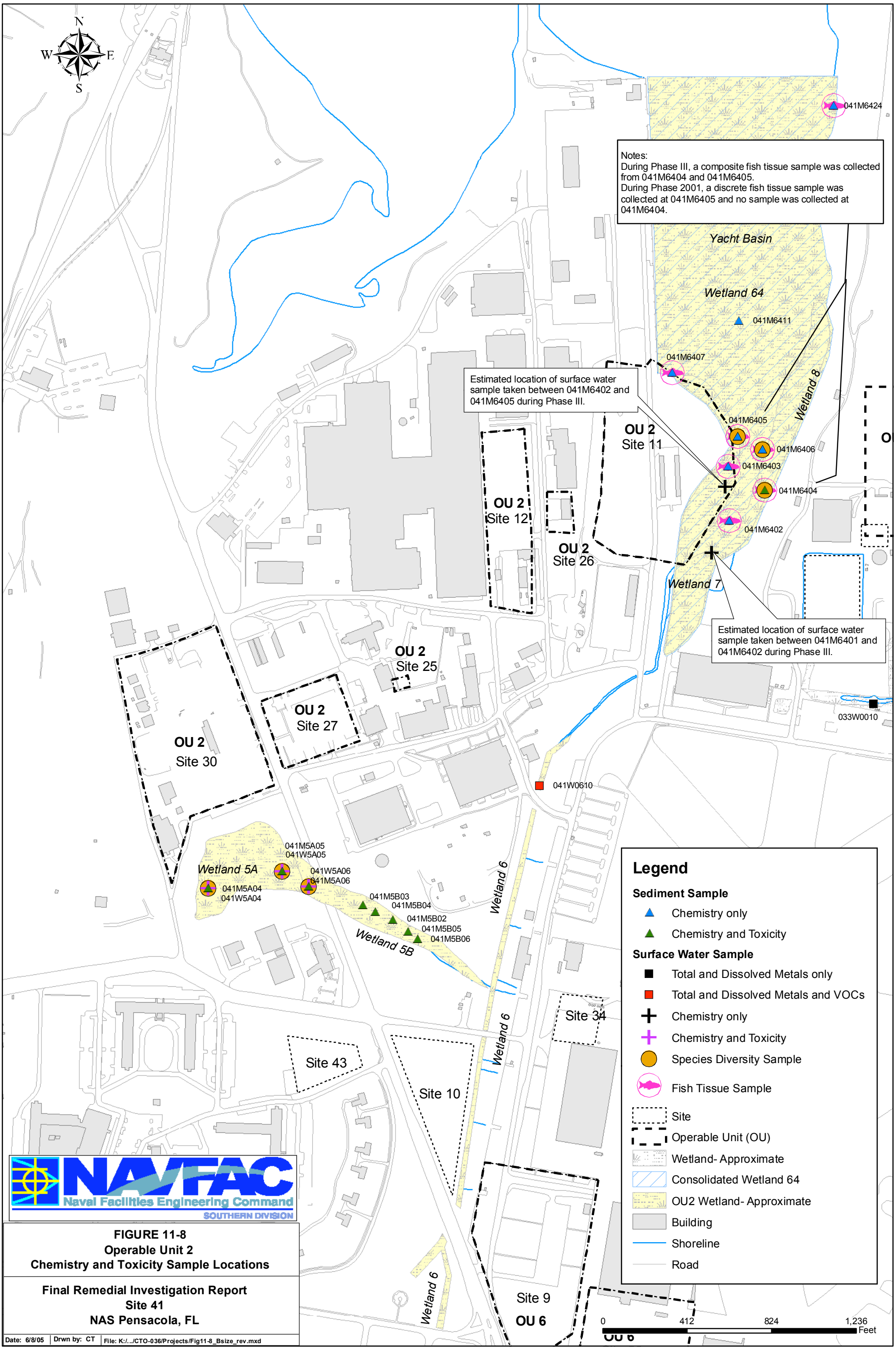

FIGURE 11-8
Operable Unit 2
Chemistry and Toxicity Sample Locations

Final Remedial Investigation Report
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NAS Pensacola, FL

Date: 6/8/05 | Drwn by: CT | File: K:/.../CTO-036/Projects/Fig11-8_Bsize_rev.mxd

11.1 Wetland 5 — Screening Level Problem Formulation

11.1.1 Site Description and Habitats Present at Wetland 5

Wetland 5, a wooded area within the developed portion of NAS Pensacola, is flanked to the west by the A.C. Read Golf Course, to the north by the former NADEP Dynamic Components Division (Building 649 Complex) and other buildings formerly used by NADEP, and to the south by Taylor Road (Figure 11-1). Parsons and Pruitt (USEPA, 1991a) divided this wetland into two parts, 5A and 5B. They described Wetland 5A as a palustrine forested system, and Wetland 5B is described as a palustrine emergent system.

Wetland 5A (roughly 1.3 acres in size) is connected to Wetland 5B (1.2 acres) by a culvert, which runs under Murray Road (Figure 11-1). Wetland 5A is bordered by Murray Road to the east, the golf course to the west, and buildings to the north and south. A 200-300 foot vegetative buffer surrounding this area likely offers habitat to various species. The open water portion of the wetland ranges from zero to three feet in depth and varies from 80-150 feet in width. Sediments in Wetland 5A ranged from brown poorly graded sand with little organics and a TOC of 0.642% (041M5A0601) to a dark brown silty fine sand with organics and a TOC of 40.9% (041M5A0401). Sediments in Wetland 5B ranged from light brown poorly graded medium sand with TOC of 0.18% (41M5B0101) to dark brown silty sand with organics with TOC of 7.45% (041M5B0201).

Photograph 1 Wetland 5 — Facing West to Wetland 5A

Photograph 2 Wetland 5B — Looking towards Wetland 5A. Groundwater monitoring wells 30GI126 and 30GS126 visible in foreground.

Photograph 3 Looking towards Wetland 6 from Wetland 5B. Photo includes all locations (5B03, 5B04, 5B02, 5B05, and 5B06).

Little history is available concerning the origins of Wetland 5A, which is several decades old and likely began as a man made feature (a borrow pit). It served as a drainage pathway as early as the 1930s and reportedly contained a saw mill during the 1940s. A 1939 map of the base labeled Wetland 5 as an "open ditch." In recent years, beaver dams constructed at the downstream end of Wetland 5A raised the water level in the basin containing this wetland, facilitating sedimentation and the emergence of a marsh. After a faulty valve in a nearby potable water storage tank was repaired in 1994, the water level in Wetland 5A has receded. Previously, several thousand gallons of potable water per day accidentally discharged from this tank into Wetland 5A via an overflow pipeline. Wetland 5A continues

to serve as a storm water conduit. NAS Pensacola Storm Drainage Map 1276912 shows three outfalls in Wetland 5A. Outfall T discharges storm water from the Bachelor Officers' Quarters area to the south. Outfall V and an unnamed outfall discharge storm water from the former Building 649 Complex. Wetland 5A drains via Wetland 5B into Wetland 6, which empties into the NAS Pensacola Yacht Basin (Wetland 64). Typical vegetation found in Wetland 5A consists of hardwoods, such as oaks and sweet bay magnolias.

Wetland 5B resembles and functions as a drainage ditch. It receives storm water from Wetland 5A and drains eastward into Wetland 6. NAS Pensacola Storm Drainage Map 1276912 shows one outfall in Wetland 5B, which discharges storm water from the Building 3220 area. Vegetation in Wetland 5B includes cattails *(Typha latifolia)* and other emergent plants.

IR sites potentially affecting Wetland 5 include Sites 30 and 36. Buildings 649 and 755 (Site 30) are north and upgradient of Wetland 5, and are separated by a service road, driveway and a parking lot. Building 649 was used from the 1940s to the 1950s as a tin-cadmium plating operation. Fifteen above-ground tanks near Building 649, ranging from 200 to 500 gallons, contained solutions of tin, cadmium, and cyanide. Additionally, a 250-gallon tank stored 1,1,1-trichloroethylene (TCE). The contents of these tanks reportedly were dumped monthly into a "ditch" east of the building. Based on current topography and historical data, this "ditch" was either the wetland itself, or the wetland was directly fed by the ditch. During the 1960s and 1970s, the 15 tanks stored phosphoric acid, caustics, potassium permanganate, degreasers, and chromate solutions, which were also periodically drained into the "ditch". According to historical data, the concentrated cyanide solutions were placed into a tank truck, transported to the Building 709 plating shop, and disposed of in the sanitary sewer. Plating operations in Building 649 ceased in the 1970s.

Building 755 also operated as a plating shop during the 1960s and 1970s. It had approximately 50 above-ground tanks ranging from 50 to 200 gallons in volume and containing plating solutions of nickel, silver, lead, tin, chromium, and other metals. These tanks were also reportedly periodically drained into the "ditch" east of Building 649. Building 755 plating operations ceased in the 1970s (EnSafe, 1997b).

Photograph 4 Removal of Waste Receiving Structure

Site 36 (Industrial Wastewater Treatment Plant Sewer Line) was investigated in conjunction with sites for OU 2. The wastewater treatment plant, originally built in 1948, was replaced in 1971 with a modern plant that could accept industrial wastes. Most facilities discharging to the sewer did so without any pretreatment or waste segregation. The waste stream has included paint strippers, heavy metals, pesticides, radioactive wastes, fuels, cyanide waste, and waste oil (NEESA, 1983). Beginning in 1973, the Naval Air Rework Facility operations discharged to the sewer instead of to Pensacola Bay. The IWTP sewer line consisted of vitreous clay and cast-iron piping installed both before and after 1971. OU 2 investigated portions of the IWTP sewer line from the Building 649 complex to the wastewater treatment plant.

11.1.2 Wetland 5 — Sample Location Description

11.1.2.1 Wetland 5A

Phase II Sediment Sample Location Description

Seven sediment samples were collected and analyzed from Wetland 5A. Sample locations for Wetland 5A were located in areas where groundwater seeps could occur and depositional areas. Sample locations 041M5A0101, 041M5A0201, and 041M5A0301 are located near the northernmost part of the wetland, closest to Building 649 and near Murray Road. Sample locations 041M5A0401 and

041M5A0701 are located on the west side of the wetland, whereas sample locations 041M5A0501 and 041M5A0601 are located on the eastern side of Wetland 5A, closest to the culvert diverting water under Murray Road into Wetland 5B (Figure 11-4). Table 11-1-1 (tables are located at the end of each section) provides a physical description of the sediments collected at Wetland 5A. Sediments at Wetland 5A were mostly composed of fine-grained sand to silt and clay. TOC concentrations ranged from 0.642% to 40.9%.

Phase II Surface Water Sample Location Description

Six surface water samples were collected at Wetland 5A, locations 041W5A0101 through 041W5A0701 (Figure 11-4), which were co-located with sediment locations. The surface water samples were taken during the 1995 Site 41 investigation. Several surface water samples from Wetland 5A were analyzed for physical parameters (Table 11-1-2). Of the six samples analyzed, five were found to be slightly acidic. Surface water sample 041W5A0601 was analyzed for hardness, but not for pH, specific conductivity, or turbidity.

Phase III Sediment Sample Location Description

Three sediment samples were collected at Wetland 5A during the Phase III investigation (Figure 11-4). Table 11-1-3 provides a physical description of the sediment samples collected. Sediments collected during the Wetland 5A Phase III sampling effort were mostly composed of fine-grained sand to very fine-grained silt and clay. Wetland 5A varies from 80-150 feet in width and up to 3 feet deep in places, with TOC concentrations ranging from 0.7% to 1.0%.

Phase III Surface Water Sample Location Description

As shown on Figure 11-4, three surface water samples were collected during the Phase III portion of the investigation.

11.1.2.2 Wetland 5B

Phase II Sediment Sample Location Description

Wetland 5B acts as a storm water ditch draining Wetland 5A via a culvert. Two sediment samples were collected and analyzed for the Wetland 5B ERA. Sample locations for Wetland 5B were located downstream from the culvert that passes under Murray Road. Sample location 041M5B0101 is approximately 100 feet from the culvert, and sample location 041M5B0201 is located 325 feet downstream of 041M5B0101 (Figure 11-4). Table 11-1-4 provides a physical description of the sediments collected at Wetland 5B. Sediments at Wetland 5B were mostly composed of fine-grained sand to very fine-grained silt and clay. Wetland 5B TOC concentrations ranged from 0.18% to 7.45%.

Phase II Surface Water Sample Location Description

One surface water sample was collected at Wetland 5B for this ERA process. Sample 041W5B0201 was collected in 1995. The surface water sample was co-located with sediment samples as shown in Figure 11-4. No physical description, other than hardness, of the Phase II surface water samples were collected at Wetland 5B. Hardness was measured at 52.3 mg/L at sampling location 041W5B0201.

Phase IV Sediment Sample Location Description

Five sediment samples were collected during the Phase IV/2004 sampling effort at Wetland 5B (Figure 11-4). A physical description of Wetland 5B sediments was not conducted during this sampling effort. However, TOC analysis was performed, and concentrations ranged from 0.35% to 1.5%.

11.1.3 Nature and Extent of Contamination

11.1.3.1 Wetland 5A

Phase II Sediment

Figure 11-4 presents the Phase II sediment sampling locations for Wetland 5A. Table 11-1-5 summarizes the analytical results of the seven Phase II sediment samples.

Metals — Twenty-three metals were detected during Phase II sediment sampling at Wetland 5A. The greatest number of metals detections and reference value exceedances during Phase II sampling at Wetland 5A were from sample location 041M5A0101. This sample is in the northeast section of the wetland area. Concentrations of 12 analytes exceeded freshwater reference values at this location. Location 041M5A0501, within the center of the wetland, exhibited 21 detections, with 11 of these parameters exceeding freshwater reference values. Parameters with detections exceeding freshwater reference values were aluminum, antimony, barium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, and zinc. All locations exhibited concentrations of zinc above its reference value.

Pesticides and PCBs — Eleven pesticide compounds and the PCBs aroclor-1254 and aroclor-1260 were detected during Phase II sediment sampling at Wetland 5A. Total DDT was calculated for each location by adding the concentrations of 4,4′-DDD, 4,4′-DDE and 4,4′-DDT, and were compared with the basewide total DDT concentrations. The greatest number of pesticides detected in Wetland 5A sediments during Phase II sampling was near the center of the wetland at location 041M5A0501, with seven detections. The reference values were exceeded at this location for 4,4′-DDE and total DDT. All other locations exhibited detections; however, these detections were significantly less. Aroclor-1254 was detected at 041M5A0601, and aroclor-1260 was detected at 041M5A0101, 041M5A0501, and 041M5A0701, in various areas of the wetland.

SVOCs — Nineteen SVOCs (including PAHs) were detected in sediment samples collected during Phase II sampling at Wetland 5A. Six of the seven sample locations exhibited detections of SVOCs, with the majority of detections and highest concentrations at location 041M5A0501. Location 041M5A0501 had the greatest number of SVOC detections, with 15 compounds detected. The detections of SVOCs in Wetland 5A were similar to the other analytes, with the greatest number of detections being from locations 041M5A0501, 041M5A0701, and 041M5A0101.

VOCs — Three VOCs, (acetone, methylene chloride, and toluene) were detected in sediments collected from Wetland 5A during Phase II sampling. The highest concentrations were at locations 041M5A0101, 041M5A0201, and 041M5A0301, within the northern area of the wetland. Locations 041M5A0401 and 041M5A0601 also exhibited detections.

Phase III Sediment

Based on the results of the Phase II sampling, Phase III was initiated to confirm elevated detections at sediment locations 041M5A0401, 041M5A0501, and 041M5A0601 in Wetland 5A. Table 11-1-6 summarizes the analytical results of the Phase III sediment sampling.

Metals — Twenty-two metals were detected in sediments collected during Phase III. Thallium was not detected in this event. The Phase III sample results were in close agreement with the Phase II results confirming the common problematic location 041M5A0501. Maximum detections exceeded reference values for antimony, barium, cadmium, chromium, copper, lead, and zinc. As during the Phase II sampling, all three locations exhibited concentrations of zinc above the freshwater reference value.

Pesticides and PCBs — In Phase II, the majority of detections and highest detections were exhibited at location 041M5A0501. In Phase III sampling, this location had no parameters above detection limits. Ten pesticides were detected during the Phase III sampling efforts. Locations 041M5A0401 and 041M5A0601 exhibited eight and six detections, respectively. Location 041M5A0401 exhibited the highest detections for 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT, all exceeding basewide concentrations. Total DDT also exceeded its reference value at this location. PCBs were not detected during Phase III sediment sampling.

SVOCs — During Phase III sampling, 12 SVOCs were detected as compared to 19 during Phase II. Locations 041M5A0401 and 041M5A0501 each had 10 SVOCs detected. During Phase II, location 041M5A0401 had four SVOCs detected, and they were present at low concentrations. SVOCs were confirmed at location 041M5A0501.

VOCs — No VOCs were detected during Phase III sampling.

Comparison of Phase II vs. Phase III Sediment Sampling Results

Between Phase II and Phase III sediment sampling events, an overall decrease in detections and number of exceedances occurred. Metals decreased from 23 detections and 11 exceedances in the seven Phase II samples to seven exceedances in the three Phase III samples. Location 041M5A0501 seems to be a problematic location, with the most detections and exceedances for all groups of analytes. However, in Phase II, this location exhibited seven detections of pesticides, with 4,4'-DDE and total DDT exceeding reference values; yet, in Phase III, this location had no detections. For SVOCs, 19 detections were exhibited with the greatest number being at location 041M5A0501 for Phase II. Phase III sampling confirmed detections at this location, but concentrations and number of compounds detected were lower. Limited VOCs were detected in Phase II. In Phase III, no VOCs were detected.

Phase II Surface Water

Figure 11-4 presents the Phase II surface sampling locations for Wetland 5A. Table 11-1-7 summarizes the analytical results of the seven Phase II surface water samples.

Metals — Seventeen metals were detected in Phase II surface water samples collected from Wetland 5A. All locations exhibited detections, with the highest number of detections at location 041W5A0501. Location 041W5A0501 had 13 detections, seven exceeding their reference concentrations. All other sampling locations exhibited five detections exceeding reference concentrations, with the exception of 041W5A0401 which had four.

Pesticides and PCBs — Only one pesticide, endosulfan I, was detected during Phase II surface water sampling at Wetland 5A. Endosulfan I was detected at 041W5A0101.

SVOCs — One SVOC, BEHP, was detected during Phase II sampling. BEHP was detected at all locations, except for locations 041W5A0201 and 041W5A0701.

VOCs — VOCs were detected at two sampling locations, 041W5A0101 and 041W5A0601. Location 041W5A0101 exhibited a detection for 1,1-dichloroethane. Location 041W5A0601 exhibited detections for acetone, bromodichloromethane, chloroform, cis-1,2-dichloroethene, and dibromochloromethane.

Phase III Surface Water

Phase III of the surface water sampling at Wetland 5A was implemented to confirm the previous Phase II results at locations 041W5A0401, 041W5A0501, and 041W5A0601. Table 11-1-8 summarizes the Phase III surface water sample results.

Metals — Seventeen metals were detected in the Phase III surface water sample. In general, the concentrations were comparable to those observed during Phase II, except for increases in the number of detections at all three locations. The problematic analytes were antimony, barium, calcium, chromium, cobalt, copper, iron, lead, manganese, and zinc.

Pesticides and PCBs — No pesticides or PCBs were detected during Phase III sampling efforts.

SVOCs — No SVOCs were detected in the Phase III surface water sampling at Wetland 5A.

VOCs — 1,2-Dichloroethene (total), acetone, and toluene were detected in the Phase III surface water samples. Toluene was not reported during Phase II sampling. 1,2-Dichloroethene (total) and acetone, common to location 041W5A0601 during the Phase II sampling, were detected at a relatively low concentrations; however, the acetone concentration increased from Phase II to Phase III. During Phase II investigation, 1,2-dichloroethene (total) was reported as cis-1,2-dichloroethene.

11.1.3.2 Wetland 5B

Phase II Sediment

Figure 11-4 presents the Phase II sediment sampling locations for Wetland 5B. Table 11-1-9 summarizes the analytical results of the Phase II sediment sample event.

Metals — Twenty-one metals were detected during Phase II sediment sampling at Wetland 5B. Location 041M5B0201 exhibited detections of 21 metals, nine exceeding the freshwater reference values. This sample is in the eastern section of the wetland. Location 041M5B0101 had 12 metals detected; however, none exceeded the reference values. Parameters with detections exceeding freshwater reference values were barium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc. Location 041M5B0201 exhibited greater metals diversity and higher concentrations than other locations.

Pesticides and PCBs — Six pesticide compounds and one PCB, aroclor-1254, were detected during Phase II sediment sampling at Wetland 5B. Total DDT was calculated for each location by adding the

concentrations of 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT. Likewise, a basewide total DDT reference concentration was calculated using the basewide concentrations for these same constituents.

The greatest number of pesticides detected in Wetland 5B sediments during Phase II sampling was at location 041M5B0201 with six detections. Location 041M5B0101 exhibited four detections. The reference values were not exceeded at either location for 4,4′-DDT constituents or total DDTs.

SVOCs — Six SVOCs (including PAHs) were detected in sediment samples collected during Phase II sampling at Wetland 5B. All sample locations exhibited detections of SVOCs, with the majority of detections and highest concentrations at location 041M5B0201.

VOCs — Five VOCs were detected in sediments collected from Wetland 5B during Phase II sampling: 1,2-dichloroethene (total), acetone, chlorobenzene, toluene, and vinyl chloride. Location 041M5B0201 exhibited the greatest number of VOC detections and highest concentrations in the wetland.

Phase IV Sediment

Five sediment samples were collected as part of the Phase IV sampling event. Table 11-1-10 summarizes the Phase IV/2004 sediment sample results.

Metals — Twenty-one metals were detected in the Phase IV sediment samples. Location 041M5B0202 had the greatest diversity and concentrations of metals. The analytes exhibiting concentrations above the freshwater reference values were barium, cadmium, chromium, cobalt, copper, lead, nickel, silver, and zinc.

Pesticides and PCBs — Three pesticides and one PCB, aroclor-1260, were detected during Phase IV sampling efforts. Of these detections, none exceeded reference values for 4,4′-DDE or total DDT. Aroclor-1260 was present in four of the five sample locations.

SVOCs — Seven SVOCs were detected during Phase IV sediment sampling at Wetland 5B. All five sampling locations exhibited detections, with locations 041M5B0202, 041M5B0301, and 041M5B0601 having the majority and highest of detections.

VOCs — Four VOCs, (acetone, cis-1,2-dichloroethene, toluene, and vinyl chloride) were detected in the Phase IV sediment samples. These detected constituents are similar to the Phase II sampling event.

Phase II Surface Water

Figure 11-4 presents the Phase II surface water sampling location for Wetland 5B. Table 11-1-11 summarizes the analytical results of the single Phase II surface water sample.

Metals — Sixteen metals were detected in the Phase II surface water sample taken from Wetland 5B. Of these 16 metals, 13 exceeded the freshwater reference values: aluminum, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, vanadium, and zinc.

Pesticides and PCBs — No pesticides and PCBs were detected during Phase II surface water sampling at Wetland 5B.

SVOCs — Five SVOCs were detected at low concentrations during Phase II sampling: 2-chlorophenol, 4-chloro-3-methylphenol, bis(2-ethylhexyl)phthalate, n-nitroso-di-n-propylamine, and pyrene.

VOCs — Four VOCs were detected during Phase II sampling: 1,1-dichloroethane, acetone, trichloroethene, and vinyl chloride.

11.1.4 Ecological Risk Assessment

11.1.4.1 Wetland 5A — Phase II Investigation Summary

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-1-12, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 11-1-13.

Baseline Problem Formulation — Wetland 5A Sediment COPC Refinement

During the COPC refinement, additional information was used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. This risk assessment presents a statement of potential risk for each of the COPCs.

The COPC refinement process included:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to basewide (reference) concentrations for total DDT
- Comparison of inorganic constituents to reference wetland values
- Interpretive tool for metals

- Di Toro EqP SQGs for VOCs
- Comparison to Swartz consensus values
- Mean ERM quotients
- Description of exceedances of RVs and their extent

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 11-1-14. A list of COPCs retained after refinement are presented in Table 11-1-15. Additionally, the tables compare: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 5A concentrations to reference concentrations.

At Wetland 5A, total DDT was above the basewide level at one of nine sample locations (Figure 11-5). Total DDT is retained for this wetland and will be further evaluated in the OU-wide food-chain models. For Wetland 5A, aluminum, barium, cadmium, calcium, chromium, cobalt, copper, lead, manganese, mercury, nickel, and zinc exceeded their Site 41 freshwater sediment reference concentrations. However, barium concentrations did not appear enriched, when normalized to aluminum and iron concentrations using FDEP's interpretative tool (Appendix L). In addition, chromium and nickel concentrations were below RVs.

Several organic compounds were detected and retained through the ERA process. Endosulfan II and total BHC were retained. Seven SVOCs were retained due to lack of screening criteria: 4-methylphenol(p-cresol), benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-chloroethoxy)methane, carbazole, and indeno(1,2,3-cd)pyrene. Three VOCs were retained as well (acetone, methylene chloride, and toluene). When normalized to detected TOC concentrations, both VOCs and PAHs do not appear to be risk drivers for Wetland 5A (Figure 11-6).

Table 11-1-16 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Based on this approach, six sample locations (041M5A01, 041M5A02, 041M5A03, 041M5A04, 041M5A06, and 041M5A07) were determined to be Category 2, which according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this Category also has the highest level of uncertainty. Sampling location 041M5A05 was determined to be Category 3, which is the category that includes the studies where about 50% of samples were found to be toxic and average survival was about 60-70%. Figure 11-7 shows the Mean ERM category for each sediment sample location at Wetland 5A.

The inorganic constituents with SV HQs greater than 10 all had widespread exceedances of the screening values, and all had their maximum concentration at location 041M5A0101. This indicates the source for these elevated inorganic detections may be in the general area of this sample location. Alternately, most of the organics detected with SV HQs greater than 10 were generally less widespread and had their maximum concentrations at location 041M5A0501.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-1-17, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 11-1-18.

Baseline Problem Formulation — Wetland 5A Surface Water COPC Refinement

During the surface water COPC refinement, additional information was used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs.

The COPC refinement process included:

- Comparison of maximum SV concentrations to average SV concentrations
- Comparison of inorganic constituents to reference wetland values
- Description of surface water exceedances and their extent

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 11-1-19. COPCs retained after refinement are presented in Table 11-1-20. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland.

For Wetland 5A, barium, cadmium, calcium, chromium, copper, lead, manganese, vanadium, and zinc exceeded their Site 41 freshwater reference surface water concentrations (Table 11-1-20) and were retained as COPCs for Wetland 5A surface water.

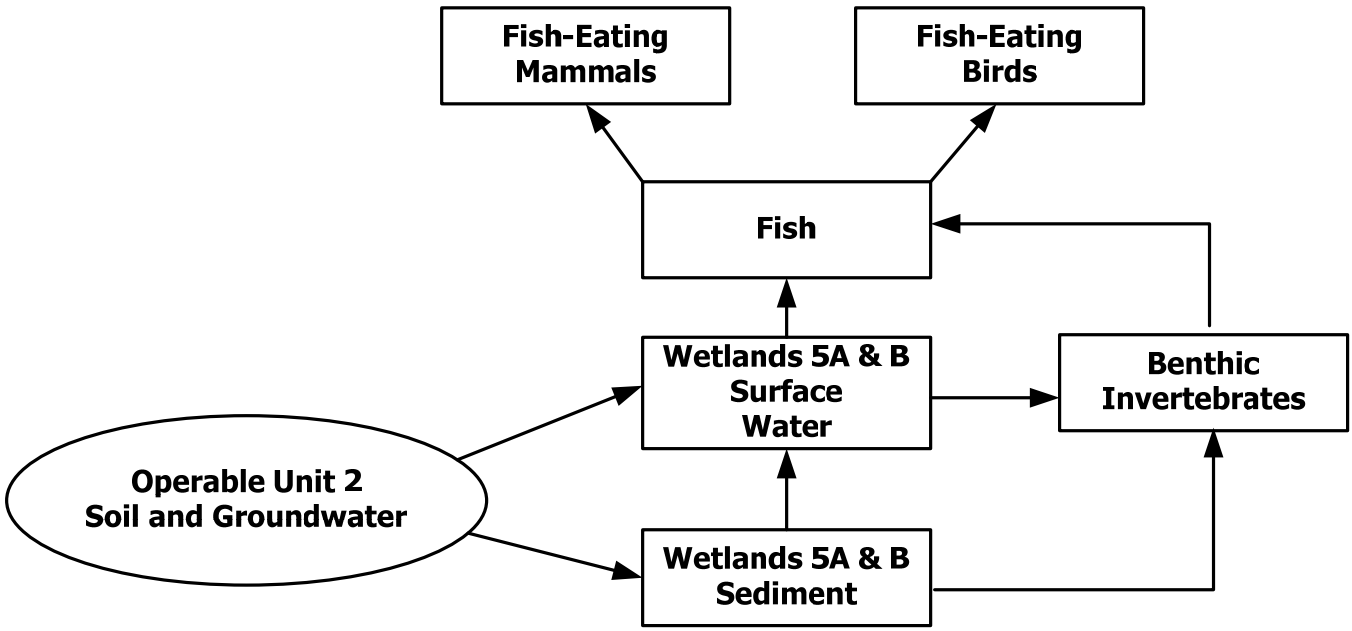
At Wetland 5A, a few organic constituents were detected in surface water at various sample locations. BEHP concentrations were detected at four of the six sample locations. Location 041W5A0401 reported the highest BEHP concentration. Five VOCs were detected and retained during the ERA process. 1,1-Dichloroethane was detected at sample location 041W5A0101. Acetone, bromodichloromethane,

cis-1,2-dichloroethene, and dibromochloromethane were detected at sample location 041W5A0601. These constituents were retained during the ERA process due to HQ exceedances or no associated screening values.

At Wetland 5A during the Phase II investigation, several of the same constituents were detected and retained in both sediment and surface water samples. These included barium, cadmium, copper, lead, manganese, and zinc.

The conceptual model below symbolizes which environmental habitats may be impacted by constituents retained during the ERA process and are likely sources.

Wetlands 5A & B
Conceptual Site Model



11.1.4.2 Wetland 5A — Phase III Investigation Summary

Additional investigation was determined to be necessary based on the Phase II results. The following assessment and measurement endpoints were selected:

Wetland Groups and Representative Wetland(s)	Assessment Endpoints	Measurement Endpoints
Wetland 5A	A) Survival, growth, and emergence of macroinvertebrates associated with the benthic environment (general benthic community)	A1) 28-day midge larvae, *Chironomous tentans,* survival, growth, and emergence A2) Benthic community indices
Wetland 5A	B) Protection of fish viability using fathead minnow (*Pimephales promelas*)	B1) 7-day fathead minnow, *Pimephales promelas*, survival and growth (by weight)
Wetland 5A	C) Bioaccumulation in wading birds and mammals	C1) These endpoints will be evaluated in the Food-Chain Model in Section 11.4

As detailed in the *Final RI/FS SAP Addendum* (E/A&H, 1997d), additional data were collected from three sample locations (041M5A04/041W5A04, 041M5A05/041W5A05, and 041M5A06/041W5A06) within Wetland 5A. These sample locations were selected because of elevated inorganic concentrations in sediment and surface water. These samples were analyzed for the following parameters:

- Laboratory analysis of full TAL/TCL list
- TOC and other physical parameters
- Sediment and surface water toxicity testing
- Benthic Community Indices

11.1.4.3 Phase III Sediment Chemistry Summary

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-1-21, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 11-1-22.

Baseline Problem Formulation — Phase III Sediment COPC Refinement

The same approach (Section 11.1.4.1) used to refine Wetland 5A Phase II sediments were applied to Phase III sediments.

The methods used in the COPC refinement for the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 11-1-23. COPCs retained after refinement are presented in Table 11-1-24. Additionally, the tables compare:

1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 5A concentrations to reference concentrations.

At Wetland 5A, 4,4'-DDD, 4,4'-DDT, and total DDT were above basewide levels, indicating that 4,4'-DDT and its daughter products are a concern for this wetland and were carried forward as COPCs. Total DDT was also included as a COPC in the OU-wide food-chain models.

For Wetland 5A Phase III, antimony, barium, cadmium, copper, lead, and zinc exceeded their Site 41 freshwater sediment reference concentrations; however, cadmium and copper were below their respective RVs and were not retained as COPCs. When assessed, using the interpretative tool, barium did not appear to be enriched.

Several pesticides were detected and retained during the ERA process due to HQ exceedances or no associated screening values. These constituents included endosulfan I, endosulfan sulfate, total chlordane, total endrin, and total BHC. Benzo(b)fluoranthene and benzo(k)fluoranthene were also detected and retained as COPCs. When normalized to detected TOC concentrations, PAHs and VOCs concentrations were not detected at levels expected to cause unacceptable ecological effects.

Table 11-1-25 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Figure 11-7 shows the Mean ERM Category for each sediment sample at Wetland 5A Phase III sediments. Based on the methods and the approach detailed in Section 8, three sample locations (041M5A04, 041M5A05, and 041M5A06) were determined to be Category 2, which, according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this category also has the greatest uncertainty in predicting toxicity.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-1-26, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 11-1-27.

Baseline Problem Formulation — Phase III Surface Water COPC Refinement

The same approach (Section 11.1.4.1) used to refine Wetland 5A Phase II surface water was applied to Phase III surface water samples.

The methods used in the COPC refinement for the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 11-1-28. Table 11-1-29 presents the COPCs retained after refinement. Additionally, the tables compare: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 5A concentrations to reference concentrations.

In Wetland 5A, barium, chromium, cobalt, copper, iron, lead, manganese, and zinc exceeded their freshwater reference concentrations (Table 11-1-28); however, chromium generated SV HQ less than 1 and was not retained as a COPC.

Two VOCs were detected and retained during the ERA process due to lack of appreciate screening values: 1,2-dichloroethene (total) and acetone. Both detections were reported at sample Location 041W5A0601.

11.1.4.4 Comparison of Phase II and III Sediment and Surface Water Results for Wetland 5A

Both the Phase II and III results indicated inorganic constituents and pesticides were the greatest concern for Wetland 5A. Concentrations dropped among constituents common between the two phases; however, surface water concentrations increased between the sampling efforts.

The differences between the Phase II and Phase III sampling efforts are presented below.

Sediment

Constituent	Phase II	Phase III	Difference
Metals mg/kg			
Copper	317	108	- 209 drop
Lead	427	258	- 169 drop
Zinc	2,290	394	- 1,896 drop

Note:
mg/kg = milligrams per kilogram

Surface Water

Constituent	Phase II	Phase III	Difference
Metals g/L			
Copper	19.6	42.8	+ 23.2 increase
Lead	20.3	91.4	+ 71.1 increase
Zinc	236	338	+ 102 increase

Note:
µg/L = microgram per liter

Evaluation of Assessment Endpoints

In addition to the chemical analyses, during the Phase III sampling, three sediments and surface water samples were collected for whole sediment and surface water toxicity tests, as well as species diversity analysis. Section 8 described the rationale and intent for this additional information.

Assessment Endpoint A — Survival, Growth, and Reproduction of Macroinvertebrates Associated with the Benthic Environment

The benthic invertebrate communities inhabiting the sediments in the fresh and salt water marshes included in Site 41 were selected as important biological resources to be evaluated in these habitats. This assessment endpoint is aimed at maintaining an ecologically viable benthic community and organism sustainability.

The benthic macroinvertebrates were selected because:

- Their relatively sessile life habits cause potential for increased exposure to contaminated sediments
- They are important component in the aquatic food web
- They are a food source for many species of fish and crustaceans harvested for recreational and commercial purposes
- Benthos has been documented to be an excellent indicator of habitat condition

Risk Questions

- Is the toxicity of COPCs to benthic macroinvertebrates in onsite sediments significantly greater that those of control sediments?
- Are the toxic responses lethal or sublethal?
- Do the results of this study show any stressor-response relationship?

To address the risk questions for this assessment endpoint, the following measurement endpoints were proposed:

- Measurement Endpoint A1: Evaluate the toxicity of COPCs in sediment to the midge Chironomous tentans by conducting a whole sediment toxicity tests measuring survival, growth and emergence

- Measurement Endpoint A2: Evaluate the health of the onsite benthic community using benthic community indices

Measurement Endpoint A1

Additional sediments were collected at locations 041M5A04, 041M5A05, and 041M5A06 during the Phase III portion of the investigation. Sediments from this freshwater wetland were prepared for testing with a terrestrial insect, *Chironomus tentans,* and a larval midge which spends its larval cycle in aquatic habitats. The larval midge *(C. tentans)* test included several endpoints: survival, growth (measured by weight), and emergence (into its terrestrial flight stage). Wetland 5A sediments were also tested against a laboratory control, which has a documented record of good survival and other test endpoint results, to determine if Wetland 5A sediments could be impacting benthic species.

The following summarizes and explains the test results:

Sample Location	Midge Survival/100	Midge Weight (mg)	Emergence (%)
Laboratory Control	100	2.6	60
041M5A0401	100	2.6	75
041M5A0501	100	1.6*	50
041M5A0601	83	2.8*	75

Note:
* = Statistically significant difference when compared to the control

The TAC are met when control survival rates are 90% or above for the control and 80% or above for the sediment being tested. The TAC for the control performance includes a minimum weight of 2.5 mg and at least 50% emergence. A simple statistical T-test can be preformed on sediment performance compared to the control performance, once the TAC is met.

Sediments from all three stations performed well in the survival and emergence portions of the test. Sediment stations 041M5A05 and 041M5A06 were found to be statistically different, when compared to the control performance for growth, which is measured by weight and is denoted with an asterisk in the

table above. Station 041M5A05 underperformed the control, whereas location 041M5A06 over-performed the control, causing both stations to be statistically significant.

Measurement Endpoint A2

In addition to collecting sediments for chemical characterization and toxicity tests, sediments were also collected at locations 041M5A04 through 041M5A06 during the Phase III portion of the investigation for species identification. Section 8 describes the process for diversity sampling and explains the importance of evenness and richness. The diversity findings for Wetland 5A are presented below:

Sample Location	Diversity Results
041M5A0401	2.56 Diversity 1.11 Evenness 9.76 Richness
041M5A0501	3.16 Diversity 1.37 Evenness 9.74 Richness
041M5A0601	2.43 Diversity 1.25 Evenness 6.88 Richness

Diversity, richness, and evenness of organisms were best at location 041M5A05, when compared to the other locations. Sample location 041M5A04 was dominated by *Limnodrilus* species and *Tubifex tubifex*, both of which are oligocheates. Location 041M5A05 exhibited a higher diversity (3.16) than locations 041M5A04 (2.56) and 041M5A06 (2.43).

Assessment Endpoint A: Conclusions

This assessment endpoint was assessed by evaluating sediment chemistry, amphipod toxicity testing, and community analysis. Based on the evaluation of Wetland 5A to date, previous levels of constituents caused statistically significant reduction of growth at one sampling station, 041M5A05. However, the community index indicated that this location indicated the highest levels of diversity in Wetland 5A.

Assessment Endpoint B: Protection of Forage Fish Viability

The forage fish communities inhabiting surface waters within Site 41 were selected as an important biological resource to be evaluated in the aquatic habitat. The forage fish community was selected as an assessment endpoint because:

- The isolated nature of these habitats and the narrow habitat requirements for forage fish causes the potential for increased exposure to contaminated sediments.

- They are an important component of the estuarine and freshwater food web.

- They are a food source for many species of fish and piscivorous birds.

Risk Questions

Are statistically significant levels of toxicity occurring to forage fish using Site 41 wetlands for forage, cover, and breeding areas?

Measurement Endpoint B1

Surface water samples were collected from locations 041W5A04, 041W5A05, and 041W5A06 during the Phase III sampling effort at Wetland 5A. These samples were tested with the freshwater fathead minnow, *Pimephales promelas*. Besides survival, the other endpoint for this test is growth, also measured by weight.

The TAC for the *P. promelas* test includes 90% survival of control organisms and a minimum weight of 0.30 mg. Wetland 5A Phase III surface water samples passed these toxicity tests for the survival endpoint but did identify sub-lethal effects at location 041W5A05 and 041W5A06 when looking at the growth endpoint, as shown below:

Sample Location	Minnow Survival/100	Minnow Weight (mg)
Laboratory Control	100	0.58
041W5A04	100	0.49
041W5A05	100	0.43*
041W5A06	97.5	0.46*

Note:
* = Statistically significant difference when compared to the control

The toxicity data reflect no acute results from Wetland 5A surface water samples but did indicate a sub-lethal impact from contaminants has been observed in the growth endpoint for sample locations 041W5A05 and 041W5A06.

Assessment Endpoint B: Conclusions

This assessment endpoint was evaluated using the surface water chemistry and minnow toxicity test result. The data indicated that constituents present in surface water at locations 041W5A05 and 041W5A06 may be causing sublethal effects (reduced growth) on forage fish.

Assessment Endpoint C: Bioaccumulation in Wading Birds and Mammals

To assess risk from contaminants that bioaccumulate, the results from Wetland 5A are used in the OU 2 food-chain models presented in Section 11.4.

11.1.4.5 Wetland 5B — Phase II Investigation Summary

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-1-30, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 11-1-31.

Baseline Problem Formulation — Wetland 5B Sediment COPC Refinement

During the COPC refinement, additional information as used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. This risk assessment presents a statement of potential risk for each of the COPCs.

The COPC refinement process included:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to basewide (reference) concentrations for total DDT
- Comparison of inorganic constituents to reference wetland values
- Interpretive tool for metals
- Di Toro EqP SQGs for VOCs
- Comparison to Swartz consensus values
- Mean ERM quotients
- Description of exceedances of RVs and their extent

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 11-1-32. COPCs retained after refinement are presented in Table 11-1-33. Additionally, the tables compare: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 5B concentrations to reference concentrations.

At Wetland 5B, total DDT was below basewide level, indicating that 4,4'-DDT and it's daughter products are not a concern for this wetland. For Wetland 5B, barium, cadmium, chromium, cobalt, copper, lead,

manganese, mercury, nickel, selenium, silver, and zinc exceeded their Site 41 freshwater sediment reference concentrations. All the constituents were retained for further consideration; except for mercury, which did not exceed screening values. However, barium concentrations did not appear enriched, when normalized to aluminum and iron concentrations using FDEP's interpretative tool (Appendix K).

At Wetland 5B, the highest inorganic exceedances were all detected at sample location 041M5B0201. Cadmium generated the largest inorganic SV and RV HQs (323.53 and 52.26, respectively). Of the two sediment samples, only one location exceeded the cadmium RV. Other RV exceedances were for chromium, copper, lead, nickel, silver, and zinc, all of which had exceedances at location 041M5B0201.

There were several organic SV and RV HQs exceedances at 041M5B0201. However, their HQs were much lower than those of the inorganic constituents listed above. Included in the organic COPCs are several pesticides, namely dieldrin, alpha and total BHCs. Several SVOCs were also detected at 041M5B0201, none of which have screening or refinement values developed for them; therefore, they were carried forward in the ERA process. Five VOCs were also detected and retained after screening: 1,2-dicholorethene (total), acetone, chlorobenzene, toluene, and vinyl chloride. When normalized to detected TOC concentrations, both VOCs (Appendix L) and PAHs do not appear to be risk drivers for Wetland 5B.

Table 11-1-34 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Based on this approach, sample location 041M5B0101 was determined to be Category 2, which, according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this Category also has the highest level of uncertainty. Sample location 041M5B0201 was determined to be Category 3, indicating sediments where approximately 50% of samples were found to be toxic and average survival was about 60-70%. Figure 11-7 shows the Mean ERM quotient for each sediment sample location at Wetland 5B.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-1-35, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of parameters retained after screening are presented in Table 11-1-36.

Baseline Problem Formulation — Phase II Surface Water COPC Refinement

The same approach used to refine Wetland 5A Phase II surface water was applied to Wetland 5B Phase II surface water samples.

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 11-1-37. COPCs retained after refinement are presented in Table 11-1-38. Additionally, the tables compare: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 5B concentrations to reference concentrations.

For Wetland 5B, aluminum, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, vanadium, and zinc exceeded their freshwater reference values and were retained for further evaluation (Table 11-1-37).

Four SVOCs and four VOCs were detected in surface water sample collected at Wetland 5B (041W5B0201). Since there are no screening values associated with these constituents, they were retained for further evaluation in the ERA process.

At Wetland 5B, Station 041W5B02 was found to have a number of double digit and one triple digit HQ values for inorganic constituents. This station is also located in a portion of the wetland that appears to be depositional in nature and had TOC levels of 7.45%.

The following constituents occurred in both Wetland 5B Phase II sediments and surface waters and were retained through the ERA process: cadmium, chromium, cobalt, copper, lead, manganese, zinc, 1,2-dichloroethene (total), and vinyl chloride.

A conceptual model symbolizes which environmental habitats may be impacted by Wetland 5B Phase II constituents was previously presented in Section 11.1.4.1.

11.1.4.6 Wetland 5B — Phase IV Investigation Summary

Additional investigation was determined to be necessary based on the Phase II results. The following assessment and measurement endpoints were selected:

Wetland Groups and Representative Wetland(s)	Assessment Endpoints	Measurement Endpoints
Wetland 5B	Survival and growth of macroinvertebrates associated with the benthic environment (representative of the general benthic community)	10-day amphipod, *Hyallela azteca*, survival and growth

As detailed in the technical memorandum (EnSafe, 2004a), additional data were collected from sample locations 041M5B02 through 041M5B06 within Wetland 5B, where COPC concentrations were high. These sample locations were selected because of elevated inorganic concentrations (specifically, cadmium) and pesticides in sediment and to address the potential ecological risks associated with this wetland. These samples were analyzed for the following parameters:

- Laboratory analysis of full TAL/TCL list
- TOC and other physical parameters
- Sediment toxicity testing
- Benthic Community Indices

11.1.4.7 Phase IV Sediment Chemistry Summary

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-1-39, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 11-1-40.

Baseline Problem Formulation — Phase IV Sediment COPC Refinement

The same approach used to refine Wetland 5A Phase II sediments was applied to Wetland 5B Phase IV sediments. The methods used in the COPC refinement for the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 11-1-41. COPCs retained after refinement are presented in Table 11-1-42. Additionally, the tables compare: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 5B concentrations to reference concentrations.

At Wetland 5B, total DDT was below base-wise level, indicating that 4,4'-DDT and its daughter products are not a concern for this wetland. For Wetland 5B, barium, cadmium, chromium, cobalt, copper, lead, nickel, silver, and zinc exceeded their Site 41 freshwater sediment reference concentrations

(Table 11-1-41). Barium, cadmium, chromium, lead, and silver were assessed using the interpretative tool. Barium did not appear to be enriched, while other constituents were enriched.

Several organic constituents were detected and retained during the ERA process due to RV HQs greater than one or no appreciate screening values. Total PCBs, dieldrin, and total BHC were retained with maximum concentrations at sample location 041M5B0601. One SVOC (3-methylphenol/4-methylphenol) and four VOCs (acetone, cis-1,2-dichloroethene, toluene, and vinyl chloride) were also detected and retained. When normalized to detected TOC concentrations, VOCs and PAHs were not detected at levels expected to cause unacceptable ecological effects.

Table 11-1-43 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location for Wetland 5B. Based on the methods and approach detailed in Section 8, sample locations 041M5B04 and 041M5B05 were found to be Category 1, indicating these sediments are considered nontoxic. Sample locations 041M5B02, 041M5B03, and 041M5B06 were determined to be Category 2, indicating these sediments according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this category also has the greatest uncertainty in predicting toxicity. Figure 11-7 shows the Mean ERM Category for each sediment sample at Wetland 5B.

Wetland 5B acts as a storm water conveyance feature between upgradient Wetland 5A and downgradient Wetland 6. Several storm water outfalls discharge into Wetland 5A eventually flow into 5B. Constituents detected in Wetland 5B most likely originate from anthropomorphic activities associated with this portion of the base. Sites affecting this wetland included Sites 30 and 36.

11.1.4.8 Comparison of Phase II and IV Sediment Results — Wetland 5B

Both the Phase II and III results indicated inorganic constituents and pesticides were of greatest concern in Wetland 5B. Generally, concentrations dropped among constituents common between the two phases. The exceptions were chromium, silver, dieldrin, and total BHC.

The differences between the Phase II and III sampling efforts are presented below.

Constituent	Phase II Sediment	Phase IV Sediment	Difference
Metals mg/kg			
Barium	30.2	18	-12.2 drop
Cadmium	220	31	-189 drop
Chromium	416	470	+54 increase
Cobalt	5.3	4.1	-1.2 drop
Lead	481	420	-61 drop
Silver	5.2	6.4	+1.2 increase
Pesticides g/kg			
Dieldrin	7.1	100	+92.9 increase
Total BHC	2.34	3.475	+1.135 increase
VOCs g/kg			
Acetone	180	28	-152 drop
1,2-Dichloroethene (total)	11	7.7	-3.3 drop
Toluene	13	3.5	-9.5 drop
Vinyl chloride	42	3.7	-38.3 drop

Notes:
mg/kg = Milligrams per kilogram
µg/kg = Micrograms per kilogram

11.1.4.9 Toxicity Test Results

Wetland 5B was selected for additional analysis based on the level of contamination detected during Phase IV. In addition to chemical analyses, during the Phase IV sampling at Wetland 5B, five sediment samples were collected for whole sediment toxicity tests to determine if sediments at Wetland 5B were having any toxicological effects on organisms in this wetland. Section 8 describes the rationale and intent for this additional information.

Sediment Toxicity

Additional sediments were collected from 041M5B02, 041M5B03, 041M5B04, 041M5B05, and 041M5B06 during the Phase IV sampling portion of the Site 41 investigation in an attempt to delineate contaminants previously identified at Station 041M5B02. Sediments from this freshwater wetland were prepared for testing with the amphipod, *Hyallela azteca,* a benthic macroinvertebrate.

Benthic macroinvertebrates fill a multitude of ecological niches: functioning as prey, predators, herbivores, omnivores, collectors, gatherers, shredders, and filter feeders, thus interacting with multiple trophic levels, which control energy/nutrient/organic matter cycling dynamics in many

ecosystems. Therefore, the health of the benthic community was used as an assessment endpoint for evaluating the sediments collected from Wetland 5B. *H. azteca* are the primary food source for many juvenile fish and are voracious feeders of animal, plant, and detrital material. Wetland 5B sediments were also tested against a laboratory control, which has a documented record of good survival and other test endpoints, to determine if Wetland 5B sediments are impacting benthic species. The test results are shown and explained below:

Sample Location	*Hyallela* Survival (%)	*Hyallela* Growth as Measured by Weight (mg)
Laboratory Control #1	97.5	0.06
041M5B02	97.5	0.06
041M5B03	97.5	0.07
041M5B03 — duplicate	97.5	0.10
Laboratory Control # 2	97.5	0.06
041M5B04	96.25	0.06
041M5B05	100	0.08
041M5B06	100	0.10

The test acceptability criteria (TAC) are met when the laboratory control survival rates are 90% or above for the control. The TAC for the control performance includes a minimum weight of 0.05 mg per organism. A simple statistical T-test can be performed on sediment performance compared to the control performance once the TAC is met.

The Phase IV sediments from all five stations performed well in the survival and growth portions of the test. The toxicity data reflects good result from these wetland sediment samples and indicated no impact from sediments (either acute or chronic) has been observed at Wetland 5B.

11.1.5 Wetland 5 — Human Health Risk Assessment

Wetland 5 is described in Section 11.1.1, and the HHRA is summarized below.

11.1.5.1 Site Data

Surface water and sediment data were collected at Wetland 5 during Phases II, III, and IV of the RI. Section 11.1.3 summarizes the nature and extent of contamination for this wetland. Surface water and sediment data are summarized in Tables 11-1-5 through 11-1-11.

11.1.5.2 Conceptual Site Model

As described in Section 11.1.1, Wetland 5 was separated into two parts, Wetlands 5A and 5B. Wetland 5A is a palustrine forested system as documented by Parsons and Pruitt, and Wetland 5B is a

palustrine emergent system. Wetlands 5A and 5B are located in an active portion of the base and are not under homeland security restrictions. Both trespassers and Navy personnel could obtain access to these wetlands.

Wetland 5A is located to the north of Murray Road and is connected to Wetland 5B (towards the south) by a large culvert. Some sediment at Wetland 5A is exposed part of the year, so sediment exposure would be assessed using soil exposure models. Wetland 5B sediments is not exposed during the year; therefore, sediment exposure was excluded from Wetland 5B calculations. Dermal contact with surface water could be a significant exposure pathway and was included in this HHRA. Based on the species present, depth of surface water, and available habitat, fishing would not likely occur, and wading would be the most likely exposure scenario.

The following scenarios and exposure pathways were evaluated for Wetland 5A:

Scenario	Medium	Ingestion	Dermal
Maintenance	Sediment	√	√
	Surface water	√	√
Trespasser	Sediment	√	√
	Surface water	√	√

11.1.5.3 Risk Characterization

The child trespasser and adult maintenance worker scenarios were assessed for this wetland as described in Section 9.

Wetland 5A Phase II

Trespasser

As shown in Tables 11-1-44 through 11-1-49, sediment and surface water ingestion and dermal contact risk estimates for trespassers were below the FDEP risk threshold. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 11-1-44 through 11-1-49, sediment ingestion and dermal contact risk estimates for maintenance workers were below the FDEP risk threshold. Hazard indices were below 1.0.

As shown in Tables 11-1-44 through 11-1-49, surface water ingestion and dermal contact risk estimates for maintenance workers were below the FDEP risk threshold. Hazard indices were below 1.0.

Summary of Wetland 5A Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	2.25E-01	4.65E-07
	Surface water	4.20E-02	8.67E-08
Trespasser	Sediment	2.35E-01	3.17E-07
	Surface water	2.43E-02	2.60E-08

Based on these data, no COCs were identified for Wetland 5A Phase II.

Wetland 5A Phase III

Trespasser

As shown in Tables 11-1-50 through 11-1-55, sediment and surface water risks were below FDEP's acceptable risk range, and hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 11-1-50 through 11-1-55, sediment and surface water risks were below FDEP's acceptable risk range, and hazard indices were below 1.0.

Summary of Wetland 5A Phase III Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	2.76E-02	5.33E-07
	Surface water	1.83E-02	N/A
Trespasser	Sediment	4.23E-02	3.34E-07
	Surface water	1.37E-02	N/A

Based on these data, no COCs were identified for Wetland 5A Phase III.

Wetland 5B Phase II

Trespasser

As shown in Tables 11-1-56 through 11-1-58, surface water dermal contact risk estimates for trespassers exceeded the FDEP risk threshold of 1E-6 for pyrene. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 11-1-56 through 11-1-58, surface water dermal contact risk estimates for maintenance workers exceeded the FDEP risk threshold of 1E-6 for N-nitroso-di-n-propylamine, pyrene, and trichloroethene. Hazard indices were below 1.0.

Summary of Wetland 5B Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	N/A	N/A
	Surface water	1.39E-01	1.17E-05
Trespasser	Sediment	N/A	N/A
	Surface water	9.49E-02	6.90E-06

Based on Wetland 5B Phase II data, N-nitroso-di-n-propylamine, pyrene, and trichloroethene were identified as COCs for this wetland.

Wetland 5 — HHRA COC Summary

The following parameters were determined in the HHRA to be COCs for Wetland 5:

- N-Nitroso-di-n-propylamine
- Pyrene
- Trichloroethene

11.1.6 Wetland 5 — Fate and Transport Analysis

Because these wetlands are contiguous, they are evaluated as a single complex. This wetland complex lies in the eastern central portion of NAS Pensacola and is bordered on the north by OU 2 (Sites 30, 27, and 25) and the east by Wetland 6 and the former Chevalier Field area. Thirteen sediment and seven surface water samples were collected from this wetland complex. The wetland drains to the east, then southeast towards Wetland 6, a channelized wetland bordering the western side of the NTTC facility (formerly Chevalier Field; see Figure 11-1). For the purpose of the fate and transport evaluation, short IDs are used for brevity.

The sediment COPCs retained after refinement are summarized in Tables 11-1-15 (5A, Phase II), 11-1-24 (5A, Phase III), 11-1-33 (5B, Phase II), and 11-1-42 (5B, Phase IV). The surface water COPCs retained after refinement are summarized in Tables 11-1-20 (5A, Phase II), 11-1-29 (5A, Phase III), and 11-1-38 (5B, Phase II). Also provided are the associated soil borings and monitoring wells used for comparing data for the fate and transport analysis. For Wetland 5A and its upgradient location, there were a set of associated borings and wells pertinent only to it, with regards to sediment and groundwater influx (meaning that borings and wells proximal to Wetland 5B are not expected to exert influence on the upgradient 5A). Since Wetland 5B is downgradient from Wetland 5A, borings associated with Wetland 5A are applicable to Wetland 5B.

Associated Monitoring Wells for Wetland 5A Only: 030GS062, 030GS006, 030GI007, 030GS033, 030GS029, 030GS028, 030GS018, 030GI019, 030GS005, 030GS0020, 030GS026, 030GS027

Associated Monitoring Wells for Wetland 5B: 030GI170, 030GS173, 030GS170, 030GS171, 030GS172, 030GS168, 030GS165, 030GS164, 030GI164, 030GS166, 030GS162, 030GS126, 030GI126, 030GS123, 027GS010

Associated Borings for Wetland 5A Only: 030S0016, 030S0138, 030S0006, 030S0135, 030S0137, 030S0017, 030S0053, 030S0004, 030S0140, 030S0139, 030S0018, 030S0020, 030S0130

Associated Borings for Wetland 5B: 030S0005, 030S0129, 030S0128, 030S0127, 030S0126, 030S0125, 030S0124, 030S0038, 030S0123, 030S0122, 030S0121

Surface Water/Sediment Transport into the Wetland Media:

Surface Water — There are no directly comparable storm water data from the area proximal to this wetland complex. There is a main storm water conveyance inlet at the headwaters of the wetland complex, at the west end of Wetland 5A). Because of the lack of data, a definitive statement can not be made regarding the validation of the pathway via storm water runoff into the wetland complex. The vast majority of surface drainage to this wetland is from the western and southern portions of OU 2 and from the storm water inflow at the western end of Wetland 5A.

Sediment — Based on the data from surface soil proximal to this wetland complex, this storm water to sediment pathway is validated for the following parameters:

Wetland 5A — Phase II	Wetland 5A — Phase III
Aluminum	Barium
Barium	Lead
Cadmium	Zinc
Copper	gamma-Chlordane
Cobalt	4,4'-DDD
Lead	4,4'-DDT
Manganese	Total Chlordane
Mercury	Total DDT
Zinc	
Total DDT	
Carbazole	
Barium	Barium
Cadmium	Cadmium
Chromium	Chromium
Cobalt	Cobalt
Copper	Lead

Wetland 5A — Phase II	Wetland 5A — Phase III
Lead	Silver
Manganese	Dieldrin
Nickel	Total PCBs
Selenium	
Silver	
Zinc	
Dieldrin	

Groundwater Discharge into the Wetland:

Surface Water — Based on the data from associated wells, this pathway is validated and significant for the following parameters (**note:** the metals data from the 1993 sampling are not used due to potential bias introduced by the sampling methodology):

Wetland 5A — Phase II	Wetland 5A — Phase III
Barium	Barium
Cadmium	Cobalt
Cobalt	Chromium
Chromium	Copper
Copper	Iron
Lead	Lead
Manganese	Manganese
Vanadium	Zinc
Zinc	1,2 Dichloroethene
1,1-Dichloroethane	Acetone
Cis-1,2-Dichloroethene	

Wetland 5B — Phase II
Aluminum
Iron
Lead
Manganese
Barium
Cadmium
Chromium
Cobalt
Copper
Vanadium
Zinc
Total PAH
Acetone
1,1-Dichloroethane
Trichloroethene

Sediment — Based on the data from associated wells, this pathway is validated and significant for the following parameters (**note:** the metals data from the 1993 sampling are not used due to potential bias introduced by the sampling methodology):

Wetland 5A — Phase II	Wetland 5A — Phase III
Aluminum	Barium
Barium	Lead
Cadmium	Zinc
Cobalt	
Copper	
Lead	
Manganese	
Zinc	
4-Methylphenol (p-Cresol)	
Carbazole	

Wetland 5B — Phase II	Wetland 5B — Phase IV/2004
Barium	Barium
Cadmium	Cadmium
Chromium	Chromium
Cobalt	Cobalt
Copper	Lead
Lead	4-Methylphenol
Manganese	
Nickel	
Zinc	
4-Methyphenol	

Surface Water/Sediment Transport within the Wetlands:

To evaluate these pathways in Wetland 5A, upgradient surface water/sediment sample location 041W5A07/041M5A07 (sampled during Phase II) was compared to downgradient surface water/sediment location 041W5A06/041M5A06 (sampled during Phase II and III). To evaluate these pathways in Wetland 5B, upgradient surface water/sediment sample 041W5A06/041M5A06 was compared to downgradient surface water/sediment sample 041W5B02/041M5B02 (sampled during Phase II). Criteria of note are the number of detected parameters and the apparent trend in concentrations.

Wetland 5A

Surface Water — Evaluation of Wetland 5A locations 04W5A07 and 041W5A06 indicated a marked increase in detected organic parameters (11 metals and zero organics upgradient versus 10 metals and six organics downgradient). For metals, one constituent was present downgradient that

was not detected upgradient, and of the ones detected at both locations, six metals decreased in concentration and three increased. Downgradient detected organics consisted primarily of VOCs and were most likely attributed to inputs from Site 30.

Sediment — Evaluation of Wetland 5A locations 041M5A07 and 041M5A06 Phase II sampling indicated a higher number of detections in the upgradient location (18 metals and 18 organics in 041M5A07 versus 18 metals and six metals in 041M5A06). In general, metals decreased from upgradient to downgradient. For those metals detected downgradient, 11 constituents showed a decrease, five showed an increase, and one was not detected upgradient. For organics, 17 parameters detected upgradient were not detected downgradient and five parameters detected downgradient were not detected in upgradient locations. Furthermore, most of the organics detected upgradient were SVOCs (primarily BAP equivalents), whereas those detected downgradient were mostly pesticides. This indicates a dominate influence of storm water, likely containing high SVOCs as a result of asphalt runoff, on the upgradient location, and a tendency for the sediment in Wetland 5A to quickly adsorb these types of contaminants. Pesticides detected in the downgradient location likely reflect application residuals. The generally higher metals in the upgradient location may also be a function of storm water runoff influences.

Wetland 5B

Surface Water — Evaluation of upgradient location 041W5A06 and downgradient location 041W5B02 sampled in Phase II indicated a higher number of detections in the downgradient location (10 metals and six metals in the upgradient location versus 16 metals and nine organics in the downgradient location). Six metals were detected downgradient that were not detected upgradient. Seven metals increased in concentration, and two constituents decreased. For organics, seven were present at downgradient that were not detected upgradient and two exhibited essentially equal concentrations. Of those not present upgradient, four of these were SVOCs, and three were VOCs. The presences of these constituents in the downgradient location indicate groundwater discharge from the south central portions of OU 2 as a valid mechanism for their presence. Of the two organics detected at each locations (BEHP and acetone), concentrations remained essentially equal, suggesting laboratory analysis as source.

Sediment — Evaluation of upgradient location 041M5A06 and downgradient location 041M5B02 indicated a higher number of detections in the downgradient location, particularly with respect to organics (18 metals and six organics upgradient versus 21 metals and 18 organics downgradient). For metals, concentrations increased in the downgradient location. Of the 21 metals present, four parameters were not detected at the upgradient location, and 17 parameters increased in

concentration. Of the organics, 13 compounds were present downgradient that were not detected upgradient. Five constituents were detected at both locations. All five compounds exhibited an increase in concentration. TOC also exhibited a large increase in the downgradient location. This general increase in parameter detections and concentrations validates the downgradient transport and accumulation of adsorbed contaminants within the 5A/5B complex. This accumulation may be enhanced by the increase in TOC, supplemented by partitioning from groundwater discharge and/or storm water runoff (containing entrained sediment) from the south central portion of OU 2, and/or partitioning from upgradient surface water.

Evaluation of Phase II versus Phase III Data:

This section includes a brief comparison of Phase II and Phase III data to define trends in sediment and surface water contamination (disregarding to some degree the inherent heterogeneity of sediment media, and the temporal sensitivity of surface water). Criteria to be noted include the number of parameters detected and the apparent trend of parameter concentrations.

Wetland 5A

Surface Water — Three locations (041W5A04, 041W5A05, and 041W5A06) were sampled as part of Phase II and Phase III activities. Evaluations of both sets of data indicated the following:

- **Location 041W5A04** — Nine metals and one organic were detected at this location in Phase II, while 12 metals and zero organics were detected in Phase III. For the metals, three parameters were present in Phase III that were not detected in Phase II. Of nine metals detected during both events, four exhibited a decrease and five an increase. The only organic detection (BEHP) detected during Phase II, was likely an associated lab artifact. Overall, there were no a clear trend in surface water quality at this location.

- **Location 041W5A05** — Thirteen metals and one organic were detected during Phase II versus 17 metals and one organic during Phase III. For the metals, four constituents were present in the Phase III that were not detected in Phase II. Of the 13 metals detected during both phases, six exhibited an increase, six exhibited a decrease, and one remained essentially the same. For the organics, BEHP, detected in Phase II, is likely a lab artifact. Overall, there was not a clear trend in surface water quality at this location.

- **Location 041W5A06** — Ten metals and six organics were detected in Phase II, while 10 metals and two organics were detected in Phase II. For the metals, only one parameter was present in Phase III that was not detected in Phase II. Of the nine metals detected in

both phases, five exhibited an increase and four exhibited a decrease. For the organics, two compounds that were detected in both phases, and both exhibited an increase. Overall, the decrease in the number of organics detected was notable. There was not a clear trend in inorganic detections.

Sediment — Three locations (041M5A04, 041M5A05, and 041M5A06) were sampled as part of Phase II and Phase III activities. An evaluation of both sets of data indicated the following:

- **Location 041M5A04** — 17 metals and nine organics were detected during Phase II versus 19 metals and 18 organics during Phase III. For metals, four parameters were present during Phase III that were not present during Phase II. Of the 15 detected in both phases, all metals exhibited a decrease in concentration. For the organics, 12 compounds were present during Phase III that were not detected in Phase II. Of the six organics detected in both phases, all exhibited an increase in concentration. Finally, TOC exhibited a notable decrease in concentration. Given the results of the evaluation listed above, the decreases in metals and the increase in organics were notable and potentially represent input from groundwater from the western portion of OU 2.

- **Location 041M5A05** — Twenty-one metals and 23 organics were detected during Phase II versus 21 metals and 10 organics during Phase III. For the metals, only one was present in Phase III that was not detected in Phase II. Of the 20 parameters detected during both phases, 18 exhibited a decrease in concentration, and two parameters exhibited an increase. For the organics, three were present in Phase III that were not detected in Phase II. Of the seven compounds detected in both phases, all seven exhibited a decrease in concentration. Overall, decreases in both metals and organics were noted, and may be due to an actual decrease in contaminant adsorption (potentially related to a decrease in measured TOC), or decreases in introduction from pathways providing parameters to the sediment.

- **Location 041M5A06** — Eighteen metals and six organics were detected during Phase II versus 17 metals and seven organics during Phase III. For the metals, only one was present in Phase III that was not detected in Phase II. Of the 16 metals that were detected during both phases, 11 parameters exhibited an increase in concentration and five exhibited a decrease. For the organics, five compounds were present in Phase III that were not detected in Phase II. Of the two organics detected in both phases, both exhibited a decrease in concentration. Finally, TOC was higher in Phase III than in Phase II. Overall, based on the relative differences in concentrations between phases, there were no notable trends in inorganic or organic detections.

Wetland 5B

Surface Water — There was one surface water sample collected in Wetland 5B (location 041W5B02, sampled during Phase II); therefore, no trend analysis was conducted for this medium.

Sediment — One sediment location (041M5B02) was sampled during Phase II and Phase IV/2004. There were 21 metals and 18 organics detected in Phase II and 26 metals and 11 organics during Phase IV. For the metals, only one was detected during Phase IV that was not detected during Phase II. Of the 25 parameters detected during both phases, 23 parameters exhibited a decrease in concentration and two exhibited an increase. Five organic parameters were present in Phase IV that were not detected in Phase II, four organic compounds exhibited higher concentrations, and two organic compounds exhibited lower concentrations. TOC was also higher in the Phase II sample than in Phase IV. For constituents detected in both events, the trend was downward in terms of overall concentrations and number of detections. This may be attributable to a decrease in actual pathway contributions or a decrease in TOC.

Table 11-1-1
Wetland 5A Phase II
Sediment Physical Parameters

Parameter	041M5A0101	041M5A0201	041M5A0301	041M5A0401	041M5A0501	041M5A0601	041M5A0701
TOC (%)	25.4	3.75	9.97	40.9	15.3	0.642	0.21
Percent Solids (%)	16.2	26.5	26.9	11.6	18.7	70.1	83.2
Grain Size Analysis (percent of composition[1])							
Fine Gravel	0	1	0	0	0	0	0
Coarse Sand	6	1	1	0	0	1	4
Medium Sand	21	38	11	36	22	30	40
Fine Sand	52	58	51	30	28	67	56
Silt and Clay	21	2	37	34	50	2	0
Description	Dark Brown Silty Fine Sand with Organics	Dark Brown Medium to Fine Sand with Organics	Dark Brown Silty Fine Sand with Organics	Dark Brown Silty Fine Sand with Organics	Dark Brown Sandy Silt with Organics	Brown Poorly Graded Sand with little Organics	Gray Medium Sand with Some Organics, shells.

Note:
1 = Derived from sieve analyses.

Table 11-1-2
Wetland 5A Phase II
Surface Water Physical Parameters

Parameter	041W5A0101	041W5A0201	041W5A0401	041W5A0501	041W5A0601	041W5A0701	041W5B0201
Hardness as CaCO3 (mg/L)	69.2	37	41.4	99	22.2	47.1	52.3
pH	6.3	6.1	6.31	6.03	No Data	6.78	No Data
Specific Conductivity (mS/cm)	0.169	0.146	0.166	0.21	No Data	1.18	No Data
Turbidity (NTU)	21	38	12	144	No Data	4	No Data
Salinity (%)	0	0	0	0	No Data	0	No Data

Notes:

mg/L = Milligrams per liter
MS/cm = Millisiemens per centimeter
NTU = Nephelometric turbidity units
% = Percent

Table 11-1-3
Wetland 5A Phase III
Sediment Physical Parameters

Parameter	041M5A0401	041M5A0501	041M5A0601
TOC (%)	0.7	0.74	1
Grain Size Analysis (percent of composition[1])			
Fine Gravel	0.3	1.2	2
Coarse Sand	0.4	1.4	0.8
Medium Sand	18.9	21.7	19.4
Fine Sand	75.9	70.7	74.1
Silt and Clay	4.5	5	3.7

Note:
[1] = Derived from sieve analyses.

Table 11-1-4
Wetland 5B Phase II
Sediment Physical Parameters

Parameter	041M5B0101	041M5B0201
TOC (%)	0.18	7.45
Percent Solids (%)	72.7	13.4
Grain Size Analysis (percent of composition[1])		
Medium Sand	32	23
Fine Sand	67	62
Silt and Clay	1	15
Description	Light Brown Poorly Graded Sand,Medium	Dark Brown Silty Sand with Organics

Note:
1 = Derived from sieve analyses.

Table 11-1-5
Wetland 5A Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	13,610.00	1	7	7	699.0	18,700.0	8,120.0	041M5A0101
Antimony	4.43	2	5	7	0.280	10.0	2.970	041M5A0101
Arsenic	6.62	0	6	7	0.780	3.20	1.840	041M5A0501
Barium	14.00	4	7	7	4.10	150.0	40.10	041M5A0101
Beryllium	0.84	0	3	7	0.270	0.830	0.276	041M5A0101
Cadmium	1.80	5	7	7	0.270	11.20	5.950	041M5A0101
Calcium	10,756.67	1	7	7	351.0	71,000.0	14,000.0	041M5A0701
Chromium	39.37	3	7	7	2.80	115.0	51.60	041M5A0501
Cobalt	2.80	3	6	7	0.30	13.40	4.310	041M5A0501
Copper	19.50	4	7	7	13.10	317.0	87.50	041M5A0501
Iron	11,911.67	0	7	7	616.0	9,830.0	4,680.0	041M5A0101
Lead	82.47	4	7	7	11.50	427.0	174.0	041M5A0101
Magnesium	7,513.33	0	7	7	44.40	5,960.0	1,330.0	041M5A0701
Manganese	37.97	3	7	7	11.80	205.0	59.70	041M5A0101
Mercury	0.55	2	5	7	0.250	1.0	0.444	041M5A0101
Nickel	9.28	3	6	7	1.30	25.20	10.90	041M5A0501
Potassium	1,628.67	0	7	7	20.30	413.0	185.0	041M5A0101
Selenium	3.45	0	5	7	1.50	2.60	1.340	041M5A0501
Silver	2.10	0	2	7	0.420	1.10	0.581	041M5A0201
Sodium	18,993.33	0	7	7	8.60	122.0	55.30	041M5A0401
Thallium	1.57	0	1	7	1.40	1.40	0.465	041M5A0101
Vanadium	28.67	0	6	7	2.20	24.0	11.70	041M5A0101
Zinc	36.73	7	7	7	39.30	2,290.0	459.0	041M5A0101
PAHs (g/kg)								
Acenaphthylene	N/A	0	1	7	120.0	120.0	54.90	041M5A0501
Anthracene	N/A	0	1	7	44.0	44.0	81.50	041M5A0701
Benzo(a)anthracene	N/A	0	3	7	120.0	320.0	123.0	041M5A0501
Benzo(a)pyrene	N/A	0	4	7	37.0	240.0	116.0	041M5A0701
Chrysene	N/A	0	3	7	180.0	510.0	181.0	041M5A0501
Fluoranthene	N/A	0	5	7	71.0	1,100.0	339.0	041M5A0501
Phenanthrene	N/A	0	3	7	110.0	240.0	109.0	041M5A0501
Pyrene	N/A	0	5	7	71.0	730.0	258.0	041M5A0501
Total PAHs	N/A	0	5	7	462.0	3,655.0	1,460.0	041M5A0501
Pesticides and PCBs (g/kg)								
Aroclor-1254	N/A	0	1	7	14.0	14.0	4.320	041M5A0601
Aroclor-1260	N/A	0	3	7	2.60	100.0	18.40	041M5A0501
Total PCBs	N/A	0	4	7	9.60	128.250	38.60	041M5A0501

Table 11-1-5
Wetland 5A Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Pesticides and PCBs (g/kg) - cont.								
Dieldrin	N/A	0	2	7	0.850	2.50	0.669	041M5A0101
Endosulfan II	N/A	0	1	7	1.70	1.70	0.434	041M5A0501
alpha-Chlordane	N/A	0	2	7	0.330	1.60	0.350	041M5A0501
gamma-Chlordane	N/A	0	2	7	0.230	1.30	0.307	041M5A0501
Total Chlordane	N/A	0	3	7	0.280	2.90	0.657	041M5A0501
Endrin	N/A	0	1	7	1.10	1.10	0.348	041M5A0501
Endrin aldehyde	N/A	0	1	7	0.720	0.720	0.294	041M5A0501
Endrin ketone	N/A	0	1	7	0.260	0.260	0.271	041M5A0701
Total Endrin	N/A	0	2	7	0.460	2.225	0.913	041M5A0501
alpha-BHC	N/A	0	2	7	0.340	0.640	0.259	041M5A0101
Total BHC	N/A	0	2	7	0.505	1.090	0.630	041M5A0101
4,4'-DDD	50.0	0	5	7	0.230	2.30	0.861	041M5A0401
4,4'-DDE	40.0	1	5	7	0.870	120.0	17.90	041M5A0501
4,4'-DDT	20.0	0	3	7	0.780	5.0	1.110	041M5A0501
Total DDT	110.0	1	7	7	0.430	125.405	19.90	041M5A0501
SVOCs (g/kg)								
4-Methylphenol (p-Cresol)	N/A	0	3	7	100.0	200.0	256.0	041M5A0101
Benzo(b)fluoranthene	N/A	0	3	7	57.0	360.0	124.0	041M5A0701
Benzo(g,h,i)perylene	N/A	0	3	7	120.0	280.0	111.0	041M5A0501
Benzo(k)fluoranthene	N/A	0	3	7	73.0	170.0	75.0	041M5A0701
bis(2-Chloroethoxy)methane	N/A	0	1	7	110.0	110.0	393.0	041M5A0501
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	3	7	690.0	1,500.0	815.0	041M5A0501
Butylbenzylphthalate	N/A	0	1	7	200.0	200.0	406.0	041M5A0501
Carbazole	N/A	0	2	7	48.0	96.0	369.0	041M5A0501
Di-n-butylphthalate	N/A	0	1	7	100.0	100.0	391.0	041M5A0501
Di-n-octylphthalate	N/A	0	1	7	22.0	22.0	466.0	041M5A0701
Indeno(1,2,3-cd)pyrene	N/A	0	3	7	110.0	310.0	113.0	041M5A0501
VOCs (g/kg)								
Acetone	N/A	0	5	7	140.0	5,200.0	1,690.0	041M5A0201
Methylene chloride	N/A	0	1	7	250.0	250.0	51.30	041M5A0101
Toluene	N/A	0	3	7	5.0	280.0	63.60	041M5A0401

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 11-1-6
Wetland 5A Phase III
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Range of Detections: Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	13,610.00	0	3	3	821.0	2,480.0	1,630.0	041M5A0401
Antimony	4.43	1	2	3	2.0	27.70	10.20	041M5A0501
Arsenic	6.62	0	1	3	0.520	0.520	0.325	041M5A0401
Barium	14.00	1	3	3	6.90	17.20	12.20	041M5A0501
Beryllium	0.84	0	2	3	0.130	0.20	0.118	041M5A0401
Cadmium	1.80	1	3	3	0.420	3.20	1.610	041M5A0501
Calcium	10,756.67	0	3	3	495.0	3,660.0	2,430.0	041M5A0501
Chromium	39.37	1	3	3	4.10	50.10	26.20	041M5A0501
Cobalt	2.80	0	3	3	0.940	1.60	1.380	041M5A0501
Copper	19.50	3	3	3	21.50	108.0	51.70	041M5A0501
Iron	11,911.67	0	3	3	546.0	3,020.0	1,550.0	041M5A0501
Lead	82.47	1	3	3	54.50	258.0	129.0	041M5A0501
Magnesium	7,513.33	0	3	3	56.10	690.0	466.0	041M5A0501
Manganese	37.97	0	3	3	8.60	21.30	15.10	041M5A0501
Mercury	0.55	0	3	3	0.060	0.130	0.093	041M5A0401
Nickel	9.28	0	3	3	1.80	7.50	3.930	041M5A0501
Potassium	1,628.67	0	2	3	54.0	93.20	51.90	041M5A0401
Selenium	3.45	0	1	3	0.60	0.60	0.290	041M5A0501
Silver	2.10	0	1	3	0.150	0.150	0.082	041M5A0501
Sodium	18,993.33	0	3	3	14.60	35.0	25.0	041M5A0401
Vanadium	28.67	0	3	3	1.80	4.20	3.20	041M5A0401
Zinc	36.73	3	3	3	77.10	394.0	191.0	041M5A0501
PAHs (g/kg)								
Anthracene	N/A	0	1	3	16.0	16.0	182.0	041M5A0401
Benzo(a)anthracene	N/A	0	2	3	41.0	100.0	137.0	041M5A0401
Benzo(a)pyrene	N/A	0	2	3	52.0	140.0	154.0	041M5A0401
Chrysene	N/A	0	2	3	58.0	170.0	166.0	041M5A0401
Fluoranthene	N/A	0	3	3	16.0	260.0	116.0	041M5A0401
Phenanthrene	N/A	0	2	3	28.0	97.0	132.0	041M5A0401
Pyrene	N/A	0	2	3	87.0	300.0	219.0	041M5A0401
Total PAHs	N/A	0	3	3	2,158.0	3,256.0	2,670.0	041M5A0601

Table 11-1-6
Wetland 5A Phase III
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Range of Detections: Average Detection	Maximum Detection Location
Pesticides and PCBs (g/kg) - cont.								
Dieldrin	N/A	0	1	3	1.40	1.40	17.60	041M5A0601
Endosulfan I	N/A	0	1	3	5.20	5.20	10.80	041M5A0401
Endosulfan sulfate	N/A	0	2	3	0.660	2.30	17.70	041M5A0401
alpha-Chlordane	N/A	0	1	3	4.50	4.50	10.50	041M5A0401
gamma-Chlordane	N/A	0	1	3	7.90	7.90	11.70	041M5A0401
Total Chlordane	N/A	0	1	3	12.40	12.40	22.20	041M5A0401
Endrin	N/A	0	1	3	1.10	1.10	0.882	041M5A0601
Total Endrin	N/A	0	1	3	6.50	6.50	36.90	041M5A0601
gamma-BHC (Lindane)	N/A	0	1	3	0.240	0.240	9.550	041M5A0401
Total BHC	N/A	0	1	3	4.140	4.140	39.20	041M5A0401
4,4'-DDD	50.0	1	2	3	1.30	100.0	50.40	041M5A0401
4,4'-DDE	40.0	2	2	3	3.60	57.0	36.90	041M5A0401
4,4'-DDT	20.0	1	2	3	3.20	7.20	20.10	041M5A0401
Total DDT	110.0	2	2	3	8.10	164.20	107.0	041M5A0401
SVOCs (g/kg)								
Benzo(b)fluoranthene	N/A	0	2	3	62.0	120.0	151.0	041M5A0401
Benzo(k)fluoranthene	N/A	0	1	3	110.0	110.0	213.0	041M5A0401
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	2	3	210.0	950.0	477.0	041M5A0501
Butylbenzylphthalate	N/A	0	1	3	140.0	140.0	220.0	041M5A0501
Di-n-octylphthalate	N/A	0	1	3	290.0	290.0	270.0	041M5A0501

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 11-1-7
Wetland 5A Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (g/L)								
Aluminum	1,090.25	0	5	6	153.0	945.0	437.0	041W5A0201
Antimony	4.00	0	1	6	3.1	3.1	3.1	041W5A0501
Barium	3.68	6	6	6	13.6	41.4	26.6	041W5A0101
Cadmium	3.00	1	1	6	3.2	3.2	3.2	041W5A0201
Calcium	7,675.00	5	6	6	5,460.0	28,600.0	15,600.0	041W5A0501
Chromium	8.00	1	1	6	11.4	11.4	11.4	041W5A0501
Cobalt	3.00	0	1	6	3.0	3.0	3.0	041W5A0101
Copper	4.00	5	3	6	7.2	21.3	16.0	041W5A0701
Iron	2,360.00	0	6	6	357.0	1,710.0	1,110.0	041W5A0501
Lead	3.20	4	5	6	2.8	20.3	11.4	041W5A0401
Magnesium	20,260.00	0	6	6	2,090.0	6,710.0	3,300.0	041W5A0501
Manganese	13.20	6	6	6	20.5	80.0	48.6	041W5A0101
Potassium	6,995.00	0	6	6	1,050.0	5,580.0	2,670.0	041W5A0501
Sodium	182,200.00	0	6	6	7,710.0	21,300.0	12,200.0	041W5A0501
Thallium	4.20	0	1	6	3.5	3.5	3.5	041W5A0101
Vanadium	4.70	1	1	6	4.8	4.8	4.8	041W5A0601
Zinc	5.53	6	4	6	55.8	236.0	123.0	041W5A0601
Pesticides (g/L)								
Endosulfan I	N/A	0	1	6	0.029	0.029	0.029	041W5A0101
SVOCs (g/L)								
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	4	6	2.0	5.0	3.0	041W5A0401
VOCs (g/L)								
1,1-Dichloroethane	N/A	0	1	6	1.0	1.0	1.0	041W5A0101
Acetone	N/A	0	1	1	9.0	9.0	9.0	041W5A0601
Bromodichloromethane	N/A	0	1	6	2.0	2.0	2.0	041W5A0601
Chloroform	N/A	0	1	6	1.0	1.0	1.0	041W5A0601
cis-1,2-Dichloroethene	N/A	0	1	6	1.0	1.0	1.0	041W5A0601
Dibromochloromethane	N/A	0	1	6	2.0	2.0	2.0	041W5A0601

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 11-1-8
Wetland 5A Phase III
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Range of Detections: Average Detection	Maximum Detection Location
Metals (g/L)								
Aluminum	1,090.25	0	3	3	124.0	668.0	305.0	041W5A0501
Antimony	4.00	1	1	3	94.3	94.3	94.3	041W5A0501
Barium	3.68	3	3	3	22.3	28.0	24.7	041W5A0501
Cadmium	3.00	0	1	3	1.2	1.2	1.2	041W5A0501
Calcium	7,675.00	3	3	3	9,160.0	12,600.0	10,600.0	041W5A0401
Chromium	8.00	1	1	3	12.0	12.0	12.0	041W5A0501
Cobalt	3.00	1	2	3	2.0	3.2	2.6	041W5A0501
Copper	4.00	2	2	3	4.1	42.8	23.5	041W5A0501
Iron	2,360.00	1	3	3	756.0	2,500.0	1,450.0	041W5A0601
Lead	3.20	2	2	3	9.0	91.4	50.2	041W5A0501
Magnesium	20,260.00	0	3	3	1,520.0	3,940.0	2,580.0	041W5A0401
Manganese	13.20	3	3	3	124.0	198.0	166.0	041W5A0501
Potassium	6,995.00	0	3	3	1,190.0	3,400.0	1,970.0	041W5A0401
Silver	4.00	0	1	3	0.1	0.1	0.1	041W5A0501
Sodium	182,200.00	0	3	3	4,450.0	9,590.0	7,670.0	041W5A0401
Vanadium	4.70	0	2	3	1.1	3.4	2.25	041W5A0501
Zinc	5.53	3	3	3	15.4	338.0	126.0	041W5A0501
VOCs (g/L)								
1,2-Dichloroethene (total)	N/A	0	1	3	1.1	1.1	1.1	041W5A0601
Acetone	N/A	0	1	3	23.0	23.0	23.0	041W5A0601
Toluene	N/A	0	1	3	0.41	0.41	0.41	041W5A0501

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 11-1-9
Wetland 5B Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Range of Detections: Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	13,610.00	0	2	2	491.0	10,500.0	5,500.0	041M5B0201
Arsenic	6.62	0	1	2	1.30	1.30	0.685	041M5B0201
Barium	14.00	1	2	2	1.30	30.20	15.80	041M5B0201
Beryllium	0.84	0	1	2	0.480	0.480	0.258	041M5B0201
Cadmium	1.80	1	2	2	0.30	220.0	110.0	041M5B0201
Calcium	10,756.67	0	2	2	109.0	4,400.0	2,250.0	041M5B0201
Chromium	39.37	1	2	2	7.90	416.0	212.0	041M5B0201
Cobalt	2.80	1	1	2	5.30	5.30	2.70	041M5B0201
Copper	19.50	1	1	2	268.0	268.0	135.0	041M5B0201
Iron	11,911.67	0	2	2	306.0	3,290.0	1,800.0	041M5B0201
Lead	82.47	1	2	2	17.90	481.0	249.0	041M5B0201
Magnesium	7,513.33	0	2	2	27.10	668.0	348.0	041M5B0201
Manganese	37.97	1	2	2	1.40	42.70	22.10	041M5B0201
Mercury	0.55	1	1	2	0.680	0.680	0.353	041M5B0201
Nickel	9.28	1	2	2	2.20	93.90	48.10	041M5B0201
Potassium	1,628.67	0	2	2	10.50	247.0	129.0	041M5B0201
Selenium	3.45	1	1	2	3.60	3.60	1.850	041M5B0201
Silver	2.10	1	1	2	5.20	5.20	2.670	041M5B0201
Sodium	18,993.33	0	1	2	95.20	95.20	48.30	041M5B0201
Vanadium	28.67	0	1	2	18.80	18.80	9.610	041M5B0201
Zinc	36.73	1	2	2	9.80	1,160.0	585.0	041M5B0201
PAHs (g/kg)								
Fluoranthene	N/A	0	1	2	110.0	110.0	65.30	041M5B0201
Pyrene	N/A	0	1	2	88.0	88.0	54.30	041M5B0201
Total PAHs	N/A	0	1	2	1,527.0	1,527.0	979.0	041M5B0201
Pesticides and PCBs (g/kg)								
Aroclor-1254	N/A	0	2	2	8.70	53.0	30.90	041M5B0201
Total PCBs	N/A	0	2	2	23.150	102.50	62.80	041M5B0201
Dieldrin	N/A	0	2	2	0.420	7.10	3.760	041M5B0201
alpha-Chlordane	N/A	0	2	2	0.190	1.20	0.695	041M5B0201
gamma-Chlordane	N/A	0	1	2	1.0	1.0	0.525	041M5B0201
Total Chlordane	N/A	0	2	2	0.240	2.20	1.220	041M5B0201
alpha-BHC	N/A	0	2	2	0.30	1.80	1.050	041M5B0201
Total BHC	N/A	0	2	2	0.450	2.340	1.40	041M5B0201
4,4'-DDD	50.0	0	1	2	2.20	2.20	1.150	041M5B0201
4,4'-DDE	40.0	0	2	2	0.320	3.90	2.110	041M5B0201
Total DDT	110.0	0	2	2	0.530	6.465	3.50	041M5B0201

Table 11-1-9
Wetland 5B Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Range of Detections: Average Detection	Maximum Detection Location
SVOCs (g/kg) - cont.								
2-Methylphenol (o-Cresol)	N/A	0	1	2	200.0	200.0	203.0	041M5B0201
4-Methylphenol (p-Cresol)	N/A	0	1	2	150.0	150.0	178.0	041M5B0201
Benzo(b)fluoranthene	N/A	0	1	2	83.0	83.0	51.80	041M5B0201
Butylbenzylphthalate	N/A	0	2	2	38.0	80.0	59.0	041M5B0201
VOCs (g/kg)								
1,2-Dichloroethene (total)	N/A	0	1	2	11.0	11.0	8.50	041M5B0201
Acetone	N/A	0	2	2	66.0	180.0	123.0	041M5B0101
Chlorobenzene	N/A	0	1	2	7.0	7.0	6.50	041M5B0201
Toluene	N/A	0	1	2	13.0	13.0	9.50	041M5B0201
Vinyl chloride	N/A	0	1	2	42.0	42.0	22.0	041M5B0201

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 11-1-10
Wetland 5B Phase IV
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	13,610.0	0	5	5	300.0	3,400.0	1,150.0	041M5B0202
Antimony	4.430	0	5	5	1.10	3.60	2.240	041M5B0202
Arsenic	6.620	0	1	5	0.840	0.840	0.382	041M5B0202
Barium	14.0	1	5	5	1.50	18.0	5.820	041M5B0202
Beryllium	0.840	0	5	5	0.036	0.150	0.072	041M5B0202
Cadmium	1.80	2	5	5	0.950	31.0	7.830	041M5B0202
Calcium	10,756.670	0	5	5	100.0	1,100.0	412.0	041M5B0202
Chromium	39.370	2	5	5	14.0	470.0	117.0	041M5B0202
Cobalt	2.80	1	5	5	0.30	4.10	1.260	041M5B0202
Copper	19.50	1	5	5	5.30	90.0	26.20	041M5B0202
Iron	11,911.670	0	5	5	210.0	1,800.0	714.0	041M5B0202
Lead	82.470	1	5	5	19.0	420.0	110.0	041M5B0202
Magnesium	7,513.330	0	5	5	26.0	210.0	81.0	041M5B0202
Manganese	37.970	0	5	5	1.10	21.0	8.120	041M5B0601
Mercury	0.550	0	4	5	0.019	0.220	0.090	041M5B0202
Nickel	9.280	1	5	5	0.610	20.0	5.160	041M5B0202
Potassium	1,628.670	0	5	5	12.0	74.0	32.0	041M5B0202
Silver	2.10	1	2	5	0.380	6.40	1.40	041M5B0202
Sodium	18,993.330	0	5	5	7.50	38.0	16.0	041M5B0202
Vanadium	28.670	0	5	5	0.550	6.70	2.080	041M5B0202
Zinc	36.730	3	5	5	19.0	200.0	70.40	041M5B0202
PAHs (g/kg)								
Benzo(a)anthracene	N/A	0	2	5	98.0	120.0	46.90	041M5B0202
Chrysene	N/A	0	3	5	56.0	160.0	69.30	041M5B0202
Fluoranthene	N/A	0	5	5	15.0	290.0	123.0	041M5B0202
Pyrene	N/A	0	5	5	13.0	210.0	95.80	041M5B0202
Total PAHs	N/A	0	5	5	55.950	922.50	413.0	041M5B0202
Pesticides and PCBs (g/kg)								
Aroclor-1260	N/A	0	4	5	20.0	150.0	65.80	041M5B0202
Total PCBs	N/A	0	4	5	56.0	202.850	110.0	041M5B0202
Dieldrin	N/A	0	5	5	8.60	100.0	32.10	041M5B0601
beta-BHC	N/A	0	1	5	2.90	2.90	0.783	041M5B0601
Total BHC	N/A	0	1	5	3.475	3.475	1.250	041M5B0601
4,4'-DDE	40.0	0	3	5	18.0	24.0	14.60	041M5B0601
Total DDT	110.0	0	3	5	25.350	31.50	20.70	041M5B0601

Table 11-1-10
Wetland 5B Phase IV
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
SVOCs (g/kg)								
3-Methylphenol/4-Methylphenol	N/A	0	2	5	73.0	200.0	75.50	041M5B0601
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	3	5	150.0	190.0	119.0	041M5B0301
Di-n-butylphthalate	N/A	0	1	5	330.0	330.0	95.20	041M5B0301
VOCs (g/kg)								
Acetone	N/A	0	2	5	21.0	28.0	14.30	041M5B0202
cis-1,2-Dichloroethene	N/A	0	1	5	7.70	7.70	2.320	041M5B0601
Toluene	N/A	0	1	5	3.50	3.50	2.150	041M5B0401
Vinyl chloride	N/A	0	1	5	3.70	3.70	1.770	041M5B0202

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 11-1-11
Wetland 5B Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections		Average Detection	Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection		
Metals (g/L)								
Aluminum	1,090.25	1	1	1	2,060.0	2,060.0	2,060.0	041W5B0201
Barium	3.68	1	1	1	27.8	27.8	27.8	041W5B0201
Cadmium	3.00	1	1	1	19.0	19.0	19.0	041W5B0201
Calcium	7,675.00	1	1	1	15,600.0	15,600.0	15,600.0	041W5B0201
Chromium	8.00	1	1	1	40.8	40.8	40.8	041W5B0201
Cobalt	3.00	1	1	1	3.9	3.9	3.9	041W5B0201
Copper	4.00	1	1	1	52.7	52.7	52.7	041W5B0201
Iron	2,360.00	1	1	1	2,890.0	2,890.0	2,890.0	041W5B0201
Lead	3.20	1	1	1	94.1	94.1	94.1	041W5B0201
Magnesium	20,260.00	0	1	1	3,250.0	3,250.0	3,250.0	041W5B0201
Manganese	13.20	1	1	1	109.0	109.0	109.0	041W5B0201
Mercury	0.13	1	1	1	0.1	0.1	0.1	041W5B0201
Potassium	6,995.00	0	1	1	2,160.0	2,160.0	2,160.0	041W5B0201
Sodium	182,200.00	0	1	1	12,600.0	12,600.0	12,600.0	041W5B0201
Vanadium	4.70	1	1	1	5.2	5.2	5.2	041W5B0201
Zinc	5.53	1	1	1	189.0	189.0	189.0	041W5B0201
SVOCs (g/L)								
2-Chlorophenol	N/A	0	1	1	1.0	1.0	1.0	041W5B0201
4-Chloro-3-methylphenol	N/A	0	1	1	1.0	1.0	1.0	041W5B0201
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	1	1	2.0	2.0	2.0	041W5B0201
N-Nitroso-di-n-propylamine	N/A	0	1	1	1.0	1.0	1.0	041W5B0201
Pyrene	N/A	0	1	1	2.0	2.0	2.0	041W5B0201
Total PAH	N/A	0	1	1	8.0	8.0	8.0	041W5B0201
VOCs (g/L)								
1,1-Dichloroethane	N/A	0	1	1	3.0	3.0	3.0	041W5B0201
Acetone	N/A	0	1	1	8.0	8.0	8.0	041W5B0201
Trichloroethene	N/A	0	1	1	10.0	10.0	10.0	041W5B0201
Vinyl chloride	N/A	0	1	1	6.0	6.0	6.0	041W5B0201

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 11-1-12
Wetland 5A Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	7	7			699	18,700	041M5A0101	18,700			N/A		Yes	No SV
Antimony	5	7	0.19	2.2	0.28	10	041M5A0101	10	J	12	2	0.83	No	Max Detect < SV
Arsenic	6	7	0.075	0.075	0.78	3.2	041M5A0501	3.2		7.24	1, 2	0.44	No	Max Detect < SV
Barium	7	7			4.1	150	041M5A0101	150			N/A		Yes	No SV
Beryllium	3	7	0.03	0.22	0.27	0.83	041M5A0101	0.83	J		N/A		Yes	No SV
Cadmium	**7**	**7**			**0.27**	**11.2**	**041M5A0101**	**11.2**		**0.68**	**1**	**16.6**	**Yes**	**Max Detect > SV**
Calcium	7	7			351	71,000	041M5A0701	71,000			N/A		Yes	No SV
Chromium	**7**	**7**			**2.8**	**115**	**041M5A0501**	**115**		**52.3**	**1, 2**	**2.2**	**Yes**	**Max Detect > SV**
Cobalt	6	7	0.65	0.65	0.3	13.4	041M5A0501	13.4	J		N/A		Yes	No SV
Copper	**7**	**7**			**13.1**	**317**	**041M5A0501**	**317**		**18.7**	**1, 2**	**17**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	7	0.3	2.1			ND	2.1	U		N/A		Yes	No SV
Iron	7	7			616	9,830	041M5A0101	9,830			N/A		Yes	No SV
Lead	**7**	**7**			**11.5**	**427**	**041M5A0101**	**427**		**30.2**	**1, 2**	**14.1**	**Yes**	**Max Detect > SV**
Magnesium	7	7			44.4	5,960	041M5A0701	5,960			N/A		Yes	No SV
Manganese	7	7			11.8	205	041M5A0101	205			N/A		Yes	No SV
Mercury	**5**	**7**	**0.025**	**0.085**	**0.25**	**1**	**041M5A0101**	**1**		**0.13**	**1, 2**	**7.69**	**Yes**	**Max Detect > SV**
Nickel	**6**	**7**	**2.65**	**2.65**	**1.3**	**25.2**	**041M5A0501**	**25.2**		**15.9**	**1, 2**	**1.58**	**Yes**	**Max Detect > SV**
Potassium	7	7			20.3	413	041M5A0101	413	J		N/A		Yes	No SV
Selenium	5	7	0.09	0.11	1.5	2.6	041M5A0501	2.6	J		N/A		Yes	No SV
Silver	**2**	**7**	**0.12**	**0.9**	**0.42**	**1.1**	**041M5A0201**	**1.1**	**J**	**0.73**	**1**	**1.5**	**Yes**	**Max Detect > SV**
Sodium	7	7			8.6	122	041M5A0401	122	J		N/A		Yes	No SV
Thallium	1	7	0.09	0.65	1.4	1.4	041M5A0101	1.4	J		N/A		Yes	No SV
Vanadium	6	7	0.55	0.55	2.2	24	041M5A0101	24			N/A		Yes	No SV
Zinc	**7**	**7**			**39.3**	**2,290**	**041M5A0101**	**2,290**		**124**	**1, 2**	**18.5**	**Yes**	**Max Detect > SV**
PAHs (µg/kg)														
2-Methylnaphthalene	0	7	20	80			ND	80	U	20.2	1	3.96	Yes	Max SQL> SV
Acenaphthene	0	7	9.5	37.5			ND	37.5	U	6.71	1	5.59	Yes	Max SQL > SV
Acenaphthylene	**1**	**7**	**20**	**70**	**120**	**120**	**041M5A0501**	**120**	**J**	**5.87**	**1**	**20.4**	**Yes**	**Max Detect > SV**
Anthracene	1	7	31.5	225	44	44	041M5A0701	44		46.9	1	0.94	No	Max Detect < SV
Benzo(a)anthracene	**3**	**7**	**22.5**	**70**	**120**	**320**	**041M5A0501**	**320**		**74.8**	**1**	**4.28**	**Yes**	**Max Detect > SV**
Benzo(a)pyrene	**4**	**7**	**22.5**	**70**	**37**	**240**	**041M5A0701**	**240**		**88.8**	**1**	**2.7**	**Yes**	**Max Detect > SV**
Chrysene	**3**	**7**	**22.5**	**70**	**180**	**510**	**041M5A0501**	**510**		**108**	**1**	**4.72**	**Yes**	**Max Detect > SV**
Dibenz(a,h)anthracene	0	7	20	80			ND	80	U	6.22	1	12.9	Yes	Max SQL > SV
Fluoranthene	**5**	**7**	**22.5**	**60**	**71**	**1,100**	**041M5A0501**	**1,100**		**113**	**1**	**9.73**	**Yes**	**Max Detect > SV**
Fluorene	0	7	9.5	37.5			ND	37.5	U	21.2	1	1.77	Yes	Max SQL> SV
Naphthalene	0	7	20	80			ND	80	U	34.6	1	2.31	Yes	Max SQL> SV
Phenanthrene	**3**	**7**	**22.5**	**70**	**110**	**240**	**041M5A0501**	**240**		**86.7**	**1**	**2.77**	**Yes**	**Max Detect > SV**
Pyrene	**5**	**7**	**22.5**	**60**	**71**	**730**	**041M5A0501**	**730**		**153**	**1**	**4.77**	**Yes**	**Max Detect > SV**
Total PAHs	**5**	**7**	**472**	**719**	**462**	**3,660**	**041M5A0501**	**3,660**		**1,684**	**1, 2**	**2.17**	**Yes**	**Max Detect > SV**
TOC Normalized PAHs	**5**	**7**	**7.21**	**73.52**	**2.13**	**1,244.29**	**041M5A0701**	**####**		**290**	**3**	**4.29**	**Yes**	**Max Detect > SV**
PCBs (µg/kg)														
Aroclor-1016	0	7	1	4.05			ND	4.05	U	21.6	1	0.19	No	Max SQL< SV
Aroclor-1221	0	7	2	8			ND	8	U	67	2	0.12	No	Max SQL< SV
Aroclor-1232	0	7	1	4.05			ND	4.05	U	21.6	1	0.19	No	Max SQL< SV
Aroclor-1242	0	7	1	4.05			ND	4.05	U	21.6	1	0.19	No	Max SQL< SV
Aroclor-1248	0	7	1	4.05			ND	4.05	U	21.6	1	0.19	No	Max SQL< SV
Aroclor-1254	1	7	1	4.05	14	14	041M5A0601	14		21.6	1	0.65	No	Max Detect < SV
Aroclor-1260	**3**	**7**	**1.6**	**3.6**	**2.6**	**100**	**041M5A0701**	**100**	**J**	**21.6**	**1**	**4.63**	**Yes**	**Max Detect > SV**
Total PCBs	**4**	**7**	**12.8**	**28.6**	**9.6**	**128**	**041M5A0701**	**128**		**21.6**	**1**	**5.94**	**Yes**	**Max Detect > SV**
Pesticides (µg/kg)														
Aldrin	0	7	0.05	0.195			ND	0.195	UJ		N/A		Yes	No SV
Dieldrin	**2**	**7**	**0.1**	**0.405**	**0.85**	**2.5**	**041M5A0101**	**2.5**	**J**	**0.72**	**1**	**3.49**	**Yes**	**Max Detect > SV**
Endosulfan I	0	7	0.05	0.405			ND	0.405	UJ		N/A		Yes	No SV
Endosulfan II	1	7	0.1	0.36	1.7	1.7	041M5A0501	1.7	J		N/A		Yes	No SV
Endosulfan sulfate	0	7	0.1	0.405			ND	0.405	UJ		N/A		Yes	No SV
Heptachlor	0	7	0.05	0.195			ND	0.195	UJ		N/A		Yes	No SV
Heptachlor epoxide	0	7	0.05	0.195			ND	0.195	UJ		N/A		Yes	No SV
Methoxychlor	0	7	0.5	1.95			ND	1.95	UJ		N/A		Yes	No SV
Toxaphene	0	7	10	37			ND	37	UJ		N/A		Yes	No SV
alpha-Chlordane	2	7	0.05	0.18	0.33	1.6	041M5A0501	1.6	J	1.7	1	0.94	No	Max Detect < SV
gamma-Chlordane	2	7	0.055	0.18	0.23	1.3	041M5A0501	1.3	J	1.7	1	0.77	No	Max Detect < SV
Total Chlordane	**3**	**7**	**0.11**	**0.36**	**0.28**	**2.9**	**041M5A0501**	**2.9**		**1.7**	**1**	**1.71**	**Yes**	**Max Detect > SV**
Endrin	1	7	0.1	0.36	1.1	1.1	041M5A0501	1.1	J	3.3	2	0.33	No	Max Detect < SV
Endrin aldehyde	1	7	0.1	0.36	0.72	0.72	041M5A0501	0.72	J	3.3	2	0.22	No	Max Detect < SV
Endrin ketone	1	7	0.115	0.405	0.26	0.26	041M5A0701	0.26		3.3	2	0.08	No	Max Detect < SV
Total Endrin	2	7	0.345	1.08	0.46	2.23	041M5A0501	2.23		3.3	2	0.67	No	Max Detect < SV
alpha-BHC	2	7	0.08	0.225	0.34	0.64	041M5A0601	0.64	J		N/A		Yes	No SV
beta-BHC	0	7	0.05	0.195			ND	0.195	U	0.32	N/A	0.61	No	Max SQL< SV
delta-BHC	0	7	0.05	0.195			ND	0.195	U	0.32	N/A	0.61	No	Max SQL< SV
gamma-BHC (Lindane)	0	7	0.05	0.195			ND	0.195	U	0.32	1	0.61	No	Max SQL< SV
Total BHC	**2**	**7**	**0.32**	**0.78**	**0.505**	**1.09**	**041M5A0601**	**1.09**		**0.32**	**2**	**3.41**	**Yes**	**Max Detect > SV**
4,4'-DDD	**5**	**7**	**0.115**	**0.405**	**0.23**	**2.3**	**041M5A0401**	**2.3**	**J**	**1.22**	**1**	**1.89**	**Yes**	**Max Detect > SV**
4,4'-DDE	**5**	**7**	**0.1**	**0.305**	**0.87**	**120**	**041M5A0501**	**120**	**D**	**2.07**	**1**	**58**	**Yes**	**Max Detect > SV**
4,4'-DDT	**3**	**7**	**0.1**	**0.305**	**0.78**	**5**	**041M5A0501**	**5**	**J**	**1.19**	**1**	**4.2**	**Yes**	**Max Detect > SV**
Total DDT	**7**	**7**			**0.43**	**125**	**041M5A0501**	**125**		**3.3**	**2**	**38**	**Yes**	**Max Detect > SV**
SVOCs (µg/kg)														
1,2,4-Trichlorobenzene	0	7	200	800			ND	800	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	7	200	800			ND	800	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	7	200	800			ND	800	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	7	200	800			ND	800	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	6	225	800			ND	800	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	7	480	1,900			ND	1,900	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	7	200	800			ND	800	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	7	200	800			ND	800	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	7	200	800			ND	800	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	7	480	1,900			ND	1,900	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	7	200	800			ND	800	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	7	200	800			ND	800	U		N/A		Yes	No SV
2-Chloronaphthalene	0	7	200	800			ND	800	U		N/A		Yes	No SV
2-Chlorophenol	0	7	200	800			ND	800	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	7	480	1,900			ND	1,900	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	7	200	800			ND	800	U		N/A		Yes	No SV
2-Nitroaniline	0	7	200	800			ND	800	U		N/A		Yes	No SV
2-Nitrophenol	0	7	200	800			ND	800	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	7	200	800			ND	800	U		N/A		Yes	No SV
3-Nitroaniline	0	7	480	1,900			ND	1,900	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	7	200	800			ND	800	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	7	200	800			ND	800	U		N/A		Yes	No SV
4-Chloroaniline	0	7	200	800			ND	800	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	7	200	800			ND	800	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	3	7	200	600	100	200	041M5A0101	200	J		N/A		Yes	No SV
4-Nitroaniline	0	7	480	1,900			ND	1,900	U		N/A		Yes	No SV
4-Nitrophenol	0	7	480	1,900			ND	1,900	U		N/A		Yes	No SV
Benzo(b)fluoranthene	3	7	22.5	80	57	360	041M5A0701	360			N/A		Yes	No SV
Benzo(g,h,i)perylene	3	7	22.5	70	120	280	041M5A0501	280			N/A		Yes	No SV
Benzo(k)fluoranthene	3	7	22.5	80	73	170	041M5A0701	170			N/A		Yes	No SV
bis(2-Chloroethoxy)methane	1	7	200	700	110	110	041M5A0501	110	J		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	7	20	80			ND	80	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**3**	**7**	**315**	**700**	**690**	**1,500**	**041M5A0501**	**1,500**	**J**	**182**	**1, 2**	**8.24**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	**1**	**7**	**200**	**700**	**200**	**200**	**041M5A0501**	**200**	**J**	**182**	**1, 2**	**1.1**	**Yes**	**Max Detect > SV**
Carbazole	2	7	225	700	48	96	041M5A0501	96	J		N/A		Yes	No SV
Dibenzofuran	0	7	200	800			ND	800	U		N/A		Yes	No SV
Diethylphthalate	0	7	200	800			ND	800	U	182	1, 2	4.4	Yes	Max SQL > SV
Dimethylphthalate	0	7	200	800			ND	800	U	182	1, 2	4.4	Yes	Max SQL > SV
Di-n-butylphthalate	1	7	200	700	100	100	041M5A0501	100	J	182	1, 2	0.55	No	Max Detect < SV
Di-n-octylphthalate	1	7	225	800	22	22	041M5A0701	22	J	182	1, 2	0.12	No	Max Detect < SV
Hexachlorobenzene	0	7	200	800			ND	800	U		N/A		Yes	No SV
Hexachlorobutadiene	0	7	200	800			ND	800	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	7	200	800			ND	800	U		N/A		Yes	No SV
Hexachloroethane	0	7	200	800			ND	800	U		N/A		Yes	No SV

Table 11-1-12
Wetland 5A Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (µg/kg) - cont.														
Indeno(1,2,3-cd)pyrene	3	7	22.5	70	110	310	041M5A0501	310			N/A		Yes	No SV
Isophorone	0	7	200	800			ND	800	U		N/A		Yes	No SV
Nitrobenzene	0	7	200	800			ND	800	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	7	20	80			ND	80	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	7	200	800			ND	800	U		N/A		Yes	No SV
Pentachlorophenol	0	7	480	1,900			ND	1,900	U		N/A		Yes	No SV
Phenol	0	7	200	800			ND	800	U		N/A		Yes	No SV
VOCs (µg/kg)														
1,1,1-Trichloroethane	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
1,1-Dichloroethane	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
1,2-Dichloropropane	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
2-Butanone (MEK)	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
2-Hexanone	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Acetone	5	7	6.5	65	140	5,200	041M5A0201	5,200	J		N/A		Yes	No SV
Benzene	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Bromodichloromethane	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Bromoform	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Bromomethane	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Carbon disulfide	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Carbon tetrachloride	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Chlorobenzene	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Chloroethane	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Chloroform	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Chloromethane	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Dibromochloromethane	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Ethylbenzene	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Methylene chloride	1	7	6.5	41.5	250	250	041M5A0101	250	J		N/A		Yes	No SV
Styrene	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Tetrachloroethene	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Toluene	3	7	6.5	26.5	5	280	041M5A0401	280			N/A		Yes	No SV
trans-1,3-Dichloropropene	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Trichloroethene	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV
Vinyl chloride	0	7	2	26.5			ND	26.5	U		N/A		Yes	No SV
Xylene (Total)	0	7	6.5	41.5			ND	41.5	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 11-1-13
Wetland 5A Phase II
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDD	4-Methylphenol (p-Cresol)	Acetone
Barium	4,4'-DDE	Acenaphthylene	Methylene chloride
Beryllium	4,4'-DDT	Benzo(a)anthracene	Toluene
Cadmium	alpha-BHC	Benzo(a)pyrene	
Calcium	Dieldrin	Benzo(b)fluoranthene	
Chromium	Endosulfan II	Benzo(g,h,i)perylene	
Cobalt	Total BHC	Benzo(k)fluoranthene	
Copper	Total Chlordane	Butylbenzylphthalate	
Iron	Total DDT	Carbazole	
Lead	Aroclor-1260	Chrysene	
Magnesium	Total PCBs	Fluoranthene	
Manganese		Indeno(1,2,3-cd)pyrene	
Mercury		Indeno(1,2,3-cd)pyrene	
Nickel		Phenanthrene	
Potassium		Pyrene	
Selenium		TOC Normalized PAHs	
Silver		Total PAHs	
Sodium			
Thallium			
Vanadium			
Zinc			
		Not Detected Parameters	
Cyanide (CN)	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
	Endosulfan I	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
	Endosulfan sulfate	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Heptachlor	1,4-Dichlorobenzene	1,1-Dichloroethane
	Heptachlor epoxide	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Methoxychlor	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Toxaphene	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
		2,4-Dichlorophenol	1,2-Dichloropropane
		2,4-Dimethylphenol	2-Butanone (MEK)
		2,4-Dinitrophenol	2-Hexanone
		2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
		2,6-Dinitrotoluene	Benzene
		2-Chloronaphthalene	Bromodichloromethane
		2-Chlorophenol	Bromoform
		2-Methyl-4,6-Dinitrophenol	Bromomethane
		2-Methylnaphthalene	Carbon disulfide
		2-Methylphenol (o-Cresol)	Carbon tetrachloride
		2-Nitroaniline	Chlorobenzene
		2-Nitrophenol	Chloroethane
		3,3'-Dichlorobenzidine	Chloroform
		3-Nitroaniline	Chloromethane
		4-Bromophenyl-phenylether	cis-1,3-Dichloropropene
		4-Chloro-3-methylphenol	Dibromochloromethane
		4-Chloroaniline	Ethylbenzene
		4-Chlorophenylphenyl ether	Styrene
		4-Nitroaniline	Tetrachloroethene
		4-Nitrophenol	trans-1,3-Dichloropropene
		Acenaphthene	Trichloroethene
		bis(2-Chloroethyl)ether	Vinyl chloride
		Dibenz(a,h)anthracene	Xylene (Total)
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Fluorene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Naphthalene	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 11-1-14
Wetland 5A Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	7	7				8,120	699	18,700	18,700		041M5A0101			NA					0	13,610	1	Yes	EPC > RC and no RV
Barium	7	7				40.1	4.1	150	150		041M5A0101			NA					0	14	4	Yes	EPC > RC and no RV
Beryllium	3	7	0.0963	0.03	0.22	0.276	0.27	0.83	0.83	J	041M5A0101			NA					0	0.84	0	No	EPC < RC
Cadmium	**7**	**7**				**5.95**	**0.27**	**11.2**	**11.2**		**041M5A0101**	**0.68**	**4.21**	**PEL**	**16.6**	**8.8**	**2.66**	**1.41**	**4**	**1.8**	**5**	**Yes**	**EPC > RV and RC**
Calcium	7	7				14,000	351	71,000	71,000		041M5A0701			NA					0	10,757	1	No	Essential Nutrient
Chromium	7	7				51.6	2.8	115	115		041M5A0501	52.3	160	PEL	2.2	0.99	0.72	0.32	0	39.37	3	No	EPC > RC, but < RV
Cobalt	6	7	0.65	0.65	0.65	4.31	0.3	13.4	13.4	J	041M5A0501			NA					0	2.8	3	Yes	EPC > RC and no RV
Copper	**7**	**7**				**87.5**	**13.1**	**317**	**317**		**041M5A0501**	**18.7**	**108**	**PEL**	**17**	**4.68**	**2.94**	**0.81**	**2**	**19.5**	**4**	**Yes**	**EPC > RV and RC**
Cyanide (CN)	0	7	1.06	0.3	2.1	1.06			2.1	U	ND			NA					0	5.22	0	No	Parameter Not Detected
Iron	7	7				4,680	616	9,830	9,830		041M5A0101			NA					0	11,912	0	No	EPC < RC
Lead	**7**	**7**				**174**	**11.5**	**427**	**427**		**041M5A0101**	**30.2**	**112**	**PEL**	**14.1**	**5.75**	**3.81**	**1.55**	**3**	**82.47**	**4**	**Yes**	**EPC > RV and RC**
Magnesium	7	7				1,330	44.4	5,960	5,960		041M5A0701			NA					0	7,513	0	No	EPC < RC; Essential Nutrient
Manganese	7	7				59.7	11.8	205	205		041M5A0101			NA					0	37.97	3	Yes	EPC > RC and no RV
Mercury	**5**	**7**	**0.055**	**0.025**	**0.085**	**0.444**	**0.25**	**1**	**1**		**041M5A0101**	**0.13**	**0.696**	**PEL**	**7.69**	**3.42**	**1.44**	**0.64**	**2**	**0.55**	**2**	**Yes**	**EPC > RV and RC**
Nickel	6	7	2.65	2.65	2.65	10.9	1.3	25.2	25.2		041M5A0501	15.9	42.8	PEL	1.58	0.69	0.59	0.26	0	9.28	3	No	EPC > RC, but < RV
Potassium	7	7				185	20.3	413	413	J	041M5A0101			NA					0	1,629	0	No	EPC < RC; Essential Nutrient
Selenium	5	7	0.1	0.09	0.11	1.34	1.5	2.6	2.6	J	041M5A0501			NA					0	3.45	0	No	EPC < RC
Silver	2	7	0.51	0.12	0.9	0.581	0.42	1.1	1.1	J	041M5A0201	0.733	1.77	PEL	1.5	0.79	0.62	0.33	0	2.1	0	No	EPC < RC and RV
Sodium	7	7				55.3	8.6	122	122	J	041M5A0401			NA					0	18,993	0	No	EPC < RC; Essential Nutrient
Thallium	1	7	0.309	0.09	0.65	0.465	1.4	1.4	1.4	J	041M5A0101			NA					0	1.57	0	No	EPC < RC
Vanadium	6	7	0.55	0.55	0.55	11.7	2.2	24	24		041M5A0101			NA					0	28.67	0	No	EPC < RC
Zinc	**7**	**7**				**459**	**39.3**	**2,290**	**2,290**		**041M5A0101**	**124**	**271**	**PEL**	**18.5**	**3.7**	**8.45**	**1.69**	**2**	**36.73**	**7**	**Yes**	**EPC > RV and RC**
PAHs (µg/kg)																							
2-Methylnaphthalene	0	7	49.1	20	80	49.1			80	U	ND	20.2	201	PEL	3.96	2.43	0.40	0.24	0		0	No	Parameter Not Detected
Acenaphthene	0	7	23.7	9.5	37.5	23.7			37.5	U	ND	6.71	88.9	PEL	5.59	3.53	0.42	0.27	0		0	No	Parameter Not Detected
Acenaphthylene	1	7	44	20	70	54.9	120	120	120	J	041M5A0501	5.87	128	PEL	20.4	9.35	0.94	0.43	0		0	No	RV HQ <1 and no RC
Anthracene	1	7	87.8	31.5	225	81.5	44	44	44		041M5A0701	46.9	245	PEL	0.94	1.74	0.18	0.33	0		0	No	RV HQ <1 and no RC
Benzo(a)anthracene	3	7	46	22.5	70	123	120	320	320		041M5A0501	74.8	693	PEL	4.28	1.65	0.46	0.18	0		0	No	RV HQ <1 and no RC
Benzo(a)pyrene	4	7	50.8	22.5	70	116	37	240	240		041M5A0701	88.8	763	PEL	2.7	1.3	0.32	0.15	0		0	No	RV HQ <1 and no RC
Chrysene	3	7	46	22.5	70	181	180	510	510		041M5A0501	108	846	PEL	4.72	1.67	0.60	0.21	0		0	No	RV HQ <1 and no RC
Dibenz(a,h)anthracene	0	7	49.1	20	80	49.1			80	U	ND	6.22	135	PEL	12.9	7.9	0.59	0.36	0		0	No	Parameter Not Detected
Fluoranthene	5	7	41.3	22.5	60	339	71	1,100	1,100		041M5A0501	113	1,494	PEL	9.73	3	0.74	0.23	0		0	No	RV HQ <1 and no RC
Fluorene	0	7	23.7	9.5	37.5	23.7			37.5	U	ND	21.2	144	PEL	1.77	1.12	0.26	0.17	0		0	No	Parameter Not Detected
Naphthalene	0	7	49.1	20	80	49.1			80	U	ND	34.6	391	PEL	2.31	1.42	0.21	0.13	0		0	No	Parameter Not Detected
Phenanthrene	3	7	46	22.5	70	109	110	240	240		041M5A0501	86.7	544	PEL	2.77	1.26	0.44	0.20	0		0	No	RV HQ <1 and no RC
Pyrene	5	7	41.3	22.5	60	258	71	730	730		041M5A0501	153	1,398	PEL	4.77	1.69	0.52	0.19	0		0	No	RV HQ <1 and no RC
Total PAHs	5	7	596	472	719	1,460	462	3,660	3,660		041M5A0501	1,684	16,770	PEL	2.17	0.87	0.22	0.09	0		0	No	RV HQ <1 and no RC
TOC Normalized PAHs	5	7	40.37	7.21	73.52	195.56	2.13	1,244.29	1,244.29		041M5A0701	290	1,800	MEC	4.29	0.67	0.69	0.11	0		0	No	RV HQ <1 and no RC
PCBs (µg/kg)																							
Aroclor-1016	0	7	2.64	1	4.05	2.64			4.05	U	ND	21.6	189	PEL	0.19	0.12	0.02	0.01	0		0	No	Parameter Not Detected
Aroclor-1221	0	7	5.26	2	8	5.26			8	U	ND	67	189	PEL	0.12	0.08	0.04	0.03	0		0	No	Parameter Not Detected
Aroclor-1232	0	7	2.64	1	4.05	2.64			4.05	U	ND	21.6	189	PEL	0.19	0.12	0.02	0.01	0		0	No	Parameter Not Detected
Aroclor-1242	0	7	2.64	1	4.05	2.64			4.05	U	ND	21.6	189	PEL	0.19	0.12	0.02	0.01	0		0	No	Parameter Not Detected
Aroclor-1248	0	7	2.64	1	4.05	2.64			4.05	U	ND	21.6	189	PEL	0.19	0.12	0.02	0.01	0		0	No	Parameter Not Detected
Aroclor-1254	1	7	2.71	1	4.05	4.32	14	14	14		041M5A0601	21.6	189	PEL	0.65	0.2	0.07	0.02	0		0	No	RV HQ <1 and no RC
Aroclor-1260	3	7	2.63	1.6	3.6	18.4	2.6	100	100	J	041M5A0701	21.6	189	PEL	4.63	0.85	0.53	0.10	0		0	No	RV HQ <1 and no RC
Total PCBs	4	7	21.9	12.8	28.6	38.6	9.6	128	128		041M5A0701	21.6	189	PEL	5.94	1.79	0.68	0.20	0		0	No	RV HQ <1 and no RC
Pesticides (µg/kg)																							
Aldrin	0	7	0.124	0.05	0.195	0.124			0.195	UJ	ND			NA					0		0	No	Parameter Not Detected
Dieldrin	2	7	0.266	0.1	0.405	0.669	0.85	2.5	2.5	J	041M5A0101	0.716	4.3	PEL	3.49	0.93	0.58	0.16	0		0	No	RV HQ <1 and no RC
Endosulfan I	0	7	0.174	0.05	0.405	0.174			0.405	UJ	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	1	7	0.223	0.1	0.36	0.434	1.7	1.7	1.7	J	041M5A0501			NA					0		0	Yes	No SV, no RV, and no RC
Endosulfan sulfate	0	7	0.249	0.1	0.405	0.249			0.405	UJ	ND			NA					0		0	No	Parameter Not Detected
Heptachlor	0	7	0.124	0.05	0.195	0.124			0.195	UJ	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	7	0.124	0.05	0.195	0.124			0.195	UJ	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	7	1.24	0.5	1.95	1.24			1.95	UJ	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	7	22.4	10	37	22.4			37	UJ	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	2	7	0.104	0.05	0.18	0.35	0.33	1.6	1.6	J	041M5A0501	1.7	4.79	PEL	0.94	0.21	0.33	0.07	0		0	No	RV HQ <1 and no RC
gamma-Chlordane	2	7	0.124	0.055	0.18	0.307	0.23	1.3	1.3	J	041M5A0501	1.7	4.79	PEL	0.77	0.18	0.27	0.06	0		0	No	RV HQ <1 and no RC
Total Chlordane	3	7	0.235	0.11	0.36	0.657	0.28	2.9	2.9		041M5A0501	1.7	4.79	PEL	1.71	0.39	0.61	0.14	0		0	No	RV HQ <1 and no RC
alpha-BHC	2	7	0.167	0.08	0.225	0.259	0.34	0.64	0.64	J	041M5A0601		0.99	PEL			0.65	0.26	0		0	No	RV HQ <1 and no RC
beta-BHC	0	7	0.124	0.05	0.195	0.124			0.195	U	ND	0.32	0.99	PEL	0.61	0.39	0.20	0.13	0		0	No	Parameter Not Detected
delta-BHC	0	7	0.124	0.05	0.195	0.124			0.195	U	ND	0.32	0.99	PEL	0.61	0.39	0.20	0.13	0		0	No	Parameter Not Detected
gamma-BHC (Lindane)	0	7	0.124	0.05	0.195	0.124			0.195	U	ND	0.32	0.99	PEL	0.61	0.39	0.20	0.13	0		0	No	Parameter Not Detected
Total BHC	**2**	**7**	**0.563**	**0.32**	**0.78**	**0.63**	**0.505**	**1.09**	**1.09**		**041M5A0601**	**0.32**	**0.99**	**PEL**	**3.41**	**1.97**	**1.1**	**0.64**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	5	7	0.26	0.115	0.405	0.861	0.23	2.3	2.3	J	041M5A0401	1.22	7.81	PEL	1.89	0.71	0.29	0.11	0	50	0	No	EPC < RC and RV
4,4'-DDE	5	7	0.203	0.1	0.305	17.9	0.87	120	120	D	041M5A0501	2.07	374	PEL	58	8.67	0.32	0.05	0	40	1	No	EPC > RC, but < RV
4,4'-DDT	**3**	**7**	**0.17**	**0.1**	**0.305**	**1.11**	**0.78**	**5**	**5**	**J**	**041M5A0501**	**1.19**	**4.77**	**PEL**	**4.2**	**0.93**	**1.05**	**0.23**	**1**	**20**	**0**	**No**	**EPC > RV, but < RC**
Total DDT	**7**	**7**				**19.9**	**0.43**	**125**	**125**		**041M5A0501**	**3.3**	**51.7**	**PEL**	**38**	**6.03**	**2.43**	**0.39**	**1**	**110**	**1**	**Yes**	**EPC > RV and RC**
SVOCs (µg/kg)																							
1,2,4-Trichlorobenzene	0	7	491	200	800	491			800	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	7	491	200	800	491			800	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	7	491	200	800	491			800	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	7	491	200	800	491			800	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	6	540	225	800	540			800	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	7	1,180	480	1,900	1,180			1,900	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	7	491	200	800	491			800	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	7	491	200	800	491			800	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	7	491	200	800	491			800	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	7	1,180	480	1,900	1,180			1,900	U	ND			NA					0		0	No	Parameter Not Detected

Table 11-1-14
Wetland 5A Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result HQ	SV	Average Result SV HQ	Maximum Result HQ	RV	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
2,4-Dinitrotoluene	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
2-Chlorophenol	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	7	1,180	480	1,900	1,180			1,900	U	ND			NA							0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
2-Nitroaniline	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
2-Nitrophenol	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
3-Nitroaniline	0	7	1,180	480	1,900	1,180			1,900	U	ND			NA							0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
4-Chloroaniline	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	3	7	335	200	600	256	100	200	200	J	041M5A0101			NA							0		0	Yes	No SV, no RV, and no RC
4-Nitroaniline	0	7	1,180	480	1,900	1,180			1,900	U	ND			NA							0		0	No	Parameter Not Detected
4-Nitrophenol	0	7	1,180	480	1,900	1,180			1,900	U	ND			NA							0		0	No	Parameter Not Detected
Benzo(b)fluoranthene	3	7	58.1	22.5	80	124	57	360	360		041M5A0701			NA							0		0	No	TOC Normalized PAHs < MEC
Benzo(g,h,i)perylene	3	7	46	22.5	70	111	120	280	280		041M5A0501			NA							0		0	No	TOC Normalized PAHs < MEC
Benzo(k)fluoranthene	3	7	48.5	22.5	80	75	73	170	170		041M5A0701			NA							0		0	No	TOC Normalized PAHs < MEC
bis(2-Chloroethoxy)methane	1	7	440	200	700	393	110	110	110	J	041M5A0501			NA							0		0	Yes	No SV, no RV, and no RC
bis(2-Chloroethyl)ether	0	7	49.1	20	80	49.1			80	U	ND			NA							0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	3	7	554	315	700	815	690	1500	1,500	J	041M5A0501	182	2647	PEL	8.24		4.48	0.57		0.31	0		0	No	RV HQ <1 and no RC
Butylbenzylphthalate	1	7	440	200	700	406	200	200	200	J	041M5A0501	182	2647	PEL	1.1		2.23	0.08		0.15	0		0	No	RV HQ <1 and no RC
Carbazole	2	7	488	225	700	369	48	96	96	J	041M5A0501			NA							0		0	Yes	No SV, no RV, and no RC
Dibenzofuran	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
Diethylphthalate	0	7	491	200	800	491			800	U	ND	182	2647	PEL	4.4		2.7	0.30		0.19	0		0	No	Parameter Not Detected
Dimethylphthalate	0	7	491	200	800	491			800	U	ND	182	2647	PEL	4.4		2.7	0.30		0.19	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
Hexachloroethane	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	3	7	46	22.5	70	113	110	310	310		041M5A0501			NA							0		0	No	TOC Normalized PAHs < MEC
Isophorone	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
Nitrobenzene	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	7	49.1	20	80	49.1			80	U	ND			NA							0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
Pentachlorophenol	0	7	1,180	480	1,900	1,180			1,900	U	ND			NA							0		0	No	Parameter Not Detected
Phenol	0	7	491	200	800	491			800	U	ND			NA							0		0	No	Parameter Not Detected
VOCs (µg/kg)																									
1,1,1-Trichloroethane	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
2-Hexanone	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Acetone	5	7	35.8	6.5	65	1,690	140	5,200	5,200	J	041M5A0201			NA							0		0	Yes	No SV, no RV, and no RC
Benzene	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Bromodichloromethane	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Bromoform	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Bromomethane	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Carbon disulfide	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Carbon tetrachloride	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Chlorobenzene	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Chloroethane	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Chloroform	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Chloromethane	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Dibromochloromethane	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Ethylbenzene	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Methylene chloride	1	7	18.2	6.5	41.5	51.3	250	250	250	J	041M5A0101			NA							0		0	Yes	No SV, no RV, and no RC
Styrene	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Tetrachloroethene	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Toluene	3	7	12.5	6.5	26.5	63.6	5	280	280		041M5A0401			NA							0		0	Yes	No SV, no RV, and no RC
trans-1,3-Dichloropropene	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Trichloroethene	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected
Vinyl chloride	0	7	8.07	2	26.5	8.07			26.5	U	ND			NA							0		0	No	Parameter Not Detected
Xylene (Total)	0	7	18	6.5	41.5	18			41.5	U	ND			NA							0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 11-1-15
Wetland 5A Phase II
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	Endosulfan II	4-Methylphenol (p-Cresol)	None
Barium	Total BHC	bis(2-Chloroethoxy)methane	
Cadmium	Total DDT	Carbazole	
Cobalt			
Copper			
Lead			
Manganese			
Mercury			
Zinc			

Table 11-1-16
Wetland 5A Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M5A0101	11/16/1995	mg/kg	2.5	J	Arsenic	8.2	70	0.04
041M5A0101	**11/16/1995**	**mg/kg**	**11.2**		**Cadmium**	**1.2**	**9.6**	**1.17**
041M5A0101	11/16/1995	mg/kg	81.1		Chromium	81	370	0.22
041M5A0101	11/16/1995	mg/kg	156		Copper	34	270	0.58
041M5A0101	**11/16/1995**	**mg/kg**	**427**		**Lead**	**46.7**	**218**	**1.96**
041M5A0101	**11/16/1995**	**mg/kg**	**1**		**Mercury**	**0.15**	**0.71**	**1.41**
041M5A0101	11/16/1995	mg/kg	23.5		Nickel	20.9	51.6	0.46
041M5A0101	11/16/1995	mg/kg	0.6	U	Silver	1	3.7	0.16
041M5A0101	**11/16/1995**	**mg/kg**	**2,290**		**Zinc**	**150**	**410**	**5.59**
041M5A0101	11/16/1995	g/kg	0.87	J	4,4'-DDE	2.2	27	0.03
041M5A0101	11/16/1995	g/kg	0.78	J	4,4'-DDT	1.58	46.1	0.02
041M5A0101	11/16/1995	g/kg	36.75		Total PCBs	22.7	180	0.20
041M5A0101	11/16/1995	g/kg	60	U	2-Methylnaphthalene	70	670	0.09
041M5A0101	11/16/1995	g/kg	28.5	U	Acenaphthene	16	500	0.06
041M5A0101	11/16/1995	g/kg	60	U	Acenaphthylene	44	640	0.09
041M5A0101	11/16/1995	g/kg	60	U	Anthracene	85.3	1,100	0.05
041M5A0101	11/16/1995	g/kg	120		Benzo(a)anthracene	261	1,600	0.08
041M5A0101	11/16/1995	g/kg	140		Benzo(a)pyrene	430	1,600	0.09
041M5A0101	11/16/1995	g/kg	180		Chrysene	384	2,800	0.06
041M5A0101	11/16/1995	g/kg	60	U	Dibenz(a,h)anthracene	63.4	260	0.23
041M5A0101	11/16/1995	g/kg	280		Fluoranthene	600	5,100	0.05
041M5A0101	11/16/1995	g/kg	28.5	U	Fluorene	19	540	0.05
041M5A0101	11/16/1995	g/kg	60	U	Naphthalene	160	2,100	0.03
041M5A0101	11/16/1995	g/kg	110	J	Phenanthrene	240	1,500	0.07
041M5A0101	11/16/1995	g/kg	220		Pyrene	665	2,600	0.08
041M5A0101	11/16/1995				ERM Quotient Sum			12.87
041M5A0101	11/16/1995				Mean ERM Quotient			0.51
041M5A0101	11/16/1995				Mean ERM Quotient without ND			0.48
041M5A0101	11/16/1995				Mean ERM Quotient Category			2
041M5A0201	11/16/1995	mg/kg	2.5		Arsenic	8.2	70	0.04
041M5A0201	11/16/1995	mg/kg	7.6		Cadmium	1.2	9.6	0.79
041M5A0201	11/16/1995	mg/kg	38.9		Chromium	81	370	0.11
041M5A0201	11/16/1995	mg/kg	13.1		Copper	34	270	0.05
041M5A0201	11/16/1995	mg/kg	64.6		Lead	46.7	218	0.30
041M5A0201	11/16/1995	mg/kg	0.085	U	Mercury	0.15	0.71	0.12
041M5A0201	11/16/1995	mg/kg	5.8	J	Nickel	20.9	51.6	0.11
041M5A0201	11/16/1995	mg/kg	1.1	J	Silver	1	3.7	0.30
041M5A0201	11/16/1995	mg/kg	39.3		Zinc	150	410	0.10
041M5A0201	11/16/1995	g/kg	1.4	J	4,4'-DDE	2.2	27	0.05
041M5A0201	11/16/1995	g/kg	0.16	UJ	4,4'-DDT	1.58	46.1	0.00
041M5A0201	11/16/1995	g/kg	12.8	U	Total PCBs	22.7	180	0.07
041M5A0201	11/16/1995	g/kg	31.5	U	2-Methylnaphthalene	70	670	0.05
041M5A0201	11/16/1995	g/kg	15.5	U	Acenaphthene	16	500	0.03
041M5A0201	11/16/1995	g/kg	31.5	U	Acenaphthylene	44	640	0.05
041M5A0201	11/16/1995	g/kg	31.5	U	Anthracene	85.3	1,100	0.03
041M5A0201	11/16/1995	g/kg	31.5	U	Benzo(a)anthracene	261	1,600	0.02
041M5A0201	11/16/1995	g/kg	37	J	Benzo(a)pyrene	430	1,600	0.02
041M5A0201	11/16/1995	g/kg	31.5	U	Chrysene	384	2,800	0.01
041M5A0201	11/16/1995	g/kg	31.5	U	Dibenz(a,h)anthracene	63.4	260	0.12
041M5A0201	11/16/1995	g/kg	71		Fluoranthene	600	5,100	0.01
041M5A0201	11/16/1995	g/kg	15.5	U	Fluorene	19	540	0.03
041M5A0201	11/16/1995	g/kg	31.5	U	Naphthalene	160	2,100	0.02
041M5A0201	11/16/1995	g/kg	31.5	U	Phenanthrene	240	1,500	0.02
041M5A0201	11/16/1995	g/kg	71		Pyrene	665	2,600	0.03
041M5A0201	11/16/1995				ERM Quotient Sum			2.47
041M5A0201	11/16/1995				Mean ERM Quotient			0.10
041M5A0201	11/16/1995				Mean ERM Quotient without ND			0.08
041M5A0201	11/16/1995				Mean ERM Quotient Category			2
041M5A0301	11/16/1995	mg/kg	2.6		Arsenic	8.2	70	0.04
041M5A0301	11/16/1995	mg/kg	7.7		Cadmium	1.2	9.6	0.80
041M5A0301	11/16/1995	mg/kg	69.3		Chromium	81	370	0.19
041M5A0301	11/16/1995	mg/kg	28.5		Copper	34	270	0.11
041M5A0301	11/16/1995	mg/kg	111		Lead	46.7	218	0.51
041M5A0301	11/16/1995	mg/kg	0.37		Mercury	0.15	0.71	0.52
041M5A0301	11/16/1995	mg/kg	16		Nickel	20.9	51.6	0.31
041M5A0301	11/16/1995	mg/kg	0.38	U	Silver	1	3.7	0.10
041M5A0301	11/16/1995	mg/kg	96.9		Zinc	150	410	0.24
041M5A0301	11/16/1995	g/kg	0.305	UJ	4,4'-DDE	2.2	27	0.01
041M5A0301	11/16/1995	g/kg	0.305	UJ	4,4'-DDT	1.58	46.1	0.01
041M5A0301	11/16/1995	g/kg	24.3	U	Total PCBs	22.7	180	0.14
041M5A0301	11/16/1995	g/kg	60	U	2-Methylnaphthalene	70	670	0.09
041M5A0301	11/16/1995	g/kg	29.5	U	Acenaphthene	16	500	0.06
041M5A0301	11/16/1995	g/kg	60	U	Acenaphthylene	44	640	0.09
041M5A0301	11/16/1995	g/kg	60	U	Anthracene	85.3	1,100	0.05
041M5A0301	11/16/1995	g/kg	60	U	Benzo(a)anthracene	261	1,600	0.04
041M5A0301	11/16/1995	g/kg	60	U	Benzo(a)pyrene	430	1,600	0.04
041M5A0301	11/16/1995	g/kg	60	U	Chrysene	384	2,800	0.02
041M5A0301	11/16/1995	g/kg	60	U	Dibenz(a,h)anthracene	63.4	260	0.23
041M5A0301	11/16/1995	g/kg	60	U	Fluoranthene	600	5,100	0.01
041M5A0301	11/16/1995	g/kg	29.5	U	Fluorene	19	540	0.05
041M5A0301	11/16/1995	g/kg	60	UJ	Naphthalene	160	2,100	0.03
041M5A0301	11/16/1995	g/kg	60	U	Phenanthrene	240	1,500	0.04
041M5A0301	11/16/1995	g/kg	60	U	Pyrene	665	2,600	0.02
041M5A0301	11/16/1995				ERM Quotient Sum			3.75
041M5A0301	11/16/1995				Mean ERM Quotient			0.15
041M5A0301	11/16/1995				Mean ERM Quotient without ND			0.11
041M5A0301	11/16/1995				Mean ERM Quotient Category			2

Table 11-1-16
Wetland 5A Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M5A0401	11/16/1995	mg/kg	1.2	J	Arsenic	8.2	70	0.02
041M5A0401	11/16/1995	mg/kg	4.2		Cadmium	1.2	9.6	0.44
041M5A0401	11/16/1995	mg/kg	33.7		Chromium	81	370	0.09
041M5A0401	11/16/1995	mg/kg	68.9		Copper	34	270	0.26
041M5A0401	11/16/1995	mg/kg	169		Lead	46.7	218	0.78
041M5A0401	11/16/1995	mg/kg	0.54	J	Mercury	0.15	0.71	0.76
041M5A0401	11/16/1995	mg/kg	2.65	U	Nickel	20.9	51.6	0.05
041M5A0401	11/16/1995	mg/kg	0.9	U	Silver	1	3.7	0.24
041M5A0401	11/16/1995	mg/kg	91.7		Zinc	150	410	0.22
041M5A0401	11/16/1995	g/kg	1.7	J	4,4'-DDE	2.2	27	0.06
041M5A0401	11/16/1995	g/kg	1.3	J	4,4'-DDT	1.58	46.1	0.03
041M5A0401	11/16/1995	g/kg	28.6	U	Total PCBs	22.7	180	0.16
041M5A0401	11/16/1995	g/kg	70	U	2-Methylnaphthalene	70	670	0.10
041M5A0401	11/16/1995	g/kg	34.5	U	Acenaphthene	16	500	0.07
041M5A0401	11/16/1995	g/kg	70	U	Acenaphthylene	44	640	0.11
041M5A0401	11/16/1995	g/kg	70	U	Anthracene	85.3	1,100	0.06
041M5A0401	11/16/1995	g/kg	70	U	Benzo(a)anthracene	261	1,600	0.04
041M5A0401	11/16/1995	g/kg	70	U	Benzo(a)pyrene	430	1,600	0.04
041M5A0401	11/16/1995	g/kg	70	U	Chrysene	384	2,800	0.03
041M5A0401	11/16/1995	g/kg	70	U	Dibenz(a,h)anthracene	63.4	260	0.27
041M5A0401	11/16/1995	g/kg	88	J	Fluoranthene	600	5,100	0.02
041M5A0401	11/16/1995	g/kg	34.5	U	Fluorene	19	540	0.06
041M5A0401	11/16/1995	g/kg	70	U	Naphthalene	160	2,100	0.03
041M5A0401	11/16/1995	g/kg	70	U	Phenanthrene	240	1,500	0.05
041M5A0401	11/16/1995	g/kg	83	J	Pyrene	665	2,600	0.03
041M5A0401	11/16/1995				ERM Quotient Sum			4.03
041M5A0401	11/16/1995				Mean ERM Quotient			0.16
041M5A0401	11/16/1995				Mean ERM Quotient without ND			0.11
041M5A0401	11/16/1995				Mean ERM Quotient Category			2
041M5A0501	11/27/1995	mg/kg	3.2		Arsenic	8.2	70	0.05
041M5A0501	**11/27/1995**	**mg/kg**	**10.1**		**Cadmium**	**1.2**	**9.6**	**1.05**
041M5A0501	11/27/1995	mg/kg	115		Chromium	81	370	0.31
041M5A0501	**11/27/1995**	**mg/kg**	**317**		**Copper**	**34**	**270**	**1.17**
041M5A0501	**11/27/1995**	**mg/kg**	**383**	**J**	**Lead**	**46.7**	**218**	**1.76**
041M5A0501	**11/27/1995**	**mg/kg**	**0.84**		**Mercury**	**0.15**	**0.71**	**1.18**
041M5A0501	11/27/1995	mg/kg	25.2		Nickel	20.9	51.6	0.49
041M5A0501	11/27/1995	mg/kg	0.55	UJ	Silver	1	3.7	0.15
041M5A0501	**11/27/1995**	**mg/kg**	**591**		**Zinc**	**150**	**410**	**1.44**
041M5A0501	**11/27/1995**	**g/kg**	**120**	**D**	**4,4'-DDE**	**2.2**	**27**	**4.44**
041M5A0501	11/27/1995	g/kg	5	J	4,4'-DDT	1.58	46.1	0.11
041M5A0501	11/27/1995	g/kg	128.25		Total PCBs	22.7	180	0.71
041M5A0501	11/27/1995	g/kg	80	U	2-Methylnaphthalene	70	670	0.12
041M5A0501	11/27/1995	g/kg	37.5	U	Acenaphthene	16	500	0.08
041M5A0501	11/27/1995	g/kg	120	J	Acenaphthylene	44	640	0.19
041M5A0501	11/27/1995	g/kg	80	U	Anthracene	85.3	1,100	0.07
041M5A0501	11/27/1995	g/kg	320		Benzo(a)anthracene	261	1,600	0.20
041M5A0501	11/27/1995	g/kg	240		Benzo(a)pyrene	430	1,600	0.15
041M5A0501	11/27/1995	g/kg	510		Chrysene	384	2,800	0.18
041M5A0501	11/27/1995	g/kg	80	U	Dibenz(a,h)anthracene	63.4	260	0.31
041M5A0501	11/27/1995	g/kg	1,100		Fluoranthene	600	5,100	0.22
041M5A0501	11/27/1995	g/kg	37.5	U	Fluorene	19	540	0.07
041M5A0501	11/27/1995	g/kg	80	U	Naphthalene	160	2,100	0.04
041M5A0501	11/27/1995	g/kg	240		Phenanthrene	240	1,500	0.16
041M5A0501	11/27/1995	g/kg	730		Pyrene	665	2,600	0.28
041M5A0501	11/27/1995				ERM Quotient Sum			14.93
041M5A0501	11/27/1995				Mean ERM Quotient			0.60
041M5A0501	11/27/1995				Mean ERM Quotient without ND			0.56
041M5A0501	11/27/1995				Mean ERM Quotient Category			3
041M5A0601	11/17/1995	mg/kg	0.075	UJ	Arsenic	8.2	70	0.00
041M5A0601	11/17/1995	mg/kg	0.56		Cadmium	1.2	9.6	0.06
041M5A0601	11/17/1995	mg/kg	20.6		Chromium	81	370	0.06
041M5A0601	11/17/1995	mg/kg	16.2		Copper	34	270	0.06
041M5A0601	11/17/1995	mg/kg	48.6	J	Lead	46.7	218	0.22
041M5A0601	11/17/1995	mg/kg	0.25		Mercury	0.15	0.71	0.35
041M5A0601	11/17/1995	mg/kg	1.3	J	Nickel	20.9	51.6	0.03
041M5A0601	11/17/1995	mg/kg	0.42	J	Silver	1	3.7	0.11
041M5A0601	11/17/1995	mg/kg	51.3		Zinc	150	410	0.13
041M5A0601	11/17/1995	g/kg	1.2		4,4'-DDE	2.2	27	0.04
041M5A0601	11/17/1995	g/kg	0.115	U	4,4'-DDT	1.58	46.1	0.00
041M5A0601	11/17/1995	g/kg	29.85		Total PCBs	22.7	180	0.17
041M5A0601	11/17/1995	g/kg	22.5	U	2-Methylnaphthalene	70	670	0.03
041M5A0601	11/17/1995	g/kg	11	U	Acenaphthene	16	500	0.02
041M5A0601	11/17/1995	g/kg	22.5	U	Acenaphthylene	44	640	0.04
041M5A0601	11/17/1995	g/kg	225	U	Anthracene	85.3	1,100	0.20
041M5A0601	11/17/1995	g/kg	22.5	U	Benzo(a)anthracene	261	1,600	0.01
041M5A0601	11/17/1995	g/kg	22.5	U	Benzo(a)pyrene	430	1,600	0.01
041M5A0601	11/17/1995	g/kg	22.5	U	Chrysene	384	2,800	0.01
041M5A0601	11/17/1995	g/kg	22.5	U	Dibenz(a,h)anthracene	63.4	260	0.09
041M5A0601	11/17/1995	g/kg	22.5	U	Fluoranthene	600	5,100	0.00
041M5A0601	11/17/1995	g/kg	11	U	Fluorene	19	540	0.02
041M5A0601	11/17/1995	g/kg	22.5	U	Naphthalene	160	2,100	0.01
041M5A0601	11/17/1995	g/kg	22.5	U	Phenanthrene	240	1,500	0.02
041M5A0601	11/17/1995	g/kg	22.5	U	Pyrene	665	2,600	0.01
041M5A0601	11/17/1995				ERM Quotient Sum			1.70
041M5A0601	11/17/1995				Mean ERM Quotient			0.07
041M5A0601	11/17/1995				Mean ERM Quotient without ND			0.05
041M5A0601	11/17/1995				Mean ERM Quotient Category			2

Table 11-1-16
Wetland 5A Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M5A0701	11/16/1995	mg/kg	0.78		Arsenic	8.2	70	0.01
041M5A0701	11/16/1995	mg/kg	0.27	J	Cadmium	1.2	9.6	0.03
041M5A0701	11/16/1995	mg/kg	2.8		Chromium	81	370	0.01
041M5A0701	11/16/1995	mg/kg	13.1		Copper	34	270	0.05
041M5A0701	11/16/1995	mg/kg	11.5		Lead	46.7	218	0.05
041M5A0701	11/16/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M5A0701	11/16/1995	mg/kg	2	J	Nickel	20.9	51.6	0.04
041M5A0701	11/16/1995	mg/kg	0.12	U	Silver	1	3.7	0.03
041M5A0701	11/16/1995	mg/kg	54.7		Zinc	150	410	0.13
041M5A0701	11/16/1995	g/kg	0.1	U	4,4'-DDE	2.2	27	0.00
041M5A0701	11/16/1995	g/kg	0.1	U	4,4'-DDT	1.58	46.1	0.00
041M5A0701	11/16/1995	g/kg	9.6		Total PCBs	22.7	180	0.05
041M5A0701	11/16/1995	g/kg	20	U	2-Methylnaphthalene	70	670	0.03
041M5A0701	11/16/1995	g/kg	9.5	U	Acenaphthene	16	500	0.02
041M5A0701	11/16/1995	g/kg	20	U	Acenaphthylene	44	640	0.03
041M5A0701	11/16/1995	g/kg	44		Anthracene	85.3	1,100	0.04
041M5A0701	11/16/1995	g/kg	240		Benzo(a)anthracene	261	1,600	0.15
041M5A0701	11/16/1995	g/kg	240		Benzo(a)pyrene	430	1,600	0.15
041M5A0701	11/16/1995	g/kg	390		Chrysene	384	2,800	0.14
041M5A0701	11/16/1995	g/kg	20	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M5A0701	11/16/1995	g/kg	750		Fluoranthene	600	5,100	0.15
041M5A0701	11/16/1995	g/kg	9.5	U	Fluorene	19	540	0.02
041M5A0701	11/16/1995	g/kg	20	UJ	Naphthalene	160	2,100	0.01
041M5A0701	11/16/1995	g/kg	230		Phenanthrene	240	1,500	0.15
041M5A0701	11/16/1995	g/kg	620		Pyrene	665	2,600	0.24
041M5A0701	11/16/1995				ERM Quotient Sum			1.65
041M5A0701	11/16/1995				Mean ERM Quotient			0.07
041M5A0701	11/16/1995				Mean ERM Quotient without ND			0.06
041M5A0701	11/16/1995				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 11-1-17
Wetland 5A Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	**5**	**6**	**70**	**70**	**70**	**376**	**153**	**945**	**041W5A0201**	**945**		**13**	**FDEP**	**72.7**	**Yes**	**Max Detect > SV**
Antimony	1	6	1	1	1	1.35	3.1	3.1	041W5A0501	3.1	J	160	EPA	0.02	No	Max Detect < SV
Arsenic	0	6	1	1	1	1			ND	1	U	50	FDEP	0.02	No	Max SQL< SV
Barium	6	6				26.6	13.6	41.4	041W5A0101	41.4	J		NA		Yes	No SV
Beryllium	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	0.13	FDEP	3.85	Yes	Max SQL > SV
Cadmium	**1**	**6**	**1.5**	**1.5**	**1.5**	**1.78**	**3.2**	**3.2**	**041W5A0201**	**3.2**	**J**	**0.66**	**EPA**	**4.85**	**Yes**	**Max Detect > SV**
Calcium	6	6				15,600	5,460	28,600	041W5A0501	28,600			NA		Yes	No SV
Chromium	**1**	**6**	**4**	**4**	**4**	**5.23**	**11.4**	**11.4**	**041W5A0501**	**11.4**		**11**	**EPA**	**1.04**	**Yes**	**Max Detect > SV**
Cobalt	1	6	1.5	1.5	1.5	1.75	3	3	041W5A0101	3			NA		Yes	No SV
Copper	**3**	**6**	**5.62**	**2.2**	**9.25**	**10.8**	**7.2**	**21.3**	**041W5A0701**	**21.3**	**J**	**6.54**	**EPA**	**3.26**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	6	2.5	2.5	2.5	2.5			ND	2.5	U	5.2	EPA	0.48	No	Max SQL< SV
Iron	6	6				1,110	357	1,710	041W5A0501	1,710			NA		Yes	No SV
Lead	**5**	**6**	**0.7**	**0.7**	**0.7**	**9.6**	**2.8**	**20.3**	**041W5A0401**	**20.3**	**J**	**1.32**	**EPA**	**15.4**	**Yes**	**Max Detect > SV**
Magnesium	6	6				3,300	2,090	6,710	041W5A0501	6,710			NA		Yes	No SV
Manganese	6	6				48.6	20.5	80	041W5A0101	80			NA		Yes	No SV
Mercury	0	6	0.065	0.065	0.065	0.065			ND	0.065	U	0.012	EPA	5.42	Yes	Max SQL > SV
Nickel	0	6	6	6	6	6			ND	6	U	87.71	EPA	0.07	No	Max SQL< SV
Potassium	6	6				2,670	1,050	5,580	041W5A0501	5,580			NA		Yes	No SV
Selenium	0	6	1.5	1.5	1.5	1.5			ND	1.5	U	5	EPA	0.3	No	Max SQL< SV
Silver	0	6	2	2	2	2			ND	2	U	0.012	EPA	167	Yes	Max SQL > SV
Sodium	6	6				12,200	7,710	21,300	041W5A0501	21,300			NA		Yes	No SV
Thallium	1	6	1.5	1.5	1.5	1.83	3.5	3.5	041W5A0101	3.5	J	4	EPA	0.88	No	Max Detect < SV
Vanadium	1	6	1.27	1	1.7	1.86	4.8	4.8	041W5A0601	4.8	J		NA		Yes	No SV
Zinc	**4**	**6**	**18.2**	**13.6**	**22.85**	**88.3**	**55.8**	**236**	**041W5A0601**	**236**		**58.91**	**EPA**	**4.01**	**Yes**	**Max Detect > SV**
Pesticides (g/L)																
Aldrin	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	1	6	0.025	0.025	0.025	0.0257	0.029	0.029	041W5A0101	0.029	J	0.056	EPA	0.52	No	Max Detect < SV
Endosulfan II	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	6.58	Yes	Max SQL > SV
Heptachlor epoxide	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	6	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	11.6	Yes	Max SQL > SV
Endrin	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	6	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
beta-BHC	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	No	Max SQL< SV
Total BHC	0	6	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	6	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	6	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	35.7	Yes	Max SQL > SV
Total PCB	0	6	4	4	4	4			ND	4	U		NA		Yes	No SV

Table 11-1-17
Wetland 5A Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	6	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	6	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chloronaphthalene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chlorophenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U	43.8	EPA	0.06	No	Max SQL< SV
2-Methyl-4,6-Dinitrophenol	0	6	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitroaniline	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitrophenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3-Nitroaniline	0	6	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloroaniline	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Nitroaniline	0	6	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Nitrophenol	0	6	10	10	10	10			ND	10	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**4**	**6**	**2.5**	**2.5**	**2.5**	**2.83**	**2**	**5**	**041W5A0401**	**5**		**0.3**	**EPA**	**16.7**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dibenzofuran	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Diethylphthalate	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dimethylphthalate	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Di-n-butylphthalate	0	6	2.5	2.5	2.5	2.5			ND	2.5	U	9.4	EPA	0.27	No	Max SQL< SV
Di-n-octylphthalate	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobenzene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Hexachlorobutadiene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachloroethane	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Isophorone	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Nitrobenzene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pentachlorophenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Phenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthylene	0	6	0.833	0.5	2.5	0.833			ND	2.5	U		NA		Yes	No SV
Anthracene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)anthracene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)pyrene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chrysene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluoranthene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluorene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Naphthalene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	26	FDEP	0.02	No	Max SQL< SV

Table 11-1-17
Wetland 5A Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
PAHs (g/L) - cont.																
Phenanthrene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Pyrene	0	6	1.33	0.5	5.5	1.33			ND	5.5	U		NA		Yes	No SV
Total PAH	0	6	7.67	6.5	11.5	7.67			ND	11.5	U		NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	270	FDEP	0.00	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	1	6	0.5	0.5	0.5	0.583	1	1	041W5A0101	1			NA		Yes	No SV
1,1-Dichloroethene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.16	No	Max SQL< SV
1,2-Dibromo-3-Chloropropane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	15.8	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloropropane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	3	FDEP	0.17	No	Max SQL< SV
2-Hexanone	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Acetone	1	1				9	9	9	041W5A0601	9	J		NA		Yes	No SV
Benzene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	53	EPA	0.01	No	Max SQL< SV
Bromochloromethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	1	6	0.5	0.5	0.5	0.75	2	2	041W5A0601	2			NA		Yes	No SV
Bromoform	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	17	FDEP	0.03	No	Max SQL< SV
Chloroethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	1	6	0.5	0.5	0.5	0.583	1	1	041W5A0601	1		289	EPA	0.00	No	Max Detect < SV
Chloromethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,2-Dichloroethene	1	6	0.5	0.5	0.5	0.583	1	1	041W5A0601	1			NA		Yes	No SV
cis-1,3-Dichloropropene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	1	6	0.5	0.5	0.5	0.75	2	2	041W5A0601	2			NA		Yes	No SV
Ethylbenzene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	453	EPA	0.00	No	Max SQL< SV
Methylene chloride	0	6	3.17	2.5	3.5	3.17			ND	3.5	U	1,580	FDEP	0.00	No	Max SQL< SV
Styrene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	175	EPA	0.00	No	Max SQL< SV
trans-1,2-Dichloroethene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Vinyl chloride	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening Value (detailed explanation for SVs provided in Section 8).
RV = Refinement Value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No Refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value

Table 11-1-18
Wetland 5A Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	bis(2-Ethylhexyl)phthalate (BEHP)	1,1-Dichloroethane
Barium			Acetone
Cadmium			Bromodichloromethane
Calcium			cis-1,2-Dichloroethene
Chromium			Dibromochloromethane
Cobalt			
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Potassium			
Sodium			
Vanadium			
Zinc			
		Not Detected Parameters	
Beryllium	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Mercury	Dieldrin	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1,2-Trichloroethane
Silver	Endosulfan II	2,4,5-Trichlorophenol	1,2-Dibromo-3-Chloropropane
	Endosulfan sulfate	2,4,6-Trichlorophenol	1,2-Dibromoethane
	Heptachlor	2,4-Dichlorophenol	1,2-Dichloroethane
	Heptachlor epoxide	2,4-Dimethylphenol	1,2-Dichloropropane
	Methoxychlor	2,4-Dinitrophenol	1,3-Dichlorobenzene
	Toxaphene	2,4-Dinitrotoluene	2-Hexanone
	alpha-Chlordane	2,6-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
	gamma-Chlordane	2-Chloronaphthalene	Bromochloromethane
	Total Chlordane	2-Methyl-4,6-Dinitrophenol	Bromoform
	Endrin	2-Methylphenol (o-Cresol)	Bromomethane
	Endrin aldehyde	2-Nitroaniline	Carbon disulfide
	Endrin ketone	2-Nitrophenol	Carbon tetrachloride
	Total Endrin	3,3'-Dichlorobenzidine	Chloroethane
	alpha-BHC	3-Nitroaniline	Chloromethane
	beta-BHC	4-Bromophenyl-phenylether	cis-1,3-Dichloropropene
	delta-BHC	4-Chloro-3-methylphenol	Styrene
	Total BHC	4-Chloroaniline	Tetrachloroethene
	4,4'-DDD	4-Chlorophenylphenyl ether	trans-1,2-Dichloroethene
	4,4'-DDE	4-Methylphenol (p-Cresol)	trans-1,3-Dichloropropene
	4,4'-DDT	4-Nitroaniline	Trichloroethene
	Total DDT	4-Nitrophenol	Vinyl chloride
	Aroclor-1016	Benzo(b)fluoranthene	Xylene (Total)
	Aroclor-1221	Benzo(g,h,i)perylene	
	Aroclor-1232	Benzo(k)fluoranthene	
	Aroclor-1242	bis(2-Chloroethoxy)methane	
	Aroclor-1248	bis(2-Chloroethyl)ether	
	Aroclor-1254	Butylbenzylphthalate	
	Aroclor-1260	Dibenzofuran	
	Total PCBs	Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	

Table 11-1-18
Wetland 5A Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Not Detected Parameters - cont.	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 11-1-19
Wetland 5A Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
Metals (µg/L)																				
Aluminum	**5**	**6**	**70**	**70**	**70**	**376**	**153**	**945**	**041W5A0201**	**945**		**13**	**FDEP**	**73**	**28.9**	**1,090**	**0**	**6**	**No**	**Max Result < Ref. Conc.**
Barium	6	6				26.6	13.6	41.4	041W5A0101	41.4	J		NA			3.67	6	6	Yes	Max Result > Ref. Conc.
Beryllium	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	0.13	FDEP	4	3.85	1	0	6	No	Max Result < Ref. Conc.
Cadmium	**1**	**6**	**1.5**	**1.5**	**1.5**	**1.78**	**3.2**	**3.2**	**041W5A0201**	**3.2**	**J**	**0.66**	**EPA**	**5**	**2.7**	**3**	**1**	**6**	**Yes**	**Max Result > Ref. Conc.**
Calcium	6	6				15,600	5,460	28,600	041W5A0501	28,600			NA			7,680	5	6	No	Essential Nutrient
Chromium	**1**	**6**	**4**	**4**	**4**	**5.23**	**11.4**	**11.4**	**041W5A0501**	**11.4**		**11**	**EPA**	**1.04**	**0.48**	**8**	**1**	**6**	**Yes**	**Max Result > Ref. Conc.**
Cobalt	1	6	1.5	1.5	1.5	1.75	3	3	041W5A0101	3			NA			3	0	6	No	Max Result < Ref. Conc.
Copper	**3**	**6**	**5.62**	**2.2**	**9.25**	**10.8**	**7.2**	**21.3**	**041W5A0701**	**21.3**	**J**	**6.54**	**EPA**	**3.26**	**1.66**	**4**	**5**	**6**	**Yes**	**Max Result > Ref. Conc.**
Iron	6	6				1,110	357	1,710	041W5A0501	1,710			NA			2,360	0	6	No	Max Result < Ref. Conc.
Lead	**5**	**6**	**0.7**	**0.7**	**0.7**	**9.6**	**2.8**	**20.3**	**041W5A0401**	**20.3**	**J**	**1.32**	**EPA**	**15.38**	**7.27**	**3.2**	**4**	**6**	**Yes**	**Max Result > Ref. Conc.**
Magnesium	6	6				3,300	2,090	6,710	041W5A0501	6,710			NA			20,300	0	6	No	Max Result < Ref. Conc.
Manganese	6	6				48.6	20.5	80	041W5A0101	80			NA			13.2	6	6	Yes	Max Result > Ref. Conc.
Mercury	0	6	0.065	0.065	0.065	0.065			ND	0.065	U	0.012	EPA	5.42	5.42	0.13	0	6	No	Max Result < Ref. Conc.
Potassium	6	6				2,670	1,050	5,580	041W5A0501	5,580			NA			7,000	0	6	No	Max Result < Ref. Conc.
Silver	0	6	2	2	2	2			ND	2	U	0.012	EPA	167	167	4	0	6	No	Max Result < Ref. Conc.
Sodium	6	6				12,200	7,710	21,300	041W5A0501	21,300			NA			182,000	0	6	No	Max Result < Ref. Conc.
Vanadium	1	6	1.27	1	1.7	1.86	4.8	4.8	041W5A0601	4.8	J		NA			4.7	1	6	Yes	Max Result > Ref. Conc.
Zinc	**4**	**6**	**18.2**	**13.6**	**22.85**	**88.3**	**55.8**	**236**	**041W5A0601**	**236**		**58.91**	**EPA**	**4.01**	**1.5**	**5.53**	**6**	**6**	**Yes**	**Max Result > Ref. Conc.**
Pesticides (µg/L)																				
Aldrin	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Dieldrin	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Endosulfan II	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Endosulfan sulfate	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Heptachlor	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	7	6.58		0	6	No	No Ref. Conc.; Parameter Not Detected
Heptachlor epoxide	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	6	No	No Ref. Conc.; Parameter Not Detected
Methoxychlor	0	6	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Toxaphene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
alpha-Chlordane	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
gamma-Chlordane	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Total Chlordane	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	12	11.6		0	6	No	No Ref. Conc.; Parameter Not Detected
Endrin	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Endrin aldehyde	0	6	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Endrin ketone	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22	21.7		0	6	No	No Ref. Conc.; Parameter Not Detected
Total Endrin	0	6	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
alpha-BHC	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
beta-BHC	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
delta-BHC	0	6	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
gamma-BHC (Lindane)	0	6	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	0.31		0	6	No	No Ref. Conc.; Parameter Not Detected
Total BHC	0	6	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
4,4'-DDD	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	6	No	No Ref. Conc.; Parameter Not Detected
4,4'-DDE	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	6	No	No Ref. Conc.; Parameter Not Detected
4,4'-DDT	0	6	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85	84.7		0	6	No	No Ref. Conc.; Parameter Not Detected
Total DDT	0	6	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
PCBs (µg/L)																				
Aroclor-1016	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Aroclor-1221	0	6	1	1	1	1			ND	1	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Aroclor-1232	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Aroclor-1242	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Aroclor-1248	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Aroclor-1254	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Aroclor-1260	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	36	35.7		0	6	No	No Ref. Conc.; Parameter Not Detected
Total PCB	0	6	4	4	4	4			ND	4	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
SVOCs (µg/L)																				
1,2,4-Trichlorobenzene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2,4,5-Trichlorophenol	0	6	10	10	10	10			ND	10	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2,4,6-Trichlorophenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2,4-Dichlorophenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2,4-Dimethylphenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2,4-Dinitrophenol	0	6	10	10	10	10			ND	10	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2,4-Dinitrotoluene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2,6-Dinitrotoluene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2-Chloronaphthalene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	6	10	10	10	10			ND	10	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2-Methylphenol (o-Cresol)	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2-Nitroaniline	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2-Nitrophenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
3,3'-Dichlorobenzidine	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
3-Nitroaniline	0	6	10	10	10	10			ND	10	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
4-Bromophenyl-phenylether	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
4-Chloro-3-methylphenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
4-Chloroaniline	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
4-Chlorophenylphenyl ether	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
4-Methylphenol (p-Cresol)	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
4-Nitroaniline	0	6	10	10	10	10			ND	10	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
4-Nitrophenol	0	6	10	10	10	10			ND	10	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected

Table 11-1-19
Wetland 5A Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
SVOCs (µg/L) - cont.																				
Benzo(b)fluoranthene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Benzo(g,h,i)perylene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Benzo(k)fluoranthene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
bis(2-Chloroethoxy)methane	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
bis(2-Chloroethyl)ether	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	**4**	**6**	**2.5**	**2.5**	**2.5**	**2.83**	**2**	**5**	**041W5A0401**	**5**		**0.3**	**EPA**	**17**	**9.44**		**0**	**6**	**Yes**	**No Ref. Conc.**
Butylbenzylphthalate	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Dibenzofuran	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Diethylphthalate	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Dimethylphthalate	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Di-n-octylphthalate	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Hexachlorobenzene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Hexachlorobutadiene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Hexachlorocyclopentadiene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Hexachloroethane	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Isophorone	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Nitrobenzene	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
N-Nitroso-di-n-propylamine	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
N-Nitrosodiphenylamine	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Pentachlorophenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Phenol	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
PAHs (µg/L)																				
2-Methylnaphthalene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Acenaphthene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Acenaphthylene	0	6	0.833	0.5	2.5	0.833			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Anthracene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Benzo(a)anthracene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Benzo(a)pyrene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Chrysene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Dibenz(a,h)anthracene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Fluoranthene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Fluorene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Naphthalene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U	26	FDEP	0.02	0.02		0	6	No	No Ref. Conc.; Parameter Not Detected
Phenanthrene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Pyrene	0	6	1.33	0.5	5.5	1.33			ND	5.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Total PAH	0	6	7.67	6.5	11.5	7.67			ND	11.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
VOCs (µg/L)																				
1,1,2,2-Tetrachloroethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
1,1,2-Trichloroethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
1,1-Dichloroethane	1	6	0.5	0.5	0.5	0.583	1	1	041W5A0101	1			NA				0	6	Yes	No Ref. Conc.
1,2-Dibromo-3-Chloropropane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
1,2-Dibromoethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
1,2-Dichloroethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
1,2-Dichloropropane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
1,3-Dichlorobenzene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
2-Hexanone	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	6	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Acetone	1	1				9	9	9	041W5A0601	9	J		NA				0	1	Yes	No Ref. Conc.
Bromochloromethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Bromodichloromethane	1	6	0.5	0.5	0.5	0.75	2	2	041W5A0601	2			NA				0	6	Yes	No Ref. Conc.
Bromoform	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Bromomethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Carbon disulfide	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Carbon tetrachloride	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Chloroethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Chloromethane	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
cis-1,2-Dichloroethene	1	6	0.5	0.5	0.5	0.583	1	1	041W5A0601	1			NA				0	6	Yes	No Ref. Conc.
cis-1,3-Dichloropropene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Dibromochloromethane	1	6	0.5	0.5	0.5	0.75	2	2	041W5A0601	2			NA				0	6	Yes	No Ref. Conc.
Styrene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Tetrachloroethene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
trans-1,2-Dichloroethene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
trans-1,3-Dichloropropene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Trichloroethene	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Vinyl chloride	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected
Xylene (Total)	0	6	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	6	No	No Ref. Conc.; Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening Value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No Refinement value available.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 11-1-20
Wetland 5A Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Lead	None	bis(2-Ethylhexyl)phthalate (BEHP)	Dibromochloromethane
Manganese			cis-1,2-Dichloroethene
Barium			Acetone
Cadmium			Bromodichloromethane
Chromium			1,1-Dichloroethane
Copper			
Vanadium			
Zinc			

Table 11-1-21
Wetland 5A Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	3	3			821	2,480	041M5A0401	2,480			N/A		Yes	No SV
Antimony	**2**	**3**	**0.75**	**0.75**	**2**	**27.7**	**041M5A0501**	**27.7**	**J**	**12**	**2**	**2.31**	**Yes**	**Max Detect > SV**
Arsenic	1	3	0.225	0.23	0.52	0.52	041M5A0401	0.52	J	7.24	1, 2	0.07	No	Max Detect < SV
Barium	3	3			6.9	17.2	041M5A0501	17.2			N/A		Yes	No SV
Beryllium	2	3	0.025	0.025	0.13	0.2	041M5A0401	0.2			N/A		Yes	No SV
Cadmium	**3**	**3**			**0.42**	**3.2**	**041M5A0501**	**3.2**		**0.676**	**1**	**4.73**	**Yes**	**Max Detect > SV**
Calcium	3	3			495	3,660	041M5A0501	3,660			N/A		Yes	No SV
Chromium	3	3			4.1	50.1	041M5A0501	50.1		52.3	1, 2	0.96	No	Max Detect < SV
Cobalt	3	3			0.94	1.6	041M5A0501	1.6	J		N/A		Yes	No SV
Copper	**3**	**3**			**21.5**	**108**	**041M5A0501**	**108**		**18.7**	**1, 2**	**5.78**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	3	0.45	0.48			ND	0.48	UJ		N/A		Yes	No SV
Iron	3	3			546	3,020	041M5A0501	3,020			N/A		Yes	No SV
Lead	**3**	**3**			**54.5**	**258**	**041M5A0501**	**258**		**30.2**	**1, 2**	**8.54**	**Yes**	**Max Detect > SV**
Magnesium	3	3			56.1	690	041M5A0501	690			N/A		Yes	No SV
Manganese	3	3			8.6	21.3	041M5A0501	21.3			N/A		Yes	No SV
Mercury	**3**	**3**			**0.06**	**0.13**	**041M5A0401**	**0.13**		**0.13**	**1, 2**	**1**	**Yes**	**Max Detect = SV**
Nickel	3	3			1.8	7.5	041M5A0501	7.5		15.9	1, 2	0.47	No	Max Detect < SV
Potassium	2	3	8.4	8.4	54	93.2	041M5A0401	93.2			N/A		Yes	No SV
Selenium	1	3	0.13	0.14	0.6	0.6	041M5A0501	0.6	J		N/A		Yes	No SV
Silver	1	3	0.045	0.05	0.15	0.15	041M5A0501	0.15	J	0.733	1	0.21	No	Max Detect < SV
Sodium	3	3			14.6	35	041M5A0401	35	J		N/A		Yes	No SV
Thallium	0	3	0.295	0.315			ND	0.315	U		N/A		Yes	No SV
Vanadium	3	3			1.8	4.2	041M5A0401	4.2			N/A		Yes	No SV
Zinc	**3**	**3**			**77.1**	**394**	**041M5A0501**	**394**		**124**	**1, 2**	**3.18**	**Yes**	**Max Detect > SV**
PAHs (µg/kg)														
2-Methylnaphthalene	0	3	250	270			ND	270	U	20.2	1	13.4	Yes	Max SQL > SV
Acenaphthene	0	3	250	270			ND	270	U	6.71	1	40.2	Yes	Max SQL > SV
Acenaphthylene	0	3	250	270			ND	270	U	5.87	1	46	Yes	Max SQL > SV
Anthracene	1	3	260	270	16	16	041M5A0401	16	J	46.9	1	0.34	No	Max Detect < SV
Benzo(a)anthracene	**2**	**3**	**270**	**270**	**41**	**100**	**041M5A0401**	**100**	**J**	**74.8**	**1**	**1.34**	**Yes**	**Max Detect > SV**
Benzo(a)pyrene	**2**	**3**	**270**	**270**	**52**	**140**	**041M5A0401**	**140**	**J**	**88.8**	**1**	**1.58**	**Yes**	**Max Detect > SV**
Chrysene	**2**	**3**	**270**	**270**	**58**	**170**	**041M5A0401**	**170**	**J**	**108**	**1**	**1.57**	**Yes**	**Max Detect > SV**
Dibenz(a,h)anthracene	0	3	250	270			ND	270	U	6.22	1	43.4	Yes	Max SQL > SV
Fluoranthene	**3**	**3**			**16**	**260**	**041M5A0401**	**260**	**J**	**113**	**1**	**2.3**	**Yes**	**Max Detect > SV**
Fluorene	0	3	250	270			ND	270	U	21.2	1	12.7	Yes	Max SQL > SV
Naphthalene	0	3	250	270			ND	270	U	34.6	1	7.8	Yes	Max SQL > SV
Phenanthrene	**2**	**3**	**270**	**270**	**28**	**97**	**041M5A0401**	**97**	**J**	**86.7**	**1**	**1.12**	**Yes**	**Max Detect > SV**
Pyrene	**2**	**3**	**270**	**270**	**87**	**300**	**041M5A0401**	**300**	**J**	**153**	**1**	**1.96**	**Yes**	**Max Detect > SV**
Total PAHs	**3**	**3**			**2,160**	**3,260**	**041M5A0601**	**3,260**		**1,684**	**1, 2**	**1.93**	**Yes**	**Max Detect > SV**
TOC Normalized PAHs	**3**	**3**			**291.62**	**369**	**041M5A0401**	**369**		**290**	**3**	**1.27**	**Yes**	**Max Detect > SV**
PCBs (µg/kg)														
Aroclor-1016	0	3	25	500			ND	500	U	21.6	N/A	23.1	Yes	Max SQL > SV
Aroclor-1221	0	3	50	1,050			ND	1,050	U	67	2	15.7	Yes	Max SQL > SV
Aroclor-1232	0	3	25	500			ND	500	U	21.6	N/A	23.1	Yes	Max SQL > SV
Aroclor-1242	0	3	25	500			ND	500	U	21.6	N/A	23.1	Yes	Max SQL > SV
Aroclor-1248	0	3	25	500			ND	500	U	21.6	N/A	23.1	Yes	Max SQL > SV
Aroclor-1254	0	3	25	500			ND	500	U	21.6	N/A	23.1	Yes	Max SQL > SV
Aroclor-1260	0	3	25	500			ND	500	U	21.6	N/A	23.1	Yes	Max SQL > SV
Total PCBs	0	3	200	4,050			ND	4,050	U	21.6	1	188	Yes	Max SQL > SV
Pesticides (µg/kg)														
Aldrin	0	3	1.3	27			ND	27	U		N/A		Yes	No SV
Dieldrin	**1**	**3**	**1.45**	**50**	**1.4**	**1.4**	**041M5A0601**	**1.4**	**J**	**0.716**	**1**	**1.96**	**Yes**	**Max Detect > SV**
Endosulfan I	1	3	0.15	27	5.2	5.2	041M5A0401	5.2			N/A		Yes	No SV
Endosulfan II	0	3	2.5	50			ND	50	U		N/A		Yes	No SV
Endosulfan sulfate	2	3	50	50	0.66	2.3	041M5A0401	2.3	J		N/A		Yes	No SV
Heptachlor	0	3	1.3	27			ND	27	U		N/A		Yes	No SV
Heptachlor epoxide	0	3	1.3	27			ND	27	U		N/A		Yes	No SV
Methoxychlor	0	3	0.33	270			ND	270	U		N/A		Yes	No SV
Toxaphene	0	3	130	2,700			ND	2,700	U		N/A		Yes	No SV
alpha-Chlordane	**1**	**3**	**0.13**	**27**	**4.5**	**4.5**	**041M5A0401**	**4.5**		**1.7**	**1**	**2.65**	**Yes**	**Max Detect > SV**
gamma-Chlordane	**1**	**3**	**0.07**	**27**	**7.9**	**7.9**	**041M5A0401**	**7.9**	**J**	**1.7**	**1**	**4.65**	**Yes**	**Max Detect > SV**
Total Chlordane	**1**	**3**	**0.2**	**54**	**12.4**	**12.4**	**041M5A0401**	**12.4**		**1.7**	**1**	**7.29**	**Yes**	**Max Detect > SV**
Endrin	1	3	0.345	1.2	1.1	1.1	041M5A0601	1.1	J	3.3	2	0.33	No	Max Detect < SV
Endrin aldehyde	0	3	0.28	50			ND	50	U	3.3	2	15.2	Yes	Max SQL > SV
Endrin ketone	0	3	2.5	50			ND	50	U	3.3	2	15.2	Yes	Max SQL > SV
Total Endrin	**1**	**3**	**3.13**	**101**	**6.5**	**6.5**	**041M5A0601**	**6.5**		**3.3**	**2**	**1.97**	**Yes**	**Max Detect > SV**
alpha-BHC	0	3	1.3	27			ND	27	U		N/A		Yes	No SV
beta-BHC	0	3	1.3	27			ND	27	U	0.32	N/A	84.4	Yes	Max SQL > SV
delta-BHC	0	3	1.3	27			ND	27	U	0.32	N/A	84.4	Yes	Max SQL > SV
gamma-BHC (Lindane)	1	3	1.4	27	0.24	0.24	041M5A0401	0.24	J	0.32	1	0.75	No	Max Detect < SV
Total BHC	**1**	**3**	**5.6**	**108**	**4.14**	**4.14**	**041M5A0401**	**4.14**		**0.32**	**2**	**12.9**	**Yes**	**Max Detect > SV**
4,4'-DDD	**2**	**3**	**50**	**50**	**1.3**	**100**	**041M5A0401**	**100**	**D**	**1.22**	**1**	**82**	**Yes**	**Max Detect > SV**
4,4'-DDE	**2**	**3**	**50**	**50**	**3.6**	**57**	**041M5A0401**	**57**	**D**	**2.07**	**1**	**27.5**	**Yes**	**Max Detect > SV**
4,4'-DDT	**2**	**3**	**50**	**50**	**3.2**	**7.2**	**041M5A0401**	**7.2**		**1.19**	**1**	**6.05**	**Yes**	**Max Detect > SV**
Total DDT	**2**	**3**	**150**	**150**	**8.1**	**164**	**041M5A0401**	**164**		**3.3**	**2**	**49.8**	**Yes**	**Max Detect > SV**
SVOCs (µg/kg)														
1,2,4-Trichlorobenzene	0	3	250	270			ND	270	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	3	250	270			ND	270	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	3	250	270			ND	270	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	3	250	270			ND	270	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	3	250	270			ND	270	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	3	250	270			ND	270	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	3	250	270			ND	270	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	3	250	270			ND	270	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	3	250	270			ND	270	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	3	600	650			ND	650	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	3	250	270			ND	270	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	3	250	270			ND	270	U		N/A		Yes	No SV
2-Chloronaphthalene	0	3	250	270			ND	270	U		N/A		Yes	No SV
2-Chlorophenol	0	3	250	270			ND	270	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	3	600	650			ND	650	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	3	250	270			ND	270	U		N/A		Yes	No SV
2-Nitroaniline	0	3	600	650			ND	650	U		N/A		Yes	No SV
2-Nitrophenol	0	3	250	270			ND	270	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	3	500	550			ND	550	U		N/A		Yes	No SV
3-Methylphenol/4-Methylphenol	0	3	250	270			ND	270	U				Yes	No SV
3-Nitroaniline	0	3	600	650			ND	650	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	3	250	270			ND	270	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	3	250	270			ND	270	U		N/A		Yes	No SV
4-Chloroaniline	0	3	250	270			ND	270	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	3	250	270			ND	270	U		N/A		Yes	No SV
4-Nitroaniline	0	3	600	650			ND	650	U		N/A		Yes	No SV
4-Nitrophenol	0	3	600	650			ND	650	U		N/A		Yes	No SV
Benzo(b)fluoranthene	2	3	270	270	62	120	041M5A0401	120	J		N/A		Yes	No SV
Benzo(g,h,i)perylene	0	3	250	270			ND	270	U		N/A		Yes	No SV
Benzo(k)fluoranthene	1	3	260	270	110	110	041M5A0401	110	J		N/A		Yes	No SV
bis(2-Chloroethoxy)methane	0	3	250	270			ND	270	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	3	250	270			ND	270	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**2**	**3**	**270**	**270**	**210**	**950**	**041M5A0501**	**950**		**182**	**1, 2**	**5.22**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	1	3	250	270	140	140	041M5A0501	140	J	182	1, 2	0.77	No	Max Detect < SV
Carbazole	0	3	250	270			ND	270	U		N/A		Yes	No SV
Dibenzofuran	0	3	250	270			ND	270	U		N/A		Yes	No SV
Diethylphthalate	0	3	250	270			ND	270	U	182	1, 2	1.48	Yes	Max SQL > SV
Dimethylphthalate	0	3	250	270			ND	270	U	182	1, 2	1.48	Yes	Max SQL > SV
Di-n-butylphthalate	0	3	250	270			ND	270	U	182	1, 2	1.48	Yes	Max SQL > SV
Di-n-octylphthalate	**1**	**3**	**250**	**270**	**290**	**290**	**041M5A0501**	**290**	**J**	**182**	**1, 2**	**1.59**	**Yes**	**Max Detect > SV**
Hexachlorobenzene	0	3	250	270			ND	270	U		N/A		Yes	No SV
Hexachlorobutadiene	0	3	250	270			ND	270	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	3	250	270			ND	270	U		N/A		Yes	No SV
Hexachloroethane	0	3	250	270			ND	270	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	3	250	270			ND	270	U		N/A		Yes	No SV
Isophorone	0	3	250	270			ND	270	U		N/A		Yes	No SV
Nitrobenzene	0	3	250	270			ND	270	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	3	250	270			ND	270	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	3	250	270			ND	270	U		N/A		Yes	No SV
Pentachlorophenol	0	3	600	650			ND	650	U		N/A		Yes	No SV
Phenol	0	3	250	270			ND	270	U		N/A		Yes	No SV

Table 11-1-21
Wetland 5A Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
VOCs (µg/kg)														
1,1,1-Trichloroethane	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
1,1-Dichloroethane	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
1,1-Dichloroethene	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
1,2-Dichloroethane	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
1,2-Dichloropropane	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
2-Butanone (MEK)	0	3	7.5	8			ND	8	U		N/A		Yes	No SV
2-Hexanone	0	3	7.5	8			ND	8	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	3	7.5	8			ND	8	U		N/A		Yes	No SV
Acetone	0	3	7.5	8			ND	8	U		N/A		Yes	No SV
Benzene	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Bromodichloromethane	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Bromoform	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Bromomethane	0	3	7.5	8			ND	8	U		N/A		Yes	No SV
Carbon disulfide	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Carbon tetrachloride	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Chlorobenzene	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Chloroethane	0	3	7.5	8			ND	8	U		N/A		Yes	No SV
Chloroform	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Chloromethane	0	3	7.5	8			ND	8	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Dibromochloromethane	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Ethylbenzene	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Methylene chloride	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Styrene	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Tetrachloroethene	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Toluene	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Trichloroethene	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV
Vinyl chloride	0	3	7.5	8			ND	8	U		N/A		Yes	No SV
Xylene (Total)	0	3	3.8	4.1			ND	4.1	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient
D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 11-1-22
Wetland 5A Phase III
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDD	Benzo(b)fluoranthene	None
Antimony	4,4'-DDE	Benzo(k)fluoranthene	
Barium	4,4'-DDT	bis(2-Ethylhexyl)phthalate (BEHP)	
Beryllium	alpha-Chlordane	Di-n-octylphthalate	
Cadmium	Dieldrin	Benzo(a)anthracene	
Calcium	Endosulfan I	Benzo(a)pyrene	
Cobalt	Endosulfan sulfate	Chrysene	
Copper	gamma-Chlordane	Fluoranthene	
Iron	Total BHC	Phenanthrene	
Lead	Total Chlordane	Pyrene	
Magnesium	Total DDT	Total PAHs	
Manganese	Total Endrin	TOC Normalized PAHs	
Mercury			
Potassium			
Selenium			
Sodium			
Vanadium			
Zinc			
		Not Detected Parameters	
Cyanide (CN)	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Thallium	alpha-BHC	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
	beta-BHC	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	delta-BHC	1,4-Dichlorobenzene	1,1-Dichloroethane
	Endosulfan II	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Endrin aldehyde	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Endrin ketone	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
	Heptachlor	2,4-Dichlorophenol	1,2-Dichloropropane
	Heptachlor epoxide	2,4-Dimethylphenol	2-Butanone (MEK)
	Methoxychlor	2,4-Dinitrophenol	2-Hexanone
	Toxaphene	2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
	Aroclor-1016	2,6-Dinitrotoluene	Acetone
	Aroclor-1221	2-Chloronaphthalene	Benzene
	Aroclor-1232	2-Chlorophenol	Bromodichloromethane
	Aroclor-1242	2-Methyl-4,6-Dinitrophenol	Bromoform
	Aroclor-1248	2-Methylnaphthalene	Bromomethane
	Aroclor-1254	2-Methylphenol (o-Cresol)	Carbon disulfide
	Aroclor-1260	2-Nitroaniline	Carbon tetrachloride
	Total PCBs	2-Nitrophenol	Chlorobenzene
		3,3'-Dichlorobenzidine	Chloroethane
		3-Methylphenol/4-Methylphenol	Chloroform
		3-Nitroaniline	Chloromethane
		4-Bromophenyl-phenylether	cis-1,3-Dichloropropene
		4-Chloro-3-methylphenol	Dibromochloromethane
		4-Chloroaniline	Ethylbenzene
		4-Chlorophenylphenyl ether	Methylene chloride
		4-Nitroaniline	Styrene
		4-Nitrophenol	Tetrachloroethene
		Acenaphthene	Toluene
		Acenaphthylene	trans-1,3-Dichloropropene
		Benzo(g,h,i)perylene	Trichloroethene
		bis(2-Chloroethoxy)methane	Vinyl chloride
		bis(2-Chloroethyl)ether	Xylene (Total)
		Carbazole	
		Dibenz(a,h)anthracene	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-butylphthalate	
		Fluorene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Naphthalene	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	

Table 11-1-23
Wetland 5A Phase III
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	3	3				1,630	821	2,480	2,480		041M5A0401			NA					0	13,610	0	No	EPC < RC
Antimony	2	3	0.75	0.75	0.75	10.2	2	27.7	27.7	J	041M5A0501	12		NA	2.31	0.85			0	4.43	1	Yes	EPC > RC and no RV
Barium	3	3				12.2	6.9	17.2	17.2		041M5A0501			NA					0	14	1	Yes	EPC > RC and no RV
Beryllium	2	3	0.025	0.025	0.025	0.118	0.13	0.2	0.2		041M5A0401			NA					0	0.84	0	No	EPC < RC
Cadmium	3	3				1.61	0.42	3.2	3.2		041M5A0501	0.676	4.21	PEL	4.73	2.38	0.76	0.38	0	1.8	1	No	EPC > RC, but < RV
Calcium	3	3				2,430	495	3,660	3,660		041M5A0501			NA					0	10,756.67	0	No	EPC < RC
Cobalt	3	3				1.38	0.94	1.6	1.6	J	041M5A0501			NA					0	2.8	0	No	EPC < RC
Copper	**3**	**3**				**51.7**	**21.5**	**108**	**108**		**041M5A0501**	**18.7**	**108**	**PEL**	**5.78**	**2.76**	**1**	**0.48**	**0**	**19.5**	**3**	**Yes**	**EPC > RC, but = RV**
Cyanide (CN)	0	3	0.467	0.45	0.48	0.467			0.48	UJ	ND			NA					0	5.22	0	No	Parameter Not Detected
Iron	3	3				1,550	546	3,020	3,020		041M5A0501			NA					0	11,911.67	0	No	EPC < RC
Lead	**3**	**3**				**129**	**54.5**	**258**	**258**		**041M5A0501**	**30.2**	**112**	**PEL**	**8.54**	**4.28**	**2.3**	**1.15**	**1**	**82.47**	**1**	**Yes**	**EPC > RV and RC**
Magnesium	3	3				466	56.1	690	690		041M5A0501			NA					0	7,513.33	0	No	EPC < RC
Manganese	3	3				15.1	8.6	21.3	21.3		041M5A0501			NA					0	37.97	0	No	EPC < RC
Mercury	3	3				0.09	0.06	0.13	0.13		041M5A0401	0.13	0.696	PEL	1	0.69	0.19	0.13	0	0.55	0	No	EPC < RC and RC
Potassium	2	3	8.4	8.4	8.4	51.9	54	93.2	93.2		041M5A0401			NA					0	1,628.67	0	No	EPC < RC
Selenium	1	3	0.135	0.13	0.14	0.29	0.6	0.6	0.6	J	041M5A0501			NA					0	3.45	0	No	EPC < RC
Sodium	3	3				25	14.6	35	35	J	041M5A0401			NA					0	18,993.33	0	No	EPC < RC
Thallium	0	3	0.307	0.295	0.315	0.307			0.315	U	ND			NA					0	1.57	0	No	Parameter Not Detected
Vanadium	3	3				3.2	1.8	4.2	4.2		041M5A0401			NA					0	28.67	0	No	EPC < RC
Zinc	**3**	**3**				**191**	**77.1**	**394**	**394**		**041M5A0501**	**124**	**271**	**PEL**	**3.18**	**1.54**	**1.45**	**0.71**	**1**	**36.73**	**3**	**Yes**	**EPC > RV and RC**
PAHs (g/kg)																							
2-Methylnaphthalene	0	3	260	250	270	260			270	U	ND	20.2	201	PEL	13.4	12.9	1.34	1.29	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthene	0	3	260	250	270	260			270	U	ND	6.71	88.9	PEL	40.2	38.7	3.04	2.92	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthylene	0	3	260	250	270	260			270	U	ND	5.87	128	PEL	46	44.3	2.11	2.03	0		0	No	Parameter Not Detected; Max SQL > RV
Anthracene	1	3	265	260	270	182	16	16	16	J	041M5A0401	46.9	245	PEL	0.34	3.88	0.07	0.74	0		0	No	RV HQ <1 and no RC
Benzo(a)anthracene	2	3	270	270	270	137	41	100	100	J	041M5A0401	74.8	693	PEL	1.34	1.83	0.14	0.20	0		0	No	RV HQ <1 and no RC
Benzo(a)pyrene	2	3	270	270	270	154	52	140	140	J	041M5A0401	88.8	763	PEL	1.58	1.73	0.18	0.20	0		0	No	RV HQ <1 and no RC
Chrysene	2	3	270	270	270	166	58	170	170	J	041M5A0401	108	846	PEL	1.57	1.54	0.20	0.20	0		0	No	RV HQ <1 and no RC
Dibenz(a,h)anthracene	0	3	260	250	270	260			270	U	ND	6.22	135	PEL	43.4	41.8	2	1.93	0		0	No	Parameter Not Detected; Max SQL > RV
Fluoranthene	3	3				116	16	260	260	J	041M5A0401	113	1,494	PEL	2.3	1.03	0.17	0.08	0		0	No	RV HQ <1 and no RC
Fluorene	0	3	260	250	270	260			270	U	ND	21.2	144	PEL	12.7	12.3	1.88	1.81	0		0	No	Parameter Not Detected; Max SQL > RV
Naphthalene	0	3	260	250	270	260			270	U	ND	34.6	391	PEL	7.8	7.51	0.69	0.67	0		0	No	Parameter Not Detected
Phenanthrene	2	3	270	270	270	132	28	97	97	J	041M5A0401	86.7	544	PEL	1.12	1.52	0.18	0.24	0		0	No	RV HQ <1 and no RC
Pyrene	2	3	270	270	270	219	87	300	300	J	041M5A0401	153	1,398	PEL	1.96	1.43	0.22	0.16	0		0	No	RV HQ <1 and no RC
Total PAHs	3	3				2,670	2,160	3,260	3,260		041M5A0601	1,684	16,770	PEL	1.93	1.58	0.19	0.16	0		0	No	RV HQ <1 and no RC
TOC Normalized PAHs	3	3				328.74	291.62	369	369		041M5A0401	290	1,800	MEC	1.27	1.13	0.21	0.18	0		0	No	RV HQ <1 and no RC
PCBs (g/kg)																							
Aroclor-1016	0	3	184	25	500	184			500	U	ND	21.6	189	PEL	23.1	8.52	2.65	0.97	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1221	0	3	385	50	1,050	385			1,050	U	ND	21.6	189	PEL	15.7	5.75	5.56	2.04	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1232	0	3	184	25	500	184			500	U	ND	21.6	189	PEL	23.1	8.52	2.65	0.97	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1242	0	3	184	25	500	184			500	U	ND	21.6	189	PEL	23.1	8.52	2.65	0.97	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1248	0	3	184	25	500	184			500	U	ND	21.6	189	PEL	23.1	8.52	2.65	0.97	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1254	0	3	184	25	500	184			500	U	ND	21.6	189	PEL	23.1	8.52	2.65	0.97	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1260	0	3	184	25	500	184			500	U	ND	21.6	189	PEL	23.1	8.52	2.65	0.97	0		0	No	Parameter Not Detected; Max SQL > RV
Total PCBs	0	3	1,490	200	4,050	1,490			4,050	U	ND	21.6	189	PEL	188	68.9	21.4	7.88	0		0	No	Parameter Not Detected; Max SQL > RV
Pesticides (g/kg)																							
Aldrin	0	3	9.9	1.3	27	9.9			27	U	ND			NA					0		0	No	Parameter Not Detected
Dieldrin	1	3	25.7	1.45	50	17.6	1.4	1.4	1.4	J	041M5A0601	0.716	4.3	PEL	1.96	24.6	0.33	4.1	0		0	No	RV HQ <1 and no RC
Endosulfan I	1	3	13.6	0.15	27	10.8	5.2	5.2	5.2		041M5A0401			NA					0		0	Yes	No SV, no RV, and no RC
Endosulfan II	0	3	18.4	2.5	50	18.4			50	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	2	3	50	50	50	17.7	0.66	2.3	2.3	J	041M5A0401			NA					0		0	Yes	No SV, no RV, and no RC
Heptachlor	0	3	9.9	1.3	27	9.9			27	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	3	9.9	1.3	27	9.9			27	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	3	90.3	0.33	270	90.3			270	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	3	990	130	2,700	990			2,700	U	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	1	3	13.6	0.13	27	10.5	4.5	4.5	4.5		041M5A0401	1.7	4.79	PEL	2.65	6.2	0.94	2.2	0		0	No	RV HQ <1 and no RC
gamma-Chlordane	**1**	**3**	**13.5**	**0.07**	**27**	**11.7**	**7.9**	**7.9**	**7.9**	**J**	**041M5A0401**	**1.7**	**4.79**	**PEL**	**4.65**	**6.86**	**1.65**	**2.43**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Total Chlordane	**1**	**3**	**27.1**	**0.2**	**54**	**22.2**	**12.4**	**12.4**	**12.4**		**041M5A0401**	**1.7**	**4.79**	**PEL**	**7.29**	**13.1**	**2.59**	**4.63**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Endrin	1	3	0.772	0.345	1.2	0.882	1.1	1.1	1.1	J	041M5A0601	3.3		NA	0.33	0.27			0		0	Yes	No RV or RC and EPC > SV
Endrin aldehyde	0	3	17.7	0.28	50	17.7			50	U	ND	3.3		NA	15.2	5.35			0		0	No	Parameter Not Detected
Endrin ketone	0	3	18.4	2.5	50	18.4			50	U	ND	3.3		NA	15.2	5.58			0		0	No	Parameter Not Detected
Total Endrin	**1**	**3**	**52.2**	**3.13**	**101**	**36.9**	**6.5**	**6.5**	**6.5**		**041M5A0601**	**3.3**		**NA**	**1.97**	**11.2**			**0**		**0**	**Yes**	**No RV or RC and EPC > SV**
alpha-BHC	0	3	9.9	1.3	27	9.9			27	U	ND		0.99	PEL			27.3	10	0		0	No	Parameter Not Detected; Max SQL > RV
beta-BHC	0	3	9.9	1.3	27	9.9			27	U	ND	0.32	0.99	PEL	84.4	30.9	27.3	10	0		0	No	Parameter Not Detected; Max SQL > RV
delta-BHC	0	3	9.9	1.3	27	9.9			27	U	ND	0.32	0.99	PEL	84.4	30.9	27.3	10	0		0	No	Parameter Not Detected; Max SQL > RV
gamma-BHC (Lindane)	1	3	14.2	1.4	27	9.55	0.24	0.24	0.24	J	041M5A0401	0.32	0.99	PEL	0.75	29.8	0.24	9.64	0		0	No	RV HQ <1 and no RC
Total BHC	**1**	**3**	**56.8**	**5.6**	**108**	**39.2**	**4.14**	**4.14**	**4.14**		**041M5A0401**	**0.32**	**0.99**	**PEL**	**12.9**	**123**	**4.18**	**39.6**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	**2**	**3**	**50**	**50**	**50**	**50.4**	**1.3**	**100**	**100**	**D**	**041M5A0401**	**1.22**	**7.81**	**PEL**	**82**	**41.3**	**12.8**	**6.46**	**1**	**50**	**1**	**Yes**	**EPC > RV and RC**
4,4'-DDE	2	3	50	50	50	36.9	3.6	57	57	D	041M5A0401	2.07	374	PEL	27.5	17.8	0.15	0.10	0	40	2	No	EPC > RC, but < RV
4,4'-DDT	**2**	**3**	**50**	**50**	**50**	**20.1**	**3.2**	**7.2**	**7.2**		**041M5A0401**	**1.19**	**4.77**	**PEL**	**6.05**	**16.9**	**1.51**	**4.22**	**1**	**20**	**1**	**Yes**	**EPC > RV and RC**
Total DDT	**2**	**3**	**150**	**150**	**150**	**107**	**8.1**	**164**	**164**		**041M5A0401**	**3.3**	**51.7**	**PEL**	**49.8**	**32.6**	**3.18**	**2.08**	**1**	**110**	**2**	**Yes**	**EPC > RV and RC**
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	3	633	600	650	633			650	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected

Table 11-1-23
Wetland 5A Phase III
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
2-Methyl-4,6-Dinitrophenol	0	3	633	600	650	633			650	U	ND			NA					0		0	No	Parameter Not Detected
SVOCs (g/kg) - cont.																							
2-Methylphenol (o-Cresol)	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	3	633	600	650	633			650	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	3	517	500	550	517			550	U	ND			NA					0		0	No	Parameter Not Detected
3-Methylphenol/4-Methylphenol	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	3	633	600	650	633			650	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	3	633	600	650	633			650	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	3	633	600	650	633			650	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(b)fluoranthene	2	3	270	270	270	151	62	120	120	J	041M5A0401			NA					0		0	No	TOC normalized PAHs <MEC
Benzo(g,h,i)perylene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(k)fluoranthene	1	3	265	260	270	213	110	110	110	J	041M5A0401			NA					0		0	No	TOC normalized PAHs <MEC
bis(2-Chloroethoxy)methane	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	2	3	270	270	270	477	210	950	950		041M5A0501	182	2,647	PEL	5.22	2.62	0.36	0.18	0		0	No	RV HQ <1 and no RC
Carbazole	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	0	3	260	250	270	260			270	U	ND	182	2,647	PEL	1.48	1.43	0.10	0.10	0		0	No	Parameter Not Detected
Dimethylphthalate	0	3	260	250	270	260			270	U	ND	182	2,647	PEL	1.48	1.43	0.10	0.10	0		0	No	Parameter Not Detected
Di-n-butylphthalate	0	3	260	250	270	260			270	U	ND	182	2,647	PEL	1.48	1.43	0.10	0.10	0		0	No	Parameter Not Detected
Di-n-octylphthalate	1	3	260	250	270	270	290	290	290	J	041M5A0501	182	2,647	PEL	1.59	1.48	0.11	0.10	0		0	No	RV HQ <1 and no RC
Hexachlorobenzene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	3	633	600	650	633			650	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	3	260	250	270	260			270	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	3	7.83	7.5	8	7.83			8	U	ND			NA					0		0	No	Parameter Not Detected
2-Hexanone	0	3	7.83	7.5	8	7.83			8	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	3	7.83	7.5	8	7.83			8	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	0	3	7.83	7.5	8	7.83			8	U	ND			NA					0		0	No	Parameter Not Detected
Benzene	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	3	7.83	7.5	8	7.83			8	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Chloroethane	0	3	7.83	7.5	8	7.83			8	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	3	7.83	7.5	8	7.83			8	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	3	7.83	7.5	8	7.83			8	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	3	3.95	3.8	4.1	3.95			4.1	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result
Parameters in bold were detected and exceeded screening values.

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8)
RV = Refinement value (detailed explanation of RVs provided in Section 8)
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detection
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT

Table 11-1-24
Wetland 5A Phase III
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
	Detected Parameters		
Antimony	Endosulfan I	None	None
Barium	Endosulfan sulfate		
Copper	gamma-Chlordane		
Lead	Total Chlordane		
Zinc	Endrin		
	Total Endrin		
	Total BHC		
	4,4'-DDD		
	4,4'-DDT		
	Total DDT		

Table 11-1-25
Wetland 5A Phase III
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M5A0401	8/28/1997	mg/kg	0.52	J	Arsenic	8.2	70	0.01
041M5A0401	8/28/1997	mg/kg	0.42	J	Cadmium	1.2	9.6	0.04
041M5A0401	8/28/1997	mg/kg	4.1		Chromium	81	370	0.01
041M5A0401	8/28/1997	mg/kg	21.5		Copper	34	270	0.08
041M5A0401	8/28/1997	mg/kg	54.5		Lead	46.7	218	0.25
041M5A0401	8/28/1997	mg/kg	0.13		Mercury	0.15	0.71	0.18
041M5A0401	8/28/1997	mg/kg	2.5		Nickel	20.9	51.6	0.05
041M5A0401	8/28/1997	mg/kg	0.045	UJ	Silver	1	3.7	0.01
041M5A0401	8/28/1997	mg/kg	77.1		Zinc	150	410	0.19
041M5A0401	**8/28/1997**	**g/kg**	**57**	**D**	**4,4'-DDE**	**2.2**	**27**	**2.11**
041M5A0401	8/28/1997	g/kg	7.2		4,4'-DDT	1.58	46.1	0.16
041M5A0401	8/28/1997	g/kg	200	U	Total PCBs	22.7	180	1.11
041M5A0401	8/28/1997	g/kg	250	U	2-Methylnaphthalene	70	670	0.37
041M5A0401	8/28/1997	g/kg	250	U	Acenaphthene	16	500	0.50
041M5A0401	8/28/1997	g/kg	250	U	Acenaphthylene	44	640	0.39
041M5A0401	8/28/1997	g/kg	16	J	Anthracene	85.3	1,100	0.01
041M5A0401	8/28/1997	g/kg	100	J	Benzo(a)anthracene	261	1,600	0.06
041M5A0401	8/28/1997	g/kg	140	J	Benzo(a)pyrene	430	1,600	0.09
041M5A0401	8/28/1997	g/kg	170	J	Chrysene	384	2,800	0.06
041M5A0401	8/28/1997	g/kg	250	U	Dibenz(a,h)anthracene	63.4	260	0.96
041M5A0401	8/28/1997	g/kg	260	J	Fluoranthene	600	5,100	0.05
041M5A0401	8/28/1997	g/kg	250	U	Fluorene	19	540	0.46
041M5A0401	8/28/1997	g/kg	250	U	Naphthalene	160	2,100	0.12
041M5A0401	8/28/1997	g/kg	97	J	Phenanthrene	240	1,500	0.06
041M5A0401	8/28/1997	g/kg	300	J	Pyrene	665	2,600	0.12
041M5A0401	8/28/1997				ERM Quotient Sum			7.47
041M5A0401	8/28/1997				Mean ERM Quotient			0.30
041M5A0401	8/28/1997				Mean ERM Quotient without ND			0.14
041M5A0401	8/28/1997				Mean ERM Quotient Category			2
041M5A0501	8/28/1997	mg/kg	0.225	UJ	Arsenic	8.2	70	0.00
041M5A0501	8/28/1997	mg/kg	3.2		Cadmium	1.2	9.6	0.33
041M5A0501	8/28/1997	mg/kg	50.1		Chromium	81	370	0.14
041M5A0501	8/28/1997	mg/kg	108		Copper	34	270	0.40
041M5A0501	**8/28/1997**	**mg/kg**	**258**		**Lead**	**46.7**	**218**	**1.18**
041M5A0501	8/28/1997	mg/kg	0.09		Mercury	0.15	0.71	0.13
041M5A0501	8/28/1997	mg/kg	7.5		Nickel	20.9	51.6	0.15
041M5A0501	8/28/1997	mg/kg	0.15	J	Silver	1	3.7	0.04
041M5A0501	8/28/1997	mg/kg	394		Zinc	150	410	0.96
041M5A0501	8/28/1997	g/kg	50	U	4,4'-DDE	2.2	27	1.85
041M5A0501	8/28/1997	g/kg	50	U	4,4'-DDT	1.58	46.1	1.08
041M5A0501	8/28/1997	g/kg	4,050	U	Total PCBs	22.7	180	22.50
041M5A0501	8/28/1997	g/kg	260	U	2-Methylnaphthalene	70	670	0.39
041M5A0501	8/28/1997	g/kg	260	U	Acenaphthene	16	500	0.52
041M5A0501	8/28/1997	g/kg	260	U	Acenaphthylene	44	640	0.41
041M5A0501	8/28/1997	g/kg	260	U	Anthracene	85.3	1,100	0.24
041M5A0501	8/28/1997	g/kg	41	J	Benzo(a)anthracene	261	1,600	0.03
041M5A0501	8/28/1997	g/kg	52	J	Benzo(a)pyrene	430	1,600	0.03
041M5A0501	8/28/1997	g/kg	58	J	Chrysene	384	2,800	0.02
041M5A0501	8/28/1997	g/kg	260	U	Dibenz(a,h)anthracene	63.4	260	1
041M5A0501	8/28/1997	g/kg	72	J	Fluoranthene	600	5,100	0.01
041M5A0501	8/28/1997	g/kg	260	U	Fluorene	19	540	0.48
041M5A0501	8/28/1997	g/kg	260	U	Naphthalene	160	2,100	0.12
041M5A0501	8/28/1997	g/kg	28	J	Phenanthrene	240	1,500	0.02
041M5A0501	8/28/1997	g/kg	87	J	Pyrene	665	2,600	0.03
041M5A0501	8/28/1997				ERM Quotient Sum			32.07
041M5A0501	8/28/1997				Mean ERM Quotient			1.28
041M5A0501	8/28/1997				Mean ERM Quotient without ND			0.14
041M5A0501	8/28/1997				Mean ERM Quotient Category			2
041M5A0601	8/28/1997	mg/kg	0.23	UJ	Arsenic	8.2	70	0.00
041M5A0601	8/28/1997	mg/kg	1.2		Cadmium	1.2	9.6	0.13
041M5A0601	8/28/1997	mg/kg	24.4		Chromium	81	370	0.07
041M5A0601	8/28/1997	mg/kg	25.6		Copper	34	270	0.09
041M5A0601	8/28/1997	mg/kg	75.5		Lead	46.7	218	0.35
041M5A0601	8/28/1997	mg/kg	0.06		Mercury	0.15	0.71	0.08
041M5A0601	8/28/1997	mg/kg	1.8		Nickel	20.9	51.6	0.03
041M5A0601	8/28/1997	mg/kg	0.05	UJ	Silver	1	3.7	0.01
041M5A0601	8/28/1997	mg/kg	103		Zinc	150	410	0.25
041M5A0601	8/28/1997	g/kg	3.6	J	4,4'-DDE	2.2	27	0.13
041M5A0601	8/28/1997	g/kg	3.2	J	4,4'-DDT	1.58	46.1	0.07
041M5A0601	8/28/1997	g/kg	217	U	Total PCBs	22.7	180	1.21
041M5A0601	8/28/1997	g/kg	270	U	2-Methylnaphthalene	70	670	0.40
041M5A0601	8/28/1997	g/kg	270	U	Acenaphthene	16	500	0.54
041M5A0601	8/28/1997	g/kg	270	U	Acenaphthylene	44	640	0.42
041M5A0601	8/28/1997	g/kg	270	U	Anthracene	85.3	1,100	0.25
041M5A0601	8/28/1997	g/kg	270	U	Benzo(a)anthracene	261	1,600	0.17
041M5A0601	8/28/1997	g/kg	270	U	Benzo(a)pyrene	430	1,600	0.17
041M5A0601	8/28/1997	g/kg	270	U	Chrysene	384	2,800	0.10
041M5A0601	8/28/1997	g/kg	270	U	Dibenz(a,h)anthracene	63.4	260	1.04
041M5A0601	8/28/1997	g/kg	16	J	Fluoranthene	600	5,100	0.00
041M5A0601	8/28/1997	g/kg	270	U	Fluorene	19	540	0.50
041M5A0601	8/28/1997	g/kg	270	U	Naphthalene	160	2,100	0.13
041M5A0601	8/28/1997	g/kg	270	U	Phenanthrene	240	1,500	0.18
041M5A0601	8/28/1997	g/kg	270	U	Pyrene	665	2,600	0.10
041M5A0601	8/28/1997				ERM Quotient Sum			6.43
041M5A0601	8/28/1997				Mean ERM Quotient			0.26
041M5A0601	8/28/1997				Mean ERM Quotient without ND			0.05
041M5A0601	8/28/1997				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 11-1-26
Wetland 5A Phase III
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	**3**	**3**				**305**	**124**	**668**	**041W5A0501**	**668**		**13**	**FDEP**	**51.4**	**Yes**	**Max Detect > SV**
Antimony	1	3	1.3	1.3	1.3	32.3	94.3	94.3	041W5A0501	94.3		160	EPA	0.59	No	Max Detect < SV
Arsenic	0	3	1.1	1.1	1.1	1.1			ND	1.1	UJ	50	FDEP	0.02	No	Max SQL< SV
Barium	3	3				24.7	22.3	28	041W5A0501	28			NA		Yes	No SV
Beryllium	0	3	0.113	0.095	0.13	0.113			ND	0.13	U	0.13	FDEP	1	Yes	Max SQL > SV
Cadmium	**1**	**3**	**0.29**	**0.29**	**0.29**	**0.593**	**1.2**	**1.2**	**041W5A0501**	**1.2**		**0.66**	**EPA**	**1.82**	**Yes**	**Max Detect > SV**
Calcium	3	3				10,600	9,160	12,600	041W5A0401	12,600			NA		Yes	No SV
Chromium	**1**	**3**	**0.44**	**0.44**	**0.44**	**4.29**	**12**	**12**	**041W5A0501**	**12**		**11**	**EPA**	**1.09**	**Yes**	**Max Detect > SV**
Cobalt	2	3	0.265	0.265	0.265	1.82	2	3.2	041W5A0501	3.2	J		NA		Yes	No SV
Copper	**2**	**3**	**0.85**	**0.85**	**0.85**	**15.9**	**4.1**	**42.8**	**041W5A0501**	**42.8**		**6.54**	**EPA**	**6.54**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	3	0.7	0.7	0.7	0.7			ND	0.7	UJ	5.2	EPA	0.14	No	Max SQL< SV
Iron	3	3				1,450	756	2,500	041W5A0601	2,500			NA		Yes	No SV
Lead	**2**	**3**	**2.75**	**2.75**	**2.75**	**34.4**	**9**	**91.4**	**041W5A0501**	**91.4**		**1.32**	**EPA**	**69.2**	**Yes**	**Max Detect > SV**
Magnesium	3	3				2,580	1,520	3,940	041W5A0401	3,940			NA		Yes	No SV
Manganese	3	3				166	124	198	041W5A0501	198			NA		Yes	No SV
Mercury	0	3	0.0317	0.025	0.045	0.0317			ND	0.045	U	0.012	EPA	3.75	Yes	Max SQL > SV
Nickel	0	3	1.28	0.6	2.65	1.28			ND	2.65	U	87.71	EPA	0.03	No	Max SQL< SV
Potassium	3	3				1,970	1,190	3,400	041W5A0401	3,400			NA		Yes	No SV
Selenium	0	3	1.3	1.3	1.3	1.3			ND	1.3	U	5	EPA	0.26	No	Max SQL< SV
Silver	**1**	**3**	**0.015**	**0.015**	**0.015**	**0.0433**	**0.1**	**0.1**	**041W5A0501**	**0.1**	**J**	**0.012**	**EPA**	**8.33**	**Yes**	**Max Detect > SV**
Sodium	3	3				7,670	4,450	9,590	041W5A0401	9,590			NA		Yes	No SV
Thallium	0	3	0.6	0.6	0.6	0.6			ND	0.6	U	4	EPA	0.15	No	Max SQL< SV
Vanadium	2	3	0.385	0.385	0.385	1.63	1.1	3.4	041W5A0501	3.4	J		NA		Yes	No SV
Zinc	**3**	**3**				**126**	**15.4**	**338**	**041W5A0501**	**338**		**58.91**	**EPA**	**5.74**	**Yes**	**Max Detect > SV**
Pesticides (g/L)																
Aldrin	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	3	0.0338	0.0014	0.05	0.0338			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.056	EPA	0.45	No	Max SQL< SV
Endosulfan II	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	6.58	Yes	Max SQL > SV
Heptachlor epoxide	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	3	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	3	0.0179	0.00365	0.025	0.0179			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	3	0.0429	0.02865	0.05	0.0429			ND	0.05	U	0.0043	EPA	11.6	Yes	Max SQL > SV
Endrin	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	3	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
beta-BHC	0	3	0.0177	0.0031	0.025	0.0177			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	3	0.0175	0.00235	0.025	0.0175			ND	0.025	U	0.08	EPA	0.31	No	Max SQL< SV
Total BHC	0	3	0.0852	0.05545	0.1	0.0852			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	3	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	3	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	35.7	Yes	Max SQL > SV
Total PCB	0	3	4	4	4	4			ND	4	U		NA		Yes	No SV

Table 11-1-26
Wetland 5A Phase III
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	3	5	5	5	5			ND	5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	3	5	5	5	5			ND	5	U	15.8	EPA	0.32	No	Max SQL< SV
1,3-Dichlorobenzene	0	3	5	5	5	5			ND	5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	3	5	5	5	5			ND	5	U	3	FDEP	1.67	Yes	Max SQL > SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	3	10	10	10	10			ND	10	UJ		NA		Yes	No SV
2,4-Dinitrotoluene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chloronaphthalene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chlorophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U	43.8	EPA	0.06	No	Max SQL< SV
2-Methyl-4,6-Dinitrophenol	0	3	10	10	10	10			ND	10	UJ		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitroaniline	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Nitrophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
3-Methylphenol/4-Methylphenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3-Nitroaniline	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloroaniline	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Nitroaniline	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Nitrophenol	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	3	2.5	2.5	2.5	2.5			ND	2.5	U	0.3	EPA	8.33	Yes	Max SQL > SV
Butylbenzylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Carbazole	0	3	5	5	5	5			ND	5	U		NA		Yes	No SV
Dibenzofuran	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Diethylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dimethylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Di-n-butylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U	9.4	EPA	0.27	No	Max SQL< SV
Di-n-octylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobenzene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobutadiene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachloroethane	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Isophorone	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Nitrobenzene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pentachlorophenol	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
Phenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV

Table 11-1-26
Wetland 5A Phase III
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
PAHs (g/L)																
2-Methylnaphthalene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Acenaphthene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Acenaphthylene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Anthracene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzo(a)anthracene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzo(a)pyrene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Chrysene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Fluoranthene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Fluorene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Naphthalene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U	26	FDEP	0.10	No	Max SQL< SV
Phenanthrene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pyrene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Total PAH	0	3	32.5	32.5	32.5	32.5			ND	32.5	U		NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	270	FDEP	0.00	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.16	No	Max SQL< SV
1,2-Dichloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloroethene (total)	1	3	0.5	0.5	0.5	0.7	1.1	1.1	041W5A0601	1.1			NA		Yes	No SV
1,2-Dichloropropane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
2-Butanone (MEK)	0	3	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Hexanone	0	3	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	3	5	5	5	5			ND	5	U		NA		Yes	No SV
Acetone	1	3	12.5	12.5	12.5	16	23	23	041W5A0601	23	J		NA		Yes	No SV
Benzene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	53	EPA	0.01	No	Max SQL< SV
Bromodichloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	17	FDEP	0.03	No	Max SQL< SV
Chloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	289	EPA	0.00	No	Max SQL< SV
Chloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	453	EPA	0.00	No	Max SQL< SV
Methylene chloride	0	3	2.5	2.5	2.5	2.5			ND	2.5	U	1,580	FDEP	0.00	No	Max SQL< SV
Styrene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	1	3	0.5	0.5	0.5	0.47	0.41	0.41	041W5A0501	0.41	J	175	EPA	0.00	No	Max Detect < SV
trans-1,3-Dichloropropene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Vinyl chloride	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	3	1	1	1	1			ND	1	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 11-1-27
Wetland 5A Phase III
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	None	1,2-Dichloroethene (total)
Barium			Acetone
Cadmium			
Calcium			
Chromium			
Cobalt			
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Potassium			
Silver			
Sodium			
Vanadium			
Zinc			
		Not Detected Parameters	
Beryllium	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Mercury	Dieldrin	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Endosulfan II	1,4-Dichlorobenzene	1,1-Dichloroethane
	Endosulfan sulfate	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,2-Dichloroethane
	Heptachlor	2,4,5-Trichlorophenol	1,2-Dichloropropane
	Heptachlor epoxide	2,4,6-Trichlorophenol	2-Butanone (MEK)
	Methoxychlor	2,4-Dichlorophenol	2-Hexanone
	Toxaphene	2,4-Dimethylphenol	4-Methyl-2-Pentanone (MIBK)
	alpha-Chlordane	2,4-Dinitrophenol	Bromodichloromethane
	gamma-Chlordane	2,4-Dinitrotoluene	Bromoform
	Total Chlordane	2,6-Dinitrotoluene	Bromomethane
	Endrin	2-Chloronaphthalene	Carbon disulfide
	Endrin aldehyde	2-Methyl-4,6-Dinitrophenol	Carbon tetrachloride
	Endrin ketone	2-Methylphenol (o-Cresol)	Chloroethane
	Total Endrin	2-Nitroaniline	Chloromethane
	alpha-BHC	2-Nitrophenol	cis-1,3-Dichloropropene
	beta-BHC	3,3'-Dichlorobenzidine	Dibromochloromethane
	delta-BHC	3-Methylphenol/4-Methylphenol	Styrene
	Total BHC	3-Nitroaniline	Tetrachloroethene
	4,4'-DDD	4-Bromophenyl-phenylether	trans-1,3-Dichloropropene
	4,4'-DDE	4-Chloro-3-methylphenol	Trichloroethene
	4,4'-DDT	4-Chloroaniline	Vinyl chloride
	Total DDT	4-Chlorophenylphenyl ether	Xylene (Total)
	Aroclor-1016	4-Nitroaniline	
	Aroclor-1221	4-Nitrophenol	
	Aroclor-1232	Benzo(b)fluoranthene	
	Aroclor-1242	Benzo(g,h,i)perylene	
	Aroclor-1248	Benzo(k)fluoranthene	
	Aroclor-1254	bis(2-Chloroethoxy)methane	
	Aroclor-1260	bis(2-Chloroethyl)ether	
	Total PCBs	bis(2-Ethylhexyl)phthalate (BEHP)	
		Butylbenzylphthalate	
		Carbazole	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 11-1-28
Wetland 5A Phase III
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
Metals (µg/L)																				
Aluminum	**3**	**3**				**305**	**124**	**668**	**041W5A0501**	**668**		**13**	**FDEP**	**51.38**	**23.5**	**1,090**	**0**	**3**	**No**	**Max Result < Ref. Conc.**
Barium	3	3				24.7	22.3	28	041W5A0501	28			NA			3.67	3	3	Yes	Max Result > Ref. Conc.
Beryllium	0	3	0.113	0.095	0.13	0.113			ND	0.13	U	0.13	FDEP	1	0.87	1	0	3	No	Max Result < Ref. Conc.
Cadmium	**1**	**3**	**0.29**	**0.29**	**0.29**	**0.593**	**1.2**	**1.2**	**041W5A0501**	**1.2**		**0.66**	**EPA**	**2**	**0.90**	**3**	**0**	**3**	**No**	**Max Result < Ref. Conc.**
Calcium	3	3				10,600	9,160	12,600	041W5A0401	12,600			NA			7,680	3	3	No	Essential Nutrient
Chromium	**1**	**3**	**0.44**	**0.44**	**0.44**	**4.29**	**12**	**12**	**041W5A0501**	**12**		**11**	**EPA**	**1.09**	**0.39**	**8**	**1**	**3**	**Yes**	**Max Result > Ref. Conc.**
Cobalt	2	3	0.265	0.265	0.265	1.82	2	3.2	041W5A0501	3.2	J		NA			3	1	3	Yes	Max Result > Ref. Conc.
Copper	**2**	**3**	**0.85**	**0.85**	**0.85**	**15.9**	**4.1**	**42.8**	**041W5A0501**	**42.8**		**6.54**	**EPA**	**6.54**	**2.43**	**4**	**2**	**3**	**Yes**	**Max Result > Ref. Conc.**
Iron	3	3				1,450	756	2,500	041W5A0601	2,500			NA			2,360	1	3	Yes	Max Result > Ref. Conc.
Lead	**2**	**3**	**2.75**	**2.75**	**2.75**	**34.4**	**9**	**91.4**	**041W5A0501**	**91.4**		**1.32**	**EPA**	**69.24**	**26**	**3.2**	**2**	**3**	**Yes**	**Max Result > Ref. Conc.**
Magnesium	3	3				2,580	1,520	3,940	041W5A0401	3,940			NA			20,300	0	3	No	Max Result < Ref. Conc.
Manganese	3	3				166	124	198	041W5A0501	198			NA			13.2	3	3	Yes	Max Result > Ref. Conc.
Mercury	0	3	0.0317	0.025	0.045	0.0317			ND	0.045	U	0.012	EPA	4	2.64	0.13	0	3	No	Max Result < Ref. Conc.
Potassium	3	3				1,970	1,190	3,400	041W5A0401	3,400			NA			7,000	0	3	No	Max Result < Ref. Conc.
Silver	**1**	**3**	**0.015**	**0.015**	**0.015**	**0.0433**	**0.1**	**0.1**	**041W5A0501**	**0.1**	**J**	**0.012**	**EPA**	**8.33**	**3.61**	**4**	**0**	**3**	**No**	**Max Result < Ref. Conc.**
Sodium	3	3				7,670	4,450	9,590	041W5A0401	9,590			NA			182,000	0	3	No	Max Result < Ref. Conc.
Vanadium	2	3	0.385	0.385	0.385	1.63	1.1	3.4	041W5A0501	3.4	J		NA			4.7	0	3	No	Max Result < Ref. Conc.
Zinc	**3**	**3**				**126**	**15.4**	**338**	**041W5A0501**	**338**		**58.91**	**EPA**	**6**	**2.13**	**5.53**	**3**	**3**	**Yes**	**Max Result > Ref. Conc.**
Pesticides (µg/L)																				
Aldrin	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Dieldrin	0	3	0.0338	0.0014	0.05	0.0338			ND	0.05	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Endosulfan II	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Endosulfan sulfate	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Heptachlor	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	7	6.58		0	3	No	No Ref. Conc.; Parameter Not Detected
Heptachlor epoxide	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	3	No	No Ref. Conc.; Parameter Not Detected
Methoxychlor	0	3	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Toxaphene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
alpha-Chlordane	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
gamma-Chlordane	0	3	0.0179	0.00365	0.025	0.0179			ND	0.025	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Total Chlordane	0	3	0.0429	0.02865	0.05	0.0429			ND	0.05	U	0.0043	EPA	12	9.97		0	3	No	No Ref. Conc.; Parameter Not Detected
Endrin	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Endrin aldehyde	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Endrin ketone	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22	21.7		0	3	No	No Ref. Conc.; Parameter Not Detected
Total Endrin	0	3	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
alpha-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
beta-BHC	0	3	0.0177	0.0031	0.025	0.0177			ND	0.025	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
delta-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
gamma-BHC (Lindane)	0	3	0.0175	0.00235	0.025	0.0175			ND	0.025	U	0.08	EPA	0.31	0.22		0	3	No	No Ref. Conc.; Parameter Not Detected
Total BHC	0	3	0.0852	0.05545	0.1	0.0852			ND	0.1	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
4,4'-DDD	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	3	No	No Ref. Conc.; Parameter Not Detected
4,4'-DDE	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	3	No	No Ref. Conc.; Parameter Not Detected
4,4'-DDT	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85	84.7		0	3	No	No Ref. Conc.; Parameter Not Detected
Total DDT	0	3	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
PCBs (µg/L)																				
Aroclor-1016	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Aroclor-1221	0	3	1	1	1	1			ND	1	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Aroclor-1232	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Aroclor-1242	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Aroclor-1248	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Aroclor-1254	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Aroclor-1260	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	36	35.7		0	3	No	No Ref. Conc.; Parameter Not Detected
Total PCB	0	3	4	4	4	4			ND	4	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
SVOCs (µg/L)																				
1,2,4-Trichlorobenzene	0	3	5	5	5	5			ND	5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
1,3-Dichlorobenzene	0	3	5	5	5	5			ND	5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
1,4-Dichlorobenzene	0	3	5	5	5	5			ND	5	U	3	FDEP	2	1.67		0	3	No	No Ref. Conc.; Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chl	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2,4,5-Trichlorophenol	0	3	10	10	10	10			ND	10	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2,4,6-Trichlorophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2,4-Dichlorophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2,4-Dimethylphenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2,4-Dinitrophenol	0	3	10	10	10	10			ND	10	UJ		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2,4-Dinitrotoluene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2,6-Dinitrotoluene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2-Chloronaphthalene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	3	10	10	10	10			ND	10	UJ		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2-Methylphenol (o-Cresol)	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2-Nitroaniline	0	3	10	10	10	10			ND	10	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2-Nitrophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
3,3'-Dichlorobenzidine	0	3	10	10	10	10			ND	10	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
3-Methylphenol/4-Methylphenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
3-Nitroaniline	0	3	10	10	10	10			ND	10	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
4-Bromophenyl-phenylether	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
4-Chloro-3-methylphenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected

Table 11-1-28
Wetland 5A Phase III
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
4-Chloroaniline	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
4-Chlorophenylphenyl ether	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
4-Nitroaniline	0	3	10	10	10	10			ND	10	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
4-Nitrophenol	0	3	10	10	10	10			ND	10	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Benzo(b)fluoranthene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
SVOCs (µg/L) - cont.																				
Benzo(g,h,i)perylene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Benzo(k)fluoranthene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
bis(2-Chloroethoxy)methane	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
bis(2-Chloroethyl)ether	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	3	2.5	2.5	2.5	2.5			ND	2.5	U	0.3	EPA	8.33	8.33		0	3	No	No Ref. Conc.; Parameter Not Detected
Butylbenzylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Carbazole	0	3	5	5	5	5			ND	5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Dibenzofuran	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Diethylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Dimethylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Di-n-octylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Hexachlorobenzene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Hexachlorobutadiene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Hexachlorocyclopentadiene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Hexachloroethane	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Isophorone	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Nitrobenzene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
N-Nitroso-di-n-propylamine	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
N-Nitrosodiphenylamine	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Pentachlorophenol	0	3	10	10	10	10			ND	10	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Phenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
PAHs (µg/L)																				
2-Methylnaphthalene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Acenaphthene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Acenaphthylene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Anthracene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Benzo(a)anthracene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Benzo(a)pyrene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Chrysene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Dibenz(a,h)anthracene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Fluoranthene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Fluorene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Naphthalene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U	26	FDEP	0.10	0.10		0	3	No	No Ref. Conc.; Parameter Not Detected
Phenanthrene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Pyrene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Total PAH	0	3	32.5	32.5	32.5	32.5			ND	32.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
VOCs (µg/L)																				
1,1,2,2-Tetrachloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
1,1,2-Trichloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
1,1-Dichloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
1,2-Dichloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
1,2-Dichloroethene (total)	1	3	0.5	0.5	0.5	0.7	1.1	1.1	041W5A0601	1.1			NA				0	3	Yes	No Ref. Conc.
1,2-Dichloropropane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2-Butanone (MEK)	0	3	5	5	5	5			ND	5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
2-Hexanone	0	3	5	5	5	5			ND	5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	3	5	5	5	5			ND	5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Acetone	1	3	12.5	12.5	12.5	16	23	23	041W5A0601	23	J		NA				0	3	Yes	No Ref. Conc.
Bromodichloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Bromoform	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Bromomethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Carbon disulfide	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Carbon tetrachloride	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Chloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Chloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
cis-1,3-Dichloropropene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Dibromochloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Styrene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Tetrachloroethene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
trans-1,3-Dichloropropene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Trichloroethene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Vinyl chloride	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected
Xylene (Total)	0	3	1	1	1	1			ND	1	U		NA				0	3	No	No Ref. Conc.; Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available

UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections.

Table 11-1-28
Wetland 5A Phase III
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale

U or ND = Not Detected at or above the SQL

N/R = No refinement value available.

Parameters in bold were detected and exceeded Ref. Conc.s.

Table 11-1-29
Wetland 5A Phase III
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Iron	None	None	1,2-Dichloroethene (total)
Lead			Acetone
Manganese			
Barium			
Chromium			
Cobalt			
Copper			
Zinc			

Table 11-1-30
Wetland 5B Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	2	2			491	10,500	041M5B0201	10,500			N/A		Yes	No SV
Arsenic	1	2	0.07	0.07	1.3	1.3	041M5B0201	1.3	J	7.24	1, 2	0.18	No	Max Detect < SV
Barium	2	2			1.3	30.2	041M5B0201	30.2	J		N/A		Yes	No SV
Beryllium	1	2	0.035	0.035	0.48	0.48	041M5B0201	0.48	J		N/A		Yes	No SV
Cadmium	**2**	**2**			**0.3**	**220**	**041M5B0201**	**220**		**0.676**	**1**	**325**	**Yes**	**Max Detect > SV**
Calcium	2	2			109	4,400	041M5B0201	4,400	J		N/A		Yes	No SV
Chromium	**2**	**2**			**7.9**	**416**	**041M5B0201**	**416**		**52.3**	**1, 2**	**7.95**	**Yes**	**Max Detect > SV**
Cobalt	1	2	0.1	0.1	5.3	5.3	041M5B0201	5.3	J		N/A		Yes	No SV
Copper	**1**	**2**	**1.55**	**1.55**	**268**	**268**	**041M5B0201**	**268**		**18.7**	**1, 2**	**14.3**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	2	0.325	1.85			ND	1.85	U		N/A		Yes	No SV
Iron	2	2			306	3,290	041M5B0201	3,290			N/A		Yes	No SV
Lead	**2**	**2**			**17.9**	**481**	**041M5B0201**	**481**	**J**	**30.2**	**1, 2**	**15.9**	**Yes**	**Max Detect > SV**
Magnesium	2	2			27.1	668	041M5B0201	668	J		N/A		Yes	No SV
Manganese	2	2			1.4	42.7	041M5B0201	42.7			N/A		Yes	No SV
Mercury	**1**	**2**	**0.025**	**0.025**	**0.68**	**0.68**	**041M5B0201**	**0.68**		**0.13**	**1, 2**	**5.23**	**Yes**	**Max Detect > SV**
Nickel	**2**	**2**			**2.2**	**93.9**	**041M5B0201**	**93.9**		**15.9**	**1, 2**	**5.91**	**Yes**	**Max Detect > SV**
Potassium	2	2			10.5	247	041M5B0201	247	J		N/A		Yes	No SV
Selenium	1	2	0.1	0.1	3.6	3.6	041M5B0201	3.6			N/A		Yes	No SV
Silver	**1**	**2**	**0.135**	**0.135**	**5.2**	**5.2**	**041M5B0201**	**5.2**	**J**	**0.733**	**1**	**7.09**	**Yes**	**Max Detect > SV**
Sodium	1	2	1.3	1.3	95.2	95.2	041M5B0201	95.2	J		N/A		Yes	No SV
Thallium	0	2	0.1	0.6			ND	0.6	U		N/A		Yes	No SV
Vanadium	1	2	0.415	0.415	18.8	18.8	041M5B0201	18.8	J		N/A		Yes	No SV
Zinc	**2**	**2**			**9.8**	**1,160**	**041M5B0201**	**1,160**		**124**	**1, 2**	**9.35**	**Yes**	**Max Detect > SV**
PAHs (g/kg)														
2-Methylnaphthalene	0	2	20.5	70			ND	70	U	20.2	1	3.47	No	TOC normalized PAHs<TEC
Acenaphthene	0	2	10	34.5			ND	34.5	U	6.71	1	5.14	No	TOC normalized PAHs<TEC
Acenaphthylene	0	2	20.5	70			ND	70	U	5.87	1	11.9	No	TOC normalized PAHs<TEC
Anthracene	0	2	205	700			ND	700	U	46.9	1	14.9	No	TOC normalized PAHs<TEC
Benzo(a)anthracene	0	2	20.5	70			ND	70	U	74.8	1	0.94	No	Max SQL< SV
Benzo(a)pyrene	0	2	20.5	70			ND	70	U	88.8	1	0.79	No	Max SQL< SV
Chrysene	0	2	20.5	70			ND	70	U	108	1	0.65	No	Max SQL< SV
Dibenz(a,h)anthracene	0	2	20.5	70			ND	70	U	6.22	1	11.3	No	TOC normalized PAHs<TEC
Fluoranthene	1	2	20.5	20.5	110	110	041M5B0201	110	J	113	1	0.97	No	Max Detect < SV
Fluorene	0	2	10	34.5			ND	34.5	U	21.2	1	1.63	No	TOC normalized PAHs<TEC
Naphthalene	0	2	20.5	70			ND	70	U	34.6	1	2.02	No	TOC normalized PAHs<TEC
Phenanthrene	0	2	20.5	70			ND	70	U	86.7	1	0.81	No	Max SQL< SV
Pyrene	1	2	20.5	20.5	88	88	041M5B0201	88	J	153	1	0.58	No	Max Detect < SV
Total PAHs	1	2	430	430	1,530	1,530	041M5B0201	1,530		1,684	1, 2	0.91	No	Max Detect < SV
TOC Normalized PAHs	1	2	240.22	240.22	20.5	20.5	041M5B0201	20.5		290	3	0.07	No	Max Detect < SV
PCBs (g/kg)														
Aroclor-1016	0	2	2.05	7			ND	7	U	21.6	N/A	0.32	No	Max SQL< SV
Aroclor-1221	0	2	4.2	14.5			ND	14.5	U	67	2	0.22	No	Max SQL< SV
Aroclor-1232	0	2	2.05	7			ND	7	U	21.6	N/A	0.32	No	Max SQL< SV
Aroclor-1242	0	2	2.05	7			ND	7	U	21.6	N/A	0.32	No	Max SQL< SV
Aroclor-1248	0	2	2.05	7			ND	7	U	21.6	N/A	0.32	No	Max SQL< SV
Aroclor-1254	**2**	**2**			**8.7**	**53**	**041M5B0201**	**53**		**21.6**	**N/A**	**2.45**	**Yes**	**Max Detect > SV**
Aroclor-1260	0	2	2.05	7			ND	7	U	21.6	N/A	0.32	No	Max SQL< SV
Total PCBs	**2**	**2**			**23.2**	**103**	**041M5B0201**	**103**		**21.6**	**1**	**4.75**	**Yes**	**Max Detect > SV**
Pesticides (g/kg)														
Aldrin	0	2	0.05	0.18			ND	0.18	U		N/A		Yes	No SV
Dieldrin	**2**	**2**			**0.42**	**7.1**	**041M5B0201**	**7.1**	**J**	**0.716**	**1**	**9.92**	**Yes**	**Max Detect > SV**
Endosulfan I	0	2	0.105	0.365			ND	0.365	U		N/A		Yes	No SV
Endosulfan II	0	2	0.105	0.365			ND	0.365	U		N/A		Yes	No SV
Endosulfan sulfate	0	2	0.105	0.365			ND	0.365	U		N/A		Yes	No SV
Heptachlor	0	2	0.05	0.18			ND	0.18	U		N/A		Yes	No SV
Heptachlor epoxide	0	2	0.05	0.18			ND	0.18	U		N/A		Yes	No SV
Methoxychlor	0	2	0.5	1.8			ND	1.8	U		N/A		Yes	No SV
Toxaphene	0	2	10.5	36.5			ND	36.5	U		N/A		Yes	No SV
alpha-Chlordane	2	2			0.19	1.2	041M5B0201	1.2	J	1.7	1	0.71	No	Max Detect < SV
gamma-Chlordane	1	2	0.05	0.05	1	1	041M5B0201	1	J	1.7	1	0.59	No	Max Detect < SV
Total Chlordane	**2**	**2**			**0.24**	**2.2**	**041M5B0201**	**2.2**		**1.7**	**1**	**1.29**	**Yes**	**Max Detect > SV**
Endrin	0	2	0.105	0.365			ND	0.365	U	3.3	2	0.11	No	Max SQL< SV
Endrin aldehyde	0	2	0.105	0.365			ND	0.365	U	3.3	2	0.11	No	Max SQL< SV
Endrin ketone	0	2	0.105	0.365			ND	0.365	U	3.3	2	0.11	No	Max SQL< SV
Total Endrin	0	2	0.315	1.1			ND	1.1	U	3.3	2	0.33	No	Max SQL< SV
alpha-BHC	**2**	**2**			**0.3**	**1.8**	**041M5B0201**	**1.8**		**0.32**	**1**	**5.63**	**Yes**	**Max Detect > SV**
beta-BHC	0	2	0.05	0.18			ND	0.18	U	0.32	1	0.56	No	Max SQL< SV
delta-BHC	0	2	0.05	0.18			ND	0.18	U	0.32	1	0.56	No	Max SQL< SV
gamma-BHC (Lindane)	0	2	0.05	0.18			ND	0.18	U	0.32	1	0.56	No	Max SQL< SV
Total BHC	**2**	**2**			**0.45**	**2.34**	**041M5B0201**	**2.34**		**0.32**	**2**	**7.31**	**Yes**	**Max Detect > SV**
4,4'-DDD	**1**	**2**	**0.105**	**0.105**	**2.2**	**2.2**	**041M5B0201**	**2.2**	**J**	**1.22**	**1**	**1.8**	**Yes**	**Max Detect > SV**
4,4'-DDE	**2**	**2**			**0.32**	**3.9**	**041M5B0201**	**3.9**		**2.07**	**1**	**1.88**	**Yes**	**Max Detect > SV**
4,4'-DDT	0	2	0.105	0.365			ND	0.365	U	1.19	1	0.31	No	Max SQL< SV
Total DDT	**2**	**2**			**0.53**	**6.46**	**041M5B0201**	**6.46**		**3.3**	**2**	**1.96**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	2	205	700			ND	700	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	2	205	700			ND	700	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	2	205	700			ND	700	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	2	205	700			ND	700	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	2	205	700			ND	700	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	2	500	1,700			ND	1,700	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	2	205	700			ND	700	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	2	205	700			ND	700	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	2	205	700			ND	700	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	2	500	1,700			ND	1,700	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	2	205	700			ND	700	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	2	205	700			ND	700	U		N/A		Yes	No SV
2-Chloronaphthalene	0	2	205	700			ND	700	U		N/A		Yes	No SV
2-Chlorophenol	0	2	205	700			ND	700	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	2	500	1,700			ND	1,700	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	1	2	205	205	200	200	041M5B0201	200	J		N/A		Yes	No SV
2-Nitroaniline	0	2	205	700			ND	700	U		N/A		Yes	No SV
2-Nitrophenol	0	2	205	700			ND	700	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	2	205	700			ND	700	U		N/A		Yes	No SV
3-Nitroaniline	0	2	500	1,700			ND	1,700	UJ		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	2	205	700			ND	700	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	2	205	700			ND	700	U		N/A		Yes	No SV
4-Chloroaniline	0	2	205	700			ND	700	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	2	205	700			ND	700	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	1	2	205	205	150	150	041M5B0201	150	J		N/A		Yes	No SV
4-Nitroaniline	0	2	500	1,700			ND	1,700	U		N/A		Yes	No SV
4-Nitrophenol	0	2	500	1,700			ND	1,700	U		N/A		Yes	No SV
Benzo(b)fluoranthene	1	2	20.5	20.5	83	83	041M5B0201	83	J		N/A		No	TOC normalized PAHs<TEC
Benzo(g,h,i)perylene	0	2	20.5	70			ND	70	U		N/A		No	TOC normalized PAHs<TEC
Benzo(k)fluoranthene	0	2	20.5	70			ND	70	U		N/A		No	TOC normalized PAHs<TEC
bis(2-Chloroethoxy)methane	0	2	205	700			ND	700	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	2	20.5	70			ND	70	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	2	205	700			ND	700	U	182	1, 2	3.85	Yes	Max SQL > SV
Butylbenzylphthalate	2	2			38	80	041M5B0201	80	J	182	1, 2	0.44	No	Max Detect < SV
Carbazole	0	2	205	700			ND	700	UJ		N/A		Yes	No SV
Dibenzofuran	0	2	205	700			ND	700	U		N/A		Yes	No SV
Diethylphthalate	0	2	205	700			ND	700	U	182	1, 2	3.85	Yes	Max SQL > SV
Dimethylphthalate	0	2	205	700			ND	700	U	182	1, 2	3.85	Yes	Max SQL > SV
Di-n-butylphthalate	0	2	205	700			ND	700	U	182	1, 2	3.85	Yes	Max SQL > SV
Di-n-octylphthalate	0	2	205	700			ND	700	U	182	1, 2	3.85	Yes	Max SQL > SV
Hexachlorobenzene	0	2	205	700			ND	700	U		N/A		Yes	No SV

Table 11-1-30
Wetland 5B Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
Hexachlorobutadiene	0	2	205	700			ND	700	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	2	205	700			ND	700	UJ		N/A		Yes	No SV
Hexachloroethane	0	2	205	700			ND	700	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	2	20.5	70			ND	70	U		N/A		No	TOC normalized PAHs<TEC
Isophorone	0	2	205	700			ND	700	U		N/A		Yes	No SV
Nitrobenzene	0	2	205	700			ND	700	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	2	20.5	70			ND	70	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	2	205	700			ND	700	U		N/A		Yes	No SV
Pentachlorophenol	0	2	500	1,700			ND	1,700	U		N/A		Yes	No SV
Phenol	0	2	205	700			ND	700	U		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
1,1-Dichloroethane	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	1	2	6	6	11	11	041M5B0201	11	J		N/A		Yes	No SV
1,2-Dichloropropane	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
2-Butanone (MEK)	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
2-Hexanone	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Acetone	2	2			66	180	041M5B0101	180			N/A		Yes	No SV
Benzene	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Bromodichloromethane	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Bromoform	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Bromomethane	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Carbon disulfide	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Carbon tetrachloride	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Chlorobenzene	1	2	6	6	7	7	041M5B0201	7	J		N/A		Yes	No SV
Chloroethane	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Chloroform	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Chloromethane	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Dibromochloromethane	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Ethylbenzene	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Methylene chloride	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Styrene	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Tetrachloroethene	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Toluene	1	2	6	6	13	13	041M5B0201	13	J		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Trichloroethene	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV
Vinyl chloride	1	2	2	2	42	42	041M5B0201	42			N/A		Yes	No SV
Xylene (Total)	0	2	6	15.5			ND	15.5	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 11-1-31
Wetland 5B Phase II
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDD	2-Methylphenol (o-Cresol)	1,2-Dichloroethene (total)
Barium	4,4'-DDE	4-Methylphenol (p-Cresol)	Acetone
Beryllium	alpha-BHC		Chlorobenzene
Cadmium	Dieldrin		Toluene
Calcium	Total BHC		Vinyl chloride
Chromium	Total Chlordane		
Cobalt	Total DDT		
Copper	Aroclor-1254		
Iron	Total PCBs		
Lead			
Magnesium			
Manganese			
Mercury			
Nickel			
Potassium			
Selenium			
Silver			
Sodium			
Vanadium			
Zinc			
		Not Detected Parameters	
Cyanide (CN)	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Thallium	Endosulfan I	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
	Endosulfan II	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Endosulfan sulfate	1,4-Dichlorobenzene	1,1-Dichloroethane
	Heptachlor	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Heptachlor epoxide	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Methoxychlor	2,4,6-Trichlorophenol	1,2-Dichloropropane
	Toxaphene	2,4-Dichlorophenol	2-Butanone (MEK)
		2,4-Dimethylphenol	2-Hexanone
		2,4-Dinitrophenol	4-Methyl-2-Pentanone (MIBK)
		2,4-Dinitrotoluene	Benzene
		2,6-Dinitrotoluene	Bromodichloromethane
		2-Chloronaphthalene	Bromoform
		2-Chlorophenol	Bromomethane
		2-Methyl-4,6-Dinitrophenol	Carbon disulfide
		2-Nitroaniline	Carbon tetrachloride
		2-Nitrophenol	Chloroethane
		3,3'-Dichlorobenzidine	Chloroform
		3-Nitroaniline	Chloromethane
		4-Bromophenyl-phenylether	cis-1,3-Dichloropropene
		4-Chloro-3-methylphenol	Dibromochloromethane
		4-Chloroaniline	Ethylbenzene
		4-Chlorophenylphenyl ether	Methylene chloride
		4-Nitroaniline	Styrene
		4-Nitrophenol	Tetrachloroethene
		bis(2-Chloroethoxy)methane	trans-1,3-Dichloropropene
		bis(2-Chloroethyl)ether	Trichloroethene
		bis(2-Ethylhexyl)phthalate (BEHP)	Xylene (Total)
		Carbazole	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Naphthalene	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 11-1-32
Wetland 5B Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	2	2				5,500	491	10,500	10,500		041M5B0201			NA					0	13,610	0	No	EPC < RC
Barium	2	2				15.8	1.3	30.2	30.2	J	041M5B0201			NA					0	14	1	Yes	EPC > RC and no RV
Beryllium	1	2	0.035	0.035	0.035	0.258	0.48	0.48	0.48	J	041M5B0201			NA					0	0.84	0	No	EPC < RC
Cadmium	**2**	**2**				**110**	**0.3**	**220**	**220**		**041M5B0201**	**0.68**	**4.21**	**PEL**	**325**	**163**	**52.3**	**26.2**	**1**	**1.8**	**1**	**Yes**	**EPC > RV and RC**
Calcium	2	2				2,250	109	4,400	4,400	J	041M5B0201			NA					0	10,756.67	0	No	EPC < RC
Chromium	**2**	**2**				**212**	**7.9**	**416**	**416**		**041M5B0201**	**52.3**	**160**	**PEL**	**7.95**	**4.05**	**2.6**	**1.32**	**1**	**39.37**	**1**	**Yes**	**EPC > RV and RC**
Cobalt	1	2	0.1	0.1	0.1	2.7	5.3	5.3	5.3	J	041M5B0201			NA					0	2.8	1	Yes	EPC > RC and no RV
Copper	**1**	**2**	**1.55**	**1.55**	**1.55**	**135**	**268**	**268**	**268**		**041M5B0201**	**18.7**	**108**	**PEL**	**14.3**	**7.21**	**2.48**	**1.25**	**1**	**19.5**	**1**	**Yes**	**EPC > RV and RC**
Cyanide (CN)	0	2	1.09	0.325	1.85	1.09			1.85	U	ND			NA					0	5.22	0	No	Parameter Not Detected
Iron	2	2				1,800	306	3,290	3,290		041M5B0201			NA					0	11,911.67	0	No	EPC < RC
Lead	**2**	**2**				**249**	**17.9**	**481**	**481**	**J**	**041M5B0201**	**30.2**	**112**	**PEL**	**15.9**	**8.26**	**4.29**	**2.23**	**1**	**82.47**	**1**	**Yes**	**EPC > RV and RC**
Magnesium	2	2				348	27.1	668	668	J	041M5B0201			NA					0	7,513.33	0	No	EPC < RC
Manganese	2	2				22.1	1.4	42.7	42.7		041M5B0201			NA					0	37.97	1	Yes	EPC > RC and no RV
Mercury	1	2	0.025	0.025	0.025	0.353	0.68	0.68	0.68		041M5B0201	0.13	0.696	PEL	5.23	2.71	0.98	0.51	0	0.55	1	No	EPC > RC, but < RV
Nickel	**2**	**2**				**48.1**	**2.2**	**93.9**	**93.9**		**041M5B0201**	**15.9**	**42.8**	**PEL**	**5.91**	**3.02**	**2.19**	**1.12**	**1**	**9.28**	**1**	**Yes**	**EPC > RV and RC**
Potassium	2	2				129	10.5	247	247	J	041M5B0201			NA					0	1,628.67	0	No	EPC < RC
Selenium	1	2	0.1	0.1	0.1	1.85	3.6	3.6	3.6		041M5B0201			NA					0	3.45	1	Yes	EPC > RC and no RV
Silver	**1**	**2**	**0.135**	**0.135**	**0.135**	**2.67**	**5.2**	**5.2**	**5.2**	**J**	**041M5B0201**	**0.73**	**1.77**	**PEL**	**7.09**	**3.64**	**2.94**	**1.51**	**1**	**2.1**	**1**	**Yes**	**EPC > RV and RC**
Sodium	1	2	1.3	1.3	1.3	48.3	95.2	95.2	95.2	J	041M5B0201			NA					0	18,993.33	0	No	EPC < RC
Thallium	0	2	0.35	0.1	0.6	0.35			0.6	U	ND			NA					0	1.57	0	No	Parameter Not Detected
Vanadium	1	2	0.415	0.415	0.415	9.61	18.8	18.8	18.8	J	041M5B0201			NA					0	28.67	0	No	EPC < RC
Zinc	**2**	**2**				**585**	**9.8**	**1,160**	**1,160**		**041M5B0201**	**124**	**271**	**PEL**	**9.35**	**4.72**	**4.28**	**2.16**	**1**	**36.73**	**1**	**Yes**	**EPC > RV and RC**
PCBs (g/kg)																							
Aroclor-1016	0	2	4.53	2.05	7	4.53			7	U	ND	21.6	189	PEL	0.32	0.21	0.04	0.02	0		0	No	Parameter Not Detected
Aroclor-1221	0	2	9.35	4.2	14.5	9.35			14.5	U	ND	67	189	PEL	0.22	0.14	0.08	0.05	0		0	No	Parameter Not Detected
Aroclor-1232	0	2	4.53	2.05	7	4.53			7	U	ND	21.6	189	PEL	0.32	0.21	0.04	0.02	0		0	No	Parameter Not Detected
Aroclor-1242	0	2	4.53	2.05	7	4.53			7	U	ND	21.6	189	PEL	0.32	0.21	0.04	0.02	0		0	No	Parameter Not Detected
Aroclor-1248	0	2	4.53	2.05	7	4.53			7	U	ND	21.6	189	PEL	0.32	0.21	0.04	0.02	0		0	No	Parameter Not Detected
Aroclor-1254	2	2				30.9	8.7	53	53		041M5B0201	21.6	189	PEL	2.45	1.43	0.28	0.16	0		0	No	RV HQ <1 and no RC
Aroclor-1260	0	2	4.53	2.05	7	4.53			7	U	ND	21.6	189	PEL	0.32	0.21	0.04	0.02	0		0	No	Parameter Not Detected
Total PCBs	2	2				62.8	23.2	103	103		041M5B0201	21.6	189	PEL	4.75	2.91	0.54	0.33	0		0	No	RV HQ <1 and no RC
Pesticides (g/kg)																							
Aldrin	0	2	0.115	0.05	0.18	0.115			0.18	U	ND			NA					0		0	No	Parameter Not Detected
Dieldrin	**2**	**2**				**3.76**	**0.42**	**7.1**	**7.1**	**J**	**041M5B0201**	**0.72**	**4.3**	**PEL**	**9.92**	**5.25**	**1.65**	**0.87**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Endosulfan I	0	2	0.235	0.105	0.365	0.235			0.365	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	2	0.235	0.105	0.365	0.235			0.365	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	0	2	0.235	0.105	0.365	0.235			0.365	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor	0	2	0.115	0.05	0.18	0.115			0.18	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	2	0.115	0.05	0.18	0.115			0.18	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	2	1.15	0.5	1.8	1.15			1.8	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	2	23.5	10.5	36.5	23.5			36.5	U	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	2	2				0.695	0.19	1.2	1.2	J	041M5B0201	1.7	4.79	PEL	0.71	0.41	0.25	0.15	0		0	No	RV HQ <1 and no RC
gamma-Chlordane	1	2	0.05	0.05	0.05	0.525	1	1	1	J	041M5B0201	1.7	4.79	PEL	0.59	0.31	0.21	0.11	0		0	No	RV HQ <1 and no RC
Total Chlordane	2	2				1.22	0.24	2.2	2.2		041M5B0201	1.7	4.79	PEL	1.29	0.72	0.46	0.26	0		0	No	RV HQ <1 and no RC
alpha-BHC	**2**	**2**				**1.05**	**0.3**	**1.8**	**1.8**		**041M5B0201**		**0.99**	**PEL**			**1.82**	**1.06**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
beta-BHC	0	2	0.115	0.05	0.18	0.115			0.18	U	ND	0.32	0.99	PEL	0.56	0.36	0.18	0.12	0		0	No	Parameter Not Detected
delta-BHC	0	2	0.115	0.05	0.18	0.115			0.18	U	ND	0.32	0.99	PEL	0.56	0.36	0.18	0.12	0		0	No	Parameter Not Detected
gamma-BHC (Lindane)	0	2	0.115	0.05	0.18	0.115			0.18	U	ND	0.32	0.99	PEL	0.56	0.36	0.18	0.12	0		0	No	Parameter Not Detected
Total BHC	**2**	**2**				**1.4**	**0.45**	**2.34**	**2.34**		**041M5B0201**	**0.32**	**0.99**	**PEL**	**7.31**	**4.36**	**2.36**	**1.41**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	1	2	0.105	0.105	0.105	1.15	2.2	2.2	2.2	J	041M5B0201	1.22	7.81	PEL	1.8	0.95	0.28	0.15	0	50	0	No	EPC < RC and RV
4,4'-DDE	2	2				2.11	0.32	3.9	3.9		041M5B0201	2.07	374	PEL	1.88	1.02	0.01	0.01	0	40	0	No	EPC < RC and RV
4,4'-DDT	0	2	0.235	0.105	0.365	0.235			0.365	U	ND	1.19	4.77	PEL	0.31	0.20	0.08	0.05	0	20	0	No	Parameter Not Detected
Total DDT	2	2				3.5	0.53	6.46	6.46		041M5B0201	3.3	51.7	PEL	1.96	1.06	0.13	0.07	0	110	0	No	EPC < RC and RV
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	2	1,100	500	1,700	1,100			1,700	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	2	1,100	500	1,700	1,100			1,700	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	2	1,100	500	1,700	1,100			1,700	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	1	2	205	205	205	203	200	200	200	J	041M5B0201			NA					0		0	Yes	No SV, no RV, and no RC
2-Nitroaniline	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	2	1,100	500	1,700	1,100			1,700	UJ	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected

Table 11-1-32
Wetland 5B Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
4-Chloro-3-methylphenol	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
SVOCs (g/kg) - cont.																							
4-Methylphenol (p-Cresol)	1	2	205	205	205	178	150	150	150	J	041M5B0201			NA					0		0	Yes	No SV, no RV, and no RC
4-Nitroaniline	0	2	1,100	500	1,700	1,100			1,700	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	2	1,100	500	1,700	1,100			1,700	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	2	45.3	20.5	70	45.3			70	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	2	453	205	700	453			700	U	ND	182	2647	PEL	3.85	2.49	0.26	0.17	0		0	No	Parameter Not Detected
Carbazole	0	2	453	205	700	453			700	UJ	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	0	2	453	205	700	453			700	U	ND	182	2647	PEL	3.85	2.49	0.26	0.17	0		0	No	Parameter Not Detected
Dimethylphthalate	0	2	453	205	700	453			700	U	ND	182	2647	PEL	3.85	2.49	0.26	0.17	0		0	No	Parameter Not Detected
Di-n-butylphthalate	0	2	453	205	700	453			700	U	ND	182	2647	PEL	3.85	2.49	0.26	0.17	0		0	No	Parameter Not Detected
Di-n-octylphthalate	0	2	453	205	700	453			700	U	ND	182	2647	PEL	3.85	2.49	0.26	0.17	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	2	453	205	700	453			700	UJ	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	2	45.3	20.5	70	45.3			70	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	2	1,100	500	1,700	1,100			1,700	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	2	453	205	700	453			700	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	1	2	6	6	6	8.5	11	11	11	J	041M5B0201			NA					0		0	Yes	No SV, no RV, and no RC
1,2-Dichloropropane	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Hexanone	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	2	2				123	66	180	180		041M5B0101			NA					0		0	Yes	No SV, no RV, and no RC
Benzene	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	1	2	6	6	6	6.5	7	7	7	J	041M5B0201			NA					0		0	Yes	No SV, no RV, and no RC
Chloroethane	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	1	2	6	6	6	9.5	13	13	13	J	041M5B0201			NA					0		0	Yes	No SV, no RV, and no RC
trans-1,3-Dichloropropene	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	1	2	2	2	2	22	42	42	42		041M5B0201			NA					0		0	Yes	No SV, no RV, and no RC
Xylene (Total)	0	2	10.8	6	15.5	10.8			15.5	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 11-1-33
Wetland 5B Phase II
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Barium	Dieldrin	2-Methylphenol (o-Cresol)	Vinyl chloride
Cadmium	alpha-BHC	4-Methylphenol (p-Cresol)	
Chromium	Total BHC		
Cobalt			
Copper			
Lead			
Manganese			
Nickel			
Selenium			
Silver			
Zinc			

Table 11-1-34
Wetland 5B Phase II
Mean ERM Quotient

Sample_ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M5B0101	11/17/1995	mg/kg	0.07	UJ	Arsenic	8.2	70	0.00
041M5B0101	11/17/1995	mg/kg	0.3	J	Cadmium	1.2	9.6	0.03
041M5B0101	11/17/1995	mg/kg	7.9		Chromium	81	370	0.02
041M5B0101	11/17/1995	mg/kg	1.55	U	Copper	34	270	0.01
041M5B0101	11/17/1995	mg/kg	17.9	J	Lead	46.7	218	0.08
041M5B0101	11/17/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M5B0101	11/17/1995	mg/kg	2.2	J	Nickel	20.9	51.6	0.04
041M5B0101	11/17/1995	mg/kg	0.135	UJ	Silver	1	3.7	0.04
041M5B0101	11/17/1995	mg/kg	9.8		Zinc	150	410	0.02
041M5B0101	11/17/1995	g/kg	0.32	J	4,4'-DDE	2.2	27	0.01
041M5B0101	11/17/1995	g/kg	0.105	U	4,4'-DDT	1.58	46.1	0.00
041M5B0101	11/17/1995	g/kg	23.15		Total PCBs	22.7	180	0.13
041M5B0101	11/17/1995	g/kg	20.5	U	2-Methylnaphthalene	70	670	0.03
041M5B0101	11/17/1995	g/kg	10	U	Acenaphthene	16	500	0.02
041M5B0101	11/17/1995	g/kg	20.5	U	Acenaphthylene	44	640	0.03
041M5B0101	11/17/1995	g/kg	205	U	Anthracene	85.3	1,100	0.19
041M5B0101	11/17/1995	g/kg	20.5	U	Benzo(a)anthracene	261	1,600	0.01
041M5B0101	11/17/1995	g/kg	20.5	U	Benzo(a)pyrene	430	1,600	0.01
041M5B0101	11/17/1995	g/kg	20.5	U	Chrysene	384	2,800	0.01
041M5B0101	11/17/1995	g/kg	20.5	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M5B0101	11/17/1995	g/kg	20.5	U	Fluoranthene	600	5,100	0.00
041M5B0101	11/17/1995	g/kg	10	U	Fluorene	19	540	0.02
041M5B0101	11/17/1995	g/kg	20.5	U	Naphthalene	160	2,100	0.01
041M5B0101	11/17/1995	g/kg	20.5	U	Phenanthrene	240	1,500	0.01
041M5B0101	11/17/1995	g/kg	20.5	U	Pyrene	665	2,600	0.01
041M5B0101	11/17/1995				ERM Quotient Sum			0.86
041M5B0101	11/17/1995				Mean ERM Quotient			0.03
041M5B0101	11/17/1995				Mean ERM Quotient without ND			0.01
041M5B0101	11/17/1995				Mean ERM Quotient Category			2.00
041M5B0201	11/17/1995	mg/kg	1.3	J	Arsenic	8.2	70	0.02
041M5B0201	**11/17/1995**	**mg/kg**	**220**		**Cadmium**	**1.2**	**9.6**	**22.92**
041M5B0201	**11/17/1995**	**mg/kg**	**416**		**Chromium**	**81**	**370**	**1.12**
041M5B0201	11/17/1995	mg/kg	268		Copper	34	270	0.99
041M5B0201	**11/17/1995**	**mg/kg**	**481**	**J**	**Lead**	**46.7**	**218**	**2.21**
041M5B0201	11/17/1995	mg/kg	0.68		Mercury	0.15	0.71	0.96
041M5B0201	**11/17/1995**	**mg/kg**	**93.9**		**Nickel**	**20.9**	**51.6**	**1.82**
041M5B0201	**11/17/1995**	**mg/kg**	**5.2**	**J**	**Silver**	**1**	**3.7**	**1.41**
041M5B0201	**11/17/1995**	**mg/kg**	**1,160**		**Zinc**	**150**	**410**	**2.83**
041M5B0201	11/17/1995	g/kg	3.9		4,4'-DDE	2.2	27	0.14
041M5B0201	11/17/1995	g/kg	0.365	U	4,4'-DDT	1.58	46.1	0.01
041M5B0201	11/17/1995	g/kg	102.5		Total PCBs	22.7	180	0.57
041M5B0201	11/17/1995	g/kg	70	U	2-Methylnaphthalene	70	670	0.10
041M5B0201	11/17/1995	g/kg	34.5	U	Acenaphthene	16	500	0.07
041M5B0201	11/17/1995	g/kg	70	U	Acenaphthylene	44	640	0.11
041M5B0201	11/17/1995	g/kg	700	U	Anthracene	85.3	1,100	0.64
041M5B0201	11/17/1995	g/kg	70	U	Benzo(a)anthracene	261	1,600	0.04
041M5B0201	11/17/1995	g/kg	70	U	Benzo(a)pyrene	430	1,600	0.04
041M5B0201	11/17/1995	g/kg	70	U	Chrysene	384	2,800	0.03
041M5B0201	11/17/1995	g/kg	70	U	Dibenz(a,h)anthracene	63.4	260	0.27
041M5B0201	11/17/1995	g/kg	110	J	Fluoranthene	600	5,100	0.02
041M5B0201	11/17/1995	g/kg	34.5	U	Fluorene	19	540	0.06
041M5B0201	11/17/1995	g/kg	70	U	Naphthalene	160	2,100	0.03
041M5B0201	11/17/1995	g/kg	70	U	Phenanthrene	240	1,500	0.05
041M5B0201	11/17/1995	g/kg	88	J	Pyrene	665	2,600	0.03
041M5B0201	11/17/1995				ERM Quotient Sum			36.49
041M5B0201	11/17/1995				Mean ERM Quotient			1.46
041M5B0201	11/17/1995				Mean ERM Quotient without ND			1.40
041M5B0201	11/17/1995				Mean ERM Quotient Category			3.00

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 11-1-35
Wetland 5B Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	**1**	**1**				**2,060**	**2,060**	**2,060**	**041W5B0201**	**2,060**		**13**	**FDEP**	**158**	**Yes**	**Max Detect > SV**
Antimony	0	1	1	1	1	1			ND	1	UJ	160	EPA	0.01	No	Max SQL< SV
Arsenic	0	1	1	1	1	1			ND	1	UJ	50	FDEP	0.02	No	Max SQL< SV
Barium	1	1				27.8	27.8	27.8	041W5B0201	27.8	J		NA		Yes	No SV
Beryllium	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.13	FDEP	3.85	Yes	Max SQL > SV
Cadmium	**1**	**1**				**19**	**19**	**19**	**041W5B0201**	**19**		**0.66**	**EPA**	**28.8**	**Yes**	**Max Detect > SV**
Calcium	1	1				15,600	15,600	15,600	041W5B0201	15,600			NA		Yes	No SV
Chromium	**1**	**1**				**40.8**	**40.8**	**40.8**	**041W5B0201**	**40.8**	**J**	**11**	**EPA**	**3.71**	**Yes**	**Max Detect > SV**
Cobalt	1	1				3.9	3.9	3.9	041W5B0201	3.9	J		NA		Yes	No SV
Copper	**1**	**1**				**52.7**	**52.7**	**52.7**	**041W5B0201**	**52.7**		**6.54**	**EPA**	**8.06**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	5.2	EPA	0.48	No	Max SQL< SV
Iron	1	1				2,890	2,890	2,890	041W5B0201	2,890			NA		Yes	No SV
Lead	**1**	**1**				**94.1**	**94.1**	**94.1**	**041W5B0201**	**94.1**		**1.32**	**EPA**	**71.3**	**Yes**	**Max Detect > SV**
Magnesium	1	1				3,250	3,250	3,250	041W5B0201	3,250	J		NA		Yes	No SV
Manganese	1	1				109	109	109	041W5B0201	109			NA		Yes	No SV
Mercury	**1**	**1**				**0.14**	**0.14**	**0.14**	**041W5B0201**	**0.14**	**J**	**0.012**	**EPA**	**11.7**	**Yes**	**Max Detect > SV**
Nickel	0	1	13.1	13.1	13.1	13.1			ND	13.1	U	87.71	EPA	0.15	No	Max SQL< SV
Potassium	1	1				2,160	2,160	2,160	041W5B0201	2,160	J		NA		Yes	No SV
Selenium	0	1	1.5	1.5	1.5	1.5			ND	1.5	U	5	EPA	0.3	No	Max SQL< SV
Silver	0	1	2	2	2	2			ND	2	UJ	0.012	EPA	167	Yes	Max SQL > SV
Sodium	1	1				12,600	12,600	12,600	041W5B0201	12,600			NA		Yes	No SV
Thallium	0	1	1.5	1.5	1.5	1.5			ND	1.5	U	4	EPA	0.38	No	Max SQL< SV
Vanadium	1	1				5.2	5.2	5.2	041W5B0201	5.2	J		NA		Yes	No SV
Zinc	**1**	**1**				**189**	**189**	**189**	**041W5B0201**	**189**		**58.91**	**EPA**	**3.21**	**Yes**	**Max Detect > SV**
Pesticides (g/L)																
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.056	EPA	0.45	No	Max SQL< SV
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	6.58	Yes	Max SQL > SV
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	11.6	Yes	Max SQL > SV
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	No	Max SQL< SV
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	35.7	Yes	Max SQL > SV
Total PCB	0	1	4	4	4	4			ND	4	U		NA		Yes	No SV

Table 11-1-35
Wetland 5B Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chlorophenol	1	1				1	1	1	041W5B0201	1	J	43.8	EPA	0.02	No	Max Detect < SV
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	1	1				1	1	1	041W5B0201	1	J		NA		Yes	No SV
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Nitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**1**	**1**				**2**	**2**	**2**	**041W5B0201**	**2**	**J**	**0.3**	**EPA**	**6.67**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Di-n-butylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	9.4	EPA	0.27	No	Max SQL< SV
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	1	1				1	1	1	041W5B0201	1	J		NA		Yes	No SV
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pentachlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chrysene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluorene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Naphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	26	FDEP	0.02	No	Max SQL< SV
Phenanthrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

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Wetland 5B Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
PAHs (g/L) - cont.																
Pyrene	1	1				2	2	2	041W5B0201	2			NA		Yes	No SV
Total PAH	1	1				8	8	8	041W5B0201	8			NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	270	FDEP	0.00	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	1	1				3	3	3	041W5B0201	3			NA		Yes	No SV
1,1-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.16	No	Max SQL< SV
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	15.8	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	3	FDEP	0.17	No	Max SQL< SV
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Acetone	1	1				8	8	8	041W5B0201	8	J		NA		Yes	No SV
Benzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	53	EPA	0.01	No	Max SQL< SV
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	17	FDEP	0.03	No	Max SQL< SV
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	289	EPA	0.00	No	Max SQL< SV
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	453	EPA	0.00	No	Max SQL< SV
Methylene chloride	0	1	4	4	4	4			ND	4	U	1,580	FDEP	0.00	No	Max SQL< SV
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	175	EPA	0.00	No	Max SQL< SV
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	1	1				10	10	10	041W5B0201	10			NA		Yes	No SV
Vinyl chloride	1	1				6	6	6	041W5B0201	6			NA		Yes	No SV
Xylene (Total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 11-1-36
Wetland 5B Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	4-Chloro-3-methylphenol	1,1-Dichloroethane
Barium		bis(2-Ethylhexyl)phthalate (BEHP)	Acetone
Cadmium		N-Nitroso-di-n-propylamine	Trichloroethene
Calcium		Pyrene	Vinyl chloride
Chromium		Total PAHs	
Cobalt			
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Mercury			
Potassium			
Sodium			
Vanadium			
Zinc			
		Not Detected Parameters	
Beryllium	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Silver	Dieldrin	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1,2-Trichloroethane
	Endosulfan II	2,4,5-Trichlorophenol	1,2-Dibromo-3-Chloropropane
	Endosulfan sulfate	2,4,6-Trichlorophenol	1,2-Dibromoethane
	Heptachlor	2,4-Dichlorophenol	1,2-Dichloroethane
	Heptachlor epoxide	2,4-Dimethylphenol	1,2-Dichloropropane
	Methoxychlor	2,4-Dinitrophenol	1,3-Dichlorobenzene
	Toxaphene	2,4-Dinitrotoluene	2-Hexanone
	alpha-Chlordane	2,6-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
	gamma-Chlordane	2-Chloronaphthalene	Bromochloromethane
	Total Chlordane	2-Methyl-4,6-Dinitrophenol	Bromodichloromethane
	Endrin	2-Methylphenol (o-Cresol)	Bromoform
	Endrin aldehyde	2-Nitroaniline	Bromomethane
	Endrin ketone	2-Nitrophenol	Carbon disulfide
	Total Endrin	3,3'-Dichlorobenzidine	Carbon tetrachloride
	alpha-BHC	3-Nitroaniline	Chloroethane
	beta-BHC	4-Bromophenyl-phenylether	Chloromethane
	delta-BHC	4-Chloroaniline	cis-1,3-Dichloropropene
	Total BHC	4-Chlorophenylphenyl ether	Dibromochloromethane
	4,4'-DDD	4-Methylphenol (p-Cresol)	Styrene
	4,4'-DDE	4-Nitroaniline	Tetrachloroethene
	4,4'-DDT	4-Nitrophenol	trans-1,2-Dichloroethene
	Total DDT	Benzo(b)fluoranthene	trans-1,3-Dichloropropene
	Aroclor-1016	Benzo(g,h,i)perylene	Xylene (Total)
	Aroclor-1221	Benzo(k)fluoranthene	
	Aroclor-1232	bis(2-Chloroethoxy)methane	
	Aroclor-1242	bis(2-Chloroethyl)ether	
	Aroclor-1248	Butylbenzylphthalate	
	Aroclor-1254	Dibenzofuran	
	Aroclor-1260	Diethylphthalate	
	Total PCBs	Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	

Table 11-1-37
Wetland 5B Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
Metals (µg/L)																				
Aluminum	**1**	**1**				**2,060**	**2,060**	**2,060**	**041W5B0201**	**2,060**		**13**	**FDEP**	**158**	**158**	**1,090**	**1**	**1**	**Yes**	**Maximum Result exceeds Reference Concentration**
Barium	1	1				27.8	27.8	27.8	041W5B0201	27.8	J		NA			3.67	1	1	Yes	Maximum Result exceeds Reference Concentration
Beryllium	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.13	FDEP	3.85	3.85	1	0	1	No	Maximum Result below Reference Concentration
Cadmium	**1**	**1**				**19**	**19**	**19**	**041W5B0201**	**19**		**0.66**	**EPA**	**28.8**	**28.8**	**3**	**1**	**1**	**Yes**	**Maximum Result exceeds Reference Concentration**
Calcium	1	1				15,600	15,600	15,600	041W5B0201	15,600			NA			7,680	1	1	No	Essential Nutrient
Chromium	**1**	**1**				**40.8**	**40.8**	**40.8**	**041W5B0201**	**40.8**	**J**	**11**	**EPA**	**3.71**	**3.71**	**8**	**1**	**1**	**Yes**	**Maximum Result exceeds Reference Concentration**
Cobalt	1	1				3.9	3.9	3.9	041W5B0201	3.9	J		NA			3	1	1	Yes	Maximum Result exceeds Reference Concentration
Copper	**1**	**1**				**52.7**	**52.7**	**52.7**	**041W5B0201**	**52.7**		**6.54**	**EPA**	**8.06**	**8.06**	**4**	**1**	**1**	**Yes**	**Maximum Result exceeds Reference Concentration**
Iron	1	1				2,890	2,890	2,890	041W5B0201	2,890			NA			2,360	1	1	Yes	Maximum Result exceeds Reference Concentration
Lead	**1**	**1**				**94.1**	**94.1**	**94.1**	**041W5B0201**	**94.1**		**1.32**	**EPA**	**71.3**	**71.3**	**3.2**	**1**	**1**	**Yes**	**Maximum Result exceeds Reference Concentration**
Magnesium	1	1				3,250	3,250	3,250	041W5B0201	3,250	J		NA			20,300	0	1	No	Maximum Result below Reference Concentration
Manganese	1	1				109	109	109	041W5B0201	109			NA			13.2	1	1	Yes	Maximum Result exceeds Reference Concentration
Mercury	**1**	**1**				**0.14**	**0.14**	**0.14**	**041W5B0201**	**0.14**	**J**	**0.012**	**EPA**	**11.7**	**11.7**	**0.13**	**1**	**1**	**Yes**	**Maximum Result exceeds Reference Concentration**
Potassium	1	1				2,160	2,160	2,160	041W5B0201	2,160	J		NA			7,000	0	1	No	Maximum Result below Reference Concentration
Silver	0	1	2	2	2	2			ND	2	UJ	0.012	EPA	167	167	4	0	1	No	Maximum Result below Reference Concentration
Sodium	1	1				12,600	12,600	12,600	041W5B0201	12,600			NA			182,000	0	1	No	Maximum Result below Reference Concentration
Vanadium	1	1				5.2	5.2	5.2	041W5B0201	5.2	J		NA			4.7	1	1	Yes	Maximum Result exceeds Reference Concentration
Zinc	**1**	**1**				**189**	**189**	**189**	**041W5B0201**	**189**		**58.91**	**EPA**	**3.21**	**3.21**	**5.53**	**1**	**1**	**Yes**	**Maximum Result exceeds Reference Concentration**
Pesticides (µg/L)																				
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	6.58	6.58		0	1	No	Parameter Not Detected
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	1	No	Parameter Not Detected
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	1	No	Parameter Not Detected
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	11.6	11.6		0	1	No	Parameter Not Detected
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	1	No	Parameter Not Detected
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	21.7		0	1	No	Parameter Not Detected
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	1	No	Parameter Not Detected
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	1	No	Parameter Not Detected
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	1	No	Parameter Not Detected
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	1	No	Parameter Not Detected
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	1	No	Parameter Not Detected
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	84.7		0	1	No	Parameter Not Detected
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	1	No	Parameter Not Detected
PCBs (µg/L)																				
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA				0	1	No	Parameter Not Detected
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	35.7	35.7		0	1	No	Parameter Not Detected
Total PCB	0	1	4	4	4	4			ND	4	U		NA				0	1	No	Parameter Not Detected
SVOCs (µg/L)																				
1,2,4-Trichlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Nitroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected

Table 11-1-37
Wetland 5B Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
SVOCs (µg/L) - cont.																				
3-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Chloro-3-methylphenol	1	1				1	1	1	041W5B0201	1	J		NA				0	1	Yes	No Reference Concentration
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
4-Nitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	1	No	Parameter Not Detected
Benzo(b)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Benzo(k)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	**1**	**1**				**2**	**2**	**2**	**041W5B0201**	**2**	**J**	**0.3**	**EPA**	**6.67**	**6.67**		**0**	**1**	**Yes**	**No Reference Concentration**
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Hexachlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	1	1				1	1	1	041W5B0201	1	J		NA				0	1	Yes	No Reference Concentration
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Pentachlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
PAHs (µg/L)																				
2-Methylnaphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Acenaphthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Acenaphthylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Benzo(a)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Benzo(a)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Chrysene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Fluorene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Phenanthrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Pyrene	1	1				2	2	2	041W5B0201	2			NA				0	1	Yes	No Reference Concentration
Total PAH	1	1				8	8	8	041W5B0201	8			NA				0	1	Yes	No Reference Concentration
VOCs (µg/L)																				
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,1-Dichloroethane	1	1				3	3	3	041W5B0201	3			NA				0	1	Yes	No Reference Concentration
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Acetone	1	1				8	8	8	041W5B0201	8	J		NA				0	1	Yes	No Reference Concentration
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected

Table 11-1-37
Wetland 5B Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
VOCs (µg/L) - cont.																				
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Trichloroethene	1	1				10	10	10	041W5B0201	10			NA				0	1	Yes	No Reference Concentration
Vinyl chloride	1	1				6	6	6	041W5B0201	6			NA				0	1	Yes	No Reference Concentration
Xylene (Total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected

Table 11-1-38
Wetland 5B Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	bis(2-Ethylhexyl)phthalate (BEHP)	Acetone
Iron		Pyrene	Vinyl chloride
Lead		4-Chloro-3-methylphenol	1,1-Dichloroethane
Manganese		N-Nitroso-di-n-propylamine	Trichloroethene
Mercury		Total PAHs	
Barium			
Cadmium			
Chromium			
Cobalt			
Copper			
Vanadium			
Zinc			

Table 11-1-39
Wetland 5B Phase IV
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	5	5			300	3,400	041M5B0202	3,400			N/A		Yes	No SV
Antimony	5	5			1.1	3.6	041M5B0202	3.6	I	12	2	0.3	No	Max Detect < SV
Arsenic	1	5	0.23	0.33	0.84	0.84	041M5B0202	0.84	I	7.24	1, 2	0.12	No	Max Detect < SV
Barium	5	5			1.5	18	041M5B0202	18			N/A		Yes	No SV
Beryllium	5	5			0.036	0.15	041M5B0202	0.15	I		N/A		Yes	No SV
Cadmium	**5**	**5**			**0.95**	**31**	**041M5B0202**	**31**		**0.676**	**1**	**45.9**	**Yes**	**Max Detect > SV**
Calcium	5	5			100	1,100	041M5B0202	1,100			N/A		Yes	No SV
Chromium	**5**	**5**			**14**	**470**	**041M5B0202**	**470**		**52.3**	**1, 2**	**8.99**	**Yes**	**Max Detect > SV**
Cobalt	5	5			0.3	4.1	041M5B0202	4.1			N/A		Yes	No SV
Copper	**5**	**5**			**5.3**	**90**	**041M5B0202**	**90**		**18.7**	**1, 2**	**4.81**	**Yes**	**Max Detect > SV**
Iron	5	5			210	1,800	041M5B0202	1,800			N/A		Yes	No SV
Lead	**5**	**5**			**19**	**420**	**041M5B0202**	**420**		**30.2**	**1, 2**	**13.9**	**Yes**	**Max Detect > SV**
Magnesium	5	5			26	210	041M5B0202	210			N/A		Yes	No SV
Manganese	5	5			1.1	21	041M5B0601	21			N/A		Yes	No SV
Mercury	**4**	**5**	**0.0034**	**0.0034**	**0.019**	**0.22**	**041M5B0202**	**0.22**		**0.13**	**1, 2**	**1.69**	**Yes**	**Max Detect > SV**
Nickel	**5**	**5**			**0.61**	**20**	**041M5B0202**	**20**		**15.9**	**1, 2**	**1.26**	**Yes**	**Max Detect > SV**
Potassium	5	5			12	74	041M5B0202	74	I		N/A		Yes	No SV
Selenium	0	5	0.37	0.55			ND	0.55	U		N/A		Yes	No SV
Silver	**2**	**5**	**0.075**	**0.09**	**0.38**	**6.4**	**041M5B0202**	**6.4**		**0.733**	**1**	**8.73**	**Yes**	**Max Detect > SV**
Sodium	5	5			7.5	38	041M5B0202	38	I		N/A		Yes	No SV
Thallium	0	5	0.55	0.75			ND	0.75	U		N/A		Yes	No SV
Vanadium	5	5			0.55	6.7	041M5B0202	6.7			N/A		Yes	No SV
Zinc	**5**	**5**			**19**	**200**	**041M5B0202**	**200**		**124**	**1, 2**	**1.61**	**Yes**	**Max Detect > SV**
PAHs (g/kg)														
2-Methylnaphthalene	0	5	1.55	6			ND	6	U	20.2	1	0.30	No	TOC normalized PAHs<TEC
Acenaphthene	0	5	2.6	10			ND	10	U	6.71	1	1.49	No	TOC normalized PAHs<TEC
Acenaphthylene	0	5	2.5	10			ND	10	U	5.87	1	1.7	No	TOC normalized PAHs<TEC
Anthracene	0	5	2.8	11			ND	11	U	46.9	1	0.24	No	Max SQL< SV
Benzo(a)anthracene	2	5	2.2	8.5	98	120	041M5B0202	120	I	74.8	1	1.6	No	TOC normalized PAHs<TEC
Benzo(a)pyrene	0	5	2.6	10			ND	10	U	88.8	1	0.11	No	Max SQL< SV
Chrysene	3	5	2.9	7.5	56	160	041M5B0202	160		108	1	1.48	No	TOC normalized PAHs<TEC
Dibenz(a,h)anthracene	0	5	2.55	10			ND	10	U	6.22	1	1.61	Yes	Max SQL > SV
Fluoranthene	5	5			15	290	041M5B0202	290		113	1	2.57	No	TOC normalized PAHs<TEC
Fluorene	0	5	2.25	9			ND	9	U	21.2	1	0.43	No	Max SQL< SV
Naphthalene	0	5	2.05	8			ND	8	U	34.6	1	0.23	No	Max SQL< SV
Phenanthrene	0	5	3.95	70			ND	70	U	86.7	1	0.81	No	Max SQL< SV
Pyrene	5	5			13	210	041M5B0202	210		153	1	1.37	No	TOC normalized PAHs<TEC
Total PAHs	5	5			56	923	041M5B0202	923		1,684	1, 2	0.55	No	Max Detect < SV
TOC Normalized PAHs	5	5			10.4	174.54	041M5B0301	174.54		290	3	0.602	No	Max Detect < SV
PCB's (g/kg)														
Aroclor-1016	0	5	2.8	4.45			ND	4.45	U	21.6	N/A	0.21	No	Max SQL< SV
Aroclor-1221	0	5	12.5	19.5			ND	19.5	U	67	2	0.29	No	Max SQL< SV
Aroclor-1232	0	5	4.85	7.5			ND	7.5	U	21.6	N/A	0.35	No	Max SQL< SV
Aroclor-1242	0	5	4.85	7.5			ND	7.5	U	21.6	N/A	0.35	No	Max SQL< SV
Aroclor-1248	0	5	4.7	7.5			ND	7.5	U	21.6	N/A	0.35	No	Max SQL< SV
Aroclor-1254	0	5	4.85	7.5			ND	7.5	U	21.6	N/A	0.35	No	Max SQL< SV
Aroclor-1260	**4**	**5**	**3.2**	**3.2**	**20**	**150**	**041M5B0202**	**150**		**21.6**	**N/A**	**6.94**	**Yes**	**Max Detect > SV**
Total PCBs	**4**	**5**	**37.8**	**37.8**	**56**	**203**	**041M5B0601**	**203**		**21.6**	**1**	**9.39**	**Yes**	**Max Detect > SV**

Table 11-1-39
Wetland 5B Phase IV
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Pesticides (g/kg)														
Aldrin	0	5	0.1	3.5			ND	3.5	U		N/A		Yes	No SV
Dieldrin	**5**	**5**			**8.6**	**100**	**041M5B0601**	**100**		**0.716**	**1**	**140**	**Yes**	**Max Detect > SV**
Endosulfan I	0	5	0.125	0.195			ND	0.195	U		N/A		Yes	No SV
Endosulfan II	0	5	0.16	0.25			ND	0.25	U		N/A		Yes	No SV
Endosulfan sulfate	0	5	0.32	0.5			ND	0.5	U		N/A		Yes	No SV
Heptachlor	0	5	0.2	0.32			ND	0.32	U		N/A		Yes	No SV
Heptachlor epoxide	0	5	0.125	0.195			ND	0.195	U		N/A		Yes	No SV
Methoxychlor	0	5	0.145	0.225			ND	0.225	U		N/A		Yes	No SV
Toxaphene	0	5	24	37.5			ND	37.5	U		N/A		Yes	No SV
alpha-Chlordane	0	5	0.08	0.125			ND	0.125	U	1.7	1	0.07	No	Max SQL< SV
gamma-Chlordane	0	5	0.095	0.15			ND	0.15	U	1.7	1	0.09	No	Max SQL< SV
Total Chlordane	0	5	0.175	0.275			ND	0.275	U	1.7	1	0.16	No	Max SQL< SV
Endrin	0	5	0.31	0.49			ND	0.49	U	3.3	2	0.15	No	Max SQL< SV
Endrin aldehyde	0	5	0.225	0.35			ND	0.35	U	3.3	2	0.11	No	Max SQL< SV
Endrin ketone	0	5	0.275	0.43			ND	0.43	U	3.3	2	0.13	No	Max SQL< SV
Total Endrin	0	5	0.81	1.27			ND	1.27	U	3.3	2	0.39	No	Max SQL< SV
alpha-BHC	0	5	0.175	0.27			ND	0.27	U		N/A		Yes	No SV
beta-BHC	**1**	**5**	**0.21**	**0.32**	**2.9**	**2.9**	**041M5B0601**	**2.9**	**I**	**0.32**	**N/A**	**9.06**	**Yes**	**Max Detect > SV**
delta-BHC	0	5	0.085	0.135			ND	0.135	U	0.32	N/A	0.42	No	Max SQL< SV
gamma-BHC (Lindane)	0	5	0.11	0.17			ND	0.17	U	0.32	1	0.53	No	Max SQL< SV
Total BHC	**1**	**5**	**0.58**	**0.885**	**3.47**	**3.47**	**041M5B0601**	**3.47**		**0.32**	**2**	**10.9**	**Yes**	**Max Detect > SV**
4,4'-DDD	0	5	2.55	4			ND	4	U	1.22	1	3.28	Yes	Max SQL > SV
4,4'-DDE	**3**	**5**	**3.9**	**4.15**	**18**	**24**	**041M5B0601**	**24**	**I**	**2.07**	**1**	**11.6**	**Yes**	**Max Detect > SV**
4,4'-DDT	0	5	2.25	3.5			ND	3.5	U	1.19	1	2.94	Yes	Max SQL > SV
Total DDT	**3**	**5**	**8.7**	**9.25**	**25.3**	**31.5**	**041M5B0601**	**31.5**		**3.3**	**2**	**9.55**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	5	27.5	43			ND	43	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	5	16.5	26			ND	26	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	5	16.5	26			ND	26	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	5	17.5	27			ND	27	U		N/A		Yes	No SV
1-Methyl naphthalene	0	5	1	4			ND	4	U				Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	5	23	36.5			ND	36.5	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	5	22.5	35			ND	35	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	5	23	36.5			ND	36.5	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	5	21	33			ND	33	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	5	20	32			ND	32	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	5	245	385			ND	385	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	5	16	25			ND	25	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	5	21	33			ND	33	U		N/A		Yes	No SV
2-Chloronaphthalene	0	5	27	42			ND	42	U		N/A		Yes	No SV
2-Chlorophenol	0	5	29.5	46.5			ND	46.5	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	5	22.5	35			ND	35	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	5	33.5	50			ND	50	U		N/A		Yes	No SV
2-Nitroaniline	0	5	18	28.5			ND	28.5	U		N/A		Yes	No SV
2-Nitrophenol	0	5	19	29.5			ND	29.5	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	5	19	29.5			ND	29.5	U		N/A		Yes	No SV
3-Methylphenol/4-Methylphenol	2	5	29	44.5	73	200	041M5B0601	200	I				Yes	No SV
3-Nitroaniline	0	5	21.5	34			ND	34	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	5	21.5	34			ND	34	U		N/A		Yes	No SV

Table 11-1-39
Wetland 5B Phase IV
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
4-Chloro-3-methylphenol	0	5	29	45.5			ND	45.5	U		N/A		Yes	No SV
4-Chloroaniline	0	5	21	33			ND	33	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	5	19	29.5			ND	29.5	U		N/A		Yes	No SV
4-Nitroaniline	0	5	19	29.5			ND	29.5	U		N/A		Yes	No SV
4-Nitrophenol	0	5	18	28.5			ND	28.5	U		N/A		Yes	No SV
Benzo(b)fluoranthene	0	5	2.8	11			ND	11	U		N/A		No	TOC normalized PAHs<TEC
Benzo(g,h,i)perylene	0	5	1.75	7			ND	7	U		N/A		No	TOC normalized PAHs<TEC
Benzo(k)fluoranthene	0	5	2.85	11			ND	11	U		N/A		No	TOC normalized PAHs<TEC
bis(2-Chloroethoxy)methane	0	5	23	36.5			ND	36.5	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	5	27	42			ND	42	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**3**	**5**	**32**	**34**	**150**	**190**	**041M5B0301**	**190**	**I**	**182**	**1, 2**	**1.04**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	0	5	23	36.5			ND	36.5	U	182	1, 2	0.20	No	Max SQL< SV
Carbazole	0	5	21.5	34			ND	34	U		N/A		Yes	No SV
Dibenzofuran	0	5	24.5	38.5			ND	38.5	U		N/A		Yes	No SV
Diethylphthalate	0	5	25.5	40			ND	40	U	182	1, 2	0.22	No	Max SQL< SV
Dimethylphthalate	0	5	25.5	40			ND	40	U	182	1, 2	0.22	No	Max SQL< SV
Di-n-butylphthalate	**1**	**5**	**28**	**44.5**	**330**	**330**	**041M5B0301**	**330**	**I**	**182**	**1, 2**	**1.81**	**Yes**	**Max Detect > SV**
Di-n-octylphthalate	0	5	23	36.5			ND	36.5	U	182	1, 2	0.20	No	Max SQL< SV
Hexachlorobenzene	0	5	27.5	43			ND	43	U		N/A		Yes	No SV
Hexachlorobutadiene	0	5	19.5	30.5			ND	30.5	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	5	195	305			ND	305	U		N/A		Yes	No SV
Hexachloroethane	0	5	14	21.5			ND	21.5	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	5	1.9	7.5			ND	7.5	U		N/A		No	TOC normalized PAHs<TEC
Isophorone	0	5	19	29.5			ND	29.5	U		N/A		Yes	No SV
Nitrobenzene	0	5	22.5	35			ND	35	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	5	21.5	34			ND	34	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	5	21.5	34			ND	34	U		N/A		Yes	No SV
Pentachlorophenol	0	5	24.5	38.5			ND	38.5	U		N/A		Yes	No SV
Phenol	0	5	29.5	46.5			ND	46.5	U		N/A		Yes	No SV
TOC Normalized PAHs	5	5			10.4	175	041M5B0301	175		290	3	0.60	No	Max Detect < SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	5	0.6	1			ND	1	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	5	1.5	2.5			ND	2.5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	5	1.35	2.25			ND	2.25	U		N/A		Yes	No SV
1,1-Dichloroethane	0	5	0.75	1.25			ND	1.25	U		N/A		Yes	No SV
1,1-Dichloroethene	0	5	1.3	2.15			ND	2.15	U		N/A		Yes	No SV
1,2-Dichloroethane	0	5	1.15	1.9			ND	1.9	U		N/A		Yes	No SV
1,2-Dichloropropane	0	5	0.9	1.5			ND	1.5	U		N/A		Yes	No SV
2-Butanone (MEK)	0	5	3.55	6			ND	6	U		N/A		Yes	No SV
2-Hexanone	0	5	3.85	6.5			ND	6.5	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	5	3.75	6.5			ND	6.5	U		N/A		Yes	No SV
Acetone	2	5	6	10	21	28	041M5B0202	28	I		N/A		Yes	No SV
Benzene	0	5	0.85	1.4			ND	1.4	U		N/A		Yes	No SV
Bromodichloromethane	0	5	1	1.65			ND	1.65	U		N/A		Yes	No SV
Bromoform	0	5	1.3	2.15			ND	2.15	U		N/A		Yes	No SV
Bromomethane	0	5	2.55	4.3			ND	4.3	U		N/A		Yes	No SV
Carbon disulfide	0	5	1.5	2.5			ND	2.5	U		N/A		Yes	No SV
Carbon tetrachloride	0	5	0.7	1.2			ND	1.2	U		N/A		Yes	No SV
Chlorobenzene	0	5	1	1.65			ND	1.65	U		N/A		Yes	No SV
Chloroethane	0	5	1.3	2.15			ND	2.15	U		N/A		Yes	No SV

Table 11-1-39
Wetland 5B Phase IV
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
VOCs (g/kg) - cont.														
Chloroform	0	5	0.9	1.5			ND	1.5	U		N/A		Yes	No SV
Chloromethane	0	5	1.05	1.75			ND	1.75	U		N/A		Yes	No SV
cis-1,2-Dichloroethene	1	5	0.85	1.2	7.7	7.7	041M5B0601	7.7	I				Yes	No SV
cis-1,3-Dichloropropene	0	5	0.9	1.5			ND	1.5	U		N/A		Yes	No SV
Dibromochloromethane	0	5	1.05	1.75			ND	1.75	U		N/A		Yes	No SV
Ethylbenzene	0	5	0.75	1.25			ND	1.25	U		N/A		Yes	No SV
Methylene chloride	0	5	1.8	3.05			ND	3.05	U		N/A		Yes	No SV
Styrene	0	5	0.85	1.4			ND	1.4	U		N/A		Yes	No SV
Tetrachloroethene	0	5	1.15	1.9			ND	1.9	U		N/A		Yes	No SV
Toluene	1	5	1.45	2.25	3.5	3.5	041M5B0401	3.5	I		N/A		Yes	No SV
trans-1,2-Dichloroethene	0	5	0.9	1.5			ND	1.5	U				Yes	No SV
trans-1,3-Dichloropropene	0	5	1.2	2			ND	2	U		N/A		Yes	No SV
Trichloroethene	0	5	0.85	1.4			ND	1.4	U		N/A		Yes	No SV
Vinyl chloride	1	5	1.05	1.75	3.7	3.7	041M5B0202	3.7	I		N/A		Yes	No SV
Xylene (Total)	0	5	2.25	3.8			ND	3.8	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values

Table 11-1-40
Wetland 5B Phase IV
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	Dieldrin	3-Methylphenol/4-Methylphenol	Acetone
Barium	beta-BHC	bis(2-Ethylhexyl)phthalate (BEHP)	cis-1,2-Dichloroethene
Beryllium	Total BHC	Di-n-butylphthalate	Toluene
Cadmium	4,4'-DDE		Vinyl chloride
Calcium	Total DDT		
Chromium	Aroclor-1260		
Cobalt	Total PCBs		
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Mercury			
Nickel			
Potassium			
Silver			
Sodium			
Vanadium			
Zinc			
		Not Detected Parameters	
Selenium	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Thallium	Endosulfan I	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
	Endosulfan II	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Endosulfan sulfate	1,4-Dichlorobenzene	1,1-Dichloroethane
	Heptachlor	1-Methyl naphthalene	1,1-Dichloroethene
	Heptachlor epoxide	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,2-Dichloroethane
	Methoxychlor	2,4,5-Trichlorophenol	1,2-Dichloropropane
	Toxaphene	2,4,6-Trichlorophenol	2-Butanone (MEK)
	alpha-BHC	2,4-Dichlorophenol	2-Hexanone
	4,4'-DDD	2,4-Dimethylphenol	4-Methyl-2-Pentanone (MIBK)
	4,4'-DDT	2,4-Dinitrophenol	Benzene
		2,4-Dinitrotoluene	Bromodichloromethane
		2,6-Dinitrotoluene	Bromoform
		2-Chloronaphthalene	Bromomethane
		2-Chlorophenol	Carbon disulfide
		2-Methyl-4,6-Dinitrophenol	Carbon tetrachloride
		2-Methylphenol (o-Cresol)	Chlorobenzene
		2-Nitroaniline	Chloroethane
		2-Nitrophenol	Chloroform
		3,3'-Dichlorobenzidine	Chloromethane
		3-Nitroaniline	cis-1,3-Dichloropropene
		4-Bromophenyl-phenylether	Dibromochloromethane
		4-Chloro-3-methylphenol	Ethylbenzene
		4-Chloroaniline	Methylene chloride
		4-Chlorophenylphenyl ether	Styrene
		4-Nitroaniline	Tetrachloroethene
		4-Nitrophenol	trans-1,2-Dichloroethene
		bis(2-Chloroethoxy)methane	trans-1,3-Dichloropropene
		bis(2-Chloroethyl)ether	Trichloroethene
		Carbazole	Xylene (Total)
		Dibenz(a,h)anthracene	
		Dibenzofuran	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 11-1-41
Wetland 5B Phase IV
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	5	5				1,150	300	3,400	3,400		041M5B0202			NA					0	13,610	0	No	EPC < RC
Barium	5	5				5.82	1.5	18	18		041M5B0202			NA					0	14	1	Yes	EPC > RC and no RV
Beryllium	5	5				0.0716	0.036	0.15	0.15	I	041M5B0202			NA					0	0.84	0	No	EPC < RC
Cadmium	**5**	**5**				**7.83**	**0.95**	**31**	**31**		**041M5B0202**	**0.68**	**4.21**	**PEL**	**45.9**	**11.6**	**7.36**	**1.86**	**2**	**1.8**	**2**	**Yes**	**EPC > RV and RC**
Calcium	5	5				412	100	1,100	1,100		041M5B0202			NA					0	10,756.67	0	No	EPC < RC
Chromium	**5**	**5**				**117**	**14**	**470**	**470**		**041M5B0202**	**52.3**	**160**	**PEL**	**8.99**	**2.24**	**2.94**	**0.73**	**1**	**39.37**	**2**	**Yes**	**EPC > RV and RC**
Cobalt	5	5				1.26	0.3	4.1	4.1		041M5B0202			NA					0	2.8	1	Yes	EPC > RC and no RV
Copper	5	5				26.2	5.3	90	90		041M5B0202	18.7	108	PEL	4.81	1.4	0.83	0.24	0	19.5	1	No	EPC > RC, but < RV
Iron	5	5				714	210	1,800	1,800		041M5B0202			NA					0	11,911.67	0	No	EPC < RC
Lead	**5**	**5**				**110**	**19**	**420**	**420**		**041M5B0202**	**30.2**	**112**	**PEL**	**13.9**	**3.64**	**3.75**	**0.98**	**1**	**82.47**	**1**	**Yes**	**EPC > RV and RC**
Magnesium	5	5				81	26	210	210		041M5B0202			NA					0	7,513.33	0	No	EPC < RC
Manganese	5	5				8.12	1.1	21	21		041M5B0601			NA					0	37.97	0	No	EPC < RC
Mercury	4	5	0.0034	0.0034	0.0034	0.0897	0.019	0.22	0.22		041M5B0202	0.13	0.696	PEL	1.69	0.69	0.32	0.13	0	0.55	0	No	EPC < RC and RV
Nickel	5	5				5.16	0.61	20	20		041M5B0202	15.9	42.8	PEL	1.26	0.32	0.467	0.12	0	9.28	1	No	EPC > RC, but < RV
Potassium	5	5				32	12	74	74	I	041M5B0202			NA					0	1,628.67	0	No	EPC < RC
Selenium	0	5	0.447	0.37	0.55	0.447			0.55	U	ND			NA					0	3.45	0	No	Parameter Not Detected
Silver	**2**	**5**	**0.08**	**0.075**	**0.09**	**1.4**	**0.38**	**6.4**	**6.4**		**041M5B0202**	**0.73**	**1.77**	**PEL**	**8.73**	**1.92**	**3.62**	**0.79**	**1**	**2.1**	**1**	**Yes**	**EPC > RV and RC**
Sodium	5	5				16	7.5	38	38	I	041M5B0202			NA					0	18,993.33	0	No	EPC < RC
Thallium	0	5	0.64	0.55	0.75	0.64			0.75	U	ND			NA					0	1.57	0	No	Parameter Not Detected
Vanadium	5	5				2.08	0.55	6.7	6.7		041M5B0202			NA					0	28.67	0	No	EPC < RC
Zinc	5	5				70.4	19	200	200		041M5B0202	124	271	PEL	1.61	0.57	0.74	0.26	0	36.73	3	No	EPC > RC, but < RV
PCBs (g/kg)																							
Aroclor-1016	0	5	3.62	2.8	4.45	3.62			4.45	U	ND	21.6	189	PEL	0.21	0.17	0.02	0.02	0		0	No	Parameter Not Detected
Aroclor-1221	0	5	15.8	12.5	19.5	15.8			19.5	U	ND	67	189	PEL	0.29	0.24	0.10	0.08	0		0	No	Parameter Not Detected
Aroclor-1232	0	5	6.17	4.85	7.5	6.17			7.5	U	ND	21.6	189	PEL	0.35	0.29	0.04	0.03	0		0	No	Parameter Not Detected
Aroclor-1242	0	5	6.17	4.85	7.5	6.17			7.5	U	ND	21.6	189	PEL	0.35	0.29	0.04	0.03	0		0	No	Parameter Not Detected
Aroclor-1248	0	5	6.04	4.7	7.5	6.04			7.5	U	ND	21.6	189	PEL	0.35	0.28	0.04	0.03	0		0	No	Parameter Not Detected
Aroclor-1254	0	5	6.17	4.85	7.5	6.17			7.5	U	ND	21.6	189	PEL	0.35	0.29	0.04	0.03	0		0	No	Parameter Not Detected
Aroclor-1260	4	5	3.2	3.2	3.2	65.8	20	150	150		041M5B0202	21.6	189	PEL	6.94	3.05	0.79	0.35	0		0	No	RV HQ <1 and no RC
Total PCBs	**4**	**5**	**37.8**	**37.8**	**37.8**	**110**	**56**	**203**	**203**		**041M5B0601**	**21.6**	**189**	**PEL**	**9.39**	**5.08**	**1.07**	**0.58**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Pesticides (g/kg)																							
Aldrin	0	5	1.33	0.1	3.5	1.33			3.5	U	ND			NA					0		0	No	Parameter Not Detected
Dieldrin	**5**	**5**				**32.1**	**8.6**	**100**	**100**		**041M5B0601**	**0.72**	**4.3**	**PEL**	**140**	**44.9**	**23.3**	**7.47**	**5**		**0**	**Yes**	**RV HQ > 1 and no RC**
Endosulfan I	0	5	0.158	0.125	0.195	0.158			0.195	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	5	0.204	0.16	0.25	0.204			0.25	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	0	5	0.408	0.32	0.5	0.408			0.5	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor	0	5	0.259	0.2	0.32	0.259			0.32	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	5	0.158	0.125	0.195	0.158			0.195	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	5	0.185	0.145	0.225	0.185			0.225	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	5	30.6	24	37.5	30.6			37.5	U	ND			NA					0		0	No	Parameter Not Detected
alpha-BHC	0	5	0.222	0.175	0.27	0.222			0.27	U	ND		0.99	PEL			0.27	0.22	0		0	No	Parameter Not Detected
beta-BHC	**1**	**5**	**0.254**	**0.21**	**0.32**	**0.783**	**2.9**	**2.9**	**2.9**	**I**	**041M5B0601**	**0.32**	**0.99**	**PEL**	**9.06**	**2.45**	**2.93**	**0.79**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
delta-BHC	0	5	0.11	0.085	0.135	0.11			0.135	U	ND	0.32	0.99	PEL	0.42	0.34	0.14	0.11	0		0	No	Parameter Not Detected
gamma-BHC (Lindane)	0	5	0.139	0.11	0.17	0.139			0.17	U	ND	0.32	0.99	PEL	0.53	0.43	0.17	0.14	0		0	No	Parameter Not Detected
Total BHC	**1**	**5**	**0.699**	**0.58**	**0.885**	**1.25**	**3.47**	**3.47**	**3.47**		**041M5B0601**	**0.32**	**0.99**	**PEL**	**10.9**	**3.92**	**3.51**	**1.27**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	0	5	3.25	2.55	4	3.25			4	U	ND	1.22	7.81	PEL	3.28	2.66	0.51	0.42	0	50	0	No	Parameter Not Detected
4,4'-DDE	3	5	4.03	3.9	4.15	14.6	18	24	24	I	041M5B0601	2.07	374	PEL	11.6	7.06	0.06	0.04	0	40	0	No	EPC < RC and RV
4,4'-DDT	0	5	2.87	2.25	3.5	2.87			3.5	U	ND	1.19	4.77	PEL	2.94	2.41	0.73	0.60	0	20	0	No	Parameter Not Detected
Total DDT	3	5	8.97	8.7	9.25	20.7	25.3	31.5	31.5		041M5B0601	3.3	51.7	PEL	9.55	6.28	0.61	0.40	0	110	0	No	EPC < RC and RV
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	5	35.1	27.5	43	35.1			43	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	5	21.2	16.5	26	21.2			26	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	5	21.2	16.5	26	21.2			26	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	5	22.2	17.5	27	22.2			27	U	ND			NA					0		0	No	Parameter Not Detected
1-Methyl naphthalene	0	5	2.94	1	4	2.94			4	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	5	29.6	23	36.5	29.6			36.5	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	5	28.7	22.5	35	28.7			35	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	5	29.6	23	36.5	29.6			36.5	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	5	26.9	21	33	26.9			33	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	5	25.9	20	32	25.9			32	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	5	315	245	385	315			385	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	5	20.4	16	25	20.4			25	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	5	26.9	21	33	26.9			33	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	5	34.3	27	42	34.3			42	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	5	37.9	29.5	46.5	37.9			46.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	5	28.7	22.5	35	28.7			35	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	5	42	33.5	50	42			50	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	5	23.2	18	28.5	23.2			28.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	5	24.1	19	29.5	24.1			29.5	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	5	24.1	19	29.5	24.1			29.5	U	ND			NA					0		0	No	Parameter Not Detected
3-Methylphenol/4-Methylphenol	2	5	34.8	29	44.5	75.5	73	200	200	I	041M5B0601			NA					0		0	Yes	No SV, no RV, and no RC
3-Nitroaniline	0	5	27.8	21.5	34	27.8			34	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	5	27.8	21.5	34	27.8			34	U	ND			NA					0		0	No	Parameter Not Detected

Table 11-1-41
Wetland 5B Phase IV
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference	COPC Retained (Y/N)	Rationale
SVOCs (g/kg)																							
4-Chloro-3-methylphenol	0	5	37.1	29	45.5	37.1			45.5	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	5	26.9	21	33	26.9			33	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	5	24.1	19	29.5	24.1			29.5	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	5	24.1	19	29.5	24.1			29.5	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	5	23.2	18	28.5	23.2			28.5	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	5	29.6	23	36.5	29.6			36.5	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	5	34.3	27	42	34.3			42	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	3	5	33	32	34	119	150	190	190	I	041M5B0301	182	2647	PEL	1.04	0.66	0.07	0.05	0		0	No	RV HQ <1 and no RC
Carbazole	0	5	27.8	21.5	34	27.8			34	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	5	31.5	24.5	38.5	31.5			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Di-n-butylphthalate	1	5	36.5	28	44.5	95.2	330	330	330	I	041M5B0301	182	2647	PEL	1.81	0.52	0.13	0.04	0		0	No	RV HQ <1 and no RC
Hexachlorobenzene	0	5	35.1	27.5	43	35.1			43	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	5	25	19.5	30.5	25			30.5	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	5	250	195	305	250			305	U	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	5	17.6	14	21.5	17.6			21.5	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	5	24.1	19	29.5	24.1			29.5	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	5	28.7	22.5	35	28.7			35	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	5	27.8	21.5	34	27.8			34	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	5	27.8	21.5	34	27.8			34	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	5	31.5	24.5	38.5	31.5			38.5	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	5	37.9	29.5	46.5	37.9			46.5	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	5	0.77	0.6	1	0.77			1	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	5	1.92	1.5	2.5	1.92			2.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	5	1.72	1.35	2.25	1.72			2.25	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	5	0.96	0.75	1.25	0.96			1.25	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	5	1.64	1.3	2.15	1.64			2.15	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	5	1.44	1.15	1.9	1.44			1.9	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	5	1.15	0.9	1.5	1.15			1.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	5	4.5	3.55	6	4.5			6	U	ND			NA					0		0	No	Parameter Not Detected
2-Hexanone	0	5	4.89	3.85	6.5	4.89			6.5	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	5	4.85	3.75	6.5	4.85			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	2	5	7.5	6	10	14.3	21	28	28	I	041M5B0202			NA					0		0	Yes	No SV, no RV, and no RC
Benzene	0	5	1.06	0.85	1.4	1.06			1.4	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	5	1.25	1	1.65	1.25			1.65	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	5	1.64	1.3	2.15	1.64			2.15	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	5	3.27	2.55	4.3	3.27			4.3	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	5	1.92	1.5	2.5	1.92			2.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	5	0.89	0.7	1.2	0.89			1.2	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	0	5	1.25	1	1.65	1.25			1.65	U	ND			NA					0		0	No	Parameter Not Detected
Chloroethane	0	5	1.64	1.3	2.15	1.64			2.15	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	5	1.15	0.9	1.5	1.15			1.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	5	1.33	1.05	1.75	1.33			1.75	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,2-Dichloroethene	1	5	0.975	0.85	1.2	2.32	7.7	7.7	7.7	I	041M5B0601			NA					0		0	Yes	No SV, no RV, and no RC
cis-1,3-Dichloropropene	0	5	1.15	0.9	1.5	1.15			1.5	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	5	1.33	1.05	1.75	1.33			1.75	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	5	0.96	0.75	1.25	0.96			1.25	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	5	2.3	1.8	3.05	2.3			3.05	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	5	1.06	0.85	1.4	1.06			1.4	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	5	1.44	1.15	1.9	1.44			1.9	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	1	5	1.81	1.45	2.25	2.15	3.5	3.5	3.5	I	041M5B0401			NA					0		0	Yes	No SV, no RV, and no RC
trans-1,2-Dichloroethene	0	5	1.15	0.9	1.5	1.15			1.5	U	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	5	1.53	1.2	2	1.53			2	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	5	1.06	0.85	1.4	1.06			1.4	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	1	5	1.29	1.05	1.75	1.77	3.7	3.7	3.7	I	041M5B0202			NA					0		0	Yes	No SV, no RV, and no RC
Xylene (Total)	0	5	2.87	2.25	3.8	2.87			3.8	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 11-1-42
Wetland 5B Phase IV
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Barium	Dieldrin	3-Methylphenol/4-Methylphenol	Vinyl Chloride
Cadmium	beta-BHC		
Chromium	Total BHC		
Cobalt	Total PCBs		
Lead			
Silver			

Table 11-1-43
Wetland 5B Phase IV
Mean ERM Quotient

Sample_ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M5B0202	4/6/2004	UG/KG	6	U	2-Methylnaphthalene	70	670	0.01
041M5B0202	4/6/2004	UG/KG	10	U	Acenaphthene	16	500	0.02
041M5B0202	4/6/2004	UG/KG	9.5	U	Acenaphthylene	44	640	0.01
041M5B0202	4/6/2004	UG/KG	10.5	U	Anthracene	85.3	1,100	0.01
041M5B0202	4/6/2004	UG/KG	120	I	Benzo(a)anthracene	261	1,600	0.08
041M5B0202	4/6/2004	UG/KG	10	U	Benzo(a)pyrene	430	1,600	0.01
041M5B0202	4/6/2004	UG/KG	160		Chrysene	384	2,800	0.06
041M5B0202	4/6/2004	UG/KG	10	U	Dibenz(a,h)anthracene	63.4	260	0.04
041M5B0202	4/6/2004	UG/KG	290		Fluoranthene	600	5,100	0.06
041M5B0202	4/6/2004	UG/KG	8.5	U	Fluorene	19	540	0.02
041M5B0202	4/6/2004	UG/KG	8	U	Naphthalene	160	2,100	0.00
041M5B0202	4/6/2004	UG/KG	70	U	Phenanthrene	240	1,500	0.05
041M5B0202	4/6/2004	UG/KG	210		Pyrene	665	2,600	0.08
041M5B0202	4/6/2004	UG/KG	18	I	4,4'-DDE	2.2	27	0.67
041M5B0202	4/6/2004	UG/KG	3.45	U	4,4'-DDT	1.58	46.1	0.07
041M5B0202	4/6/2004	MG/KG	0.84	I	Arsenic	8.2	70	0.01
041M5B0202	**4/6/2004**	**MG/KG**	**31**		**Cadmium**	**1.2**	**9.6**	**3.23**
041M5B0202	**4/6/2004**	**MG/KG**	**470**		**Chromium**	**81**	**370**	**1.27**
041M5B0202	4/6/2004	MG/KG	90		Copper	34	270	0.33
041M5B0202	**4/6/2004**	**MG/KG**	**420**		**Lead**	**46.7**	**218**	**1.93**
041M5B0202	4/6/2004	MG/KG	0.22		Mercury	0.15	0.71	0.31
041M5B0202	4/6/2004	MG/KG	20		Nickel	20.9	51.6	0.39
041M5B0202	**4/6/2004**	**MG/KG**	**6.4**		**Silver**	**1**	**3.7**	**1.73**
041M5B0202	4/6/2004	MG/KG	200		Zinc	150	410	0.49
041M5B0202	4/6/2004				ERM Quotient Sum			11.99
041M5B0202	4/6/2004				Mean ERM Quotient			0.48
041M5B0202	4/6/2004				Mean ERM Quotient without ND			0.47
041M5B0202	4/6/2004				Mean ERM Quotient Category			2
041M5B0301	4/6/2004	UG/KG	4.75	U	2-Methylnaphthalene	70	670	0.01
041M5B0301	4/6/2004	UG/KG	8	U	Acenaphthene	16	500	0.02
041M5B0301	4/6/2004	UG/KG	7.5	U	Acenaphthylene	44	640	0.01
041M5B0301	4/6/2004	UG/KG	8.5	U	Anthracene	85.3	1,100	0.01
041M5B0301	4/6/2004	UG/KG	98	I	Benzo(a)anthracene	261	1,600	0.06
041M5B0301	4/6/2004	UG/KG	8	U	Benzo(a)pyrene	430	1,600	0.01
041M5B0301	4/6/2004	UG/KG	120		Chrysene	384	2,800	0.04
041M5B0301	4/6/2004	UG/KG	8	U	Dibenz(a,h)anthracene	63.4	260	0.03
041M5B0301	4/6/2004	UG/KG	200		Fluoranthene	600	5,100	0.04
041M5B0301	4/6/2004	UG/KG	7	U	Fluorene	19	540	0.01
041M5B0301	4/6/2004	UG/KG	6.5	U	Naphthalene	160	2,100	0.00
041M5B0301	4/6/2004	UG/KG	27	U	Phenanthrene	240	1,500	0.02
041M5B0301	4/6/2004	UG/KG	160		Pyrene	665	2,600	0.06
041M5B0301	4/6/2004	UG/KG	23	I	4,4'-DDE	2.2	27	0.85
041M5B0301	4/6/2004	UG/KG	2.75	U	4,4'-DDT	1.58	46.1	0.06
041M5B0301	4/6/2004	MG/KG	0.28	U	Arsenic	8.2	70	0.00
041M5B0301	4/6/2004	MG/KG	1	J	Cadmium	1.2	9.6	0.10
041M5B0301	4/6/2004	MG/KG	24	J	Chromium	81	370	0.06
041M5B0301	4/6/2004	MG/KG	12	J	Copper	34	270	0.04
041M5B0301	4/6/2004	MG/KG	38	J	Lead	46.7	218	0.17
041M5B0301	4/6/2004	MG/KG	0.086		Mercury	0.15	0.71	0.12
041M5B0301	4/6/2004	MG/KG	1.2	I	Nickel	20.9	51.6	0.02
041M5B0301	4/6/2004	MG/KG	0.09	UJ	Silver	1	3.7	0.02
041M5B0301	4/6/2004	MG/KG	45	J	Zinc	150	410	0.11
041M5B0301	4/6/2004				ERM Quotient Sum			2.47
041M5B0301	4/6/2004				Mean ERM Quotient			0.10
041M5B0301	4/6/2004				Mean ERM Quotient without ND			0.09
041M5B0301	4/6/2004				Mean ERM Quotient Category			2

Table 11-1-43
Wetland 5B Phase IV
Mean ERM Quotient

Sample_ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M5B0401	4/6/2004	UG/KG	1.55	U	2-Methylnaphthalene	70	670	0.00
041M5B0401	4/6/2004	UG/KG	2.6	U	Acenaphthene	16	500	0.01
041M5B0401	4/6/2004	UG/KG	2.5	U	Acenaphthylene	44	640	0.00
041M5B0401	4/6/2004	UG/KG	2.8	U	Anthracene	85.3	1,100	0.00
041M5B0401	4/6/2004	UG/KG	2.2	U	Benzo(a)anthracene	261	1,600	0.00
041M5B0401	4/6/2004	UG/KG	2.6	U	Benzo(a)pyrene	430	1,600	0.00
041M5B0401	4/6/2004	UG/KG	2.9	U	Chrysene	384	2,800	0.00
041M5B0401	4/6/2004	UG/KG	2.55	U	Dibenz(a,h)anthracene	63.4	260	0.01
041M5B0401	4/6/2004	UG/KG	15	I	Fluoranthene	600	5,100	0.00
041M5B0401	4/6/2004	UG/KG	2.25	U	Fluorene	19	540	0.00
041M5B0401	4/6/2004	UG/KG	2.05	U	Naphthalene	160	2,100	0.00
041M5B0401	4/6/2004	UG/KG	3.95	U	Phenanthrene	240	1,500	0.00
041M5B0401	4/6/2004	UG/KG	13	I	Pyrene	665	2,600	0.01
041M5B0401	4/6/2004	UG/KG	3.9	U	4,4'-DDE	2.2	27	0.14
041M5B0401	4/6/2004	UG/KG	2.25	U	4,4'-DDT	1.58	46.1	0.05
041M5B0401	4/6/2004	MG/KG	0.23	U	Arsenic	8.2	70	0.00
041M5B0401	4/6/2004	MG/KG	0.95		Cadmium	1.2	9.6	0.10
041M5B0401	4/6/2004	MG/KG	14		Chromium	81	370	0.04
041M5B0401	4/6/2004	MG/KG	5.3		Copper	34	270	0.02
041M5B0401	4/6/2004	MG/KG	19		Lead	46.7	218	0.09
041M5B0401	4/6/2004	MG/KG	0.0034	U	Mercury	0.15	0.71	0.00
041M5B0401	4/6/2004	MG/KG	0.61	I	Nickel	20.9	51.6	0.01
041M5B0401	4/6/2004	MG/KG	0.075	U	Silver	1	3.7	0.02
041M5B0401	4/6/2004	MG/KG	28		Zinc	150	410	0.07
041M5B0401	4/6/2004				ERM Quotient Sum			0.80
041M5B0401	4/6/2004				Mean ERM Quotient			0.03
041M5B0401	4/6/2004				Mean ERM Quotient without ND			0.01
041M5B0401	4/6/2004				Mean ERM Quotient Category			1
041M5B0501	4/6/2004	UG/KG	4.1	U	2-Methylnaphthalene	70	670	0.01
041M5B0501	4/6/2004	UG/KG	7	U	Acenaphthene	16	500	0.01
041M5B0501	4/6/2004	UG/KG	6.5	U	Acenaphthylene	44	640	0.01
041M5B0501	4/6/2004	UG/KG	7.5	U	Anthracene	85.3	1,100	0.01
041M5B0501	4/6/2004	UG/KG	6	U	Benzo(a)anthracene	261	1,600	0.00
041M5B0501	4/6/2004	UG/KG	7	U	Benzo(a)pyrene	430	1,600	0.00
041M5B0501	4/6/2004	UG/KG	7.5	U	Chrysene	384	2,800	0.00
041M5B0501	4/6/2004	UG/KG	7	U	Dibenz(a,h)anthracene	63.4	260	0.03
041M5B0501	4/6/2004	UG/KG	39	I	Fluoranthene	600	5,100	0.01
041M5B0501	4/6/2004	UG/KG	6	U	Fluorene	19	540	0.01
041M5B0501	4/6/2004	UG/KG	5	U	Naphthalene	160	2,100	0.00
041M5B0501	4/6/2004	UG/KG	6	U	Phenanthrene	240	1,500	0.00
041M5B0501	4/6/2004	UG/KG	37	I	Pyrene	665	2,600	0.01
041M5B0501	4/6/2004	UG/KG	4.15	U	4,4'-DDE	2.2	27	0.15
041M5B0501	4/6/2004	UG/KG	2.4	U	4,4'-DDT	1.58	46.1	0.05
041M5B0501	4/6/2004	MG/KG	0.23	U	Arsenic	8.2	70	0.00
041M5B0501	4/6/2004	MG/KG	1.1		Cadmium	1.2	9.6	0.11
041M5B0501	4/6/2004	MG/KG	23		Chromium	81	370	0.06
041M5B0501	4/6/2004	MG/KG	7.8		Copper	34	270	0.03
041M5B0501	4/6/2004	MG/KG	24		Lead	46.7	218	0.11
041M5B0501	4/6/2004	MG/KG	0.019	I	Mercury	0.15	0.71	0.03
041M5B0501	4/6/2004	MG/KG	0.97	I	Nickel	20.9	51.6	0.02
041M5B0501	4/6/2004	MG/KG	0.075	U	Silver	1	3.7	0.02
041M5B0501	4/6/2004	MG/KG	19		Zinc	150	410	0.05
041M5B0501	4/6/2004				ERM Quotient Sum			1.06
041M5B0501	4/6/2004				Mean ERM Quotient			0.04
041M5B0501	4/6/2004				Mean ERM Quotient without ND			0.03
041M5B0501	4/6/2004				Mean ERM Quotient Category			1

Table 11-1-43
Wetland 5B Phase IV
Mean ERM Quotient

Sample_ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M5B0601	4/6/2004	UG/KG	6	U	2-Methylnaphthalene	70	670	0.01
041M5B0601	4/6/2004	UG/KG	10	U	Acenaphthene	16	500	0.02
041M5B0601	4/6/2004	UG/KG	10	U	Acenaphthylene	44	640	0.02
041M5B0601	4/6/2004	UG/KG	11	U	Anthracene	85.3	1,100	0.01
041M5B0601	4/6/2004	UG/KG	8.5	U	Benzo(a)anthracene	261	1,600	0.01
041M5B0601	4/6/2004	UG/KG	10	U	Benzo(a)pyrene	430	1,600	0.01
041M5B0601	4/6/2004	UG/KG	56	I	Chrysene	384	2,800	0.02
041M5B0601	4/6/2004	UG/KG	10	U	Dibenz(a,h)anthracene	63.4	260	0.04
041M5B0601	4/6/2004	UG/KG	69	I	Fluoranthene	600	5,100	0.01
041M5B0601	4/6/2004	UG/KG	9	U	Fluorene	19	540	0.02
041M5B0601	4/6/2004	UG/KG	8	U	Naphthalene	160	2,100	0.00
041M5B0601	4/6/2004	UG/KG	9	U	Phenanthrene	240	1,500	0.01
041M5B0601	4/6/2004	UG/KG	59	I	Pyrene	665	2,600	0.02
041M5B0601	4/6/2004	UG/KG	24	I	4,4'-DDE	2.2	27	0.89
041M5B0601	4/6/2004	UG/KG	3.5	U	4,4'-DDT	1.58	46.1	0.08
041M5B0601	4/6/2004	MG/KG	0.33	U	Arsenic	8.2	70	0.00
041M5B0601	4/6/2004	MG/KG	5.1		Cadmium	1.2	9.6	0.53
041M5B0601	4/6/2004	MG/KG	55		Chromium	81	370	0.15
041M5B0601	4/6/2004	MG/KG	16		Copper	34	270	0.06
041M5B0601	4/6/2004	MG/KG	48		Lead	46.7	218	0.22
041M5B0601	4/6/2004	MG/KG	0.12		Mercury	0.15	0.71	0.17
041M5B0601	4/6/2004	MG/KG	3	I	Nickel	20.9	51.6	0.06
041M5B0601	4/6/2004	MG/KG	0.38	I	Silver	1	3.7	0.10
041M5B0601	4/6/2004	MG/KG	60		Zinc	150	410	0.15
041M5B0601	4/6/2004				ERM Quotient Sum			3.43
041M5B0601	4/6/2004				Mean ERM Quotient			0.14
041M5B0601	4/6/2004				Mean ERM Quotient without ND			0.13
041M5B0601	4/6/2004				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 11-1-44
Wetland 5A Phase II
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	4.9E+02	=	1.9E+04	=	MG/KG	041M5A0101	9 / 9	NAV	7.5E+03	1.0E-03	3	3.74E-06	1.87E-06	5.92E-05	3.96E-05
7440393	Barium	N	1.3E+00	J	1.5E+02	=	MG/KG	041M5A0101	9 / 9	NAV	3.5E+01	1.0E-03	3	3.00E-08	1.50E-08	4.75E-07	3.17E-07
7440417	Beryllium	N	2.7E-01	J	8.3E-01	J	MG/KG	041M5A0101	4 / 9	6.0E-02 / 4.4E-01	2.7E-01	1.0E-03	3	1.66E-10	8.30E-11	2.63E-09	1.76E-09
7440439	Cadmium	N	2.7E-01	J	2.2E+02	=	MG/KG	041M5B0201	9 / 9	NAV	2.9E+01	1.0E-03	3	4.40E-08	2.20E-08	6.96E-07	4.66E-07
7440473	Chromium	N	2.8E+00	=	4.2E+02	=	MG/KG	041M5B0201	9 / 9	NAV	8.7E+01	1.0E-03	3	8.32E-08	4.16E-08	1.32E-06	8.81E-07
7440484	Cobalt	C	3.0E-01	J	1.3E+01	J	MG/KG	041M5A0501	7 / 9	2.0E-01 / 1.3E+00	4.0E+00	1.0E-03	3	2.68E-09	1.34E-09	6.06E-09	1.01E-08
7440508	Copper	N	1.3E+01	=	3.2E+02	=	MG/KG	041M5A0501	8 / 9	N/A / 3.1E+00	9.8E+01	1.0E-03	3	6.34E-08	3.17E-08	1.00E-06	6.71E-07
7439896	Iron	N	3.1E+02	=	9.8E+03	=	MG/KG	041M5A0101	9 / 9	NAV	4.0E+03	1.0E-03	3	1.97E-06	9.83E-07	3.11E-05	2.08E-05
7439921	Lead	N	1.2E+01	=	4.8E+02	J	MG/KG	041M5B0201	9 / 9	NAV	1.9E+02	1.0E-03	3	9.62E-08	4.81E-08	1.52E-06	1.02E-06
7439965	Manganese	N	1.4E+00	=	2.1E+02	=	MG/KG	041M5A0101	9 / 9	NAV	5.1E+01	1.0E-03	3	4.10E-08	2.05E-08	6.49E-07	4.34E-07
7487947	Mercury	N	2.5E-01	=	1.0E+00	=	MG/KG	041M5A0101	6 / 9	5.0E-02 / 1.7E-01	4.2E-01	1.0E-03	3	2.00E-10	1.00E-10	3.17E-09	2.12E-09
7440020	Nickel	N	1.3E+00	J	9.4E+01	=	MG/KG	041M5B0201	8 / 9	N/A / 5.3E+00	1.9E+01	1.0E-03	3	1.88E-08	9.39E-09	2.97E-07	1.99E-07
7782492	Selenium	N	1.5E+00	=	3.6E+00	=	MG/KG	041M5B0201	6 / 9	1.8E-01 / 2.2E-01	1.5E+00	1.0E-03	3	7.20E-10	3.60E-10	1.14E-08	7.62E-09
7440224	Silver	N	4.2E-01	J	5.2E+00	J	MG/KG	041M5B0201	3 / 9	2.4E-01 / 1.8E+00	1.0E+00	1.0E-03	3	1.04E-09	5.20E-10	1.65E-08	1.10E-08
7440280	Thallium	N	N/A	N/A	1.4E+00	J	MG/KG	041M5A0101	1 / 9	1.8E-01 / 1.3E+00	4.4E-01	1.0E-03	3	2.80E-10	1.40E-10	4.43E-09	2.96E-09
7440622	Vanadium	N	2.2E+00	J	2.4E+01	=	MG/KG	041M5A0101	7 / 9	8.3E-01 / 1.1E+00	1.1E+01	1.0E-03	3	4.80E-09	2.40E-09	7.60E-08	5.08E-08
7440666	Zinc	N	9.8E+00	=	2.3E+03	=	MG/KG	041M5A0101	9 / 9	NAV	4.9E+02	1.0E-03	3	4.58E-07	2.29E-07	7.25E-06	4.85E-06
72548	4,4'-DDD	C	2.3E-04	J	2.3E-03	J	MG/KG	041M5A0401	6 / 9	2.1E-04 / 8.1E-04	9.3E-04	3.0E-02	1	1.38E-11	6.90E-12	3.12E-11	5.22E-11
72559	4,4'-DDE	C	3.2E-04	J	1.2E-01	D	MG/KG	041M5A0501	7 / 9	2.0E-04 / 6.1E-04	1.4E-02	3.0E-02	1	7.20E-10	3.60E-10	1.63E-09	2.72E-09
50293	4,4'-DDT	C	7.8E-04	J	5.0E-03	J	MG/KG	041M5A0501	3 / 9	2.0E-04 / 7.3E-04	9.1E-04	3.0E-02	1	3.00E-11	1.50E-11	6.78E-11	1.13E-10
319846	alpha-BHC	C	3.0E-04	J	1.8E-03	=	MG/KG	041M5B0201	4 / 9	1.6E-04 / 4.5E-04	4.4E-04	4.0E-02	2	1.44E-11	7.20E-12	3.26E-11	5.44E-11
5103719	alpha-Chlordane	C	1.9E-04	J	1.6E-03	J	MG/KG	041M5A0501	4 / 9	1.0E-04 / 3.6E-04	4.3E-04	4.0E-02	2	1.28E-11	6.40E-12	2.89E-11	4.84E-11
11097691	Aroclor-1254	C	8.7E-03	J	5.3E-02	=	MG/KG	041M5B0201	3 / 9	2.0E-03 / 8.1E-03	1.0E-02	1.6E-02	3	1.65E-10	8.27E-11	3.74E-10	6.25E-10
11096825	Aroclor-1260	C	2.6E-03	J	1.0E-01	DJ	MG/KG	041M5A0501	3 / 9	3.2E-03 / 1.4E-02	1.5E-02	1.4E-02	3	2.76E-10	1.38E-10	6.24E-10	1.04E-09
60571	Dieldrin	C	4.2E-04	J	7.1E-03	J	MG/KG	041M5B0201	4 / 9	2.0E-04 / 8.1E-04	1.4E-03	1.0E-01	2	1.42E-10	7.10E-11	3.21E-10	5.37E-10
33213659	Endosulfan II	N	N/A	N/A	1.7E-03	J	MG/KG	041M5A0501	1 / 9	2.0E-04 / 7.3E-04	3.9E-04	1.0E-01	2	3.40E-11	1.70E-11	5.38E-10	3.60E-10
72208	Endrin	N	N/A	N/A	1.1E-03	J	MG/KG	041M5A0501	1 / 9	2.0E-04 / 7.3E-04	3.2E-04	1.0E-01	2	2.20E-11	1.10E-11	3.48E-10	2.33E-10
7421934	Endrin aldehyde	N	N/A	N/A	7.2E-04	J	MG/KG	041M5A0501	1 / 9	2.0E-04 / 7.3E-04	2.8E-04	1.0E-01	2	1.44E-11	7.20E-12	2.28E-10	1.52E-10
53494705	Endrin ketone	N	N/A	N/A	2.6E-04	=	MG/KG	041M5A0701	1 / 9	2.1E-04 / 8.1E-04	2.6E-04	1.0E-01	2	5.20E-12	2.60E-12	8.23E-11	5.50E-11
57749	gamma-Chlordane	C	2.3E-04	J	1.3E-03	J	MG/KG	041M5A0501	3 / 9	1.0E-04 / 3.6E-04	3.6E-04	4.0E-02	2	1.04E-11	5.20E-12	2.35E-11	3.93E-11
95487	2-Methylphenol (o-Cresol)	N	N/A	N/A	2.0E-01	J	MG/KG	041M5B0201	1 / 9	4.0E-01 / 1.6E+00	4.3E-01	1.0E-01	2	4.00E-09	2.00E-09	6.33E-08	4.23E-08
106445	4-Methylphenol (p-Cresol)	N	1.0E-01	J	2.0E-01	J	MG/KG	041M5A0101	4 / 9	4.0E-01 / 1.2E+00	2.4E-01	1.0E-01	2	4.00E-09	2.00E-09	6.33E-08	4.23E-08
120127	Anthracene	N	N/A	N/A	4.4E-02	=	MG/KG	041M5A0701	1 / 9	6.3E-02 / 1.4E+00	1.6E-01	1.0E-02	3	8.80E-11	4.40E-11	1.39E-09	9.31E-10
56553	Benzo(a)anthracene	C	1.2E-01	=	3.2E-01	=	MG/KG	041M5A0501	3 / 9	4.1E-02 / 1.4E-01	1.1E-01	1.3E-01	2	8.32E-09	4.16E-09	1.88E-08	3.14E-08
50328	Benzo(a)pyrene	C	3.7E-02	J	2.4E-01	=	MG/KG	041M5A0701	4 / 9	4.1E-02 / 1.4E-01	1.0E-01	1.3E-01	2	6.24E-09	3.12E-09	1.41E-08	2.36E-08
205992	Benzo(b)fluoranthene	C	5.7E-02	J	3.6E-01	=	MG/KG	041M5A0701	4 / 9	4.1E-02 / 1.6E-01	1.1E-01	1.3E-01	2	9.36E-09	4.68E-09	2.12E-08	3.54E-08
191242	Benzo(g,h,i)perylene	C	1.2E-01	=	2.8E-01	=	MG/KG	041M5A0501	3 / 9	4.1E-02 / 1.4E-01	9.6E-02	1.3E-01	2	7.28E-09	3.64E-09	1.65E-08	2.75E-08
207089	Benzo(k)fluoranthene	C	7.3E-02	J	1.7E-01	=	MG/KG	041M5A0701	3 / 9	4.1E-02 / 1.6E-01	6.8E-02	1.3E-01	2	4.42E-09	2.21E-09	1.00E-08	1.67E-08
111911	bis(2-Chloroethoxy)methane	N	N/A	N/A	1.1E-01	J	MG/KG	041M5A0501	1 / 9	4.0E-01 / 1.4E+00	4.1E-01	1.0E-02	3	2.20E-10	1.10E-10	3.48E-09	2.33E-09
117817	bis(2-Ethylhexyl)phthalate (BEHP)	C	6.9E-01	=	1.5E+00	J	MG/KG	041M5A0501	3 / 9	4.1E-01 / 1.4E+00	7.3E-01	1.0E-01	1	3.00E-08	1.50E-08	6.78E-08	1.13E-07
85687	Butylbenzylphthalate	N	3.8E-02	J	2.0E-01	J	MG/KG	041M5A0501	3 / 9	4.0E-01 / 1.4E+00	3.3E-01	1.0E-01	2	4.00E-09	2.00E-09	6.33E-08	4.23E-08
86748	Carbazole	C	4.8E-02	J	9.6E-02	J	MG/KG	041M5A0501	2 / 9	4.1E-01 / 1.4E+00	3.9E-01	1.0E-01	2	1.92E-09	9.60E-10	4.34E-09	7.26E-09
218019	Chrysene	C	1.8E-01	=	5.1E-01	=	MG/KG	041M5A0501	3 / 9	4.1E-02 / 1.4E-01	1.5E-01	1.3E-01	2	1.33E-08	6.63E-09	3.00E-08	5.01E-08
84742	Di-n-butylphthalate	N	N/A	N/A	1.0E-01	J	MG/KG	041M5A0501	1 / 9	4.0E-01 / 1.4E+00	4.1E-01	1.0E-01	2	2.00E-09	1.00E-09	3.17E-08	2.12E-08
117840	Di-n-octylphthalate	N	N/A	N/A	2.2E-02	J	MG/KG	041M5A0701	1 / 9	4.1E-01 / 1.6E+00	4.6E-01	1.0E-01	2	4.40E-10	2.20E-10	6.96E-09	4.66E-09
206440	Fluoranthene	N	7.1E-02	=	1.1E+00	=	MG/KG	041M5A0501	6 / 9	4.1E-02 / 1.2E-01	2.8E-01	1.3E-01	2	2.86E-08	1.43E-08	4.53E-07	3.03E-07
193395	Indeno(1,2,3-cd)pyrene	C	1.1E-01	J	3.1E-01	=	MG/KG	041M5A0501	3 / 9	4.1E-02 / 1.4E-01	9.8E-02	1.3E-01	2	8.06E-09	4.03E-09	1.82E-08	3.05E-08
85018	Phenanthrene	N	1.1E-01	J	2.4E-01	=	MG/KG	041M5A0501	3 / 9	4.1E-02 / 1.4E-01	9.5E-02	1.0E-02	3	4.80E-10	2.40E-10	7.60E-09	5.08E-09
129000	Pyrene	N	7.1E-02	=	7.3E-01	=	MG/KG	041M5A0501	6 / 9	4.1E-02 / 1.2E-01	2.1E-01	1.0E-02	3	1.46E-09	7.30E-10	2.31E-08	1.55E-08
156605	1,2-Dichloroethene (total)	N	N/A	N/A	1.1E-02	J	MG/KG	041M5B0201	1 / 9	1.2E-02 / 8.3E-02	1.6E-02	1.0E-02	3	2.20E-11	1.10E-11	3.48E-10	2.33E-10

Table 11-1-44
Wetland 5A Phase II
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
67641	Acetone	N	6.6E-02	=	5.2E+00	J	MG/KG	041M5A0201	7 / 9	1.3E-02 / 1.3E-01	1.3E+00	1.0E-02	3	1.04E-08	5.20E-09	1.65E-07	1.10E-07
85018	Chlorobenzene	N	N/A	N/A	7.0E-03	J	MG/KG	041M5B0201	1 / 9	1.2E-02 / 8.3E-02	1.5E-02	1.0E-02	3	1.40E-11	7.00E-12	2.22E-10	1.48E-10
75092	Methylene chloride	C	N/A	N/A	2.5E-01	J	MG/KG	041M5A0101	1 / 9	1.2E-02 / 8.3E-02	4.2E-02	1.0E-02	3	5.00E-10	2.50E-10	1.13E-09	1.89E-09
129000	Toluene	N	5.0E-03	J	2.8E-01	=	MG/KG	041M5A0401	4 / 9	1.2E-02 / 5.3E-02	5.2E-02	1.0E-02	3	5.60E-10	2.80E-10	8.86E-09	5.93E-09
75014	Vinyl chloride	C	N/A	N/A	4.2E-02	=	MG/KG	041M5B0201	1 / 9	4.0E-03 / 5.3E-02	1.1E-02	1.0E-02	3	8.40E-11	4.20E-11	1.90E-10	3.17E-10

Equation for sediment risk:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Equation for DA_{event} for sediment contact:

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

Where:

C_{sd} = Chemical concentration in sediment (mg/kg).
CF = Conversion factor (10^{-6} kg/mg).
AF = Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;
(2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Table 11-1-45
Wetland 5A Phase II
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABSGI	ABSGI Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser Dermal Hazard Quotient	Child Trespasser Dermal Cancer Risk	Maintenance Worker Dermal Hazard Quotient	Maintenance Worker Dermal Cancer Risk
Sediment Dermal Risk	Aluminum	N	1.9E+04	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	5.9E-04	N/A	4.0E-04	N/A
	Barium	N	1.5E+02	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	9.7E-05	N/A	6.5E-05	N/A
	Beryllium	N	8.3E-01	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	1.9E-04	N/A	1.3E-04	N/A
	Cadmium	N	2.2E+02	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	5.6E-02	N/A	3.7E-02	N/A
	Chromium	N	4.2E+02	N/A	N/A	2.5E-02	1	N/A	N/A	N/A	N/A	N/A	N/A
	Cobalt	C	1.3E+01	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	3.8E-07	N/A	6.3E-07	N/A
	Copper	N	3.2E+02	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	8.4E-05	N/A	5.6E-05	N/A
	Iron	N	9.8E+03	3.0E-01	N/A	1.5E-01	3	4.5E-02	N/A	6.9E-04	N/A	4.6E-04	N/A
	Lead	N	4.8E+02	1.0E-07	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.1E+02	2.4E-02	N/A	4.0E-02	1, 3	9.6E-04	N/A	6.8E-04	N/A	4.5E-04	N/A
	Mercury	N	1.0E+00	3.0E-04	N/A	7.0E-02	1	2.1E-05	N/A	1.5E-04	N/A	1.0E-04	N/A
	Nickel	N	9.4E+01	2.0E-02	N/A	2.7E-01	3	5.4E-03	N/A	5.5E-05	N/A	3.7E-05	N/A
	Selenium	N	3.6E+00	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	4.1E-06	N/A	2.8E-06	N/A
	Silver	N	5.2E+00	5.0E-03	N/A	1.8E-01	3	9.0E-04	N/A	1.8E-05	N/A	1.2E-05	N/A
	Thallium	N	1.4E+00	6.6E-05	N/A	1.5E-01	3	9.9E-06	N/A	4.5E-04	N/A	3.0E-04	N/A
	Vanadium	N	2.4E+01	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	4.2E-04	N/A	2.8E-04	N/A
	Zinc	N	2.3E+03	3.0E-01	N/A	2.0E-01	3, 4	6.0E-02	N/A	1.2E-04	N/A	8.1E-05	N/A
	4,4'-DDD	C	2.3E-03	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	2.5E-10	N/A	4.2E-10
	4,4'-DDE	C	1.2E-01	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	1.8E-08	N/A	3.1E-08
	4,4'-DDT	C	5.0E-03	5.0E-04	3.4E-01	3.0E-02	2	1.5E-05	1.1E+01	4.5E-06	7.7E-10	7.6E-06	1.3E-09
	alpha-BHC	C	1.8E-03	5.0E-04	6.3E+00	1.4E-02	3	7.1E-06	4.4E+02	4.6E-06	1.4E-08	7.7E-06	2.4E-08
	alpha-Chlordane	C	1.6E-03	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	7.2E-08	1.3E-11	1.2E-07	2.1E-11
	Aroclor-1254	C	5.3E-02	2.0E-05	2.0E+00	1.4E-01	2	2.8E-06	1.4E+01	1.3E-04	5.3E-09	2.2E-04	8.9E-09
	Aroclor-1260	C	1.0E-01	N/A	2.0E+00	1.4E-01	2	N/A	1.4E+01	N/A	8.9E-09	N/A	1.5E-08
	Dieldrin	C	7.1E-03	5.0E-05	1.6E+01	5.0E-01	3	2.5E-05	3.2E+01	1.3E-05	1.0E-08	2.1E-05	1.7E-08
	Endosulfan II	N	1.7E-03	6.0E-03	N/A	5.0E-01	3	3.0E-03	N/A	1.8E-07	N/A	1.2E-07	N/A
	Endrin	N	1.1E-03	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	9.3E-05	N/A	6.2E-05	N/A
	Endrin aldehyde	N	7.2E-04	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	6.1E-05	N/A	4.1E-05	N/A
	Endrin ketone	N	2.6E-04	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	2.2E-05	N/A	1.5E-05	N/A
	gamma-Chlordane	C	1.3E-03	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	5.9E-08	1.0E-11	9.8E-08	1.7E-11
	2-Methylphenol (o-Cresol)	N	2.0E-01	5.0E-02	N/A	7.4E-02	3	3.7E-03	N/A	1.7E-05	N/A	1.1E-05	N/A
	4-Methylphenol (p-Cresol)	N	2.0E-01	5.0E-03	N/A	7.4E-02	3	3.7E-04	N/A	1.7E-04	N/A	1.1E-04	N/A
	Anthracene	N	4.4E-02	3.0E-01	N/A	7.6E-01	3	2.3E-01	N/A	6.1E-09	N/A	4.1E-09	N/A
	Benzo(a)anthracene	C	3.2E-01	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	4.4E-08	N/A	7.4E-08
	Benzo(a)pyrene	C	2.4E-01	N/A	7.3E+00	3.1E-01	3	N/A	2.4E+01	N/A	3.3E-07	N/A	5.6E-07
	Benzo(b)fluoranthene	C	3.6E-01	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	5.0E-08	N/A	8.3E-08
	Benzo(g,h,i)perylene	C	2.8E-01	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	3.9E-08	N/A	6.5E-08
	Benzo(k)fluoranthene	C	1.7E-01	N/A	7.3E-02	3.1E-01	3	N/A	2.4E-01	N/A	2.4E-09	N/A	3.9E-09
	bis(2-Chloroethoxy)methane	N	1.1E-01	N/A	N/A	5.0E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	bis(2-Ethylhexyl)phthalate (BEHP)	C	1.5E+00	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	3.4E-05	9.5E-09	5.7E-05	1.6E-08
	Butylbenzylphthalate	N	2.0E-01	2.0E-01	N/A	1.7E-02	3	3.5E-03	N/A	1.8E-05	N/A	1.2E-05	N/A
	Carbazole	C	9.6E-02	N/A	2.0E-02	7.0E-01	3	N/A	2.9E-02	N/A	1.2E-10	N/A	2.1E-10
	Chrysene	C	5.1E-01	7.3E-03	N/A	3.1E-01	3	2.3E-03	N/A	1.3E-05	N/A	2.2E-05	N/A
	Di-n-butylphthalate	N	1.0E-01	1.0E-01	N/A	3.1E-01	3	3.1E-02	N/A	1.0E-06	N/A	6.8E-07	N/A
	Di-n-octylphthalate	N	2.2E-02	4.0E-02	N/A	3.1E-01	3	1.2E-02	N/A	5.6E-07	N/A	3.8E-07	N/A
	Fluoranthene	N	1.1E+00	N/A	4.0E-02	3.1E-01	3	N/A	1.3E-01	N/A	5.8E-08	N/A	3.9E-08
	Indeno(1,2,3-cd)pyrene	C	3.1E-01	7.3E-01	N/A	3.1E-01	3	2.3E-01	N/A	8.1E-08	N/A	1.3E-07	N/A
	Phenanthrene	N	2.4E-01	N/A	3.0E-02	7.3E-01	3	N/A	4.1E-02	N/A	3.1E-10	N/A	2.1E-10
	Pyrene	N	7.3E-01	N/A	3.0E-02	3.1E-01	3	N/A	9.7E-02	N/A	2.2E-09	N/A	1.5E-09
	1,2-Dichloroethene (total)	N	1.1E-02	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	2.2E-08	N/A	1.5E-08	N/A
	Acetone	N	5.2E+00	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	1.6E-05	N/A	1.1E-05	N/A
	Chlorobenzene	N	7.0E-03	2.0E-02	N/A	7.3E-02	3	1.5E-03	N/A	1.5E-07	N/A	1.0E-07	N/A
	Methylene chloride	C	2.5E-01	6.0E-02	7.5E-03	1.0E-01	3	6.1E-03	7.4E-02	1.9E-07	8.4E-11	3.1E-07	1.4E-10
	Toluene	N	2.8E-01	2.0E-01	N/A	3.1E-01	3	6.2E-02	N/A	1.4E-07	N/A	9.6E-08	N/A
	Vinyl chloride	C	4.2E-02	3.0E-03	7.5E-01	1.0E+00	3	3.0E-03	7.5E-01	6.3E-08	1.4E-10	1.1E-07	2.4E-10

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfDdermal = Dermal reference dose.
RFDoral = Oral reference dose.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 11-1-46
Wetland 5A Phase II
Sediment Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser Ingestion Hazard Quotient	Child Trespasser Ingestion Cancer Risk	Maintenance Worker Ingestion Hazard Quotient	Maintenance Worker Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	1.9E+04	1.0E+00	N/A	5.92E-03	N/A	3.81E-03	N/A
	Barium	N	1.5E+02	7.0E-02	N/A	6.78E-04	N/A	4.36E-04	N/A
	Beryllium	N	8.3E-01	2.0E-03	N/A	1.31E-04	N/A	8.45E-05	N/A
	Cadmium	N	2.2E+02	5.0E-04	N/A	1.39E-01	N/A	8.95E-02	N/A
	Chromium	N	4.2E+02	N/A	N/A	N/A	N/A	N/A	N/A
	Cobalt	C	1.3E+01	2.0E-02	N/A	3.03E-05	N/A	4.87E-05	N/A
	Copper	N	3.2E+02	4.0E-02	N/A	2.51E-03	N/A	1.61E-03	N/A
	Iron	N	9.8E+03	3.0E-01	N/A	1.04E-02	N/A	6.67E-03	N/A
	Lead	N	4.8E+02	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.1E+02	2.4E-02	N/A	2.70E-03	N/A	1.74E-03	N/A
	Mercury	N	1.0E+00	3.0E-04	N/A	1.06E-03	N/A	6.78E-04	N/A
	Nickel	N	9.4E+01	2.0E-02	N/A	1.49E-03	N/A	9.56E-04	N/A
	Selenium	N	3.6E+00	5.0E-03	N/A	2.28E-04	N/A	1.47E-04	N/A
	Silver	N	5.2E+00	5.0E-03	N/A	3.29E-04	N/A	2.12E-04	N/A
	Thallium	N	1.4E+00	6.6E-05	N/A	6.72E-03	N/A	4.32E-03	N/A
	Vanadium	N	2.4E+01	7.0E-03	N/A	1.09E-03	N/A	6.98E-04	N/A
	Zinc	N	2.3E+03	3.0E-01	N/A	2.42E-03	N/A	1.55E-03	N/A
	4,4'-DDD	C	2.3E-03	N/A	2.4E-01	N/A	2.50E-11	N/A	4.01E-11
	4,4'-DDE	C	1.2E-01	N/A	3.4E-01	N/A	1.85E-09	N/A	2.97E-09
	4,4'-DDT	C	5.0E-03	5.0E-04	3.4E-01	4.52E-07	7.69E-11	7.27E-07	1.24E-10
	alpha-BHC	C	1.8E-03	5.0E-04	6.3E+00	1.63E-07	5.13E-10	2.62E-07	8.24E-10
	alpha-Chlordane	C	1.6E-03	5.0E-04	3.5E-01	1.45E-07	2.53E-11	2.33E-07	4.07E-11
	Aroclor-1254	C	5.3E-02	2.0E-05	2.0E+00	1.20E-04	4.79E-09	1.93E-04	7.70E-09
	Aroclor-1260	C	1.0E-01	N/A	2.0E+00	N/A	9.05E-09	N/A	1.45E-08
	Dieldrin	C	7.1E-03	5.0E-05	1.6E+01	6.42E-06	5.14E-09	1.03E-05	8.26E-09
	Endosulfan II	N	1.7E-03	6.0E-03	N/A	8.97E-08	N/A	5.77E-08	N/A
	Endrin	N	1.1E-03	3.0E-04	N/A	1.16E-06	N/A	7.46E-07	N/A
	Endrin aldehyde	N	7.2E-04	3.0E-04	N/A	7.60E-07	N/A	4.88E-07	N/A
	Endrin ketone	N	2.6E-04	3.0E-04	N/A	2.74E-07	N/A	1.76E-07	N/A
	gamma-Chlordane	C	1.3E-03	5.0E-04	3.5E-01	1.18E-07	2.06E-11	1.89E-07	3.31E-11
	2-Methylphenol (o-Cresol)	N	2.0E-01	5.0E-02	N/A	1.27E-06	N/A	8.14E-07	N/A
	4-Methylphenol (p-Cresol)	N	2.0E-01	5.0E-03	N/A	1.27E-05	N/A	8.14E-06	N/A
	Anthracene	N	4.4E-02	3.0E-01	N/A	4.64E-08	N/A	2.98E-08	N/A
	Benzo(a)anthracene	C	3.2E-01	N/A	7.3E-01	N/A	1.06E-08	N/A	1.70E-08
	Benzo(a)pyrene	C	2.4E-01	N/A	7.3E+00	N/A	7.92E-08	N/A	1.27E-07
	Benzo(b)fluoranthene	C	3.6E-01	N/A	7.3E-01	N/A	1.19E-08	N/A	1.91E-08
	Benzo(g,h,i)perylene	C	2.8E-01	N/A	7.3E-01	N/A	9.24E-09	N/A	1.49E-08
	Benzo(k)fluoranthene	C	1.7E-01	N/A	7.3E-02	N/A	5.61E-10	N/A	9.02E-10
	bis(2-Chloroethoxy)methane	N	1.1E-01	N/A	N/A	N/A	N/A	N/A	N/A
	bis(2-Ethylhexyl)phthalate (BEHP)	C	1.5E+00	2.0E-02	1.4E-02	3.39E-06	9.50E-10	5.45E-06	1.53E-09
	Butylbenzylphthalate	N	2.0E-01	2.0E-01	N/A	3.17E-07	N/A	2.04E-07	N/A
	Carbazole	C	9.6E-02	N/A	2.0E-02	N/A	8.68E-11	N/A	1.40E-10
	Chrysene	C	5.1E-01	7.3E-03	N/A	3.16E-06	N/A	5.08E-06	N/A
	Di-n-butylphthalate	N	1.0E-01	1.0E-01	N/A	3.17E-07	N/A	2.04E-07	N/A
	Di-n-octylphthalate	N	2.2E-02	4.0E-02	N/A	1.74E-07	N/A	1.12E-07	N/A
	Fluoranthene	N	1.1E+00	N/A	4.0E-02	N/A	1.39E-08	N/A	8.95E-09
	Indeno(1,2,3-cd)pyrene	C	3.1E-01	7.3E-01	N/A	1.92E-08	N/A	3.09E-08	N/A
	Phenanthrene	N	2.4E-01	N/A	3.0E-02	N/A	2.28E-09	N/A	1.47E-09
	Pyrene	N	7.3E-01	N/A	3.0E-02	N/A	6.93E-09	N/A	4.46E-09
	1,2-Dichloroethene (total)	N	1.1E-02	2.0E-02	N/A	1.74E-07	N/A	1.12E-07	N/A
	Acetone	N	5.2E+00	1.0E-01	N/A	1.65E-05	N/A	1.06E-05	N/A
	Chlorobenzene	N	7.0E-03	2.0E-02	N/A	1.11E-07	N/A	7.12E-08	N/A
	Methylene chloride	C	2.5E-01	6.0E-02	7.5E-03	1.88E-07	8.48E-11	3.03E-07	1.36E-10
	Toluene	N	2.8E-01	2.0E-01	N/A	4.43E-07	N/A	2.85E-07	N/A
	Vinyl chloride	C	4.2E-02	3.0E-03	7.5E-01	6.33E-07	1.42E-09	1.02E-06	2.29E-09

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = Chronic daily intake (mg/kg-day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
IRsd = 100 mg/day for age groups greater than 6-years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Table 11-1-47
Wetland 5A Phase II
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	1.5E+02	J	9.5E+02	=	UG/L	041W5A0201	5 / 6	N/A / 1.4E+02	3.8E+02	9.5E-04	1.0E-03	2.46E-06	3.89E-05	5.20E-05
7440393	Barium	N	1.4E+01	J	4.1E+01	J	UG/L	041W5A0101	6 / 6	NAV	2.7E+01	4.1E-05	1.0E-03	1.08E-07	1.70E-06	2.28E-06
7440439	Cadmium	N	N/A	N/A	3.2E+00	J	UG/L	041W5A0201	1 / 6	3.0E+00 / 3.0E+00	1.8E+00	3.2E-06	1.0E-03	8.32E-09	1.32E-07	1.76E-07
7440473	Chromium	N	N/A	N/A	1.1E+01	=	UG/L	041W5A0501	1 / 6	8.0E+00 / 8.0E+00	5.2E+00	1.1E-05	1.0E-03	2.96E-08	4.69E-07	6.27E-07
7440484	Cobalt	C	N/A	N/A	3.0E+00	=	UG/L	041W5A0101	1 / 6	3.0E+00 / 3.0E+00	1.8E+00	3.0E-06	1.2E-03	9.36E-09	2.12E-08	7.08E-08
7440508	Copper	N	7.2E+00	J	2.1E+01	J	UG/L	041W5A0701	3 / 6	4.4E+00 / 1.9E+01	1.1E+01	2.1E-05	1.0E-03	5.54E-08	8.77E-07	1.17E-06
7439896	Iron	N	3.6E+02	=	1.7E+03	=	UG/L	041W5A0501	6 / 6	NAV	1.1E+03	1.7E-03	2.5E-04	1.11E-06	1.76E-05	2.35E-05
7439921	Lead	N	2.8E+00	J	2.0E+01	J	UG/L	041W5A0401	5 / 6	N/A / 1.4E+00	9.6E+00	2.0E-05	3.4E-04	1.79E-08	2.84E-07	3.80E-07
7439965	Manganese	N	2.1E+01	=	8.0E+01	=	UG/L	041W5A0101	6 / 6	NAV	4.9E+01	8.0E-05	1.0E-03	2.08E-07	3.29E-06	4.40E-06
7440622	Vanadium	N	N/A	N/A	4.8E+00	J	UG/L	041W5A0601	1 / 6	2.0E+00 / 3.4E+00	1.9E+00	4.8E-06	1.0E-03	1.25E-08	1.98E-07	2.64E-07
7440666	Zinc	N	5.6E+01	=	2.4E+02	=	UG/L	041W5A0601	4 / 6	2.7E+01 / 4.6E+01	8.8E+01	2.4E-04	6.0E-04	3.68E-07	5.83E-06	7.79E-06
115297	Endosulfan I	N	N/A	N/A	2.9E-02	J	UG/L	041W5A0101	1 / 6	5.0E-02 / 5.0E-02	2.6E-02	2.9E-08	3.3E-03	5.69E-10	9.01E-09	1.21E-08
117817	bis(2-Ethylhexyl)phthalate (BEHP)	C	2.0E+00	J	5.0E+00	=	UG/L	041W5A0401	4 / 6	5.0E+00 / 5.0E+00	2.8E+00	5.0E-06	2.5E-02	4.19E-06	9.48E-06	3.17E-05
75343	1,1-Dichloroethane	N	N/A	N/A	1.0E+00	=	UG/L	041W5A0101	1 / 6	1.0E+00 / 1.0E+00	5.8E-01	1.0E-06	6.7E-03	2.22E-08	3.51E-07	4.70E-07
67641	Acetone	N	N/A	N/A	9.0E+00	J	UG/L	041W5A0601	1 / 6	5.0E+00 / 1.4E+01	5.0E+00	9.0E-06	5.7E-04	1.68E-08	2.66E-07	3.56E-07
75274	Bromodichloromethane	C	N/A	N/A	2.0E+00	=	UG/L	041W5A0601	1 / 6	1.0E+00 / 1.0E+00	7.5E-01	2.0E-06	4.6E-03	4.01E-08	9.07E-08	3.03E-07
67663	Chloroform	C	N/A	N/A	1.0E+00	=	UG/L	041W5A0601	1 / 6	1.0E+00 / 1.0E+00	5.8E-01	1.0E-06	6.8E-03	2.45E-08	5.54E-08	1.85E-07
156592	cis-1,2-Dichloroethene	N	N/A	N/A	1.0E+00	=	UG/L	041W5A0601	1 / 6	1.0E+00 / 1.0E+00	5.8E-01	1.0E-06	1.5E-02	4.83E-08	7.65E-07	1.02E-06
124481	Dibromochloromethane	C	N/A	N/A	2.0E+00	=	UG/L	041W5A0601	1 / 6	1.0E+00 / 1.0E+00	7.5E-01	2.0E-06	3.2E-03	3.67E-08	8.31E-08	2.78E-07

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).

EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound,
calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 11-1-48
Wetland 5A Phase II
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	9.5E-04	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	3.9E-04	N/A	5.2E-04	N/A
	Barium	N	4.1E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	3.5E-04	N/A	4.6E-04	N/A
	Cadmium	N	3.2E-06	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	1.1E-02	N/A	1.4E-02	N/A
	Chromium	N	1.1E-05	3.0E-03	N/A	2.5E-02	1	7.5E-05	N/A	6.3E-03	N/A	8.4E-03	N/A
	Cobalt	C	3.0E-06	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	1.3E-06	N/A	4.4E-06	N/A
	Copper	N	2.1E-05	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	7.3E-05	N/A	9.8E-05	N/A
	Iron	N	1.7E-03	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	2.0E-05	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	8.0E-05	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	5.9E-04	N/A	7.9E-04	N/A
	Vanadium	N	4.8E-06	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	1.1E-03	N/A	1.5E-03	N/A
	Zinc	N	2.4E-04	3.0E-01	N/A	2.0E-01	2, 4	6.0E-02	N/A	9.7E-05	N/A	1.3E-04	N/A
	Endosulfan I	N	2.9E-08	6.0E-03	N/A	5.0E-01	3	3.0E-03	N/A	3.0E-06	N/A	4.0E-06	N/A
	bis(2-Ethylhexyl)phthalate (BEHP)	C	5.0E-06	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	4.7E-03	N/A	1.6E-02	N/A
	1,1-Dichloroethane	N	1.0E-06	1.0E-01	N/A	1.0E+00	3	1.0E-01	N/A	3.5E-06	N/A	4.7E-06	N/A
	Acetone	N	9.0E-06	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	2.7E-05	N/A	3.6E-05	N/A
	Bromodichloromethane	C	2.0E-06	2.0E-02	6.2E-02	9.8E-01	3	2.0E-02	6.3E-02	4.6E-06	5.7E-09	1.5E-05	1.9E-08
	Chloroform	C	1.0E-06	1.0E-02	3.1E-02	2.0E-01	3	2.0E-03	1.6E-01	2.8E-05	8.6E-09	9.3E-05	2.9E-08
	cis-1,2-Dichloroethene	N	1.0E-06	1.0E-02	N/A	1.0E+00	3	1.0E-02	N/A	7.6E-05	N/A	1.0E-04	N/A
	Dibromochloromethane	C	2.0E-06	2.0E-02	8.4E-02	6.0E-01	3	1.2E-02	1.4E-01	6.9E-06	1.2E-08	2.3E-05	3.9E-08

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 11-1-49
Wetland 5A Phase II
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser: Ingestion Hazard Quotient	Child Trespasser: Ingestion Cancer Risk	Maintenance Worker: Ingestion Hazard Quotient	Maintenance Worker: Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	9.5E-04	1.0E+00	N/A	3.0E-08	N/A	1.9E-08	N/A
	Barium	N	4.1E-05	7.0E-02	N/A	1.9E-08	N/A	1.2E-08	N/A
	Cadmium	N	3.2E-06	5.0E-04	N/A	2.0E-07	N/A	1.3E-07	N/A
	Chromium	N	1.1E-05	3.0E-03	N/A	1.2E-07	N/A	7.7E-08	N/A
	Cobalt	C	3.0E-06	2.0E-02	N/A	6.8E-10	N/A	1.1E-09	N/A
	Copper	N	2.1E-05	4.0E-02	N/A	1.7E-08	N/A	1.1E-08	N/A
	Iron	N	1.7E-03	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	2.0E-05	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	8.0E-05	1.4E-01	N/A	1.8E-08	N/A	1.2E-08	N/A
	Vanadium	N	4.8E-06	7.0E-03	N/A	2.2E-08	N/A	1.4E-08	N/A
	Zinc	N	2.4E-04	3.0E-01	N/A	2.5E-08	N/A	1.6E-08	N/A
	Endosulfan I	N	2.9E-08	6.0E-03	N/A	1.5E-10	N/A	9.8E-11	N/A
	bis(2-Ethylhexyl)phthalate (BEHP)	C	5.0E-06	2.0E-02	1.4E-02	1.1E-09	3.2E-13	1.8E-09	5.1E-13
	1,1-Dichloroethane	N	1.0E-06	1.0E-01	N/A	3.2E-10	N/A	2.0E-10	N/A
	Acetone	N	9.0E-06	1.0E-01	N/A	2.8E-09	N/A	1.8E-09	N/A
	Bromodichloromethane	C	2.0E-06	2.0E-02	6.2E-02	4.5E-10	5.6E-13	7.3E-10	9.0E-13
	Chloroform	C	1.0E-06	1.0E-02	3.1E-02	4.5E-10	1.4E-13	7.3E-10	2.3E-13
	cis-1,2-Dichloroethene	N	1.0E-06	1.0E-02	N/A	3.2E-09	N/A	2.0E-09	N/A
	Dibromochloromethane	C	2.0E-06	2.0E-02	8.4E-02	4.5E-10	7.6E-13	7.3E-10	1.2E-12

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Risk = CDI \times SF_{oral}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Table 11-1-50
Wetland 5A Phase III
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	8.2E+02	=	2.5E+03	=	MG/KG	041M5A0401	3 / 3	NAV	1.6E+03	1.0E-03	3	4.96E-07	2.48E-07	7.85E-06	5.25E-06
7440360	Antimony	N	2.0E+00	J	2.8E+01	J	MG/KG	041M5A0501	2 / 3	N/A / 1.5E+00	1.0E+01	1.0E-03	3	5.54E-09	2.77E-09	8.77E-08	5.86E-08
7440393	Barium	N	6.9E+00	=	1.7E+01	=	MG/KG	041M5A0501	3 / 3	NAV	1.2E+01	1.0E-03	3	3.44E-09	1.72E-09	5.45E-08	3.64E-08
7440417	Beryllium	N	1.3E-01	J	2.0E-01	=	MG/KG	041M5A0401	2 / 3	N/A / 5.0E-02	1.2E-01	1.0E-03	3	4.00E-11	2.00E-11	6.33E-10	4.23E-10
7440439	Cadmium	N	4.2E-01	J	3.2E+00	=	MG/KG	041M5A0501	3 / 3	NAV	1.6E+00	1.0E-03	3	6.40E-10	3.20E-10	1.01E-08	6.77E-09
7440484	Cobalt	C	9.4E-01	J	1.6E+00	J	MG/KG	041M5A0501	3 / 3	NAV	1.4E+00	1.0E-03	3	3.20E-10	1.60E-10	7.24E-10	1.21E-09
7440508	Copper	N	2.2E+01	=	1.1E+02	=	MG/KG	041M5A0501	3 / 3	NAV	5.2E+01	1.0E-03	3	2.16E-08	1.08E-08	3.42E-07	2.29E-07
7439896	Iron	N	5.5E+02	=	3.0E+03	=	MG/KG	041M5A0501	3 / 3	NAV	1.6E+03	1.0E-03	3	6.04E-07	3.02E-07	9.56E-06	6.39E-06
7439921	Lead	N	5.5E+01	=	2.6E+02	=	MG/KG	041M5A0501	3 / 3	NAV	1.3E+02	1.0E-03	3	5.16E-08	2.58E-08	8.17E-07	5.46E-07
7439965	Manganese	N	8.6E+00	=	2.1E+01	=	MG/KG	041M5A0501	3 / 3	NAV	1.5E+01	1.0E-03	3	4.26E-09	2.13E-09	6.74E-08	4.51E-08
7782492	Selenium	N	N/A	N/A	6.0E-01	J	MG/KG	041M5A0501	1 / 3	2.6E-01 / 2.8E-01	2.9E-01	1.0E-03	3	1.20E-10	6.00E-11	1.90E-09	1.27E-09
7440622	Vanadium	N	1.8E+00	=	4.2E+00	=	MG/KG	041M5A0401	3 / 3	NAV	3.2E+00	1.0E-03	3	8.40E-10	4.20E-10	1.33E-08	8.89E-09
7440666	Zinc	N	7.7E+01	=	3.9E+02	=	MG/KG	041M5A0501	3 / 3	NAV	1.9E+02	1.0E-03	3	7.88E-08	3.94E-08	1.25E-06	8.34E-07
72548	4,4'-DDD	C	1.3E-03	J	1.0E-01	D	MG/KG	041M5A0401	2 / 3	N/A / 1.0E-01	5.0E-02	3.0E-02	1	6.00E-10	3.00E-10	1.36E-09	2.27E-09
72559	4,4'-DDE	C	3.6E-03	J	5.7E-02	D	MG/KG	041M5A0401	2 / 3	N/A / 1.0E-01	3.7E-02	3.0E-02	1	3.42E-10	1.71E-10	7.73E-10	1.29E-09
50293	4,4'-DDT	C	3.2E-03	J	7.2E-03	=	MG/KG	041M5A0401	2 / 3	N/A / 1.0E-01	2.0E-02	3.0E-02	1	4.32E-11	2.16E-11	9.77E-11	1.63E-10
5103719	alpha-Chlordane	C	N/A	N/A	4.5E-03	=	MG/KG	041M5A0401	1 / 3	2.6E-04 / 5.4E-02	1.1E-02	4.0E-02	2	3.60E-11	1.80E-11	8.14E-11	1.36E-10
60571	Dieldrin	C	N/A	N/A	1.4E-03	J	MG/KG	041M5A0601	1 / 3	2.9E-03 / 1.0E-01	1.8E-02	1.0E-01	2	2.80E-11	1.40E-11	6.33E-11	1.06E-10
115297	Endosulfan I	N	N/A	N/A	5.2E-03	=	MG/KG	041M5A0401	1 / 3	3.0E-04 / 5.4E-02	1.1E-02	1.0E-01	2	1.04E-10	5.20E-11	1.65E-09	1.10E-09
1031078	Endosulfan sulfate	N	6.6E-04	J	2.3E-03	J	MG/KG	041M5A0401	2 / 3	N/A / 1.0E-01	1.8E-02	1.0E-01	2	4.60E-11	2.30E-11	7.28E-10	4.87E-10
72208	Endrin	N	N/A	N/A	1.1E-03	J	MG/KG	041M5A0601	1 / 3	6.9E-04 / 2.4E-03	8.8E-04	1.0E-01	2	2.20E-11	1.10E-11	3.48E-10	2.33E-10
58899	gamma-BHC (Lindane)	C	N/A	N/A	2.4E-04	J	MG/KG	041M5A0401	1 / 3	2.8E-03 / 5.4E-02	9.5E-03	4.0E-02	2	1.92E-12	9.60E-13	4.34E-12	7.26E-12
57749	gamma-Chlordane	C	N/A	N/A	7.9E-03	J	MG/KG	041M5A0401	1 / 3	1.4E-04 / 5.4E-02	1.2E-02	4.0E-02	2	6.32E-11	3.16E-11	1.43E-10	2.39E-10
120127	Anthracene	N	N/A	N/A	1.6E-02	J	MG/KG	041M5A0401	1 / 3	5.2E-01 / 5.4E-01	1.8E-01	1.0E-02	3	3.20E-11	1.60E-11	5.07E-10	3.39E-10
56553	Benzo(a)anthracene	C	4.1E-02	J	1.0E-01	J	MG/KG	041M5A0401	2 / 3	N/A / 5.4E-01	1.4E-01	1.3E-01	2	2.60E-09	1.30E-09	5.88E-09	9.83E-09
50328	Benzo(a)pyrene	C	5.2E-02	J	1.4E-01	J	MG/KG	041M5A0401	2 / 3	N/A / 5.4E-01	1.5E-01	1.3E-01	2	3.64E-09	1.82E-09	8.23E-09	1.38E-08
205992	Benzo(b)fluoranthene	C	6.2E-02	J	1.2E-01	J	MG/KG	041M5A0401	2 / 3	N/A / 5.4E-01	1.5E-01	1.3E-01	2	3.12E-09	1.56E-09	7.06E-09	1.18E-08
207089	Benzo(k)fluoranthene	C	N/A	N/A	1.1E-01	J	MG/KG	041M5A0401	1 / 3	5.2E-01 / 5.4E-01	2.1E-01	1.3E-01	2	2.86E-09	1.43E-09	6.47E-09	1.08E-08
117817	bis(2-Ethylhexyl)phthalate (BEHP)	C	2.1E-01	J	9.5E-01	=	MG/KG	041M5A0501	2 / 3	N/A / 5.4E-01	4.8E-01	1.0E-01	1	1.90E-08	9.50E-09	4.30E-08	7.18E-08
85687	Butylbenzylphthalate	N	N/A	N/A	1.4E-01	J	MG/KG	041M5A0501	1 / 3	5.0E-01 / 5.4E-01	2.2E-01	1.0E-01	2	2.80E-09	1.40E-09	4.43E-08	2.96E-08
218019	Chrysene	C	5.8E-02	J	1.7E-01	J	MG/KG	041M5A0401	2 / 3	N/A / 5.4E-01	1.7E-01	1.3E-01	2	4.42E-09	2.21E-09	1.00E-08	1.67E-08
117840	Di-n-octylphthalate	N	N/A	N/A	2.9E-01	J	MG/KG	041M5A0501	1 / 3	5.0E-01 / 5.4E-01	2.7E-01	1.0E-01	2	5.80E-09	2.90E-09	9.18E-08	6.14E-08
206440	Fluoranthene	N	1.6E-02	J	2.6E-01	J	MG/KG	041M5A0401	3 / 3	NAV	1.2E-01	1.3E-01	2	6.76E-09	3.38E-09	1.07E-07	7.15E-08
85018	Phenanthrene	N	2.8E-02	J	9.7E-02	J	MG/KG	041M5A0401	2 / 3	N/A / 5.4E-01	1.3E-01	1.0E-02	3	1.94E-10	9.70E-11	3.07E-09	2.05E-09
129000	Pyrene	N	8.7E-02	J	3.0E-01	J	MG/KG	041M5A0401	2 / 3	N/A / 5.4E-01	2.2E-01	1.0E-02	3	6.00E-10	3.00E-10	9.50E-09	6.35E-09

Notes:
Equation for sediment risk:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Equation for DA_{event} for sediment contact:

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

Where:

C_{sd} = Chemical concentration in sediment (mg/kg).
CF = Conversion factor (10^{-6} kg/mg).
AF = Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;
(2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Table 11-1-51
Wetland 5A Phase III
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABSGI	ABSGIS ource	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
Sediment Dermal Risk	Aluminum	N	2.5E+03	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	7.9E-05	N/A	5.2E-05	N/A
	Antimony	N	2.8E+01	4.0E-04	N/A	2.0E-02	3	8.0E-06	N/A	1.1E-02	N/A	7.3E-03	N/A
	Barium	N	1.7E+01	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	1.1E-05	N/A	7.4E-06	N/A
	Beryllium	N	2.0E-01	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	4.5E-05	N/A	3.0E-05	N/A
	Cadmium	N	3.2E+00	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	8.1E-04	N/A	5.4E-04	N/A
	Cobalt	C	1.6E+00	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	4.5E-08	N/A	7.6E-08	N/A
	Copper	N	1.1E+02	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	2.8E-05	N/A	1.9E-05	N/A
	Iron	N	3.0E+03	3.0E-01	N/A	1.5E-01	3	4.5E-02	N/A	2.1E-04	N/A	1.4E-04	N/A
	Lead	N	2.6E+02	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.1E+01	2.4E-02	N/A	4.0E-02	1, 3	9.6E-04	N/A	7.0E-05	N/A	4.7E-05	N/A
	Selenium	N	6.0E-01	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	6.9E-07	N/A	4.6E-07	N/A
	Vanadium	N	4.2E+00	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	7.3E-05	N/A	4.9E-05	N/A
	Zinc	N	3.9E+02	3.0E-01	N/A	2.0E-01	3, 4	6.0E-02	N/A	2.1E-05	N/A	1.4E-05	N/A
	4,4'-DDD	C	1.0E-01	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	1.1E-08	N/A	1.8E-08
	4,4'-DDE	C	5.7E-02	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	8.8E-09	N/A	1.5E-08
	4,4'-DDT	C	7.2E-03	5.0E-04	3.4E-01	3.0E-02	2	1.5E-05	1.1E+01	6.5E-06	1.1E-09	1.1E-05	1.9E-09
	alpha-Chlordane	C	4.5E-03	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	2.0E-07	3.6E-11	3.4E-07	6.0E-11
	Dieldrin	C	1.4E-03	5.0E-05	1.6E+01	5.0E-01	3	2.5E-05	3.2E+01	2.5E-06	2.0E-09	4.2E-06	3.4E-09
	Endosulfan I	N	5.2E-03	6.0E-03	N/A	5.0E-01	3	3.0E-03	N/A	5.5E-07	N/A	3.7E-07	N/A
	Endosulfan sulfate	N	2.3E-03	6.0E-03	N/A	5.0E-01	3	3.0E-03	N/A	2.4E-07	N/A	1.6E-07	N/A
	Endrin	N	1.1E-03	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	9.3E-05	N/A	6.2E-05	N/A
	gamma-BHC (Lindane)	C	2.4E-04	3.0E-04	1.3E+00	9.7E-01	3	2.9E-04	1.3E+00	1.5E-08	5.8E-12	2.5E-08	9.7E-12
	gamma-Chlordane	C	7.9E-03	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	3.6E-07	6.3E-11	6.0E-07	1.0E-10
	Anthracene	N	1.6E-02	3.0E-01	N/A	7.6E-01	3	2.3E-01	N/A	2.2E-09	N/A	1.5E-09	N/A
	Benzo(a)anthracene	C	1.0E-01	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	1.4E-08	N/A	2.3E-08
	Benzo(a)pyrene	C	1.4E-01	N/A	7.3E+00	3.1E-01	3	N/A	2.4E+01	N/A	1.9E-07	N/A	3.2E-07
	Benzo(b)fluoranthene	C	1.2E-01	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	1.7E-08	N/A	2.8E-08
	Benzo(k)fluoranthene	C	1.1E-01	N/A	7.3E-02	3.1E-01	3	N/A	2.4E-01	N/A	1.5E-09	N/A	2.5E-09
	bis(2-Ethylhexyl)phthalate (BEHP)	C	9.5E-01	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	2.1E-05	6.0E-09	3.6E-05	1.0E-08
	Butylbenzylphthalate	N	1.4E-01	2.0E-01	N/A	1.7E-02	3	3.5E-03	N/A	1.3E-05	N/A	8.5E-06	N/A
	Chrysene	C	1.7E-01	7.3E-03	N/A	3.1E-01	3	2.3E-03	N/A	4.4E-06	N/A	7.4E-06	N/A
	Di-n-octylphthalate	N	2.9E-01	4.0E-02	N/A	3.1E-01	3	1.2E-02	N/A	7.4E-06	N/A	5.0E-06	N/A
	Fluoranthene	N	2.6E-01	N/A	4.0E-02	3.1E-01	3	N/A	1.3E-01	N/A	1.4E-08	N/A	9.2E-09
	Phenanthrene	N	9.7E-02	N/A	3.0E-02	7.3E-01	3	N/A	4.1E-02	N/A	1.3E-10	N/A	8.4E-11
	Pyrene	N	3.0E-01	N/A	3.0E-02	3.1E-01	3	N/A	9.7E-02	N/A	9.2E-10	N/A	6.1E-10

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfDdermal = Dermal reference dose.
RFDoral = Oral reference dose.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 11-1-52
Wetland 5A Phase III
Sediment Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	2.5E+03	1.0E+00	N/A	7.85E-04	N/A	5.05E-04	N/A
	Antimony	N	2.8E+01	4.0E-04	N/A	2.19E-02	N/A	1.41E-02	N/A
	Barium	N	1.7E+01	7.0E-02	N/A	7.78E-05	N/A	5.00E-05	N/A
	Beryllium	N	2.0E-01	2.0E-03	N/A	3.17E-05	N/A	2.04E-05	N/A
	Cadmium	N	3.2E+00	5.0E-04	N/A	2.03E-03	N/A	1.30E-03	N/A
	Cobalt	C	1.6E+00	2.0E-02	N/A	3.62E-06	N/A	5.81E-06	N/A
	Copper	N	1.1E+02	4.0E-02	N/A	8.55E-04	N/A	5.50E-04	N/A
	Iron	N	3.0E+03	3.0E-01	N/A	3.19E-03	N/A	2.05E-03	N/A
	Lead	N	2.6E+02	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.1E+01	2.4E-02	N/A	2.81E-04	N/A	1.81E-04	N/A
	Selenium	N	6.0E-01	5.0E-03	N/A	3.80E-05	N/A	2.44E-05	N/A
	Vanadium	N	4.2E+00	7.0E-03	N/A	1.90E-04	N/A	1.22E-04	N/A
	Zinc	N	3.9E+02	3.0E-01	N/A	4.16E-04	N/A	2.67E-04	N/A
	4,4'-DDD	C	1.0E-01	N/A	2.4E-01	N/A	1.09E-09	N/A	1.74E-09
	4,4'-DDE	C	5.7E-02	N/A	3.4E-01	N/A	8.77E-10	N/A	1.41E-09
	4,4'-DDT	C	7.2E-03	5.0E-04	3.4E-01	6.51E-07	1.11E-10	1.05E-06	1.78E-10
	alpha-Chlordane	C	4.5E-03	5.0E-04	3.5E-01	4.07E-07	7.12E-11	6.54E-07	1.14E-10
	Dieldrin	C	1.4E-03	5.0E-05	1.6E+01	1.27E-06	1.01E-09	2.04E-06	1.63E-09
	Endosulfan I	N	5.2E-03	6.0E-03	N/A	2.74E-07	N/A	1.76E-07	N/A
	Endosulfan sulfate	N	2.3E-03	6.0E-03	N/A	1.21E-07	N/A	7.80E-08	N/A
	Endrin	N	1.1E-03	3.0E-04	N/A	1.16E-06	N/A	7.46E-07	N/A
	gamma-BHC (Lindane)	C	2.4E-04	3.0E-04	1.3E+00	3.62E-08	1.41E-11	5.81E-08	2.27E-11
	gamma-Chlordane	C	7.9E-03	5.0E-04	3.5E-01	7.15E-07	1.25E-10	1.15E-06	2.01E-10
	Anthracene	N	1.6E-02	3.0E-01	N/A	1.69E-08	N/A	1.09E-08	N/A
	Benzo(a)anthracene	C	1.0E-01	N/A	7.3E-01	N/A	3.30E-09	N/A	5.31E-09
	Benzo(a)pyrene	C	1.4E-01	N/A	7.3E+00	N/A	4.62E-08	N/A	7.43E-08
	Benzo(b)fluoranthene	C	1.2E-01	N/A	7.3E-01	N/A	3.96E-09	N/A	6.37E-09
	Benzo(k)fluoranthene	C	1.1E-01	N/A	7.3E-02	N/A	3.63E-10	N/A	5.84E-10
	bis(2-Ethylhexyl)phthalate (BEHP)	C	9.5E-01	2.0E-02	1.4E-02	2.15E-06	6.02E-10	3.45E-06	9.67E-10
	Butylbenzylphthalate	N	1.4E-01	2.0E-01	N/A	2.22E-07	N/A	1.42E-07	N/A
	Chrysene	C	1.7E-01	7.3E-03	N/A	1.05E-06	N/A	1.69E-06	N/A
	Di-n-octylphthalate	N	2.9E-01	4.0E-02	N/A	2.30E-06	N/A	1.48E-06	N/A
	Fluoranthene	N	2.6E-01	N/A	4.0E-02	N/A	3.29E-09	N/A	2.12E-09
	Phenanthrene	N	9.7E-02	N/A	3.0E-02	N/A	9.21E-10	N/A	5.92E-10
	Pyrene	N	3.0E-01	N/A	3.0E-02	N/A	2.85E-09	N/A	1.83E-09

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = chronic daily intake (mg/kg-day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
IRsd = 100 mg/day for age groups greater than 6-years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 11-1-53
Wetland 5A Phase III
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	1.2E+02	=	6.7E+02	=	UG/L	041W5A0501	3 / 3	NAV	3.1E+02	6.7E-04	1.0E-03	1.74E-06	2.75E-05	3.68E-05
7440393	Barium	N	2.2E+01	=	2.8E+01	=	UG/L	041W5A0501	3 / 3	NAV	2.5E+01	2.8E-05	1.0E-03	7.28E-08	1.15E-06	1.54E-06
7440439	Cadmium	N	N/A	N/A	1.2E+00	=	UG/L	041W5A0501	1 / 3	5.8E-01 / 5.8E-01	5.9E-01	1.2E-06	1.0E-03	3.12E-09	4.94E-08	6.60E-08
7440473	Chromium	N	N/A	N/A	1.2E+01	=	UG/L	041W5A0501	1 / 3	8.8E-01 / 8.8E-01	4.3E+00	1.2E-05	1.0E-03	3.12E-08	4.94E-07	6.60E-07
7440484	Cobalt	C	2.0E+00	J	3.2E+00	J	UG/L	041W5A0501	2 / 3	N/A / 5.3E-01	1.8E+00	3.2E-06	1.2E-03	9.98E-09	2.26E-08	7.55E-08
7440508	Copper	N	4.1E+00	J	4.3E+01	=	UG/L	041W5A0501	2 / 3	N/A / 1.7E+00	1.6E+01	4.3E-05	1.0E-03	1.11E-07	1.76E-06	2.36E-06
7439896	Iron	N	7.6E+02	=	2.5E+03	=	UG/L	041W5A0601	3 / 3	NAV	1.4E+03	2.5E-03	2.5E-04	1.63E-06	2.57E-05	3.44E-05
7439921	Lead	N	9.0E+00	=	9.1E+01	=	UG/L	041W5A0501	2 / 3	N/A / 5.5E+00	3.4E+01	9.1E-05	3.4E-04	8.08E-08	1.28E-06	1.71E-06
7439965	Manganese	N	1.2E+02	=	2.0E+02	=	UG/L	041W5A0501	3 / 3	NAV	1.7E+02	2.0E-04	1.0E-03	5.15E-07	8.15E-06	1.09E-05
7440224	Silver	N	N/A	N/A	1.0E-01	J	UG/L	041W5A0501	1 / 3	3.0E-02 / 3.0E-02	4.3E-02	1.0E-07	6.0E-04	1.56E-10	2.47E-09	3.30E-09
7440622	Vanadium	N	1.1E+00	J	3.4E+00	J	UG/L	041W5A0501	2 / 3	N/A / 7.7E-01	1.6E+00	3.4E-06	1.0E-03	8.84E-09	1.40E-07	1.87E-07
7440666	Zinc	N	1.5E+01	J	3.4E+02	=	UG/L	041W5A0501	3 / 3	NAV	1.3E+02	3.4E-04	6.0E-04	5.27E-07	8.35E-06	1.12E-05
156605	1,2-Dichloroethene (total)	N	N/A	N/A	1.1E+00	=	UG/L	041W5A0601	1 / 3	1.0E+00 / 1.0E+00	7.0E-01	1.1E-06	7.7E-03	2.83E-08	4.48E-07	5.99E-07
67641	Acetone	N	N/A	N/A	2.3E+01	J	UG/L	041W5A0601	1 / 3	2.5E+01 / 2.5E+01	1.6E+01	2.3E-05	5.7E-04	4.30E-08	6.80E-07	9.09E-07
108883	Toluene	N	N/A	N/A	4.1E-01	J	UG/L	041W5A0501	1 / 3	1.0E+00 / 1.0E+00	4.7E-01	4.1E-07	3.1E-02	3.98E-08	6.30E-07	8.43E-07

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 11-1-54
Wetland 5A Phase III
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	6.7E-04	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	2.7E-04	N/A	3.7E-04	N/A
	Barium	N	2.8E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	2.4E-04	N/A	3.1E-04	N/A
	Cadmium	N	1.2E-06	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	4.0E-03	N/A	5.3E-03	N/A
	Chromium	N	1.2E-05	3.0E-03	N/A	2.5E-02	1	7.5E-05	N/A	6.6E-03	N/A	8.8E-03	N/A
	Cobalt	C	3.2E-06	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	1.4E-06	N/A	4.7E-06	N/A
	Copper	N	4.3E-05	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	1.5E-04	N/A	2.0E-04	N/A
	Iron	N	2.5E-03	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	9.1E-05	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.0E-04	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	1.5E-03	N/A	1.9E-03	N/A
	Silver	N	1.0E-07	5.0E-03	N/A	1.8E-01	3	9.0E-04	N/A	2.7E-06	N/A	3.7E-06	N/A
	Vanadium	N	3.4E-06	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	7.7E-04	N/A	1.0E-03	N/A
	Zinc	N	3.4E-04	3.0E-01	N/A	2.0E-01	2, 4	6.0E-02	N/A	1.4E-04	N/A	1.9E-04	N/A
	1,2-Dichloroethene (total)	N	1.1E-06	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	2.8E-05	N/A	3.7E-05	N/A
	Acetone	N	2.3E-05	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	6.8E-05	N/A	9.1E-05	N/A
	Toluene	N	4.1E-07	2.0E-01	N/A	3.1E-01	3	6.2E-02	N/A	1.0E-05	N/A	1.4E-05	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 11-1-55
Wetland 5A Phase III
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

						Child Trespasser		Maintenance Worker	
Exposure Route	**COPC**		**Maximum concentration (mg/cm^3)**	**Oral RfD (mg/kg-day)**	**Oral SF (mg/kg-day)-1**	**Ingestion Hazard Quotient**	**Ingestion Cancer Risk**	**Ingestion Hazard Quotient**	**Ingestion Cancer Risk**
SW Incidental Ingestion	Aluminum	N	6.7E-04	1.0E+00	N/A	2.1E-08	N/A	1.4E-08	N/A
	Barium	N	2.8E-05	7.0E-02	N/A	1.3E-08	N/A	8.1E-09	N/A
	Cadmium	N	1.2E-06	5.0E-04	N/A	7.6E-08	N/A	4.9E-08	N/A
	Chromium	N	1.2E-05	3.0E-03	N/A	1.3E-07	N/A	8.1E-08	N/A
	Cobalt	C	3.2E-06	2.0E-02	N/A	7.2E-10	N/A	1.2E-09	N/A
	Copper	N	4.3E-05	4.0E-02	N/A	3.4E-08	N/A	2.2E-08	N/A
	Iron	N	2.5E-03	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	9.1E-05	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.0E-04	1.4E-01	N/A	4.5E-08	N/A	2.9E-08	N/A
	Silver	N	1.0E-07	5.0E-03	N/A	6.3E-10	N/A	4.1E-10	N/A
	Vanadium	N	3.4E-06	7.0E-03	N/A	1.5E-08	N/A	9.9E-09	N/A
	Zinc	N	3.4E-04	3.0E-01	N/A	3.6E-08	N/A	2.3E-08	N/A
	1,2-Dichloroethene (total)	N	1.1E-06	2.0E-02	N/A	1.7E-09	N/A	1.1E-09	N/A
	Acetone	N	2.3E-05	1.0E-01	N/A	7.3E-09	N/A	4.7E-09	N/A
	Toluene	N	4.1E-07	2.0E-01	N/A	6.5E-11	N/A	4.2E-11	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Risk = CDI \times SF_{oral}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Table 11-1-56
Wetland 5B Phase II
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	N/A	N/A	2.1E+03	=	UG/L	041W5B0201	1 / 1	NAV	2.1E+03	2.1E-03	1.0E-03	5.36E-06	8.48E-05	1.13E-04
7440393	Barium	N	N/A	N/A	2.8E+01	J	UG/L	041W5B0201	1 / 1	NAV	2.8E+01	2.8E-05	1.0E-03	7.23E-08	1.14E-06	1.53E-06
7440439	Cadmium	N	N/A	N/A	1.9E+01	=	UG/L	041W5B0201	1 / 1	NAV	1.9E+01	1.9E-05	1.0E-03	4.94E-08	7.82E-07	1.05E-06
7440473	Chromium	N	N/A	N/A	4.1E+01	J	UG/L	041W5B0201	1 / 1	NAV	4.1E+01	4.1E-05	1.0E-03	1.06E-07	1.68E-06	2.25E-06
7440484	Cobalt	C	N/A	N/A	3.9E+00	J	UG/L	041W5B0201	1 / 1	NAV	3.9E+00	3.9E-06	1.2E-03	1.22E-08	2.75E-08	9.20E-08
7440508	Copper	N	N/A	N/A	5.3E+01	=	UG/L	041W5B0201	1 / 1	NAV	5.3E+01	5.3E-05	1.0E-03	1.37E-07	2.17E-06	2.90E-06
7439896	Iron	N	N/A	N/A	2.9E+03	=	UG/L	041W5B0201	1 / 1	NAV	2.9E+03	2.9E-03	2.5E-04	1.88E-06	2.97E-05	3.98E-05
7439921	Lead	N	N/A	N/A	9.4E+01	=	UG/L	041W5B0201	1 / 1	NAV	9.4E+01	9.4E-05	3.4E-04	8.32E-08	1.32E-06	1.76E-06
7439965	Manganese	N	N/A	N/A	1.1E+02	=	UG/L	041W5B0201	1 / 1	NAV	1.1E+02	1.1E-04	1.0E-03	2.83E-07	4.49E-06	6.00E-06
7487947	Mercury	N	N/A	N/A	1.4E-01	J	UG/L	041W5B0201	1 / 1	NAV	1.4E-01	1.4E-07	1.0E-03	3.64E-10	5.76E-09	7.70E-09
7440622	Vanadium	N	N/A	N/A	5.2E+00	J	UG/L	041W5B0201	1 / 1	NAV	5.2E+00	5.2E-06	1.0E-03	1.35E-08	2.14E-07	2.86E-07
7440666	Zinc	N	N/A	N/A	1.9E+02	=	UG/L	041W5B0201	1 / 1	NAV	1.9E+02	1.9E-04	6.0E-04	2.95E-07	4.67E-06	6.24E-06
95578	2-Chlorophenol	N	N/A	N/A	1.0E+00	J	UG/L	041W5B0201	1 / 1	NAV	1.0E+00	1.0E-06	8.0E-03	2.98E-08	4.71E-07	6.30E-07
59507	4-Chloro-3-methylphenol	N	N/A	N/A	1.0E+00	J	UG/L	041W5B0201	1 / 1	NAV	1.0E+00	1.0E-06	2.9E-02	1.11E-07	1.76E-06	2.35E-06
117817	bis(2-Ethylhexyl)phthalate (BEHP)	C	N/A	N/A	2.0E+00	J	UG/L	041W5B0201	1 / 1	NAV	2.0E+00	2.0E-06	2.5E-02	1.68E-06	3.79E-06	1.27E-05
621647	N-Nitroso-di-n-propylamine	C	N/A	N/A	1.0E+00	J	UG/L	041W5B0201	1 / 1	NAV	1.0E+00	1.0E-06	2.3E-03	8.60E-09	1.95E-08	6.50E-08
129000	Pyrene	N	N/A	N/A	2.0E+00	=	UG/L	041W5B0201	1 / 1	NAV	2.0E+00	2.0E-06	3.2E-01	3.71E-06	5.88E-05	7.86E-05
75343	1,1-Dichloroethane	N	N/A	N/A	3.0E+00	=	UG/L	041W5B0201	1 / 1	NAV	3.0E+00	3.0E-06	6.7E-03	6.66E-08	1.05E-06	1.41E-06
67641	Acetone	N	N/A	N/A	8.0E+00	J	UG/L	041W5B0201	1 / 1	NAV	8.0E+00	8.0E-06	5.7E-04	1.49E-08	2.37E-07	3.16E-07
79016	Trichloroethene	C	N/A	N/A	1.0E+01	=	UG/L	041W5B0201	1 / 1	NAV	1.0E+01	1.0E-05	1.2E-02	4.37E-07	9.87E-07	3.30E-06
75014	Vinyl chloride	C	N/A	N/A	6.0E+00	=	UG/L	041W5B0201	1 / 1	NAV	6.0E+00	6.0E-06	5.6E-03	1.03E-07	2.34E-07	7.82E-07

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 11-1-57
Wetland 5B Phase II
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	2.1E-03	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	8.5E-04	N/A	1.1E-03	N/A
	Barium	N	2.8E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	2.3E-04	N/A	3.1E-04	N/A
	Cadmium	N	1.9E-05	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	6.3E-02	N/A	8.4E-02	N/A
	Chromium	N	4.1E-05	3.0E-03	N/A	2.5E-02	1	7.5E-05	N/A	2.2E-02	N/A	3.0E-02	N/A
	Cobalt	C	3.9E-06	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	1.7E-06	N/A	5.7E-06	N/A
	Copper	N	5.3E-05	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	1.8E-04	N/A	2.4E-04	N/A
	Iron	N	2.9E-03	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	9.4E-05	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.1E-04	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	8.0E-04	N/A	1.1E-03	N/A
	Mercury	N	1.4E-07	3.0E-04	N/A	7.0E-02	1	2.1E-05	N/A	2.7E-04	N/A	3.7E-04	N/A
	Vanadium	N	5.2E-06	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	1.2E-03	N/A	1.6E-03	N/A
	Zinc	N	1.9E-04	3.0E-01	N/A	2.0E-01	2, 4	6.0E-02	N/A	7.8E-05	N/A	1.0E-04	N/A
	2-Chlorophenol	N	1.0E-06	5.0E-03	N/A	5.0E-01	3	2.5E-03	N/A	1.9E-04	N/A	2.5E-04	N/A
	4-Chloro-3-methylphenol	N	1.0E-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	bis(2-Ethylhexyl)phthalate (BEHP)	C	2.0E-06	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	1.9E-03	N/A	6.3E-03	N/A
	N-Nitroso-di-n-propylamine	C	1.0E-06	N/A	7.0E+00	2.5E-01	3	N/A	2.8E+01	N/A	5.4E-07	N/A	**1.8E-06**
	Pyrene	N	2.0E-06	N/A	3.0E-02	3.1E-01	3	N/A	9.7E-02	N/A	**5.7E-06**	N/A	**7.6E-06**
	1,1-Dichloroethane	N	3.0E-06	1.0E-01	N/A	1.0E+00	3	1.0E-01	N/A	1.1E-05	N/A	1.4E-05	N/A
	Acetone	N	8.0E-06	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	2.4E-05	N/A	3.2E-05	N/A
	Trichloroethene	C	1.0E-05	3.0E-04	4.0E-01	8.0E-01	3	2.4E-04	5.0E-01	4.1E-03	4.9E-07	1.4E-02	**1.7E-06**
	Vinyl chloride	C	6.0E-06	3.0E-03	7.5E-01	1.0E+00	3	3.0E-03	7.5E-01	7.8E-05	1.8E-07	2.6E-04	5.9E-07

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 11-1-58
Wetland 5B Phase II
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

						Child Trespasser		Maintenance Worker	
Exposure Route	**COPC**		**Maximum concentration (mg/cm^3)**	**Oral RfD (mg/kg-day)**	**Oral SF (mg/kg-day)-1**	**Ingestion Hazard Quotient**	**Ingestion Cancer Risk**	**Ingestion Hazard Quotient**	**Ingestion Cancer Risk**
SW Incidental Ingestion	Aluminum	N	2.1E-03	1.0E+00	N/A	6.5E-08	N/A	4.2E-08	N/A
	Barium	N	2.8E-05	7.0E-02	N/A	1.3E-08	N/A	8.1E-09	N/A
	Cadmium	N	1.9E-05	5.0E-04	N/A	1.2E-06	N/A	7.7E-07	N/A
	Chromium	N	4.1E-05	3.0E-03	N/A	4.3E-07	N/A	2.8E-07	N/A
	Cobalt	C	3.9E-06	2.0E-02	N/A	8.8E-10	N/A	1.4E-09	N/A
	Copper	N	5.3E-05	4.0E-02	N/A	4.2E-08	N/A	2.7E-08	N/A
	Iron	N	2.9E-03	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	9.4E-05	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.1E-04	1.4E-01	N/A	2.5E-08	N/A	1.6E-08	N/A
	Mercury	N	1.4E-07	3.0E-04	N/A	1.5E-08	N/A	9.5E-09	N/A
	Vanadium	N	5.2E-06	7.0E-03	N/A	2.4E-08	N/A	1.5E-08	N/A
	Zinc	N	1.9E-04	3.0E-01	N/A	2.0E-08	N/A	1.3E-08	N/A
	2-Chlorophenol	N	1.0E-06	5.0E-03	N/A	6.3E-09	N/A	4.1E-09	N/A
	4-Chloro-3-methylphenol	N	1.0E-06	N/A	N/A	N/A	N/A	N/A	N/A
	bis(2-Ethylhexyl)phthalate (BEHP)	C	2.0E-06	2.0E-02	1.4E-02	4.5E-10	1.3E-13	7.3E-10	2.0E-13
	N-Nitroso-di-n-propylamine	C	1.0E-06	N/A	7.0E+00	N/A	3.2E-11	N/A	5.1E-11
	Pyrene	N	2.0E-06	N/A	3.0E-02	N/A	1.9E-12	N/A	1.2E-12
	1,1-Dichloroethane	N	3.0E-06	1.0E-01	N/A	9.5E-10	N/A	6.1E-10	N/A
	Acetone	N	8.0E-06	1.0E-01	N/A	2.5E-09	N/A	1.6E-09	N/A
	Trichloroethene	C	1.0E-05	3.0E-04	4.0E-01	1.5E-07	1.8E-11	2.4E-07	2.9E-11
	Vinyl chloride	C	6.0E-06	3.0E-03	7.5E-01	9.0E-09	2.0E-11	1.5E-08	3.3E-11

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Risk = CDI \times SF_{oral}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

= Oral reference dose.
= Oral slope factor.

Table 11-1-58
Wetland 5B Phase II
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Where:

CDI	=	Chronic daily intake (mg/kg-day).
EPC_{sw}	=	Exposure point concentration in surface water (mg/L).
IR_{sw}	=	Incidental ingestion rate for sediment (L/day).
EF	=	Exposure frequency (days/year).
ED	=	Exposure duration (years).
BW	=	Body weight (kg) 70 kg (adult) 45 kg (child).
AT	=	Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr. carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

Irsw	=	0.01 L/day exposure to surface water during wading for adolescents and adults.
EF	=	52 dys/yr (child trespasser/adult maintenance worker).
ED	=	10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW	=	45 kg (child trespasser); 70 kg (adult maintenance worker).
AT	=	Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker). Cancer - 25,550 days (child trespasser/adult maintenance worker).

11.2 Wetland 6 — Screening Level Problem Formulation

11.2.1 Site Description and Habitats Present in Wetland 6

Wetland 6 is tile lined drainage ditch that originating at the parade grounds north of the NAS Chapel and draining to the north into the Navy Yacht Basin. It receives surface water from Wetland 5 and the area associated with the former Chevalier Field area (now NATTC). Parsons and Pruitt describe Wetland 6 as a palustrine wetland with open water. This tile lined drainage ditch is fed by several surface water runoff sources and Wetland 5B. Wetland 5B feeds Wetland 6 from the west. Wetland 6 flows north past the former Chevalier Field area (now NATTC) into the Yacht Basin. This wetland is bound by mowed grass, buildings, or isolated areas of highly disturbed vegetation. The ditch portion of Wetland 6 is no deeper than about 3 feet and has a maximum width of about 3 to 5 feet. Sediment in Wetland 6 ranges from a brown poorly graded fine sand with a TOC of 0.121% (041M060401) to a dark yellow brown poorly graded sand with silt and organics and a TOC of 4.03% (041M060701).

Photograph 1 Wetland 6 — After Wetland 5 Enters

Photograph 2 Wetland 6 — Facing South

Wetland 6 is near OU 2 Sites 12 and 30, OU 6 (Sites 9, 29, and 34), and Sites 10 and 36. All of these sites are adjacent or near to this wetland. Wetland 6 eventually drains into the Yacht Basin, Wetland 64 complex and is tidally influenced along its entire length.

Site 9 (Navy Yard Disposal Site) was used as the station disposal site for the old Navy yard. The earliest existing records indicate this disposal site was used in from 1917 to the early 1930s and was used primarily to dispose of ordinary domestic trash and refuse. Contaminants detected in the soil include SVOCs and pesticides (E/A&H, 1997f). The SVOCs may be associated with Site 23, a UST site. Pesticides are believed to represent normal application residue through base wide applications.

Site 10, Commodore's Pond, was used in the mid-1800s for underwater storage of wooden timbers for shipbuilding. There is no evidence of hazardous material use, storage, or disposal at this site.

Site 12 (Scrap Bins) was the location where wet garbage was deposited in receptacles from the early 1930s through the 1940s. Garbage was reportedly stored here, although it is possible that hazardous waste or PCB-containing oil was also stored. Site 12 is approximately 600 feet west of Site 11. Most of the site is enclosed by a fence and paved with concrete.

Site 29 (Soil South of Building 3460) is the location where in 1981 several evacuation workers received minor skin burns from contact with a liquid in soil south of Building 3460. The chemical was never identified.

Site 30 (Buildings 648, 649, and 755) was active from the 1940s through the 1970s as the NADEP Dynamic Components Division. Historical accounts note the periodic discharge of metal plating complex effluents into Wetland 5.

Site 34 is identified as the location of a solvent spill that occurred north of Building 3557.

Site 36 (IWTP Sewer Line) was investigated in conjunction with sites for OU 2. The wastewater treatment plant, originally built in 1948, was replaced in 1971 with a modern plant that could accept industrial wastes. Most facilities discharging to the sewer did so without any pretreatment or waste segregation. The waste stream has included paint strippers, heavy metals, pesticides, radioactive wastes, fuels, cyanide waste, and waste oil (NEESA, 1983). Beginning in 1973, the Naval Air Rework Facility operations discharged to the sewer instead of to Pensacola Bay. The IWTP sewer line consisted of vitreous clay and cast-iron piping installed both before and after 1971. OU 2 investigated portions of the IWTP sewer line from the Building 649 complex to the wastewater treatment plant.

The Chevalier Field Pipe Leak Area was divided into three sub-sites (UST Sites 5, 6, and 7) corresponding to the USTs 116, 119, and 122, for the purpose of the closure and preliminary contamination assessment. Site 5 is located on the west-central side of Chevalier Field at the former location of a 500-gallon underground storage tank (UST 116), associated with the aviation gasoline (AVGAS) pipeline. Site 6 is located on the southwestern boundary of Chevalier Field at the former location of UST 119 (500-gallon tank), associated with the AVGAS pipeline. Site 7 is located on the western boundary of Chevalier Field at the former location of UST 122 (500-gallon tank), associated with the AVGAS pipeline. The three USTs were removed from Site 23 by Phoenix Construction Company and GT Environmental Services Inc. (GTES) in 1994. All excavated soils were returned to the excavation. The UST sites were subsequently transferred to ABB Environmental Services, Inc. (ABB-ES) for closure and preliminary contamination assessment.

11.2.2 Wetland 6 — Sample Location Description

Phase II Sediment Sample Location Description

Twelve sediment samples were collected and analyzed for the Wetland 6 ERA. Sample locations for Wetland 6 were located throughout the length of the wetland, as shown on Figure 11-4.

Sample location 010M0001 was collected in 1994 during the Site 10 investigation. The remaining 11 samples were collected in 1995 during the Site 41 investigation. The 1994 and 1995 data were combined for use in the Site 41 RI. Sampling locations 041M0601 through 041M0603 are located south of the point Murray Road intersects Wetland 6. Sampling locations 041M0604 through 041M0611 are located at approximate 300-foot intervals moving north towards Wetland 64. Sample location 010M0001 is bounded by sample locations 041M0604 and 041M0605. Sample location 041M0607 is located where Wetland 5B enters Wetland 6 (Figure 11-4).

Table 11-2-1 (tables are located at the end of each section) describes the sediments collected at Wetland 6. No physical parameter data were collected for sampling location 010M0001 in 1994. Fine and medium sands made up the majority of samples collected from the 11 sampling stations with most of the sands being fine grained. Ranges among the samples were from 39% fine sand to 74%. TOC levels for stations ranged from 0.121% at sampling location 041M0604 to 4.03% at sampling location 041M0607.

Phase II Surface Water Sample Location Description

Three surface water samples were collected at Wetland 6, locations 041W0603, 041W0607, and 041W0610 (Figure 11-4), and were collocated with sediment locations. The surface water samples were collected during the 1995 Site 41 investigation. Hardness at sample 041W0603 was 53.5 mg/L, 75.9 mg/L at sample location 041W0607, and 57.8 mg/L at sample 041W0610. None of these stations were analyzed for pH, specific conductivity, or turbidity.

Phase IV Surface Water Sample Location Description

As shown in Figure 11-4, one surface water sample, location 041W0610, was collected in Phase IV/2004 for VOC and metals analysis. The Wetland 6 Phase IV surface water sample was not analyzed for physical parameters.

11.2.3 Nature and Extent of Contamination

Phase II Sediment

Figure 11-4 presents the Phase II sediment sampling locations for Wetland 6. Table 11-2-2 presents a summary of the analytical results of the sediment samples.

Metals — Twenty-three metals were detected during Phase II sediment sampling at Wetland 6. The greatest number of exceedances and generally the highest concentrations detected were at location 041M060701, where 21 analytes were detected, and six were present above the freshwater reference values. In addition, locations 010M000101, 041M060101, 041M060301, and

041M060601 exhibited detections exceeding reference values. Parameters with detections exceeding freshwater reference values at Wetland 6 were barium, cadmium, chromium, cobalt, copper, lead, and zinc.

Pesticides and PCBs — Twelve pesticide compounds and PCBs, aroclor-1254 and aroclor-1260, were detected during Phase II sediment sampling at Wetland 6. Total DDT was calculated for each location by adding the concentrations of 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT. Likewise, a basewide total DDT reference concentration was calculated using the basewide concentrations for these same constituents.

The greatest numbers of pesticides detected in Wetland 6 sediments during Phase II sampling were at locations 041M060201, 041M060301, 041M060701, and 041M060801, with eight to ten detections each. Reference values were exceeded at 041M060101 for 4,4′-DDE and 4,4′-DDT and at location 041M060301 for 4,4′-DDT. These two locations also exceeded the basewide reference value for total DDT. The PCBs were detected at locations 041M060201, 041M060601, 04M061001, and 041M061101 at low concentrations.

SVOCs — Fifteen SVOCs were detected in sediment samples collected during Phase II sampling at Wetland 6. Sample locations 041M060101, 041M060201, and 041M060401 exhibited 12, 11, and eight SVOC detections, respectively. The highest concentrations were generally found at location 041M060201.

VOCs — Nine VOCs were detected in sediments collected from Wetland 6 during Phase II sampling. Location 041M060901 exhibited the most detections with nine VOC detections. Other locations with detections include 041M060201, 041M060301, 041M060501, 041M060601, 041M060701, 041M060801, 041M061001, and 041M061101.

Phase II Surface Water

Figure 11-4 presents the Phase II surface sampling locations for Wetland 6. Table 11-2-3 summarizes the analytical results of the three Phase II surface water samples.

Metals — Twelve metals and cyanide were detected in Phase II surface water samples taken from Wetland 6. Location 041W060301 had seven detections, two of which exceeded their reference concentrations. Location 041W060701 exhibited 11 detections, three of which exceeded reference concentrations. Location 041W061001 exhibited detections for 10 metals and cyanide. Four of these metals exceeded reference concentrations, as well as cyanide, which was a

slight exceedance. The inorganic analytes detected at concentrations exceeding the freshwater reference values were barium, calcium, cyanide, manganese, and mercury.

Pesticides and PCBs — No pesticides or PCBs were detected during Phase II surface water sampling at Wetland 6.

SVOCs — Only one SVOC, bis(2-ethylhexyl)phthalate, was detected during Phase II sampling at location 041W061001.

VOCs — VOCs were detected at two sampling locations, 041W060701 and 041W061001. Location 041W060701 exhibited a single detection of methylene chloride. Location 041W061001 exhibited detections of the following parameters: 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, and trichloroethene.

Phase IV Surface Water

The Phase IV/2004 surface water sampling at Wetland 6 was implemented to confirm the previous Phase II results at location 041W061002. Table 11-2-4 summarizes the surface water sample results.

Metals — Eighteen metals were detected in the Phase IV surface water sample. When compared to the Phase II results, the Phase IV results illustrated a greater diversity of analytes and a greater number of reference value exceedances. The problematic analytes identified by Phase IV data were aluminum, arsenic, barium, calcium, chromium, copper, iron, lead, manganese, selenium, and zinc. Each of these exceeded its reference concentration.

Pesticides and PCBs — No pesticides or PCBs were detected during the Phase IV sampling efforts.

SVOCs — No SVOCs were detected in the Phase IV surface water sampling at Wetland 6.

VOCs — Five VOCs, (1,1-dichloroethane, 1,1-dichloroethene, chlorobenzene, cis-1,2-dichloroethene, and trichloroethene) were detected in Phase IV surface water sample collected from location 041W061002. VOCs detected during the Phase IV sampling were generally lower, with the exception of cis-1,2-dichloroethene. Chlorobenzene, not detected during Phase II, was reported in this more recent sampling event.

11.2.4 Ecological Risk Assessment

11.2.4.1 Phase II Investigation Summary — Wetland 6

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-2-5, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 11-2-6.

Baseline Problem Formulation — Wetland 6 Sediment COPC Refinement

During the COPC refinement, additional information was used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. This risk assessment presents a statement of potential risk for each of the COPCs.
The COPC refinement process included:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to basewide (reference) concentrations for DDT
- Comparison of inorganic constituents to reference wetland values
- Interpretive tool for metals
- Di Toro EqP SQGs for VOCs
- Comparison to Swartz consensus values
- Mean ERM quotients
- Description of exceedances of RVs and their extent

The methods used in the COPC refinement for the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 11-2-7. COPCs retained after refinement are presented in Table 11-2-8. Additionally, the table compares: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 6 concentrations to reference concentrations.

As showing in Figure 11-5, total DDT and 4,4′-DDT were above the basewide level. Total DDT was retained as a COPC for this wetland and was included as a COPC in the OU-wide food chain models. For Wetland 6, barium, cadmium, chromium, cobalt, copper, lead, and zinc exceeded their Site 41 freshwater sediment reference concentrations. Barium, cadmium, copper, chromium, lead, and zinc concentrations did appear enriched, when normalized to aluminum and iron concentrations using FDEP's interpretative tool (Appendix L).

Several organic constituents were detected and retained due to HQs greater than one or no appropriate screening values. Five pesticides were retained: aldrin, dieldrin, heptachlor, total endrin, and total BHC. Four SVOCs, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene, were retained as COPCs. Nine VOCs were detected and retained for refinement due to lack of screening values. When normalized to detected TOC concentrations, both VOCs (Appendix L) and PAHs do not appear to be risk drivers for Wetland 6. Normalized PAHs are shown on Figure 11-6. 1,1-Dichloroethane and chloroethane were not addressed by this method and were therefore carried forward as COPCs.

Table 11-2-9 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Based on this approach, eight sample locations (010M0001, 041M0601 through 041M0606, and 041M0608) were determined to be Category 2, which, according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this Category also has the highest level of uncertainty. Sample location 041M0607 was determined to be Category 3, which is the category that includes the studies where about 50% of samples were found to be toxic and average survival was about 60-70%. Sampling locations 041M0609 through 041M0611 were determined to be Category 1, indicating these sediments are considered nontoxic. Figure 11-7 shows the Mean ERM category for each sediment sample location at Wetland 6.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-2-10, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 11-2-11.

Baseline Problem Formulation — Wetland 6 Surface Water COPC Refinement

During the surface water COPC refinement, additional information was used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs.

The COPC refinement process included:

- Comparison of maximum SV concentrations to average SV concentrations
- Comparison of inorganic constituents to reference wetland values
- Description of surface water exceedances and their extent

The methods used in the COPC refinement in the Site 41 ERA Process are detailed in Section 8.

Comparison of maximum detected concentrations with refinement values is presented in Table 11-2-12. COPCs retained after refinement are presented in Table 11-2-13. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland.

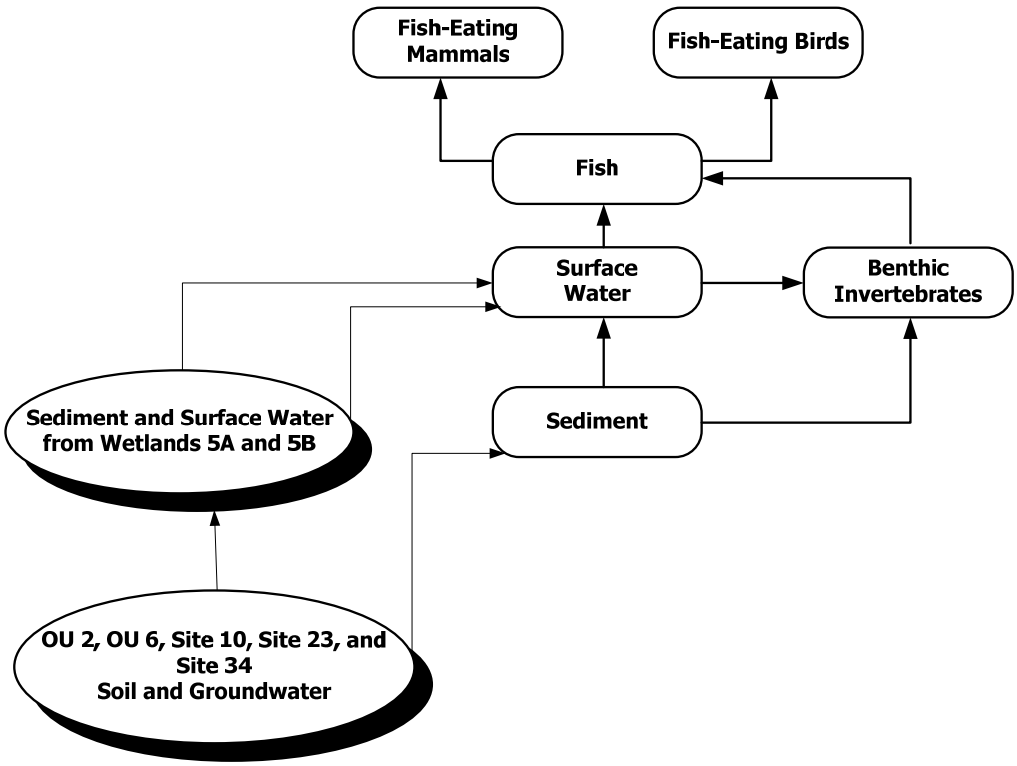
For Wetland 6, barium, calcium, cyanide, manganese, and mercury exceeded their Site 41 freshwater reference surface water concentrations (Table 11-2-12) and were therefore retained as COPCs for Wetland 6 surface water. The majority of the exceedances above were detected at sample location 041W061001.

One SVOC (BEHP) and three VOCs (1,1-dichloroethane, cis-1,2-dichloroethene, and trichloroethene) were detected at surface water sample 041W061001. These constituents were retained for further consideration due to the site proximity to OU 1 and the lack of a screening value for comparison.

During the Wetland 6 Phase II investigation, the following constituents were detected in sediment and surface water samples: barium and 1,1-dichloroethane. Barium was detected at sample location 041M0610/041W0610; however, 1,1-dichloroethane was detected at sediment sample location 041M0609 and surface water location 041W0610.

The conceptual model below symbolizes which environmental habitats may be impacted by Wetland 6 Phase II constituents retained during the ERA Process. Based on the Phase II findings, Wetland 6 was identified as an Orange-Coded Wetland, indicating contaminants were detected and may be related to nearby IR sites.

Wetland 6
Conceptual Site Model



11.2.4.2 Phase IV Investigation Summary

Additional investigation was determined to be necessary based on the Phase II results. As detailed in *Final RI/FS SAP Addendum* (E/A&H, 1997d), an additional surface water sample (041W061002) was collected within Wetland 6, where COPC concentrations were high.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-2-14, the surface water sample was compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 11-2-15.

Baseline Problem Formulation — Phase IV Surface Water COPC Refinement

The same approach used to refine Wetland 6 Phase II surface water was applied to the Phase IV Wetland 6 surface water sample.

The methods used in the COPC refinement for the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 11-2-16. COPCs retained after refinement are presented in Table 11-2-17. Additionally, the tables compare: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 6 concentrations to reference concentrations.

In Wetland 6, aluminum, barium, calcium, chromium, copper, iron, lead, manganese, selenium, and zinc exceeded their freshwater reference concentrations (Table 11-2-16) and were therefore retained as COPCs. Three VOCs were detected and retained as COPCs due to no appropriate screening values: 1,1-dichloroethane, cis-1,2-dichloroethene, and trichloroethene. These constituents were also detected during the Phase II surface water sampling.

11.2.4.3 Comparison of Phase II and IV Surface Water Results

Both the Phase II and IV results indicate that inorganic constituents and VOCs were the greatest concern in Wetland 6. Concentrations increased among constituents common between the two phase, with the exception of 1,1-dichloroethane, which decreased during this time period.

The differences between the Phase II and Phase IV sampling efforts are presented below.

Surface Water

Constituent	Phase II	Phase IV	Difference
Metals g/L			
Barium	30.5	46	+15.5 increase
Calcium	24,700	30,000	+5,300 increase
Manganese	55.7	110	+54.3 increase
Organics g/L			
1,1-Dichloroethane	5	0.8	-4.2 drop
Cis-1,2-Dichloroethene	2	5.1	+3.1 increase
Trichloroethene	1	1.3	+0.3 increase

Note:
µg/L = Micrograms per Liter

11.2.5 Wetland 6 — Human Health Risk Assessment

Wetland 6 is described in Section 11.2.1, and the HHRA is summarized below.

11.2.5.1 Site Data

Surface water and sediment data were collected at Wetland 6 during Phase II and IV of the RI. Section 11.2.3 summarizes the nature and extent of contamination for this wetland. Surface water and sediment data are summarized in Tables 11-2-2 and 11-2-3 (Phase II data) and Table 11-2-4 (Phase IV).

11.2.5.2 Conceptual Site Model

As described in Section 11.2.1, Wetland 6 is an estuarine, tile-lined drainage ditch that is fed by several surface water runoff sources, including Wetland 5B, flowing north into the Yacht Basin. This wetland is surrounded by mowed grass, buildings, or isolated areas of highly disturbed vegetation. Wetland 6 is accessible to both trespassers and Navy personnel.

The wetland is continually inundated. Therefore, in accordance with USEPA Region IV Supplemental Guidance to RAGS Bulletins (USEPA Region 4, 2000) described in Section 9, sediment exposure was not assessed in this HHRA, because it is assumed to be an insignificant exposure pathway. Based on the species present, depth of surface water, and available habitat, fishing would not likely occur, and contact with surface water while wading would be the only likely exposure scenario.

The following scenarios and exposure pathways were evaluated for this wetland:

Scenario	Medium	Ingestion	Dermal
Maintenance	Surface water	√	√
Trespasser	Surface water	√	√

11.2.5.3 Risk Characterization

The child trespasser and adult maintenance worker scenarios were assessed for surface water for this wetland as described in Section 9.

Phase II Data

Trespasser

As shown in Tables 11-2-18 through 11-2-20, surface water ingestion and dermal contact risk estimates for trespassers were below the FDEP risk threshold. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 11-2-18 through 11-2-20, surface water ingestion risk estimates for maintenance workers exceeded the FDEP risk threshold of 1E-6 for BEHP. Dermal contact risk estimates for maintenance workers were below the FDEP risk threshold. Hazard indices were below 1.0.

Summary of Wetland 6 Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Surface water	1.6E-02	2.9E-06
Trespasser	Surface water	6.7E-03	8.7E-07

Based on Phase II data, BEHP was identified as a COC for Wetland 6.

Phase IV Data

Trespasser

As shown in Tables 11-2-21 through 11-2-23, surface water ingestion and dermal contact risk estimates for maintenance workers were below the FDEP risk threshold. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 11-2-21 through 11-2-23, surface water ingestion and dermal contact risk estimates for maintenance workers were below the FDEP risk threshold. Hazard indices were below 1.0.

Summary of Wetland 6 Phase IV Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Surface water	4.9E-02	2.1E-07
Trespasser	Surface water	3.6E-02	6.4E-08

No COCs were identified for Wetland 6 based on the Phase IV data.

Wetland 6 HHRA COC Summary

The following parameter was determined in the HHRA to be a COC for Wetland 6:

- BEHP

11.2.6 Wetland 6 — Fate and Transport Analysis

This wetland is channelized from its headwaters through its exit to the Wetland 7/64 complex, drains the eastern side of OU 2 and IR Site 10, and flows from south to north. It is intersected on the west by Wetland 5B, approximately halfway down its defined span, and discharges on its northern end into the Wetland 7/64 complex (see Figure 11-1). It also receives storm water drainage from the east through a series of drainage ditches, from what is now the NTTC training complex (and originally was Chevalier Field, which hosted IR sites 9, 27, and 34).

Eight sediment samples and one surface water sample were collected from this wetland prior to its confluence with Wetland 5B, and five sediment and two surface water samples were collected prior to its flow point into the Wetland 7/64 complex. This wetland has been documented to be tidally influenced, but flow reversal due to normal tidal flux has not been documented. Because this wetland spans a large distance and is large scale, long term flow reversals have not been documented.

Based on site topography and groundwater flow (Figures 11-2 and 11-3), it is expected that only certain areas of soil and groundwater discharge will affect certain portions of the wetland; similarly, only the span downgradient of their confluence is expected to be affected by direct inflow from Wetland 5B. Therefore, this fate and transport evaluation was segmented into two parts: a lower span (upgradient of the Wetland 5B confluence) and an upper span (downgradient of the Wetland 5B confluence). The influence of soil and groundwater influx on the lower span was evaluated using a set of borings/wells proximal to it alone; the upper span was evaluated using these and another set located downgradient of the 5B/6 confluence.

The sediment and surface water COPCs retained after refinement for this wetland are summarized in Tables 11-2-8 (sediment, Phase II), 11-2-13 (surface water, Phase II) and 11-2-17 (surface water, Phase IV). Provided below are the associated soil borings and monitoring wells used for comparing data for the fate and transport analysis.

Associated Monitoring Wells for Wetland 6:

Lower Span — 009G0008, 009GGM30, 036GGR37, 009G0003, 036GGR22, 009G0002, 009G0001, 009GGR02, 010GS04, 010GS05, 0101GGM06, 010GS03, 010GGS02

Upper Span — 030GS154, 030GS108, 030GS105, 030GI014, 011GS013, 011GS52, 030GS123, 030GS113, 030GiI113, 030GS156, 030GS157, 030GS160, 0303GS161, 030GS146, 030GS162, 030GS166, 030GS165, 030GS164, 030GI164

Associated Borings for Wetland 6:

Lower Span — 009S0008, 009S0019, 036S3700, 09S0003, 009S0017, 009S0024, 009S0016, 036S0022, 009S0002, 009S0031, 009S0030, 009S0014, 009S0015, 009S0001, 010S0004, 010S0005, 010S0003, 010S0002, 030S0121, 030S0120, 030S0122

Upper Span — 030S0123, 030S0112, 030S0113, 030S0110, 030S0109, 030S0153, 030S0154, 030S0154, 030S0108, 030S0106, 030S105, 1030S0104

Surface Water/Sediment Transport into the Wetlands:

Surface Water — Although there is significant storm water drainage into this wetland, there is no directly comparable storm water data from the area proximal to this wetland complex. Because of the lack of data, no definitive statement can be made regarding the validation of the pathway via storm water runoff into the wetland complex. The vast majority of surface drainage to this wetland is from the eastern side of OU 2 (including Sites 30, 27, and 25), direct drainage from Wetland 5A, and storm water inflow from the former Chevalier Field area.

Sediment (Lower Span) — Based on the data from surface soil proximal to this wetland complex, this storm water to wetland sediment pathway is validated for the following parameters:

Phase II
Barium
Cadmium
Cobalt
Lead
Dieldrin

Sediment (Upper Span) — Based on the data from surface soil proximal to this wetland complex, this storm water to wetland sediment pathway is validated for the following parameters:

Phase II
Barium
Cadmium
Cobalt
Lead
Dieldrin
Heptachlor

Groundwater Discharge into the Wetland Media:

Surface Water (Lower Span) — Based on the data from associated monitoring wells, the groundwater to wetland surface water pathway is validated and significant for the following parameters (**note:** the metals data from the 1993 sampling is not used due to potential bias introduced by the sampling methodology):

Phase II
Barium
Cyanide
Manganese
Bis(2-Ethylhexyl)phthalate (BEHP)

Surface Water (Upper Span) — Based on the data from associated monitoring wells, the groundwater to wetland surface water pathway is validated and significant for the following parameters (**note:** the metals data from the 1993 sampling is not used due to potential bias introduced by the sampling methodology):

Phase II
Barium
Cyanide
Manganese
Bis(2-Ethylhexyl)phthalate (BEHP)
1,1-Dichloroethane
Cis-1,2-Dichloroethene
Trichloroethene

Sediment (Lower Span) — Based on the data from associated monitoring wells, the groundwater to wetland sediment pathway is validated and significant for the following parameters (**note:** the metals data from the 1993 sampling is not used due to potential bias introduced by the sampling methodology):

Phase II
Barium
Lead

Sediment (Upper Span) — Based on the data from associated monitoring wells, the groundwater to wetland sediment pathway is validated and significant for the following parameters (**note:** that metals data from the 1993 sampling is not used due to potential bias introduced by the sampling methodology):

Phase II
Barium
Lead
Dieldrin
1,1-Dichloroethane
Acetone
Chloroethane

Surface Water/Sediment Transport within the Wetlands:

To evaluate these pathways in the lower span of Wetland 6, the most upgradient surface water/sediment sample location 041M0603/041W0603 (sampled during Phase II) was compared to downgradient surface water/sediment location 041M0607/041W0607 (sampled during Phase II; first location after the Wetland 6/5B confluence). To evaluate these pathways in the upper span of Wetland 6, upgradient surface water/sediment sample 041M0607/041W0607 was compared to the most downgradient surface water/sediment sample 041M0610/041W0610 (sampled during Phase II). Criteria of note were the number of detected parameters and the apparent trend in concentrations.

Wetland 6

Surface Water (Lower Span) — Evaluation of Wetland 6 locations 041W0603 and 041W0607 indicated an increase in detected parameters (seven metals and zero organics upgradient versus 11 metals and one organic downgradient). Four metals were present downgradient that were not detected upgradient, and of the ones detected at each location, six parameters increased in concentration and one decreased. The only detected organic compound downgradient may be a lab artifact. Increases in inorganic concentrations downgradient were most likely attributable to direct inflow from 5B.

Surface Water (Upper Span) — Evaluation of Wetland 6 locations 041W0607 and 041W0610 indicated a higher number of detections in the downgradient location (11 metals and one organic upgradient versus 11 metals and six organics downgradient). For the metals, there was no apparent trend in concentrations. Two metals were present downgradient that were not detected upgradient; four parameters exhibited a decrease in concentration; and five metals exhibited an increase. For the organics, all six compounds present downgradient were not detected upgradient. The majority of the compounds were VOCs. This increase in organics was attributable to groundwater discharge from the eastern side of OU 2.

Sediment (Lower Span) — Evaluation of Wetland 6 upstream location 041M0603 with downstream location 041M0607 indicated a slightly higher number of detections in the downstream location (19 metals and 11 organics upgradient versus 21 metals and 13 organics downgradient). Inorganic concentrations also trended higher in the downgradient location. Four metals were present downgradient that were not detected upgradient, sixteen metals exhibited an increase in concentration, and one metal exhibited a decrease. For the organics, three compounds were present downgradient that were not detected upgradient. Of the 10 compounds detected at both locations, four constituents exhibited an increase in concentration, four compounds exhibited a decrease, and two compounds remained essentially the same. The bulk of organics in both locations were pesticides (normal surface application of pesticides was practiced along this span of the ditch), although SVOCs were also noted in the downstream location. TOC also exhibited a very large increase in the downgradient location.

The general increase in inorganic detections and concentrations may indicate sediment influx from 5B, entrained sediment within storm water entering from the former Chevalier Field side of the wetland, and/or partitioning from groundwater influx into the wetland. The presence of additional SVOCs in the downstream location infers that storm water runoff plays some role in the increase. Whichever mechanism(s) may be responsible, the increase in TOC concentrations provides a ready substrate for metals absorption.

Sediment (Upper Span) — Evaluation of Wetland 6 upgradient location 041M0607 with downgradient location 041M0610 indicated a marked decrease in parameter detections (21 metals and 13 organics upgradient versus 13 metals and nine organics downgradient). Inorganic concentrations showed a decreasing trend in the downgradient location. All 13 constituents detected in both locations exhibited a decrease. For the organics, three were present downgradient that were not detected upgradient, and of the six detected at both locations, all compounds exhibited a decrease. The bulk of the organics detected were pesticides. TOC also exhibited a significant decrease. The general decrease in both metals and organics together suggests that contamination via sediment transport is not playing a large role in migration. This may be due to the greater adsorptive capabilities of sediment further upgradient that is able to fix the parameters within the sediment, hydrodynamic segregation of contaminated sediment, and/or the lower adsorptive capabilities of sediment in the downstream location.

Table 11-2-1
Wetland 6 Phase II
Sediment Physical Parameters

Parameter	010M000101	041M060101	041M060201	041M060301	041M060401	041M060501	041M060601	041M060701	041M060801	041M060901	041M061001	041M061101
TOC (%)	No Data	0.362	0.378	1.1	0.121	0.204	1.3	4.03	0.148	0.265	0.159	0.137
Percent Solids (%)	No Data	82.7	81.9	70.4	81.6	81.4	51.2	37.6	80.9	73.3	80.9	81.3
Grain Size Analysis (percent of composition[1])												
Fine Gravel	No Data	4	14	0	0	0	1	0	2	0	0	0
Coarse Sand	No Data	4	5	4	0	0	1	7	0	0	0	0
Medium Sand	No Data	35	40	23	25	29	32	25	25	28	24	29
Fine Sand	No Data	55	39	70	74	67	62	64	72	71	74	69
Silt and Clay	No Data	2	2	3	1	4	4	4	1	1	2	2
Description	N/A	Brown Poorly Graded Sand, Fine	Black Silty Sand	Dark Brown Poorly Graded Sand, Fine, with organics	Brown Poorly Graded Sand, Fine	Drak Gray Poorly Graded Sand, Fine, with some Organics	Black Poorly Graded Sand, Medium to Fine, with Organics, shells	Dark Yellow Brown Poorly Graded Sand with Silt, Organics	Pale Yellow Poorly Graded Sand, Medium to Fine	Dark Gray Brown Poorly Graded Sand, Medium to Fine, Organics	Light Yellowish Brown Poorly Graded Sand, Medium	Light Yellowish Brown Poorly Graded Sand, Medium

Note:
1 = Derived from sieve analyses.

Table 11-2-2
Wetland 6 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	13,610.0	0	12	12	313.0	5,980.0	1,560.0	041M060701
Antimony	4.430	0	2	9	0.160	0.320	0.369	041M060601
Arsenic	6.620	0	9	12	0.140	2.10	0.564	041M060701
Barium	14.0	3	11	12	1.0	37.0	8.840	041M060101
Beryllium	0.840	0	3	12	0.10	0.140	0.058	041M060101
Cadmium	1.80	1	9	12	0.190	5.40	0.793	041M060701
Calcium	10,756.670	0	12	12	62.50	8,370.0	2,150.0	041M060101
Chromium	39.370	1	11	12	0.560	73.50	14.40	041M060701
Cobalt	2.80	1	7	12	0.180	20.70	2.10	010M000101
Copper	19.50	2	11	12	0.970	48.20	12.10	041M060701
Iron	11,911.670	0	12	12	328.0	4,320.0	1,340.0	041M060701
Lead	82.470	1	12	12	6.0	147.0	31.50	041M060701
Magnesium	7,513.330	0	11	12	27.30	1,180.0	356.0	041M060201
Manganese	37.970	0	11	12	1.20	35.20	12.30	041M060701
Mercury	0.550	0	1	12	0.110	0.110	0.034	041M060701
Nickel	9.280	0	7	12	0.840	4.30	1.350	010M000101
Potassium	1,628.670	0	11	12	9.60	161.0	57.10	041M060701
Selenium	3.450	0	1	12	0.850	0.850	0.170	041M060701
Silver	2.10	0	1	12	0.890	0.890	0.220	041M060701
Sodium	18,993.330	0	9	12	4.90	105.0	26.10	041M060301
Thallium	1.570	0	2	12	0.670	0.680	0.215	041M060701
Vanadium	28.670	0	12	12	0.60	11.30	2.830	041M060701
Zinc	36.730	5	11	12	9.70	207.0	50.30	041M060701
PAHs (g/kg)								
Acenaphthene	N/A	0	1	11	34.0	34.0	42.50	041M060401
Benzo(a)anthracene	N/A	0	3	11	34.0	43.0	67.60	041M060201
Benzo(a)pyrene	N/A	0	4	11	23.0	42.0	67.0	041M060201
Chrysene	N/A	0	4	11	21.0	300.0	68.70	041M060701
Fluoranthene	N/A	0	4	11	42.0	120.0	83.90	041M060201
Phenanthrene	N/A	0	2	11	37.0	51.0	67.10	041M060101
Pyrene	N/A	0	4	11	52.0	100.0	81.80	041M060201
Total PAHs	N/A	0	6	11	242.0	3,540.0	849.0	041M060701
Pesticides and PCBs (g/kg)								
Aroclor-1254	N/A	0	1	12	9.50	9.50	7.530	041M060201
Aroclor-1260	N/A	0	3	12	0.820	4.10	7.360	041M060601
Total PCBs	N/A	0	4	12	8.070	23.90	56.60	041M060201
Aldrin	N/A	0	5	12	0.230	1.10	0.417	041M060701
Dieldrin	N/A	0	8	12	0.240	10.0	2.530	041M060701
Heptachlor	N/A	0	1	12	0.160	0.160	0.239	041M061001

Table 11-2-2
Wetland 6 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Pesticides and PCBs (g/kg) - cont.								
alpha-Chlordane	N/A	0	6	12	0.150	1.70	0.585	041M060301
gamma-Chlordane	N/A	0	6	12	0.190	1.20	0.427	041M060701
Total Chlordane	N/A	0	7	12	0.205	2.70	1.010	041M060701
Endrin	N/A	0	4	12	1.80	3.60	1.10	041M060701
Endrin aldehyde	N/A	0	1	12	0.480	0.480	0.488	041M060801
Total Endrin	N/A	0	4	12	2.385	5.10	2.050	041M060701
alpha-BHC	N/A	0	2	12	0.480	0.60	0.334	041M060801
beta-BHC	N/A	0	3	12	0.160	2.80	0.552	041M060301
Total BHC	N/A	0	4	12	0.740	3.355	1.350	041M060301
4,4'-DDD	50.0	0	12	12	0.210	40.0	12.10	041M060301
4,4'-DDE	40.0	1	11	12	0.230	110.0	19.40	041M060101
4,4'-DDT	20.0	2	11	12	0.220	260.0	29.10	041M060101
Total DDT	110.0	2	12	12	0.60	393.0	60.60	041M060101
SVOCs (g/kg)								
Benzo(b)fluoranthene	N/A	0	5	11	27.0	340.0	77.30	041M060701
Benzo(g,h,i)perylene	N/A	0	2	11	29.0	32.0	64.70	041M060101
Benzo(k)fluoranthene	N/A	0	2	11	21.0	24.0	63.20	041M060201
Butylbenzylphthalate	N/A	0	6	11	22.0	30.0	356.0	041M060401
Diethylphthalate	N/A	0	1	11	23.0	23.0	439.0	041M060401
Di-n-butylphthalate	N/A	0	4	11	29.0	99.0	403.0	041M060201
Di-n-octylphthalate	N/A	0	1	11	84.0	84.0	442.0	041M060601
Indeno(1,2,3-cd)pyrene	N/A	0	2	11	27.0	28.0	64.10	041M060101
VOCs (g/kg)								
1,1,1-Trichloroethane	N/A	0	1	12	4.0	4.0	7.250	041M060901
1,1-Dichloroethane	N/A	0	1	12	9.0	9.0	7.670	041M060901
1,1-Dichloroethene	N/A	0	1	12	8.0	8.0	7.580	041M060901
Acetone	N/A	0	7	11	13.0	4,000.0	490.0	041M060801
Chlorobenzene	N/A	0	1	12	2.0	2.0	7.080	041M060901
Chloroethane	N/A	0	1	12	2.0	2.0	7.080	041M060901
Tetrachloroethene	N/A	0	2	12	2.0	4.0	6.920	041M061101
Toluene	N/A	0	3	12	4.0	14.0	6.670	041M060301
Trichloroethene	N/A	0	3	12	2.0	5.0	5.580	041M060701

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 11-2-3
Wetland 6 Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Range of Detections: Average Detection	Maximum Detection Location
Metals (g/L)								
Aluminum	1,090.25	0	2	3	287.0	406.0	347.0	041W060701
Barium	3.68	3	2	3	15.9	30.5	23.2	041W061001
Calcium	7,675.0	3	3	3	18,300.0	24,700.0	20,700.0	041W060701
Cyanide (CN)	5.0	1	1	3	5.6	5.6	5.6	041W061001
Iron	2,360.0	0	3	3	334.0	870.0	527.0	041W061001
Lead	3.2	0	2	3	1.2	3.1	2.15	041W061001
Magnesium	20,260.0	0	3	3	1,910.0	3,480.0	2,610.0	041W060701
Manganese	13.2	3	3	3	19.5	55.7	36.2	041W061001
Mercury	0.13	1	1	3	0.88	0.88	0.88	041W061001
Potassium	6,995.0	0	3	3	1,520.0	3,050.0	2,160.0	041W060701
Sodium	182,200.0	0	3	3	10,300.0	13,800.0	12,000.0	041W060301
Thallium	4.2	0	1	3	3.3	3.3	3.3	041W060701
Vanadium	4.7	0	2	3	2.1	2.3	2.2	041W060701
SVOCs (g/L)								
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	1	3	3.0	3.0	3.0	041W061001
VOCs (g/L)								
1,1,1-Trichloroethane	N/A	0	1	3	5.0	5.0	5.0	041W061001
1,1-Dichloroethane	N/A	0	1	3	5.0	5.0	5.0	041W061001
1,1-Dichloroethene	N/A	0	1	3	8.0	8.0	8.0	041W061001
cis-1,2-Dichloroethene	N/A	0	1	3	2.0	2.0	2.0	041W061001
Methylene chloride	N/A	0	1	3	13.0	13.0	13.0	041W060701
Trichloroethene	N/A	0	1	3	1.0	1.0	1.0	041W061001

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 11-2-4
Wetland 6 Phase IV
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (g/L)								
Aluminum	1,090.25	1	1	1	1,200.0	1,200.0	1,200.0	041W061002
Arsenic	2.7	1	1	1	5.7	5.7	5.7	041W061002
Barium	3.68	1	1	1	46.0	46.0	46.0	041W061002
Beryllium	1.0	0	1	1	0.34	0.34	0.34	041W061002
Cadmium	3.0	0	1	1	2.5	2.5	2.5	041W061002
Calcium	7,675.0	1	1	1	30,000.0	30,000.0	30,000.0	041W061002
Chromium	8.0	1	1	1	21.0	21.0	21.0	041W061002
Copper	4.0	1	1	1	19.0	19.0	19.0	041W061002
Iron	2,360.0	1	1	1	3,300.0	3,300.0	3,300.0	041W061002
Lead	3.2	1	1	1	40.0	40.0	40.0	041W061002
Magnesium	20,260.0	0	1	1	3,800.0	3,800.0	3,800.0	041W061002
Manganese	13.2	1	1	1	110.0	110.0	110.0	041W061002
Nickel	12.0	0	1	1	2.5	2.5	2.5	041W061002
Potassium	6,995.0	0	1	1	2,400.0	2,400.0	2,400.0	041W061002
Selenium	3.0	1	1	1	6.9	6.9	6.9	041W061002
Sodium	182,200.0	0	1	1	13,000.0	13,000.0	13,000.0	041W061002
Vanadium	4.7	0	1	1	3.4	3.4	3.4	041W061002
Zinc	5.53	1	1	1	78.0	78.0	78.0	041W061002
VOCs (g/L)								
1,1-Dichloroethane	N/A	0	1	1	0.8	0.8	0.8	041W061002
1,1-Dichloroethene	N/A	0	1	1	0.98	0.98	0.98	041W061002
Chlorobenzene	N/A	0	1	1	11	11	11	041W061002
cis-1,2-Dichloroethene	N/A	0	1	1	5.1	5.1	5.1	041W061002
Trichloroethene	N/A	0	1	1	1.3	1.3	1.3	041W061002

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 11-2-5
Wetland 6 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	12	12			313	5,980	041M060701	5,980			N/A		Yes	No SV
Antimony	2	9	0.06	1.9	0.16	0.32	041M060601	0.32	J	12	2	0.03	No	Max Detect < SV
Arsenic	9	12	0.06	0.355	0.14	2.1	041M060701	2.1		7.24	1, 2	0.29	No	Max Detect < SV
Barium	11	12	1.2	1.2	1	37	041M060101	37			N/A		Yes	No SV
Beryllium	3	12	0.03	0.065	0.1	0.14	041M060101	0.14	J		N/A		Yes	No SV
Cadmium	**9**	**12**	**0.09**	**0.325**	**0.19**	**5.4**	**041M060701**	**5.4**		**0.676**	**1**	**7.99**	**Yes**	**Max Detect > SV**
Calcium	12	12			62.5	8,370	041M060101	8,370	J		N/A		Yes	No SV
Chromium	**11**	**12**	**0.9**	**0.9**	**0.56**	**73.5**	**041M060701**	**73.5**		**52.3**	**1, 2**	**1.41**	**Yes**	**Max Detect > SV**
Cobalt	7	12	0.095	0.145	0.18	20.7	010M000101	20.7	J		N/A		Yes	No SV
Copper	**11**	**12**	**1.2**	**1.2**	**0.97**	**48.2**	**041M060701**	**48.2**		**18.7**	**1, 2**	**2.58**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	12	0.06	0.65			ND	0.65	U		N/A		Yes	No SV
Iron	12	12			328	4,320	041M060701	4,320			N/A		Yes	No SV
Lead	**12**	**12**			**6**	**147**	**041M060701**	**147**		**30.2**	**1, 2**	**4.87**	**Yes**	**Max Detect > SV**
Magnesium	11	12	21.3	21.3	27.3	1,180	041M060201	1,180			N/A		Yes	No SV
Manganese	11	12	0.6	0.6	1.2	35.2	041M060701	35.2			N/A		Yes	No SV
Mercury	1	12	0.015	0.04	0.11	0.11	041M060701	0.11	J	0.13	1, 2	0.85	No	Max Detect < SV
Nickel	7	12	0.345	0.395	0.84	4.3	010M000101	4.3		15.9	1, 2	0.27	No	Max Detect < SV
Potassium	11	12	79	79	9.6	161	041M060701	161	J		N/A		Yes	No SV
Selenium	1	12	0.085	0.205	0.85	0.85	041M060701	0.85			N/A		Yes	No SV
Silver	**1**	**12**	**0.115**	**0.44**	**0.89**	**0.89**	**041M060701**	**0.89**	**J**	**0.733**	**1**	**1.21**	**Yes**	**Max Detect > SV**
Sodium	9	12	1.2	5	4.9	105	041M060301	105	J		N/A		Yes	No SV
Thallium	2	12	0.085	0.34	0.67	0.68	041M060701	0.68	J		N/A		Yes	No SV
Vanadium	12	12			0.6	11.3	041M060701	11.3			N/A		Yes	No SV
Zinc	**11**	**12**	**1.9**	**1.9**	**9.7**	**207**	**041M060701**	**207**		**124**	**1, 2**	**1.67**	**Yes**	**Max Detect > SV**
PAHs (g/kg)														
2-Methylnaphthalene	0	11	19.5	295			ND	295	U	20.2	1	14.6	No	Max SQL> SV
Acenaphthene	1	11	9.5	210	34	34	041M060401	34		6.71	1	5.07	No	TOC normalized PAHs<TEC
Acenaphthylene	0	11	19.5	295			ND	295	U	5.87	1	50.3	No	TOC normalized PAHs<TEC
Anthracene	0	11	19.5	295			ND	295	U	46.9	1	6.29	No	Max SQL> SV
Benzo(a)anthracene	3	11	20	295	34	43	041M060201	43		74.8	1	0.58	No	Max Detect < SV
Benzo(a)pyrene	4	11	20	295	23	42	041M060201	42		88.8	1	0.47	No	Max Detect < SV
Chrysene	4	11	20	210	21	300	041M060701	300	J	108	1	2.78	No	TOC normalized PAHs<TEC
Dibenz(a,h)anthracene	0	11	19.5	295			ND	295	UJ	6.22	1	47.4	No	TOC normalized PAHs<TEC
Fluoranthene	4	11	20	295	42	120	041M060201	120		113	1	1.06	No	TOC normalized PAHs<TEC
Fluorene	0	11	9.5	210			ND	210	UJ	21.2	1	9.91	No	Max SQL> SV
Naphthalene	0	11	19.5	295			ND	295	U	34.6	1	8.53	No	Max SQL> SV
Phenanthrene	2	11	20	295	37	51	041M060101	51		86.7	1	0.59	No	Max Detect < SV
Pyrene	4	11	20	295	52	100	041M060201	100		153	1	0.65	No	Max Detect < SV
Total PAHs	6	11	239	2,730	242	3,540	041M060701	3,540		1,684	1, 2	2.1	No	TOC normalized PAHs<TEC
TOC Normalized PAHs	6	11	94.72	2,256.20	30.69	266.94	041M060401	266.94		290	3	0.92	No	Max Detect < SV
PCBs (g/kg)														
Aroclor-1016	0	12	1	21			ND	21	U	21.6	N/A	0.97	No	Max SQL< SV
Aroclor-1221	0	12	2	43			ND	43	U	67	2	0.64	No	Max SQL< SV
Aroclor-1232	0	12	1	21			ND	21	U	21.6	N/A	0.97	No	Max SQL< SV
Aroclor-1242	0	12	1	21			ND	21	U	21.6	N/A	0.97	No	Max SQL< SV
Aroclor-1248	0	12	1	21			ND	21	U	21.6	N/A	0.97	No	Max SQL< SV
Aroclor-1254	1	12	1	21	9.5	9.5	041M060201	9.5	J	21.6	N/A	0.44	No	Max Detect < SV
Aroclor-1260	3	12	1	21	0.82	4.1	041M061101	4.1	J	21.6	N/A	0.19	No	Max Detect < SV
Total PCBs	**4**	**12**	**8**	**169**	**8.07**	**23.9**	**041M061101**	**23.9**		**21.6**	**1**	**1.11**	**Yes**	**Max Detect > SV**
Pesticides (g/kg)														
Aldrin	5	12	0.05	1.1	0.23	1.1	041M060701	1.1	J		N/A		Yes	No SV
Dieldrin	**8**	**12**	**0.105**	**2.1**	**0.24**	**10**	**041M060701**	**10**	**J**	**0.716**	**1**	**14**	**Yes**	**Max Detect > SV**
Endosulfan I	0	12	0.05	1.1			ND	1.1	UJ		N/A		Yes	No SV
Endosulfan II	0	12	0.1	2.1			ND	2.1	UJ		N/A		Yes	No SV
Endosulfan sulfate	0	12	0.1	2.1			ND	2.1	UJ		N/A		Yes	No SV
Heptachlor	1	12	0.05	1.1	0.16	0.16	041M061001	0.16	J		N/A		Yes	No SV
Heptachlor epoxide	0	12	0.05	1.1			ND	1.1	UJ		N/A		Yes	No SV
Methoxychlor	0	12	0.5	11			ND	11	UJ		N/A		Yes	No SV
Toxaphene	0	11	10	110			ND	110	UJ		N/A		Yes	No SV
alpha-Chlordane	6	12	0.05	1.1	0.15	1.7	041M060301	1.7	J	1.7	1	1	No	Max Detect < SV

Table 11-2-5
Wetland 6 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Pesticides (g/kg) - cont.														
gamma-Chlordane	6	12	0.05	1.1	0.19	1.2	041M060701	1.2	J	1.7	1	0.71	No	Max Detect < SV
Total Chlordane	**7**	**12**	**0.1**	**2.2**	**0.205**	**2.7**	**041M060701**	**2.7**		**1.7**	**1**	**1.59**	**Yes**	**Max Detect > SV**
Endrin	**4**	**12**	**0.1**	**2.1**	**1.8**	**3.6**	**041M060701**	**3.6**	**J**	**3.3**	**2**	**1.09**	**Yes**	**Max Detect > SV**
Endrin aldehyde	1	12	0.1	2.1	0.48	0.48	041M060801	0.48	J	3.3	2	0.15	No	Max Detect < SV
Endrin ketone	0	12	0.1	2.1			ND	2.1	UJ	3.3	2	0.64	No	Max SQL< SV
Total Endrin	**4**	**12**	**0.3**	**6.3**	**2.38**	**5.1**	**041M060701**	**5.1**		**3.3**	**2**	**1.55**	**Yes**	**Max Detect > SV**
alpha-BHC	2	12	0.05	1.1	0.48	0.6	041M060801	0.6	J		N/A		Yes	No SV
beta-BHC	**3**	**12**	**0.05**	**1.1**	**0.16**	**2.8**	**041M060701**	**2.8**	**J**	**0.32**	**N/A**	**8.75**	**Yes**	**Max Detect > SV**
delta-BHC	0	12	0.05	1.1			ND	1.1	U	0.32	N/A	3.44	No	Max SQL> SV
gamma-BHC (Lindane)	0	12	0.05	1.1			ND	1.1	U	0.32	1	3.44	No	Max SQL> SV
Total BHC	**4**	**12**	**0.2**	**4.4**	**0.74**	**3.36**	**041M060801**	**3.36**		**0.32**	**2**	**10.5**	**Yes**	**Max Detect > SV**
4,4'-DDD	**12**	**12**			**0.21**	**40**	**041M060301**	**40**	**DJ**	**1.22**	**1**	**32.8**	**Yes**	**Max Detect > SV**
4,4'-DDE	**11**	**12**	**0.11**	**0.11**	**0.23**	**110**	**041M060101**	**110**	**D**	**2.07**	**1**	**53.1**	**Yes**	**Max Detect > SV**
4,4'-DDT	**11**	**12**	**0.1**	**0.1**	**0.22**	**260**	**041M060101**	**260**	**DJ**	**1.19**	**1**	**218**	**Yes**	**Max Detect > SV**
Total DDT	**12**	**12**			**0.6**	**393**	**041M060101**	**393**		**3.3**	**2**	**119**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	8	200	2,950			ND	2,950	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	11	475	7,000			ND	7,000	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	11	475	7,000			ND	7,000	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
2-Chloronaphthalene	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
2-Chlorophenol	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	11	475	7,000			ND	7,000	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
2-Nitroaniline	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
2-Nitrophenol	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
3-Nitroaniline	0	10	475	7,000			ND	7,000	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
4-Chloroaniline	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
4-Nitroaniline	0	11	475	7,000			ND	7,000	U		N/A		Yes	No SV
4-Nitrophenol	0	11	475	7,000			ND	7,000	U		N/A		Yes	No SV
Benzo(b)fluoranthene	5	11	20	210	27	340	041M060701	340	J		N/A		No	TOC normalized PAHs<TEC
Benzo(g,h,i)perylene	2	11	20	295	29	32	041M060101	32	J		N/A		No	TOC normalized PAHs<TEC
Benzo(k)fluoranthene	2	11	20	295	21	24	041M060201	24	J		N/A		No	TOC normalized PAHs<TEC
bis(2-Chloroethoxy)methane	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	11	19.5	295			ND	295	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	11	195	2,950			ND	2,950	U	182	1, 2	16.2	Yes	Max SQL > SV
Butylbenzylphthalate	6	11	200	2,950	22	30	041M060401	30	J	182	1, 2	0.17	No	Max Detect < SV
Carbazole	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
Dibenzofuran	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
Diethylphthalate	1	11	195	2,950	23	23	041M060401	23	J	182	1, 2	0.13	No	Max Detect < SV
Dimethylphthalate	0	11	195	2,950			ND	2,950	U	182	1, 2	16.2	Yes	Max SQL > SV
Di-n-butylphthalate	4	11	200	2,950	29	99	041M060201	99	J	182	1, 2	0.54	No	Max Detect < SV
Di-n-octylphthalate	1	11	195	2,950	84	84	041M060601	84	J	182	1, 2	0.46	No	Max Detect < SV
Hexachlorobenzene	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
Hexachlorobutadiene	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
Hexachloroethane	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	2	11	20	295	27	28	041M060101	28	J		N/A		No	TOC normalized PAHs<TEC

Table 11-2-5
Wetland 6 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
Isophorone	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
Nitrobenzene	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	11	19.5	295			ND	295	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
Pentachlorophenol	0	11	475	7,000			ND	7,000	U		N/A		Yes	No SV
Phenol	0	11	195	2,950			ND	2,950	U		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	1	12	6	20	4	4	041M060901	4	J		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	12	6	20			ND	20	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	12	6	20			ND	20	U		N/A		Yes	No SV
1,1-Dichloroethane	1	12	6	20	9	9	041M060901	9	J		N/A		Yes	No SV
1,1-Dichloroethene	1	12	6	20	8	8	041M060901	8	J		N/A		Yes	No SV
1,2-Dichloroethane	0	12	6	20			ND	20	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	12	6	20			ND	20	U		N/A		Yes	No SV
1,2-Dichloropropane	0	12	6	20			ND	20	U		N/A		Yes	No SV
2-Butanone (MEK)	0	12	6	20			ND	20	U		N/A		Yes	No SV
2-Hexanone	0	12	6	20			ND	20	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	12	6	20			ND	20	U		N/A		Yes	No SV
Acetone	7	11	6	95	13	4000	041M060801	4,000			N/A		Yes	No SV
Benzene	0	12	6	20			ND	20	U		N/A		Yes	No SV
Bromodichloromethane	0	12	6	20			ND	20	U		N/A		Yes	No SV
Bromoform	0	12	6	20			ND	20	U		N/A		Yes	No SV
Bromomethane	0	12	6	20			ND	20	U		N/A		Yes	No SV
Carbon disulfide	0	12	6	20			ND	20	U		N/A		Yes	No SV
Carbon tetrachloride	0	12	6	20			ND	20	U		N/A		Yes	No SV
Chlorobenzene	1	12	6	20	2	2	041M060901	2	J		N/A		Yes	No SV
Chloroethane	1	12	6	20	2	2	041M060901	2	J		N/A		Yes	No SV
Chloroform	0	12	6	20			ND	20	U		N/A		Yes	No SV
Chloromethane	0	12	6	20			ND	20	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	12	6	20			ND	20	U		N/A		Yes	No SV
Dibromochloromethane	0	12	6	20			ND	20	U		N/A		Yes	No SV
Ethylbenzene	0	12	6	20			ND	20	U		N/A		Yes	No SV
Methylene chloride	0	12	6	39			ND	39	U		N/A		Yes	No SV
Styrene	0	12	6	20			ND	20	U		N/A		Yes	No SV
Tetrachloroethene	2	12	6	20	2	4	041M061101	4	J		N/A		Yes	No SV
Toluene	3	12	6	7.5	4	14	041M060301	14	J		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	12	6	20			ND	20	U		N/A		Yes	No SV
Trichloroethene	3	12	6	7.5	2	5	041M060701	5	J		N/A		Yes	No SV
Vinyl chloride	0	12	2	6.5			ND	6.5	U		N/A		Yes	No SV
Xylene (Total)	0	12	6	20			ND	20	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 11-2-6
Wetland 6 Phase II
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDD	None	1,1,1-Trichloroethane
Barium	4,4'-DDE		1,1-Dichloroethane
Beryllium	4,4'-DDT		1,1-Dichloroethene
Cadmium	Aldrin		Acetone
Calcium	alpha-BHC		Chlorobenzene
Chromium	beta-BHC		Chloroethane
Cobalt	Dieldrin		Tetrachloroethene
Copper	Endrin		Toluene
Iron	Heptachlor		Trichloroethene
Lead	Total BHC		
Magnesium	Total Chlordane		
Manganese	Total DDT		
Potassium	Total Endrin		
Selenium	Total PCBs		
Silver			
Sodium			
Thallium			
Vanadium			
Zinc			
		Not Detected Parameters	
Cyanide (CN)	Endosulfan I	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
	Endosulfan II	1,2-Dichlorobenzene	1,1,2-Trichloroethane
	Endosulfan sulfate	1,3-Dichlorobenzene	1,2-Dichloroethane
	Heptachlor epoxide	1,4-Dichlorobenzene	1,2-Dichloroethene (total)
	Methoxychlor	2,2'-oxybis(1-Chloropropane)/bis(2-chlor	1,2-Dichloropropane
	Toxaphene	2,4,5-Trichlorophenol	2-Butanone (MEK)
		2,4,6-Trichlorophenol	2-Hexanone
		2,4-Dichlorophenol	4-Methyl-2-Pentanone (MIBK)
		2,4-Dimethylphenol	Benzene
		2,4-Dinitrophenol	Bromodichloromethane
		2,4-Dinitrotoluene	Bromoform
		2,6-Dinitrotoluene	Bromomethane
		2-Chloronaphthalene	Carbon disulfide
		2-Chlorophenol	Carbon tetrachloride
		2-Methyl-4,6-Dinitrophenol	Chloroform
		2-Methylphenol (o-Cresol)	Chloromethane
		2-Nitroaniline	cis-1,3-Dichloropropene
		2-Nitrophenol	Dibromochloromethane
		3,3'-Dichlorobenzidine	Ethylbenzene
		3-Nitroaniline	Methylene chloride
		4-Bromophenyl-phenylether	Styrene
		4-Chloro-3-methylphenol	trans-1,3-Dichloropropene
		4-Chloroaniline	Vinyl chloride
		4-Chlorophenylphenyl ether	Xylene (Total)
		4-Methylphenol (p-Cresol)	
		4-Nitroaniline	
		4-Nitrophenol	
		bis(2-Chloroethoxy)methane	
		bis(2-Chloroethyl)ether	
		bis(2-Ethylhexyl)phthalate (BEHP)	
		Carbazole	
		Dibenzofuran	
		Dimethylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 11-2-7
Wetland 6 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	12	12				1,560	313	5,980	5,980		041M060701			NA					0	13,610	0	No	EPC < RC
Barium	11	12	1.2	1.2	1.2	8.84	1	37	37		041M060101			NA					0	14	3	Yes	EPC > RC and no RV
Beryllium	3	12	0.0389	0.03	0.065	0.0583	0.1	0.14	0.14	J	041M060101			NA					0	0.84	0	No	EPC < RC
Cadmium	**9**	**12**	**0.17**	**0.09**	**0.325**	**0.793**	**0.19**	**5.4**	**5.4**		**041M060701**	**0.676**	**4.21**	**PEL**	**7.99**	**1.17**	**1.28**	**0.19**	**1**	**1.8**	**1**	**Yes**	**EPC > RV and RC**
Calcium	12	12				2,150	62.5	8,370	8,370	J	041M060101			NA					0	10,756.67	0	No	EPC < RC
Chromium	11	12	0.9	0.9	0.9	14.4	0.56	73.5	73.5		041M060701	52.3	160	PEL	1.41	0.28	0.46	0.09	0	39.37	1	No	EPC > RC, but < RV
Cobalt	7	12	0.106	0.095	0.145	2.1	0.18	20.7	20.7	J	010M000101			NA					0	2.8	1	Yes	EPC > RC and no RV
Copper	11	12	1.2	1.2	1.2	12.1	0.97	48.2	48.2		041M060701	18.7	108	PEL	2.58	0.65	0.45	0.11	0	19.5	2	No	EPC > RC, but < RV
Cyanide (CN)	0	12	0.33	0.06	0.65	0.33			0.65	U	ND			NA					0	5.22	0	No	Parameter Not Detected
Iron	12	12				1,340	328	4,320	4,320		041M060701			NA					0	11,911.67	0	No	EPC < RC
Lead	**12**	**12**				**31.5**	**6**	**147**	**147**		**041M060701**	**30.2**	**112**	**PEL**	**4.87**	**1.04**	**1.31**	**0.28**	**1**	**82.47**	**1**	**Yes**	**EPC > RV and RC**
Magnesium	11	12	21.3	21.3	21.3	356	27.3	1,180	1,180		041M060201			NA					0	7,513.33	0	No	EPC < RC
Manganese	11	12	0.6	0.6	0.6	12.3	1.2	35.2	35.2		041M060701			NA					0	37.97	0	No	EPC < RC
Potassium	11	12	79	79	79	57.1	9.6	161.00	161	J	041M060701			NA					0	1,628.67	0	No	EPC < RC
Selenium	1	12	0.108	0.085	0.205	0.17	0.85	0.85	0.85		041M060701			NA					0	3.45	0	No	EPC < RC
Silver	1	12	0.159	0.115	0.44	0.22	0.89	0.89	0.89	J	041M060701	0.733	1.77	PEL	1.21	0.3	0.50	0.12	0	2.1	0	No	EPC < RC and RV
Sodium	9	12	2.48	1.2	5	26.1	4.9	105	105	J	041M060301			NA					0	18,993.33	0	No	EPC < RC
Thallium	2	12	0.123	0.085	0.34	0.215	0.67	0.68	0.68	J	041M060701			NA					0	1.57	0	No	EPC < RC
Vanadium	12	12				2.83	0.6	11.3	11.3		041M060701			NA					0	28.67	0	No	EPC < RC
Zinc	11	12	1.9	1.9	1.9	50.3	9.7	207	207		041M060701	124	271	PEL	1.67	0.41	0.76	0.19	0	36.73	5	No	EPC > RC, but < RV
PCBs (g/kg)																							
Aroclor-1016	0	12	6.91	1	21	6.91			21	UJ	ND	21.6	189	PEL					0		0	No	Parameter Not Detected
Aroclor-1221	0	12	14.03	2	43	14.03			43	UJ	ND	67	189	PEL					0		0	No	Parameter Not Detected
Aroclor-1232	0	12	6.91	1	21	6.91			21	UJ	ND	21.6	189	PEL					0		0	No	Parameter Not Detected
Aroclor-1242	0	12	6.91	1	21	6.91			21	UJ	ND	21.6	189	PEL					0		0	No	Parameter Not Detected
Aroclor-1248	0	12	6.91	1	21	6.91			21	UJ	ND	21.6	189	PEL					0		0	No	Parameter Not Detected
Aroclor-1254	1	12	7.35	1	21	7.53	9.5	9.5	9.5	J	041M060201	21.6	189	PEL	0.44	0.35	0.05	0.04	0		0	No	RV HQ <1 and no RC
Aroclor-1260	3	12	8.85	1	21	7.36	0.82	4.1	4.1	J	041M061101	21.6	189	PEL	0.19	0.34	0.01	0.04	0		0	No	RV HQ <1 and no RC
Total PCBs	4	12	77.9	8	169	56.6	8.07	23.9	23.9		041M061101	21.6	189	PEL	1.11	2.62	0.13	0.30	0		0	No	RV HQ <1 and no RC
Pesticides (g/kg)																							
Aldrin	5	12	0.293	0.05	1.1	0.417	0.23	1.1	1.1	J	041M060701			NA					0		0	Yes	No SV, no RV, and no RC
Dieldrin	**8**	**12**	**0.704**	**0.105**	**2.1**	**2.53**	**0.24**	**10**	**10**	**J**	**041M060701**	**0.716**	**4.3**	**PEL**	**14**	**3.53**	**2.33**	**0.59**	**3**		**0**	**Yes**	**RV HQ > 1 and no RC**
Endosulfan I	0	12	0.355	0.05	1.1	0.355			1.1	UJ	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	12	0.457	0.1	2.1	0.457			2.1	UJ	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	0	12	0.457	0.1	2.1	0.457			2.1	UJ	ND			NA					0		0	No	Parameter Not Detected
Heptachlor	1	12	0.246	0.05	1.1	0.239	0.16	0.16	0.16	J	041M061001			NA					0		0	Yes	No SV, no RV, and no RC
Heptachlor epoxide	0	12	0.23	0.05	1.1	0.23			1.1	UJ	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	12	2.3	0.5	11	2.3			11	UJ	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	11	37.3	10	110	37.3			110	UJ	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	6	12	0.333	0.05	1.1	0.585	0.15	1.7	1.7	J	041M060301	1.7	4.79	PEL	1	0.34	0.36	0.12	0		0	No	RV HQ <1 and no RC
Total Chlordane	7	12	0.778	0.1	2.2	1.01	0.205	2.7	2.7		041M060701	1.7	4.79	PEL	1.59	0.60	0.56	0.21	0		0	No	RV HQ <1 and no RC
Endrin	4	12	0.405	0.1	2.1	1.1	1.8	3.6	3.6	J	041M060701	3.3		NA	1.09	0.33			0		0	Yes	No RV or RC and EPC > SV
Total Endrin	4	12	1.22	0.3	6.3	2.05	2.38	5.1	5.1		041M060701	3.3		NA	1.55	0.62			0		0	Yes	No RV or RC and EPC > SV
alpha-BHC	2	12	0.293	0.05	1.1	0.334	0.48	0.6	0.6	J	041M060801		0.99	PEL			0.61	0.34	0		0	No	RV HQ <1 and no RC
beta-BHC	**3**	**12**	**0.24**	**0.05**	**1.1**	**0.552**	**0.16**	**2.8**	**2.8**	**J**	**041M060301**	**0.32**	**0.99**	**PEL**	**8.75**	**1.72**	**2.83**	**0.56**	**2**		**0**	**Yes**	**RV HQ > 1 and no RC**
delta-BHC	0	12	0.23	0.05	1.1	0.23			1.1	U	ND	0.32	0.99	PEL	3.44	0.72	1.11	0.23	0		0	No	Parameter Not Detected; Max SQL > RV
gamma-BHC (Lindane)	0	12	0.23	0.05	1.1	0.23			1.1	U	ND	0.32	0.99	PEL	3.44	0.72	1.11	0.23	0		0	No	Parameter Not Detected; Max SQL > RV
Total BHC	**4**	**12**	**1.09**	**0.2**	**4.4**	**1.35**	**0.74**	**3.36**	**3.36**		**041M060301**	**0.32**	**0.99**	**PEL**	**10.5**	**4.2**	**3.39**	**1.36**	**2**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	**12**	**12**				**12.1**	**0.21**	**40**	**40**	**DJ**	**041M060301**	**1.22**	**7.81**	**PEL**	**32.8**	**9.9**	**5.12**	**1.55**	**5**	**50**	**0**	**No**	**EPC > RV, but < RC**
4,4'-DDE	11	12	0.11	0.11	0.11	19.4	0.23	110	110	D	041M060101	2.07	374	PEL	53.1	9.38	0.29	0.05	0	40	1	No	EPC > RC, but < RV
4,4'-DDT	**11**	**12**	**0.1**	**0.1**	**0.1**	**29.1**	**0.22**	**260**	**260**	**DJ**	**041M060101**	**1.19**	**4.77**	**PEL**	**218**	**24.4**	**54.5**	**6.1**	**5**	**20**	**2**	**Yes**	**EPC > RV and RC**
Total DDT	**12**	**12**				**60.6**	**0.6**	**393**	**393**		**041M060101**	**3.3**	**51.7**	**PEL**	**119**	**18.4**	**7.6**	**1.17**	**4**	**110**	**2**	**Yes**	**EPC > RV and RC**
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	8	552	200	2,950	552			2,950	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	11	1,090	475	7,000	1,090			7,000	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	11	1,090	475	7,000	1,090			7,000	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	11	1,090	475	7,000	1,090			7,000	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	11	482	195	2,950	482			2,950	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	10	1,150	475	7,000	1,150			7,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	11	1,090	475	7,000	1,090			7,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	11	1,090	475	7,000	1,090			7,000	U	ND			NA					0		0	No	Parameter Not Detected

Table 11-2-7
Wetland 6 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
bis(2-Chloroethoxy)methane	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	11	62.8	19.5	295	62.8			295	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	11	483	195	2,950	483			2,950	U	ND	182	2,647	PEL	16.2	2.65	1.11	0.18	0		0	No	Parameter Not Detected; Max SQL > RV
Carbazole	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
Dimethylphthalate	0	11	456	195	2,950	456			2,950	U	ND	182	2,647	PEL	16.2	2.5	1.11	0.17	0		0	No	Parameter Not Detected; Max SQL > RV
Hexachlorobenzene	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	11	62.8	20	295	62.8			295	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	11	1,090	475	7,000	1,090			7,000	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	11	456	195	2,950	456			2,950	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	1	12	7.55	6	20	7.25	4	4	4	J	041M060901			NA					0		0	Yes	No SV, no RV, and no RC
1,1,2,2-Tetrachloroethane	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	1	12	7.55	6	20	7.67	9	9	9	J	041M060901			NA					0		0	Yes	No SV, no RV, and no RC
1,1-Dichloroethene	1	12	7.55	6	20	7.58	8	8	8	J	041M060901			NA					0		0	Yes	No SV, no RV, and no RC
1,2-Dichloroethane	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
2-Hexanone	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	7	11	45.5	6	95	490	13	4000	4,000		041M060801			NA					0		0	Yes	No SV, no RV, and no RC
Benzene	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	1	12	7.55	6	20	7.08	2	2	2	J	041M060901			NA					0		0	Yes	No SV, no RV, and no RC
Chloroethane	1	12	7.55	6	20	7.08	2	2	2	J	041M060901			NA					0		0	Yes	No SV, no RV, and no RC
Chloroform	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	12	12	6	39	12			39	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	2	12	7.7	6	20	6.92	2	4	4	J	041M061101			NA					0		0	Yes	No SV, no RV, and no RC
Toluene	3	12	6.22	6	7.5	6.67	4	14	14	J	041M060301			NA					0		0	Yes	No SV, no RV, and no RC
trans-1,3-Dichloropropene	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	3	12	6.33	6	7.5	5.58	2	5	5	J	041M060701			NA					0		0	Yes	No SV, no RV, and no RC
Vinyl chloride	0	12	2.75	2	6.5	2.75			6.5	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	12	7.42	6	20	7.42			20	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 11-2-8
Wetland 6 Phase II
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Barium	Aldrin	None	1,1-Dichloroethane
Cadmium	Dieldrin		Chloroethane
Cobalt	Heptachlor		Acetone
Lead	Endrin		
	Total Endrin		
	beta-BHC		
	Total BHC		
	4,4'-DDT		
	Total DDT		

Table 11-2-9
Wetland 6 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
010M000101	2/4/1994	mg/kg	0.355	U	Arsenic	8.2	70	0.01
010M000101	2/4/1994	mg/kg	0.325	U	Cadmium	1.2	9.6	0.03
010M000101	2/4/1994	mg/kg	0.9	U	Chromium	81	370	0.00
010M000101	2/4/1994	mg/kg	14.2	J	Copper	34	270	0.05
010M000101	2/4/1994	mg/kg	31.4		Lead	46.7	218	0.14
010M000101	2/4/1994	mg/kg	0.015	U	Mercury	0.15	0.71	0.02
010M000101	2/4/1994	mg/kg	4.3		Nickel	20.9	51.6	0.08
010M000101	2/4/1994	mg/kg	0.44	U	Silver	1	3.7	0.12
010M000101	2/4/1994	mg/kg	59.6	J	Zinc	150	410	0.15
010M000101	**2/4/1994**	**g/kg**	**29**	**J**	**4,4'-DDE**	**2.2**	**27**	**1.07**
010M000101	2/4/1994	g/kg	11	J	4,4'-DDT	1.58	46.1	0.24
010M000101	2/4/1994	g/kg	169	U	Total PCBs	22.7	180	0.94
010M000101	2/4/1994	g/kg	210	UJ	2-Methylnaphthalene	70	670	0.31
010M000101	2/4/1994	g/kg	210	UJ	Acenaphthene	16	500	0.42
010M000101	2/4/1994	g/kg	210	UJ	Acenaphthylene	44	640	0.33
010M000101	2/4/1994	g/kg	210	UJ	Anthracene	85.3	1,100	0.19
010M000101	2/4/1994	g/kg	210	UJ	Benzo(a)anthracene	261	1,600	0.13
010M000101	2/4/1994	g/kg	210	UJ	Benzo(a)pyrene	430	1,600	0.13
010M000101	2/4/1994	g/kg	210	UJ	Chrysene	384	2,800	0.08
010M000101	2/4/1994	g/kg	210	UJ	Dibenz(a,h)anthracene	63.4	260	0.81
010M000101	2/4/1994	g/kg	210	UJ	Fluoranthene	600	5,100	0.04
010M000101	2/4/1994	g/kg	210	UJ	Fluorene	19	540	0.39
010M000101	2/4/1994	g/kg	210	UJ	Naphthalene	160	2,100	0.10
010M000101	2/4/1994	g/kg	210	UJ	Phenanthrene	240	1,500	0.14
010M000101	2/4/1994	g/kg	210	UJ	Pyrene	665	2,600	0.08
010M000101	2/4/1994				ERM Quotient Sum			6.01
010M000101	2/4/1994				Mean ERM Quotient			0.24
010M000101	2/4/1994				Mean ERM Quotient without ND			0.07
010M000101	2/4/1994				Mean ERM Quotient Category			2
041M060101	11/15/1995	mg/kg	0.74		Arsenic	8.2	70	0.01
041M060101	11/15/1995	mg/kg	0.28	J	Cadmium	1.2	9.6	0.03
041M060101	11/15/1995	mg/kg	2.5		Chromium	81	370	0.01
041M060101	11/15/1995	mg/kg	7.8	J	Copper	34	270	0.03
041M060101	11/15/1995	mg/kg	47.4	J	Lead	46.7	218	0.22
041M060101	11/15/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M060101	11/15/1995	mg/kg	1.6	J	Nickel	20.9	51.6	0.03
041M060101	11/15/1995	mg/kg	0.115	UJ	Silver	1	3.7	0.03
041M060101	11/15/1995	mg/kg	64.2	J	Zinc	150	410	0.16
041M060101	**11/15/1995**	**g/kg**	**110**	**D**	**4,4'-DDE**	**2.2**	**27**	**4.07**
041M060101	**11/15/1995**	**g/kg**	**260**	**DJ**	**4,4'-DDT**	**1.58**	**46.1**	**5.64**
041M060101	11/15/1995	g/kg	156.5	U	Total PCBs	22.7	180	0.87
041M060101	11/15/1995	g/kg	19.5	U	2-Methylnaphthalene	70	670	0.03
041M060101	11/15/1995	g/kg	9.5	U	Acenaphthene	16	500	0.02
041M060101	11/15/1995	g/kg	19.5	U	Acenaphthylene	44	640	0.03
041M060101	11/15/1995	g/kg	19.5	U	Anthracene	85.3	1,100	0.02
041M060101	11/15/1995	g/kg	34	J	Benzo(a)anthracene	261	1,600	0.02
041M060101	11/15/1995	g/kg	33	J	Benzo(a)pyrene	430	1,600	0.02
041M060101	11/15/1995	g/kg	55		Chrysene	384	2,800	0.02
041M060101	11/15/1995	g/kg	19.5	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M060101	11/15/1995	g/kg	88		Fluoranthene	600	5,100	0.02
041M060101	11/15/1995	g/kg	9.5	U	Fluorene	19	540	0.02
041M060101	11/15/1995	g/kg	19.5	U	Naphthalene	160	2,100	0.01
041M060101	11/15/1995	g/kg	51		Phenanthrene	240	1,500	0.03
041M060101	11/15/1995	g/kg	73		Pyrene	665	2,600	0.03
041M060101	11/15/1995				ERM Quotient Sum			11.47
041M060101	11/15/1995				Mean ERM Quotient			0.46
041M060101	11/15/1995				Mean ERM Quotient without ND			0.41
041M060101	11/15/1995				Mean ERM Quotient Category			2
041M060201	11/15/1995	mg/kg	0.28	J	Arsenic	8.2	70	0.00
041M060201	11/15/1995	mg/kg	0.33		Cadmium	1.2	9.6	0.03
041M060201	11/15/1995	mg/kg	2		Chromium	81	370	0.01
041M060201	11/15/1995	mg/kg	8.3	J	Copper	34	270	0.03
041M060201	11/15/1995	mg/kg	10.9	J	Lead	46.7	218	0.05
041M060201	11/15/1995	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M060201	11/15/1995	mg/kg	0.84	J	Nickel	20.9	51.6	0.02
041M060201	11/15/1995	mg/kg	0.115	UJ	Silver	1	3.7	0.03
041M060201	11/15/1995	mg/kg	29.5	J	Zinc	150	410	0.07
041M060201	11/15/1995	g/kg	2.8	J	4,4'-DDE	2.2	27	0.10
041M060201	11/15/1995	g/kg	0.35	J	4,4'-DDT	1.58	46.1	0.01
041M060201	11/15/1995	g/kg	23.9		Total PCBs	22.7	180	0.13
041M060201	11/15/1995	g/kg	20.5	U	2-Methylnaphthalene	70	670	0.03
041M060201	11/15/1995	g/kg	10	U	Acenaphthene	16	500	0.02
041M060201	11/15/1995	g/kg	20.5	U	Acenaphthylene	44	640	0.03
041M060201	11/15/1995	g/kg	20.5	U	Anthracene	85.3	1,100	0.02
041M060201	11/15/1995	g/kg	43		Benzo(a)anthracene	261	1,600	0.03
041M060201	11/15/1995	g/kg	42		Benzo(a)pyrene	430	1,600	0.03
041M060201	11/15/1995	g/kg	45		Chrysene	384	2,800	0.02
041M060201	11/15/1995	g/kg	20.5	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M060201	11/15/1995	g/kg	120		Fluoranthene	600	5,100	0.02
041M060201	11/15/1995	g/kg	10	U	Fluorene	19	540	0.02
041M060201	11/15/1995	g/kg	20.5	U	Naphthalene	160	2,100	0.01
041M060201	11/15/1995	g/kg	37	J	Phenanthrene	240	1,500	0.02
041M060201	11/15/1995	g/kg	100		Pyrene	665	2,600	0.04
041M060201	11/15/1995				ERM Quotient Sum			0.89
041M060201	11/15/1995				Mean ERM Quotient			0.04
041M060201	11/15/1995				Mean ERM Quotient without ND			0.02
041M060201	11/15/1995				Mean ERM Quotient Category			2

Table 11-2-9
Wetland 6 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M060301	11/15/1995	mg/kg	0.53	J	Arsenic	8.2	70	0.01
041M060301	11/15/1995	mg/kg	0.32	J	Cadmium	1.2	9.6	0.03
041M060301	11/15/1995	mg/kg	4.4		Chromium	81	370	0.01
041M060301	11/15/1995	mg/kg	20.9	J	Copper	34	270	0.08
041M060301	11/15/1995	mg/kg	36.1	J	Lead	46.7	218	0.17
041M060301	11/15/1995	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M060301	11/15/1995	mg/kg	1.2	J	Nickel	20.9	51.6	0.02
041M060301	11/15/1995	mg/kg	0.135	UJ	Silver	1	3.7	0.04
041M060301	11/15/1995	mg/kg	74.1	J	Zinc	150	410	0.18
041M060301	**11/15/1995**	**g/kg**	**33**	**DJ**	**4,4'-DDE**	**2.2**	**27**	**1.22**
041M060301	**11/15/1995**	**g/kg**	**52**	**D**	**4,4'-DDT**	**1.58**	**46.1**	**1.13**
041M060301	11/15/1995	g/kg	60	U	Total PCBs	22.7	180	0.33
041M060301	11/15/1995				ERM Quotient Sum			3.26
041M060301	11/15/1995				Mean ERM Quotient			0.13
041M060301	11/15/1995				Mean ERM Quotient without ND			0.11
041M060301	11/15/1995				Mean ERM Quotient Category			2
041M060401	11/15/1995	mg/kg	0.06	U	Arsenic	8.2	70	0.00
041M060401	11/15/1995	mg/kg	0.09	U	Cadmium	1.2	9.6	0.01
041M060401	11/15/1995	mg/kg	0.85		Chromium	81	370	0.00
041M060401	11/15/1995	mg/kg	13.6	J	Copper	34	270	0.05
041M060401	11/15/1995	mg/kg	16.2	J	Lead	46.7	218	0.07
041M060401	11/15/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M060401	11/15/1995	mg/kg	0.36	U	Nickel	20.9	51.6	0.01
041M060401	11/15/1995	mg/kg	0.12	UJ	Silver	1	3.7	0.03
041M060401	11/15/1995	mg/kg	28.1	J	Zinc	150	410	0.07
041M060401	11/15/1995	g/kg	4.3		4,4'-DDE	2.2	27	0.16
041M060401	11/15/1995	g/kg	2	J	4,4'-DDT	1.58	46.1	0.04
041M060401	11/15/1995	g/kg	80.5	U	Total PCBs	22.7	180	0.45
041M060401	11/15/1995	g/kg	20.5	U	2-Methylnaphthalene	70	670	0.03
041M060401	11/15/1995	g/kg	34		Acenaphthene	16	500	0.07
041M060401	11/15/1995	g/kg	20.5	U	Acenaphthylene	44	640	0.03
041M060401	11/15/1995	g/kg	20.5	U	Anthracene	85.3	1,100	0.02
041M060401	11/15/1995	g/kg	20.5	U	Benzo(a)anthracene	261	1,600	0.01
041M060401	11/15/1995	g/kg	20.5	U	Benzo(a)pyrene	430	1,600	0.01
041M060401	11/15/1995	g/kg	21	J	Chrysene	384	2,800	0.01
041M060401	11/15/1995	g/kg	20.5	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M060401	11/15/1995	g/kg	42		Fluoranthene	600	5,100	0.01
041M060401	11/15/1995	g/kg	10	U	Fluorene	19	540	0.02
041M060401	11/15/1995	g/kg	20.5	U	Naphthalene	160	2,100	0.01
041M060401	11/15/1995	g/kg	20.5	U	Phenanthrene	240	1,500	0.01
041M060401	11/15/1995	g/kg	52		Pyrene	665	2,600	0.02
041M060401	11/15/1995				ERM Quotient Sum			1.26
041M060401	11/15/1995				Mean ERM Quotient			0.05
041M060401	11/15/1995				Mean ERM Quotient without ND			0.02
041M060401	11/15/1995				Mean ERM Quotient Category			2
041M060501	11/16/1995	mg/kg	0.06	U	Arsenic	8.2	70	0.00
041M060501	11/16/1995	mg/kg	0.095	U	Cadmium	1.2	9.6	0.01
041M060501	11/16/1995	mg/kg	0.56	J	Chromium	81	370	0.00
041M060501	11/16/1995	mg/kg	3.6		Copper	34	270	0.01
041M060501	11/16/1995	mg/kg	9.4		Lead	46.7	218	0.04
041M060501	11/16/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M060501	11/16/1995	mg/kg	0.37	U	Nickel	20.9	51.6	0.01
041M060501	11/16/1995	mg/kg	0.125	U	Silver	1	3.7	0.03
041M060501	11/16/1995	mg/kg	18.8		Zinc	150	410	0.05
041M060501	11/16/1995	g/kg	2.8	J	4,4'-DDE	2.2	27	0.10
041M060501	11/16/1995	g/kg	2.2		4,4'-DDT	1.58	46.1	0.05
041M060501	11/16/1995	g/kg	8	U	Total PCBs	22.7	180	0.04
041M060501	11/16/1995	g/kg	20	U	2-Methylnaphthalene	70	670	0.03
041M060501	11/16/1995	g/kg	9.5	U	Acenaphthene	16	500	0.02
041M060501	11/16/1995	g/kg	20	U	Acenaphthylene	44	640	0.03
041M060501	11/16/1995	g/kg	20	U	Anthracene	85.3	1,100	0.02
041M060501	11/16/1995	g/kg	20	U	Benzo(a)anthracene	261	1,600	0.01
041M060501	11/16/1995	g/kg	20	U	Benzo(a)pyrene	430	1,600	0.01
041M060501	11/16/1995	g/kg	20	U	Chrysene	384	2,800	0.01
041M060501	11/16/1995	g/kg	20	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M060501	11/16/1995	g/kg	20	U	Fluoranthene	600	5,100	0.00
041M060501	11/16/1995	g/kg	9.5	U	Fluorene	19	540	0.02
041M060501	11/16/1995	g/kg	20	U	Naphthalene	160	2,100	0.01
041M060501	11/16/1995	g/kg	20	U	Phenanthrene	240	1,500	0.01
041M060501	11/16/1995	g/kg	20	U	Pyrene	665	2,600	0.01
041M060501	11/16/1995				ERM Quotient Sum			0.65
041M060501	11/16/1995				Mean ERM Quotient			0.03
041M060501	11/16/1995				Mean ERM Quotient without ND			0.01
041M060501	11/16/1995				Mean ERM Quotient Category			2
041M060601	11/16/1995	mg/kg	1.4		Arsenic	8.2	70	0.02
041M060601	11/16/1995	mg/kg	0.76		Cadmium	1.2	9.6	0.08
041M060601	11/16/1995	mg/kg	7.5		Chromium	81	370	0.02
041M060601	11/16/1995	mg/kg	19		Copper	34	270	0.07
041M060601	11/16/1995	mg/kg	49.1		Lead	46.7	218	0.23
041M060601	11/16/1995	mg/kg	0.04	U	Mercury	0.15	0.71	0.06
041M060601	11/16/1995	mg/kg	1.3	J	Nickel	20.9	51.6	0.03
041M060601	11/16/1995	mg/kg	0.195	U	Silver	1	3.7	0.05
041M060601	11/16/1995	mg/kg	75.7		Zinc	150	410	0.18
041M060601	11/16/1995	g/kg	8	D	4,4'-DDE	2.2	27	0.30
041M060601	11/16/1995	g/kg	4.8	J	4,4'-DDT	1.58	46.1	0.10
041M060601	11/16/1995	g/kg	12.5		Total PCBs	22.7	180	0.07
041M060601	11/16/1995	g/kg	24	U	2-Methylnaphthalene	70	670	0.04
041M060601	11/16/1995	g/kg	11.5	U	Acenaphthene	16	500	0.02
041M060601	11/16/1995	g/kg	24	U	Acenaphthylene	44	640	0.04
041M060601	11/16/1995	g/kg	24	U	Anthracene	85.3	1,100	0.02

Table 11-2-9
Wetland 6 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M060601	11/16/1995	g/kg	40	J	Benzo(a)anthracene	261	1,600	0.03
041M060601	11/16/1995	g/kg	32	J	Benzo(a)pyrene	430	1,600	0.02
041M060601	11/16/1995	g/kg	24	U	Chrysene	384	2,800	0.01
041M060601	11/16/1995	g/kg	24	U	Dibenz(a,h)anthracene	63.4	260	0.09
041M060601	11/16/1995	g/kg	67		Fluoranthene	600	5,100	0.01
041M060601	11/16/1995	g/kg	11.5	U	Fluorene	19	540	0.02
041M060601	11/16/1995	g/kg	24	U	Naphthalene	160	2,100	0.01
041M060601	11/16/1995	g/kg	24	U	Phenanthrene	240	1,500	0.02
041M060601	11/16/1995	g/kg	69		Pyrene	665	2,600	0.03
041M060601	11/16/1995				ERM Quotient Sum			1.56
041M060601	11/16/1995				Mean ERM Quotient			0.06
041M060601	11/16/1995				Mean ERM Quotient without ND			0.05
041M060601	11/16/1995				Mean ERM Quotient Category			2
041M060701	11/14/1995	mg/kg	2.1		Arsenic	8.2	70	0.03
041M060701	11/14/1995	mg/kg	5.4		Cadmium	1.2	9.6	0.56
041M060701	11/14/1995	mg/kg	73.5		Chromium	81	370	0.20
041M060701	11/14/1995	mg/kg	48.2		Copper	34	270	0.18
041M060701	11/14/1995	mg/kg	147		Lead	46.7	218	0.67
041M060701	11/14/1995	mg/kg	0.11	J	Mercury	0.15	0.71	0.15
041M060701	11/14/1995	mg/kg	4.2	J	Nickel	20.9	51.6	0.08
041M060701	11/14/1995	mg/kg	0.89	J	Silver	1	3.7	0.24
041M060701	11/14/1995	mg/kg	207		Zinc	150	410	0.50
041M060701	**11/14/1995**	**g/kg**	**34**	**J**	**4,4'-DDE**	**2.2**	**27**	**1.26**
041M060701	11/14/1995	g/kg	11	J	4,4'-DDT	1.58	46.1	0.24
041M060701	11/14/1995	g/kg	116.5	U	Total PCBs	22.7	180	0.65
041M060701	11/14/1995	g/kg	295	U	2-Methylnaphthalene	70	670	0.44
041M060701	11/14/1995	g/kg	145	U	Acenaphthene	16	500	0.29
041M060701	11/14/1995	g/kg	295	U	Acenaphthylene	44	640	0.46
041M060701	11/14/1995	g/kg	295	U	Anthracene	85.3	1,100	0.27
041M060701	11/14/1995	g/kg	295	U	Benzo(a)anthracene	261	1,600	0.18
041M060701	11/14/1995	g/kg	295	UJ	Benzo(a)pyrene	430	1,600	0.18
041M060701	11/14/1995	g/kg	300	J	Chrysene	384	2,800	0.11
041M060701	11/14/1995	g/kg	295	UJ	Dibenz(a,h)anthracene	63.4	260	1.13
041M060701	11/14/1995	g/kg	295	U	Fluoranthene	600	5,100	0.06
041M060701	11/14/1995	g/kg	145	U	Fluorene	19	540	0.27
041M060701	11/14/1995	g/kg	295	U	Naphthalene	160	2,100	0.14
041M060701	11/14/1995	g/kg	295	U	Phenanthrene	240	1,500	0.20
041M060701	11/14/1995	g/kg	295	U	Pyrene	665	2,600	0.11
041M060701	11/14/1995				ERM Quotient Sum			8.62
041M060701	11/14/1995				Mean ERM Quotient			0.34
041M060701	11/14/1995				Mean ERM Quotient without ND			0.17
041M060701	11/14/1995				Mean ERM Quotient Category			2
041M060801	11/14/1995	mg/kg	0.14	J	Arsenic	8.2	70	0.00
041M060801	11/14/1995	mg/kg	0.19	J	Cadmium	1.2	9.6	0.02
041M060801	11/14/1995	mg/kg	19.6		Chromium	81	370	0.05
041M060801	11/14/1995	mg/kg	0.97	J	Copper	34	270	0.00
041M060801	11/14/1995	mg/kg	6.6		Lead	46.7	218	0.03
041M060801	11/14/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M060801	11/14/1995	mg/kg	0.345	U	Nickel	20.9	51.6	0.01
041M060801	11/14/1995	mg/kg	0.115	U	Silver	1	3.7	0.03
041M060801	11/14/1995	mg/kg	1.9	U	Zinc	150	410	0.00
041M060801	11/14/1995	g/kg	8.4	D	4,4'-DDE	2.2	27	0.31
041M060801	11/14/1995	g/kg	4.5	J	4,4'-DDT	1.58	46.1	0.10
041M060801	11/14/1995	g/kg	16.05	U	Total PCBs	22.7	180	0.09
041M060801	11/14/1995	g/kg	20	U	2-Methylnaphthalene	70	670	0.03
041M060801	11/14/1995	g/kg	9.5	U	Acenaphthene	16	500	0.02
041M060801	11/14/1995	g/kg	20	U	Acenaphthylene	44	640	0.03
041M060801	11/14/1995	g/kg	20	U	Anthracene	85.3	1,100	0.02
041M060801	11/14/1995	g/kg	20	U	Benzo(a)anthracene	261	1,600	0.01
041M060801	11/14/1995	g/kg	20	U	Benzo(a)pyrene	430	1,600	0.01
041M060801	11/14/1995	g/kg	20	U	Chrysene	384	2,800	0.01
041M060801	11/14/1995	g/kg	20	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M060801	11/14/1995	g/kg	20	U	Fluoranthene	600	5,100	0.00
041M060801	11/14/1995	g/kg	9.5	U	Fluorene	19	540	0.02
041M060801	11/14/1995	g/kg	20	U	Naphthalene	160	2,100	0.01
041M060801	11/14/1995	g/kg	20	U	Phenanthrene	240	1,500	0.01
041M060801	11/14/1995	g/kg	20	U	Pyrene	665	2,600	0.01
041M060801	11/14/1995				ERM Quotient Sum			0.94
041M060801	11/14/1995				Mean ERM Quotient			0.04
041M060801	11/14/1995				Mean ERM Quotient without ND			0.02
041M060801	11/14/1995				Mean ERM Quotient Category			2
041M060901	11/14/1995	mg/kg	0.47	J	Arsenic	8.2	70	0.01
041M060901	11/14/1995	mg/kg	0.24	J	Cadmium	1.2	9.6	0.03
041M060901	11/14/1995	mg/kg	15.6		Chromium	81	370	0.04
041M060901	11/14/1995	mg/kg	2.9		Copper	34	270	0.01
041M060901	11/14/1995	mg/kg	10.8		Lead	46.7	218	0.05
041M060901	11/14/1995	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M060901	11/14/1995	mg/kg	0.395	U	Nickel	20.9	51.6	0.01
041M060901	11/14/1995	mg/kg	0.13	U	Silver	1	3.7	0.04
041M060901	11/14/1995	mg/kg	9.7		Zinc	150	410	0.02
041M060901	11/14/1995	g/kg	0.11	U	4,4'-DDE	2.2	27	0.00
041M060901	11/14/1995	g/kg	0.74		4,4'-DDT	1.58	46.1	0.02
041M060901	11/14/1995	g/kg	16.9	U	Total PCBs	22.7	180	0.09
041M060901	11/14/1995	g/kg	21	U	2-Methylnaphthalene	70	670	0.03
041M060901	11/14/1995	g/kg	10	U	Acenaphthene	16	500	0.02
041M060901	11/14/1995	g/kg	21	U	Acenaphthylene	44	640	0.03
041M060901	11/14/1995	g/kg	21	U	Anthracene	85.3	1,100	0.02
041M060901	11/14/1995	g/kg	21	U	Benzo(a)anthracene	261	1,600	0.01
041M060901	11/14/1995	g/kg	21	U	Benzo(a)pyrene	430	1,600	0.01
041M060901	11/14/1995	g/kg	21	U	Chrysene	384	2,800	0.01

Table 11-2-9
Wetland 6 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M060901	11/14/1995	g/kg	21	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M060901	11/14/1995	g/kg	21	U	Fluoranthene	600	5,100	0.00
041M060901	11/14/1995	g/kg	10	U	Fluorene	19	540	0.02
041M060901	11/14/1995	g/kg	21	U	Naphthalene	160	2,100	0.01
041M060901	11/14/1995	g/kg	21	U	Phenanthrene	240	1,500	0.01
041M060901	11/14/1995	g/kg	21	U	Pyrene	665	2,600	0.01
041M060901	11/14/1995				ERM Quotient Sum			0.63
041M060901	11/14/1995				Mean ERM Quotient			0.03
041M060901	11/14/1995				Mean ERM Quotient without ND			0.01
041M060901	11/14/1995				Mean ERM Quotient Category			1
041M061001	11/16/1995	mg/kg	0.33	J	Arsenic	8.2	70	0.00
041M061001	11/16/1995	mg/kg	0.77		Cadmium	1.2	9.6	0.08
041M061001	11/16/1995	mg/kg	22.6		Chromium	81	370	0.06
041M061001	11/16/1995	mg/kg	1.2	U	Copper	34	270	0.00
041M061001	11/16/1995	mg/kg	7.1		Lead	46.7	218	0.03
041M061001	11/16/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M061001	11/16/1995	mg/kg	0.385	U	Nickel	20.9	51.6	0.01
041M061001	11/16/1995	mg/kg	0.13	U	Silver	1	3.7	0.04
041M061001	11/16/1995	mg/kg	16.4		Zinc	150	410	0.04
041M061001	11/16/1995	g/kg	0.23		4,4'-DDE	2.2	27	0.01
041M061001	11/16/1995	g/kg	0.22		4,4'-DDT	1.58	46.1	0.00
041M061001	11/16/1995	g/kg	8.07		Total PCBs	22.7	180	0.04
041M061001	11/16/1995	g/kg	20	U	2-Methylnaphthalene	70	670	0.03
041M061001	11/16/1995	g/kg	9.5	U	Acenaphthene	16	500	0.02
041M061001	11/16/1995	g/kg	20	U	Acenaphthylene	44	640	0.03
041M061001	11/16/1995	g/kg	200	U	Anthracene	85.3	1,100	0.18
041M061001	11/16/1995	g/kg	20	U	Benzo(a)anthracene	261	1,600	0.01
041M061001	11/16/1995	g/kg	20	U	Benzo(a)pyrene	430	1,600	0.01
041M061001	11/16/1995	g/kg	20	U	Chrysene	384	2,800	0.01
041M061001	11/16/1995	g/kg	20	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M061001	11/16/1995	g/kg	20	U	Fluoranthene	600	5,100	0.00
041M061001	11/16/1995	g/kg	9.5	U	Fluorene	19	540	0.02
041M061001	11/16/1995	g/kg	20	U	Naphthalene	160	2,100	0.01
041M061001	11/16/1995	g/kg	20	U	Phenanthrene	240	1,500	0.01
041M061001	11/16/1995	g/kg	20	U	Pyrene	665	2,600	0.01
041M061001	11/16/1995				ERM Quotient Sum			0.78
041M061001	11/16/1995				Mean ERM Quotient			0.03
041M061001	11/16/1995				Mean ERM Quotient without ND			0.01
041M061001	11/16/1995				Mean ERM Quotient Category			1
041M061101	11/16/1995	mg/kg	0.3	J	Arsenic	8.2	70	0.00
041M061101	11/16/1995	mg/kg	0.72		Cadmium	1.2	9.6	0.08
041M061101	11/16/1995	mg/kg	22.4		Chromium	81	370	0.06
041M061101	11/16/1995	mg/kg	4		Copper	34	270	0.01
041M061101	11/16/1995	mg/kg	6		Lead	46.7	218	0.03
041M061101	11/16/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M061101	11/16/1995	mg/kg	0.96	J	Nickel	20.9	51.6	0.02
041M061101	11/16/1995	mg/kg	0.125	U	Silver	1	3.7	0.03
041M061101	11/16/1995	mg/kg	18.3		Zinc	150	410	0.04
041M061101	11/16/1995	g/kg	0.29		4,4'-DDE	2.2	27	0.01
041M061101	11/16/1995	g/kg	0.1	U	4,4'-DDT	1.58	46.1	0.00
041M061101	11/16/1995	g/kg	10.8		Total PCBs	22.7	180	0.06
041M061101	11/16/1995	g/kg	20	U	2-Methylnaphthalene	70	670	0.03
041M061101	11/16/1995	g/kg	9.5	U	Acenaphthene	16	500	0.02
041M061101	11/16/1995	g/kg	20	U	Acenaphthylene	44	640	0.03
041M061101	11/16/1995	g/kg	20	U	Anthracene	85.3	1,100	0.02
041M061101	11/16/1995	g/kg	20	U	Benzo(a)anthracene	261	1,600	0.01
041M061101	11/16/1995	g/kg	23	J	Benzo(a)pyrene	430	1,600	0.01
041M061101	11/16/1995	g/kg	20	U	Chrysene	384	2,800	0.01
041M061101	11/16/1995	g/kg	20	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M061101	11/16/1995	g/kg	20	U	Fluoranthene	600	5,100	0.00
041M061101	11/16/1995	g/kg	9.5	U	Fluorene	19	540	0.02
041M061101	11/16/1995	g/kg	20	U	Naphthalene	160	2,100	0.01
041M061101	11/16/1995	g/kg	20	U	Phenanthrene	240	1,500	0.01
041M061101	11/16/1995	g/kg	20	U	Pyrene	665	2,600	0.01
041M061101	11/16/1995				ERM Quotient Sum			0.65
041M061101	11/16/1995				Mean ERM Quotient			0.03
041M061101	11/16/1995				Mean ERM Quotient without ND			0.01
041M061101	11/16/1995				Mean ERM Quotient Category			1

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 11-2-10
Wetland 6 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	**2**	**3**	**95.5**	**95.5**	**95.5**	**263**	**287**	**406**	**041W060701**	**406**		**13**	**FDEP**	**31.2**	**Yes**	**Max Detect > SV**
Antimony	0	3	1	1	1	1			ND	1	UJ	160	EPA	0.01	No	Max SQL< SV
Arsenic	0	3	1	1	1	1			ND	1	U	50	FDEP	0.02	No	Max SQL< SV
Barium	2	3	5.8	5.8	5.8	17.4	15.9	30.5	041W061001	30.5	J		NA		Yes	No SV
Beryllium	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	0.13	FDEP	3.85	Yes	Max SQL > SV
Cadmium	0	3	1.5	1.5	1.5	1.5			ND	1.5	U	0.66	EPA	2.27	Yes	Max SQL > SV
Calcium	3	3				20,700	18,300	24,700	041W060701	24,700			NA		Yes	No SV
Chromium	0	3	4	4	4	4			ND	4	U	11	EPA	0.36	No	Max SQL< SV
Cobalt	0	3	1.5	1.5	1.5	1.5			ND	1.5	UJ		NA		Yes	No SV
Copper	0	3	2.67	2	4	2.67			ND	4	U	6.54	EPA	0.61	No	Max SQL< SV
Cyanide (CN)	**1**	**3**	**2.5**	**2.5**	**2.5**	**3.53**	**5.6**	**5.6**	**041W061001**	**5.6**	**J**	**5.2**	**EPA**	**1.08**	**Yes**	**Max Detect > SV**
Iron	3	3				527	334	870	041W061001	870	J		NA		Yes	No SV
Lead	**2**	**3**	**0.5**	**0.5**	**0.5**	**1.6**	**1.2**	**3.1**	**041W061001**	**3.1**	**J**	**1.32**	**EPA**	**2.35**	**Yes**	**Max Detect > SV**
Magnesium	3	3				2,610	1,910	3,480	041W060701	3,480	J		NA		Yes	No SV
Manganese	3	3				36.2	19.5	55.7	041W061001	55.7			NA		Yes	No SV
Mercury	**1**	**3**	**0.065**	**0.065**	**0.065**	**0.337**	**0.88**	**0.88**	**041W061001**	**0.88**		**0.012**	**EPA**	**73.3**	**Yes**	**Max Detect > SV**
Nickel	0	3	6	6	6	6			ND	6	U	87.71	EPA	0.07	No	Max SQL< SV
Potassium	3	3				2,160	1,520	3,050	041W060701	3,050	J		NA		Yes	No SV
Selenium	0	3	1.5	1.5	1.5	1.5			ND	1.5	U	5	EPA	0.3	No	Max SQL< SV
Silver	0	3	2	2	2	2			ND	2	U	0.012	EPA	167	Yes	Max SQL > SV
Sodium	3	3				12,000	10,300	13,800	041W060301	13,800			NA		Yes	No SV
Thallium	1	3	1.5	1.5	1.5	2.1	3.3	3.3	041W060701	3.3	J	4	EPA	0.83	No	Max Detect < SV
Vanadium	2	3	1.9	1.9	1.9	2.1	2.1	2.3	041W060701	2.3	J		NA		Yes	No SV
Zinc	0	3	10.1	5.4	19.35	10.1			ND	19.35	U	58.91	EPA	0.33	No	Max SQL< SV
Pesticides (g/L)																
Aldrin	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.056	EPA	0.45	No	Max SQL< SV
Endosulfan II	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	6.58	Yes	Max SQL > SV
Heptachlor epoxide	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	3	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	11.6	Yes	Max SQL > SV
Endrin	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	3	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
beta-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	No	Max SQL< SV
Total BHC	0	3	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	3	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	3	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Table 11-2-10
Wetland 6 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
PCBs (g/L) - cont.																
Aroclor-1260	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	35.7	Yes	Max SQL > SV
Total PCB	0	3	4	4	4	4			ND	4	U		NA		Yes	No SV
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlo	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chloronaphthalene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chlorophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U	43.8	EPA	0.06	No	Max SQL< SV
2-Methyl-4,6-Dinitrophenol	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitroaniline	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitrophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3-Nitroaniline	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloroaniline	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Nitroaniline	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Nitrophenol	0	3	10	10	10	10			ND	10	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**1**	**3**	**2.5**	**2.5**	**2.5**	**2.67**	**3**	**3**	**041W061001**	**3**	**J**	**0.3**	**EPA**	**10**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dibenzofuran	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Diethylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dimethylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Di-n-butylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U	9.4	EPA	0.27	No	Max SQL< SV
Di-n-octylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobenzene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Hexachlorobutadiene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachloroethane	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Isophorone	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Nitrobenzene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pentachlorophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Phenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthylene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Anthracene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)anthracene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)pyrene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Table 11-2-10
Wetland 6 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
PAHs (g/L) - cont.																
Chrysene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluoranthene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluorene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Naphthalene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	26	FDEP	0.02	No	Max SQL< SV
Phenanthrene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Pyrene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Total PAH	0	3	6.5	6.5	6.5	6.5			ND	6.5	U		NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	1	3	0.5	0.5	0.5	2	5	5	041W061001	5		270	FDEP	0.02	No	Max Detect < SV
1,1,2,2-Tetrachloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	1	3	0.5	0.5	0.5	2	5	5	041W061001	5			NA		Yes	No SV
1,1-Dichloroethene	**1**	**3**	**0.5**	**0.5**	**0.5**	**3**	**8**	**8**	**041W061001**	**8**		**3.2**	**FDEP**	**2.5**	**Yes**	**Max Detect > SV**
1,2-Dibromo-3-Chloropropane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	15.8	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloropropane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	3	FDEP	0.17	No	Max SQL< SV
2-Butanone (MEK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Hexanone	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Acetone	0	1	8.5	8.5	8.5	8.5			ND	8.5	U		NA		Yes	No SV
Benzene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	53	EPA	0.01	No	Max SQL< SV
Bromochloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	17	FDEP	0.03	No	Max SQL< SV
Chloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	289	EPA	0.00	No	Max SQL< SV
Chloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,2-Dichloroethene	1	3	0.5	0.5	0.5	1	2	2	041W061001	2			NA		Yes	No SV
cis-1,3-Dichloropropene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	453	EPA	0.00	No	Max SQL< SV
Methylene chloride	1	3	2	0.5	3.5	5.67	13	13	041W060701	13		1,580	FDEP	0.01	No	Max Detect < SV
Styrene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	175	EPA	0.00	No	Max SQL< SV
trans-1,2-Dichloroethene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	1	3	0.5	0.5	0.5	0.667	1	1	041W061001	1			NA		Yes	No SV
Vinyl chloride	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value

Table 11-2-11
Wetland 6 Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	None	bis(2-Ethylhexyl)phthalate (BEHP)	cis-1,2-Dichloroethene
Barium			1,1-Dichloroethane
Calcium			1,1-Dichloroethene
Cyanide (CN)			Trichloroethene
Iron			
Lead			
Magnesium			
Manganese			
Mercury			
Potassium			
Sodium			
Vanadium			
		Not Detected Parameters	
Beryllium	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Cadmium	Dieldrin	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1,2-Trichloroethane
Cobalt	Endosulfan II	2,4,5-Trichlorophenol	1,2-Dibromo-3-Chloropropane
Silver	Endosulfan sulfate	2,4,6-Trichlorophenol	1,2-Dibromoethane
	Heptachlor	2,4-Dichlorophenol	1,2-Dichloroethane
	Heptachlor epoxide	2,4-Dimethylphenol	1,2-Dichloropropane
	Methoxychlor	2,4-Dinitrophenol	1,3-Dichlorobenzene
	Toxaphene	2,4-Dinitrotoluene	2-Butanone (MEK)
	alpha-Chlordane	2,6-Dinitrotoluene	2-Hexanone
	gamma-Chlordane	2-Chloronaphthalene	4-Methyl-2-Pentanone (MIBK)
	Total Chlordane	2-Methyl-4,6-Dinitrophenol	Acetone
	Endrin	2-Methylphenol (o-Cresol)	Bromochloromethane
	Endrin aldehyde	2-Nitroaniline	Bromodichloromethane
	Endrin ketone	2-Nitrophenol	Bromoform
	Total Endrin	3,3'-Dichlorobenzidine	Bromomethane
	alpha-BHC	3-Nitroaniline	Carbon disulfide
	beta-BHC	4-Bromophenyl-phenylether	Carbon tetrachloride
	delta-BHC	4-Chloro-3-methylphenol	Chloroethane
	Total BHC	4-Chloroaniline	Chloromethane
	4,4'-DDD	4-Chlorophenylphenyl ether	cis-1,3-Dichloropropene
	4,4'-DDE	4-Methylphenol (p-Cresol)	Dibromochloromethane
	4,4'-DDT	4-Nitroaniline	Styrene
	Total DDT	4-Nitrophenol	Tetrachloroethene
	Aroclor-1016	Benzo(b)fluoranthene	trans-1,2-Dichloroethene
	Aroclor-1221	Benzo(g,h,i)perylene	trans-1,3-Dichloropropene
	Aroclor-1232	Benzo(k)fluoranthene	Vinyl chloride
	Aroclor-1242	bis(2-Chloroethoxy)methane	Xylene (Total)
	Aroclor-1248	bis(2-Chloroethyl)ether	
	Aroclor-1254	Butylbenzylphthalate	
	Aroclor-1260	Dibenzofuran	
	Total PCBs	Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 11-2-12
Wetland 6 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Metals (g/L)																			
Aluminum	**2**	**3**	**95.5**	**95.5**	**95.5**	**263**	**287**	**406**	**041W060701**	**406**		**13**	**FDEP**	**31.23**	**20.2**	**1,090.25**	**0**	**No**	**Max Result < Ref. Conc.**
Barium	2	3	5.8	5.8	5.8	17.4	15.9	30.5	041W061001	30.5	J		NA			3.68	3	Yes	Max Result > Ref. Conc.
Beryllium	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	0.13	FDEP	4	3.85	1	0	No	Parameter Not Detected
Cadmium	0	3	1.5	1.5	1.5	1.5			ND	1.5	U	0.66	EPA	2.27	2.27	3	0	No	Parameter Not Detected
Calcium	3	3				20,700	18,300	24,700	041W060701	24,700			NA			7,675	3	No	Essential Nutrient
Cobalt	0	3	1.5	1.5	1.5	1.5			ND	1.5	UJ		NA			3	0	No	Parameter Not Detected
Cyanide (CN)	**1**	**3**	**2.5**	**2.5**	**2.5**	**3.53**	**5.6**	**5.6**	**041W061001**	**5.6**	**J**	**5.2**	**EPA**	**1.08**	**0.68**	**5**	**1**	**Yes**	**Max Result > Ref. Conc.**
Iron	3	3				527	334	870	041W061001	870	J		NA			2,360	0	No	Max Result < Ref. Conc.
Lead	**2**	**3**	**0.5**	**0.5**	**0.5**	**1.6**	**1.2**	**3.1**	**041W061001**	**3.1**	**J**	**1.32**	**EPA**	**2.35**	**1.21**	**3.2**	**0**	**No**	**Max Result < Ref. Conc.**
Magnesium	3	3				2,610	1,910	3,480	041W060701	3,480	J		NA			20,260	0	No	Max Result < Ref. Conc.
Manganese	3	3				36.2	19.5	55.7	041W061001	55.7			NA			13.2	3	Yes	Max Result > Ref. Conc.
Mercury	**1**	**3**	**0.065**	**0.065**	**0.065**	**0.337**	**0.88**	**0.88**	**041W061001**	**0.88**		**0.012**	**EPA**	**73.33**	**28.1**	**0.13**	**1**	**Yes**	**Max Result > Ref. Conc.**
Potassium	3	3				2,160	1,520	3,050	041W060701	3,050	J		NA			6,995	0	No	Max Result < Ref. Conc.
Silver	0	3	2	2	2	2			ND	2	U	0.012	EPA	167	167	4	0	No	Parameter Not Detected
Sodium	3	3				12,000	10,300	13,800	041W060301	13,800			NA			182,200	0	No	Max Result < Ref. Conc.
Vanadium	2	3	1.9	1.9	1.9	2.1	2.1	2.3	041W060701	2.3	J		NA			4.7	0	No	Max Result < Ref. Conc.
Pesticides (g/L)																			
Aldrin	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Dieldrin	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan II	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan sulfate	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Heptachlor	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	7	6.58		0	No	Parameter Not Detected
Heptachlor epoxide	0	3	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	No	Parameter Not Detected
Methoxychlor	0	3	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	No	Parameter Not Detected
Toxaphene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
alpha-Chlordane	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
gamma-Chlordane	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Total Chlordane	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	12	11.6		0	No	Parameter Not Detected
Endrin	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin aldehyde	0	3	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin ketone	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22	21.7		0	No	Parameter Not Detected
Total Endrin	0	3	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
alpha-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
beta-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
delta-BHC	0	3	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Total BHC	0	3	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	No	Parameter Not Detected
4,4'-DDD	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	No	Parameter Not Detected
4,4'-DDE	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	No	Parameter Not Detected
4,4'-DDT	0	3	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85	84.7		0	No	Parameter Not Detected
Total DDT	0	3	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
PCBs (g/L)																			
Aroclor-1016	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1221	0	3	1	1	1	1			ND	1	U		NA				0	No	Parameter Not Detected
Aroclor-1232	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1242	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1248	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1254	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1260	0	3	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	36	35.7		0	No	Parameter Not Detected
Total PCB	0	3	4	4	4	4			ND	4	U		NA				0	No	Parameter Not Detected
SVOCs (g/L)																			
1,2,4-Trichlorobenzene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	3	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dichlorophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dimethylphenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dinitrophenol	0	3	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Chloronaphthalene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	3	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Nitroaniline	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Nitrophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
3-Nitroaniline	0	3	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chloroaniline	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Nitroaniline	0	3	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
4-Nitrophenol	0	3	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected

Table 11-2-12
Wetland 6 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Benzo(g,h,i)perylene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Metals (g/L) - cont.																			
Benzo(k)fluoranthene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	**1**	**3**	**2.5**	**2.5**	**2.5**	**2.67**	**3**	**3**	**041W061001**	**3**	**J**	**0.3**	**EPA**	**10**	**8.89**		**0**	**Yes**	**Max Result > SV**
Butylbenzylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Dibenzofuran	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Diethylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Dimethylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Di-n-octylphthalate	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorobenzene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Hexachlorobutadiene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachloroethane	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Isophorone	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Nitrobenzene	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Pentachlorophenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Phenol	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
PAHs (g/L)																			
2-Methylnaphthalene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Acenaphthene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Acenaphthylene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Anthracene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(a)anthracene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(a)pyrene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chrysene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Fluoranthene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Fluorene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Phenanthrene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Pyrene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Total PAH	0	3	6.5	6.5	6.5	6.5			ND	6.5	U		NA				0	No	Parameter Not Detected
VOCs (g/L)																			
1,1,2,2-Tetrachloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,1-Dichloroethane	1	3	0.5	0.5	0.5	2	5	5	041W061001	5			NA				0	Yes	No SV
1,1-Dichloroethene	**1**	**3**	**0.5**	**0.5**	**0.5**	**3**	**8**	**8**	**041W061001**	**8**		**3.2**	**FDEP**	**2.5**	**0.94**	**NA**		Yes	Max Result > SV
1,2-Dibromo-3-Chloropropane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dibromoethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dichloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dichloropropane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
2-Butanone (MEK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Hexanone	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	3	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Acetone	0	1	8.5	8.5	8.5	8.5			ND	8.5	U		NA				0	No	Parameter Not Detected
Bromochloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromodichloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromoform	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromomethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Carbon disulfide	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Carbon tetrachloride	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chloroethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
cis-1,2-Dichloroethene	1	3	0.5	0.5	0.5	1	2	2	041W061001	2			NA				0	Yes	No SV
cis-1,3-Dichloropropene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Dibromochloromethane	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Styrene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Tetrachloroethene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Trichloroethene	1	3	0.5	0.5	0.5	0.667	1	1	041W061001	1			NA				0	Yes	No SV
Vinyl chloride	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Xylene (Total)	0	3	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections
Parameters in bold were detected and exceeded Ref. Conc.s

Table 11-2-13
Wetland 6 Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Cyanide (CN)	None	bis(2-Ethylhexyl)phthalate (BEHP)	cis-1,2-Dichloroethene
Manganese			1,1-Dichloroethene
Mercury			1,1-Dichloroethane
Barium			Trichloroethene

Table 11-2-14
Wetland 6 Phase IV
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	**1**	**1**				**1,200**	**1,200**	**1,200**	**041W061002**	**1,200**		**13**	**FDEP**	**92.3**	**Yes**	**Max Detect > SV**
Antimony	0	1	1.95	1.95	1.95	1.95			ND	1.95	U	160	EPA	0.01	No	Max SQL< SV
Arsenic	1	1				5.7	5.7	5.7	041W061002	5.7	I	50	FDEP	0.11	No	Max Detect < SV
Barium	1	1				46	46	46	041W061002	46			NA		Yes	No SV
Beryllium	**1**	**1**				**0.34**	**0.34**	**0.34**	**041W061002**	**0.34**	**I**	**0.13**	**FDEP**	**2.62**	**Yes**	**Max Detect > SV**
Cadmium	**1**	**1**				**2.5**	**2.5**	**2.5**	**041W061002**	**2.5**	**I**	**0.66**	**EPA**	**3.79**	**Yes**	**Max Detect > SV**
Calcium	1	1				30,000	30,000	30,000	041W061002	30,000			NA		Yes	No SV
Chromium	**1**	**1**				**21**	**21**	**21**	**041W061002**	**21**		**11**	**EPA**	**1.91**	**Yes**	**Max Detect > SV**
Cobalt	0	1	0.6	0.6	0.6	0.6			ND	0.6	U		NA		Yes	No SV
Copper	**1**	**1**				**19**	**19**	**19**	**041W061002**	**19**	**I**	**6.54**	**EPA**	**2.91**	**Yes**	**Max Detect > SV**
Iron	1	1				3,300	3,300	3,300	041W061002	3,300			NA		Yes	No SV
Lead	**1**	**1**				**40**	**40**	**40**	**041W061002**	**40**		**1.32**	**EPA**	**30.3**	**Yes**	**Max Detect > SV**
Magnesium	1	1				3,800	3,800	3,800	041W061002	3,800			NA		Yes	No SV
Manganese	1	1				110	110	110	041W061002	110			NA		Yes	No SV
Mercury	0	1	0.039	0.039	0.039	0.039			ND	0.039	U	0.012	EPA	3.25	Yes	Max SQL > SV
Nickel	1	1				2.5	2.5	2.5	041W061002	2.5	I	87.71	EPA	0.03	No	Max Detect < SV
Potassium	1	1				2,400	2,400	2,400	041W061002	2,400			NA		Yes	No SV
Selenium	**1**	**1**				**6.9**	**6.9**	**6.9**	**041W061002**	**6.9**	**I**	**5**	**EPA**	**1.38**	**Yes**	**Max Detect > SV**
Silver	0	1	0.55	0.55	0.55	0.55			ND	0.55	U	0.012	EPA	45.8	Yes	Max SQL > SV
Sodium	1	1				13,000	13,000	13,000	041W061002	13,000			NA		Yes	No SV
Thallium	0	1	3.8	3.8	3.8	3.8			ND	3.8	U	4	EPA	0.95	No	Max SQL< SV
Vanadium	1	1				3.4	3.4	3.4	041W061002	3.4	I		NA		Yes	No SV
Zinc	**1**	**1**				**78**	**78**	**78**	**041W061002**	**78**		**58.91**	**EPA**	**1.32**	**Yes**	**Max Detect > SV**
VOCs (g/L)																
1,1,1-Trichloroethane	0	1	0.16	0.16	0.16	0.16			ND	0.16	U	270	FDEP	0.00	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	1	0.09	0.09	0.09	0.09			ND	0.09	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	1	0.11	0.11	0.11	0.11			ND	0.11	U		NA		Yes	No SV
1,1-Dichloroethane	1	1				0.8	0.8	0.8	041W061002	0.8	I		NA		Yes	No SV
1,1-Dichloroethene	1	1				0.98	0.98	0.98	041W061002	0.98	I	3.2	FDEP	0.31	No	Max Detect < SV
1,2-Dichloroethane	0	1	0.13	0.13	0.13	0.13			ND	0.13	U		NA		Yes	No SV
1,2-Dichloropropane	0	1	0.165	0.165	0.165	0.165			ND	0.165	U		NA		Yes	No SV
2-Butanone (MEK)	0	1	2.8	2.8	2.8	2.8			ND	2.8	U		NA		Yes	No SV
2-Hexanone	0	1	0.465	0.465	0.465	0.465			ND	0.465	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	0.325	0.325	0.325	0.325			ND	0.325	U		NA		Yes	No SV
Acetone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzene	0	1	0.18	0.18	0.18	0.18			ND	0.18	U	53	EPA	0.00	No	Max SQL< SV
Bromodichloromethane	0	1	0.07	0.07	0.07	0.07			ND	0.07	U		NA		Yes	No SV
Bromoform	0	1	0.165	0.165	0.165	0.165			ND	0.165	U		NA		Yes	No SV
Bromomethane	0	1	0.31	0.31	0.31	0.31			ND	0.31	U		NA		Yes	No SV
Carbon disulfide	0	1	0.33	0.33	0.33	0.33			ND	0.33	U		NA		Yes	No SV
Carbon tetrachloride	0	1	0.155	0.155	0.155	0.155			ND	0.155	U		NA		Yes	No SV
Chlorobenzene	1	1				11	11	11	041W061002	11		17	FDEP	0.65	No	Max Detect < SV
Chloroethane	0	1	0.39	0.39	0.39	0.39			ND	0.39	U		NA		Yes	No SV
Chloroform	0	1	0.185	0.185	0.185	0.185			ND	0.185	U	289	EPA	0.00	No	Max SQL< SV
Chloromethane	0	1	0.195	0.195	0.195	0.195			ND	0.195	U		NA		Yes	No SV
cis-1,2-Dichloroethene	1	1				5.1	5.1	5.1	041W061002	5.1			NA		Yes	No SV
cis-1,3-Dichloropropene	0	1	0.115	0.115	0.115	0.115			ND	0.115	U		NA		Yes	No SV
Dibromochloromethane	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Ethylbenzene	0	1	0.17	0.17	0.17	0.17			ND	0.17	U	453	EPA	0.00	No	Max SQL< SV
Methylene chloride	0	1	0.32	0.32	0.32	0.32			ND	0.32	U	1580	FDEP	0.00	No	Max SQL< SV
Styrene	0	1	0.125	0.125	0.125	0.125			ND	0.125	U		NA		Yes	No SV
Tetrachloroethene	0	1	0.175	0.175	0.175	0.175			ND	0.175	U		NA		Yes	No SV
Toluene	0	1	0.27	0.27	0.27	0.27			ND	0.27	U	175	EPA	0.00	No	Max SQL< SV
trans-1,2-Dichloroethene	0	1	0.2	0.2	0.2	0.2			ND	0.2	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	1	0.13	0.13	0.13	0.13			ND	0.13	U		NA		Yes	No SV
Trichloroethene	1	1				1.3	1.3	1.3	041W061002	1.3			NA		Yes	No SV
Vinyl chloride	0	1	0.28	0.28	0.28	0.28			ND	0.28	U		NA		Yes	No SV
Xylene (Total)	0	1	0.65	0.65	0.65	0.65			ND	0.65	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8)
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 11-2-15
Wetland 6 Phase IV
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs	VOCs
		Detected Parameters	
Aluminum	Not Analyzed	Not Analyzed	cis-1,2-Dichloroethene
Barium			1,1-Dichloroethane
Beryllium			Trichloroethene
Cadmium			
Calcium			
Chromium			
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Potassium			
Selenium			
Sodium			
Vanadium			
Zinc			
		Not Detected Parameters	
Cobalt	Not Analyzed	Not Analyzed	1,1,2,2-Tetrachloroethane
Mercury			1,1,2-Trichloroethane
Silver			1,2-Dichloroethane
			1,2-Dichloropropane
			2-Butanone (MEK)
			2-Hexanone
			4-Methyl-2-Pentanone (MIBK)
			Acetone
			Bromodichloromethane
			Bromoform
			Bromomethane
			Carbon disulfide
			Carbon tetrachloride
			Chloroethane
			Chloromethane
			cis-1,3-Dichloropropene
			Dibromochloromethane
			Styrene
			Tetrachloroethene
			trans-1,2-Dichloroethene
			trans-1,3-Dichloropropene
			Vinyl chloride
			Xylene (Total)

Table 11-2-16
Wetland 6 Phase IV
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Metals (g/L)																			
Aluminum	**1**	**1**				**1,200**	**1,200**	**1,200**	**041W061002**	**1,200**		**13**	**FDEP**	**92.31**	**92.3**	**1,090.25**	**1**	**Yes**	**Max Result > Ref. Conc.**
Barium	1	1				46	46	46	041W061002	46			NA			3.68	1	Yes	Max Result > Ref. Conc.
Beryllium	**1**	**1**				**0.34**	**0.34**	**0.34**	**041W061002**	**0.34**	**I**	**0.13**	**FDEP**	**3**	**2.62**	**1**	**0**	**No**	**Max Result < Ref. Conc.**
Cadmium	**1**	**1**				**2.5**	**2.5**	**2.5**	**041W061002**	**2.5**	**I**	**0.66**	**EPA**	**4**	**3.79**	**3**	**0**	**No**	**Max Result < Ref. Conc.**
Calcium	1	1				30,000	30,000	30,000	041W061002	30,000			NA			7,675	1	No	Essential Nutrient
Chromium	**1**	**1**				**21**	**21**	**21**	**041W061002**	**21**		**11**	**EPA**	**2**	**1.91**	**8**	**1**	**Yes**	**Max Result > Ref. Conc.**
Cobalt	0	1	0.6	0.6	0.6	0.6			ND	0.6	U		NA			3	0	No	Parameter Not Detected
Copper	**1**	**1**				**19**	**19**	**19**	**041W061002**	**19**	**I**	**6.54**	**EPA**	**3**	**2.91**	**4**	**1**	**Yes**	**Max Result > Ref. Conc.**
Iron	1	1				3,300	3,300	3,300	041W061002	3,300			NA			2,360	1	Yes	Max Result > Ref. Conc.
Lead	**1**	**1**				**40**	**40**	**40**	**041W061002**	**40**		**1.32**	**EPA**	**30.30**	**30.3**	**3.2**	**1**	**Yes**	**Max Result > Ref. Conc.**
Magnesium	1	1				3,800	3,800	3,800	041W061002	3,800			NA			20,260	0	No	Max Result < Ref. Conc.
Manganese	1	1				110	110	110	041W061002	110			NA			13.2	1	Yes	Max Result > Ref. Conc.
Mercury	0	1	0.039	0.039	0.039	0.039			ND	0.039	U	0.012	EPA	3.25	3.25	0.13	0	No	Parameter Not Detected
Potassium	1	1				2,400	2,400	2,400	041W061002	2,400			NA			6,995	0	No	Max Result < Ref. Conc.
Selenium	**1**	**1**				**6.9**	**6.9**	**6.9**	**041W061002**	**6.9**	**I**	**5**	**EPA**	**1.38**	**1.38**	**3**	**1**	**Yes**	**Max Result > Ref. Conc.**
Silver	0	1	0.55	0.55	0.55	0.55			ND	0.55	U	0.012	EPA	46	45.8	4	0	No	Parameter Not Detected
Sodium	1	1				13,000	13,000	13,000	041W061002	13,000			NA			182,200	0	No	Max Result < Ref. Conc.
Vanadium	1	1				3.4	3.4	3.4	041W061002	3.4	I		NA			4.7	0	No	Max Result < Ref. Conc.
Zinc	**1**	**1**				**78**	**78**	**78**	**041W061002**	**78**		**58.91**	**EPA**	**1.32**	**1.32**	**5.53**	**1**	**Yes**	**Max Result > Ref. Conc.**
VOCs (g/L)																			
1,1,2,2-Tetrachloroethane	0	1	0.09	0.09	0.09	0.09			ND	0.09	U		NA				0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	0.11	0.11	0.11	0.11			ND	0.11	U		NA				0	No	Parameter Not Detected
1,1-Dichloroethane	1	1				0.8	0.8	0.8	041W061002	0.8	I		NA				0	Yes	No SV
1,2-Dichloroethane	0	1	0.13	0.13	0.13	0.13			ND	0.13	U		NA				0	No	Parameter Not Detected
1,2-Dichloropropane	0	1	0.165	0.165	0.165	0.165			ND	0.165	U		NA				0	No	Parameter Not Detected
2-Butanone (MEK)	0	1	2.8	2.8	2.8	2.8			ND	2.8	U		NA				0	No	Parameter Not Detected
2-Hexanone	0	1	0.465	0.465	0.465	0.465			ND	0.465	U		NA				0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	0.325	0.325	0.325	0.325			ND	0.325	U		NA				0	No	Parameter Not Detected
Acetone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Bromodichloromethane	0	1	0.07	0.07	0.07	0.07			ND	0.07	U		NA				0	No	Parameter Not Detected
Bromoform	0	1	0.165	0.165	0.165	0.165			ND	0.165	U		NA				0	No	Parameter Not Detected
Bromomethane	0	1	0.31	0.31	0.31	0.31			ND	0.31	U		NA				0	No	Parameter Not Detected
Carbon disulfide	0	1	0.33	0.33	0.33	0.33			ND	0.33	U		NA				0	No	Parameter Not Detected
Carbon tetrachloride	0	1	0.155	0.155	0.155	0.155			ND	0.155	U		NA				0	No	Parameter Not Detected
Chloroethane	0	1	0.39	0.39	0.39	0.39			ND	0.39	U		NA				0	No	Parameter Not Detected
Chloromethane	0	1	0.195	0.195	0.195	0.195			ND	0.195	U		NA				0	No	Parameter Not Detected
cis-1,2-Dichloroethene	1	1				5.1	5.1	5.1	041W061002	5.1			NA				0	Yes	No SV
cis-1,3-Dichloropropene	0	1	0.115	0.115	0.115	0.115			ND	0.115	U		NA				0	No	Parameter Not Detected
Dibromochloromethane	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	No	Parameter Not Detected
Styrene	0	1	0.125	0.125	0.125	0.125			ND	0.125	U		NA				0	No	Parameter Not Detected
Tetrachloroethene	0	1	0.175	0.175	0.175	0.175			ND	0.175	U		NA				0	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	1	0.2	0.2	0.2	0.2			ND	0.2	U		NA				0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	0.13	0.13	0.13	0.13			ND	0.13	U		NA				0	No	Parameter Not Detected
Trichloroethene	1	1				1.3	1.3	1.3	041W061002	1.3			NA				0	Yes	No SV
Vinyl chloride	0	1	0.28	0.28	0.28	0.28			ND	0.28	U		NA				0	No	Parameter Not Detected
Xylene (Total)	0	1	0.65	0.65	0.65	0.65			ND	0.65	U		NA				0	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 11-2-17
Wetland 6 Phase IV
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	Not Analyzed	Not Analyzed	cis-1,2-Dichloroethene
Iron			1,1-Dichloroethane
Lead			Trichloroethene
Manganese			
Barium			
Chromium			
Copper			
Zinc			
Selenium			

Table 11-2-18
Wetland 6 Phase II
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	2.9E+02	=	4.1E+02	=	UG/L	041W060701	2 / 3	N/A / 1.9E+02	2.6E+02	4.1E-04	1.0E-03	1.06E-06	1.67E-05	2.23E-05
7440393	Barium	N	1.6E+01	J	3.1E+01	J	UG/L	041W061001	2 / 3	N/A / 1.2E+01	1.7E+01	3.1E-05	1.0E-03	7.93E-08	1.26E-06	1.68E-06
57125	Cyanide (CN)	N	N/A	N/A	5.6E+00	J	UG/L	041W061001	1 / 3	5.0E+00 / 5.0E+00	3.5E+00	5.6E-06	1.0E-03	1.46E-08	2.30E-07	3.08E-07
7439921	Lead	N	1.2E+00	J	3.1E+00	J	UG/L	041W061001	2 / 3	N/A / 1.0E+00	1.6E+00	3.1E-06	3.4E-04	2.74E-09	4.34E-08	5.80E-08
7439965	Manganese	N	2.0E+01	=	5.6E+01	=	UG/L	041W061001	3 / 3	NAV	3.6E+01	5.6E-05	1.0E-03	1.45E-07	2.29E-06	3.07E-06
7487947	Mercury	N	N/A	N/A	8.8E-01	=	UG/L	041W061001	1 / 3	1.3E-01 / 1.3E-01	3.4E-01	8.8E-07	1.0E-03	2.29E-09	3.62E-08	4.84E-08
7440622	Vanadium	N	2.1E+00	J	2.3E+00	J	UG/L	041W060701	2 / 3	N/A / 3.8E+00	2.1E+00	2.3E-06	1.0E-03	5.98E-09	9.47E-08	1.27E-07
117817	bis(2-Ethylhexyl)phthalate (BEHP)	C	N/A	N/A	3.0E+00	J	UG/L	041W061001	1 / 3	5.0E+00 / 5.0E+00	2.7E+00	3.0E-06	2.5E-02	2.52E-06	5.69E-06	1.90E-05
71556	1,1,1-Trichloroethane	N	N/A	N/A	5.0E+00	=	UG/L	041W061001	1 / 3	1.0E+00 / 1.0E+00	2.0E+00	5.0E-06	6.7E-03	1.13E-07	1.78E-06	2.38E-06
75343	1,1-Dichloroethane	N	N/A	N/A	5.0E+00	=	UG/L	041W061001	1 / 3	1.0E+00 / 1.0E+00	2.0E+00	5.0E-06	6.7E-03	1.11E-07	1.76E-06	2.35E-06
75354	1,1-Dichloroethene	N	N/A	N/A	8.0E+00	=	UG/L	041W061001	1 / 3	1.0E+00 / 1.0E+00	3.0E+00	8.0E-06	1.2E-02	3.21E-07	5.08E-06	6.79E-06
156592	cis-1,2-Dichloroethene	N	N/A	N/A	2.0E+00	=	UG/L	041W061001	1 / 3	1.0E+00 / 1.0E+00	1.0E+00	2.0E-06	1.5E-02	9.67E-08	1.53E-06	2.05E-06
75092	Methylene chloride	C	N/A	N/A	1.3E+01	=	UG/L	041W060701	1 / 3	1.0E+00 / 7.0E+00	5.7E+00	1.3E-05	3.5E-03	1.46E-07	3.31E-07	1.11E-06
79016	Trichloroethene	C	N/A	N/A	1.0E+00	=	UG/L	041W061001	1 / 3	1.0E+00 / 1.0E+00	6.7E-01	1.0E-06	1.2E-02	4.37E-08	9.87E-08	3.30E-07

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound,
calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 11-2-19
Wetland 6 Phase II
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	4.1E-04	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	1.7E-04	N/A	2.2E-04	N/A
	Barium	N	3.1E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	2.6E-04	N/A	3.4E-04	N/A
	Cyanide (CN)	N	5.6E-06	2.0E-02	N/A	1.7E-01	3	3.4E-03	N/A	6.8E-05	N/A	9.1E-05	N/A
	Lead	N	3.1E-06	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	5.6E-05	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	4.1E-04	N/A	5.5E-04	N/A
	Mercury	N	8.8E-07	3.0E-04	N/A	7.0E-02	1	2.1E-05	N/A	1.7E-03	N/A	2.3E-03	N/A
	Vanadium	N	2.3E-06	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	5.2E-04	N/A	7.0E-04	N/A
	bis(2-Ethylhexyl)phthalate (BEHP)	C	3.0E-06	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	2.8E-03	8.0E-07	9.5E-03	**2.7E-06**
	1,1,1-Trichloroethane	N	5.0E-06	2.8E-01	N/A	9.0E-01	3	2.5E-01	N/A	7.1E-06	N/A	9.5E-06	N/A
	1,1-Dichloroethane	N	5.0E-06	1.0E-01	N/A	1.0E+00	3	1.0E-01	N/A	1.8E-05	N/A	2.3E-05	N/A
	1,1-Dichloroethene	N	8.0E-06	5.0E-02	N/A	1.0E+00	3	5.0E-02	N/A	1.0E-04	N/A	1.4E-04	N/A
	cis-1,2-Dichloroethene	N	2.0E-06	1.0E-02	N/A	1.0E+00	3	1.0E-02	N/A	1.5E-04	N/A	2.0E-04	N/A
	Methylene chloride	C	1.3E-05	6.0E-02	7.5E-03	1.0E-01	3	6.1E-03	7.4E-02	5.5E-05	2.5E-08	1.8E-04	8.2E-08
	Trichloroethene	C	1.0E-06	3.0E-04	4.0E-01	8.0E-01	3	2.4E-04	5.0E-01	4.1E-04	4.9E-08	1.4E-03	1.7E-07

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 11-2-20
Wetland 6 Phase II
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser Ingestion Hazard Quotient	Child Trespasser Ingestion Cancer Risk	Maintenance Worker Ingestion Hazard Quotient	Maintenance Worker Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	4.1E-04	1.0E+00	N/A	1.3E-08	N/A	8.3E-09	N/A
	Barium	N	3.1E-05	7.0E-02	N/A	1.4E-08	N/A	8.9E-09	N/A
	Cyanide (CN)	N	5.6E-06	2.0E-02	N/A	8.9E-09	N/A	5.7E-09	N/A
	Lead	N	3.1E-06	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	5.6E-05	1.4E-01	N/A	1.3E-08	N/A	8.1E-09	N/A
	Mercury	N	8.8E-07	3.0E-04	N/A	9.3E-08	N/A	6.0E-08	N/A
	Vanadium	N	2.3E-06	7.0E-03	N/A	1.0E-08	N/A	6.7E-09	N/A
	bis(2-Ethylhexyl)phthalate (BEHP)	C	3.0E-06	2.0E-02	1.4E-02	6.8E-10	1.9E-13	1.1E-09	3.1E-13
	1,1,1-Trichloroethane	N	5.0E-06	2.8E-01	N/A	5.7E-10	N/A	3.6E-10	N/A
	1,1-Dichloroethane	N	5.0E-06	1.0E-01	N/A	1.6E-09	N/A	1.0E-09	N/A
	1,1-Dichloroethene	N	8.0E-06	5.0E-02	N/A	5.1E-09	N/A	3.3E-09	N/A
	cis-1,2-Dichloroethene	N	2.0E-06	1.0E-02	N/A	6.3E-09	N/A	4.1E-09	N/A
	Methylene chloride	C	1.3E-05	6.0E-02	7.5E-03	9.8E-10	4.4E-13	1.6E-09	7.1E-13
	Trichloroethene	C	1.0E-06	3.0E-04	4.0E-01	1.5E-08	1.8E-12	2.4E-08	2.9E-12

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 11-2-21
Wetland 6 Phase IV
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	N/A	N/A	1.2E+03	=	UG/L	041W061002	1 / 1	NAV	1.2E+03	1.2E-03	1.0E-03	3.12E-06	4.94E-05	6.60E-05
7440393	Barium	N	N/A	N/A	4.6E+01	=	UG/L	041W061002	1 / 1	NAV	4.6E+01	4.6E-05	1.0E-03	1.20E-07	1.89E-06	2.53E-06
7440417	Beryllium	N	N/A	N/A	3.4E-01	I	UG/L	041W061002	1 / 1	NAV	3.4E-01	3.4E-07	1.0E-03	8.84E-10	1.40E-08	1.87E-08
7440439	Cadmium	N	N/A	N/A	2.5E+00	I	UG/L	041W061002	1 / 1	NAV	2.5E+00	2.5E-06	1.0E-03	6.50E-09	1.03E-07	1.38E-07
7440473	Chromium	N	N/A	N/A	2.1E+01	=	UG/L	041W061002	1 / 1	NAV	2.1E+01	2.1E-05	1.0E-03	5.46E-08	8.64E-07	1.16E-06
7440508	Copper	N	N/A	N/A	1.9E+01	I	UG/L	041W061002	1 / 1	NAV	1.9E+01	1.9E-05	1.0E-03	4.94E-08	7.82E-07	1.05E-06
7439896	Iron	N	N/A	N/A	3.3E+03	=	UG/L	041W061002	1 / 1	NAV	3.3E+03	3.3E-03	2.5E-04	2.15E-06	3.40E-05	4.54E-05
7439921	Lead	N	N/A	N/A	4.0E+01	=	UG/L	041W061002	1 / 1	NAV	4.0E+01	4.0E-05	3.4E-04	3.54E-08	5.60E-07	7.48E-07
7439965	Manganese	N	N/A	N/A	1.1E+02	=	UG/L	041W061002	1 / 1	NAV	1.1E+02	1.1E-04	1.0E-03	2.86E-07	4.53E-06	6.05E-06
7782492	Selenium	N	N/A	N/A	6.9E+00	I	UG/L	041W061002	1 / 1	NAV	6.9E+00	6.9E-06	1.0E-03	1.79E-08	2.84E-07	3.80E-07
7440622	Vanadium	N	N/A	N/A	3.4E+00	I	UG/L	041W061002	1 / 1	NAV	3.4E+00	3.4E-06	1.0E-03	8.84E-09	1.40E-07	1.87E-07
7440666	Zinc	N	N/A	N/A	7.8E+01	=	UG/L	041W061002	1 / 1	NAV	7.8E+01	7.8E-05	6.0E-04	1.22E-07	1.93E-06	2.58E-06
75343	1,1-Dichloroethane	N	N/A	N/A	8.0E-01	I	UG/L	041W061002	1 / 1	NAV	8.0E-01	8.0E-07	6.7E-03	1.78E-08	2.81E-07	3.76E-07
75354	1,1-Dichloroethene	N	N/A	N/A	9.8E-01	I	UG/L	041W061002	1 / 1	NAV	9.8E-01	9.8E-07	1.2E-02	3.93E-08	6.22E-07	8.31E-07
85018	Chlorobenzene	N	N/A	N/A	1.1E+01	=	UG/L	041W061002	1 / 1	NAV	1.1E+01	1.1E-05	2.8E-02	1.04E-06	1.65E-05	2.20E-05
156592	cis-1,2-Dichloroethene	N	N/A	N/A	5.1E+00	=	UG/L	041W061002	1 / 1	NAV	5.1E+00	5.1E-06	1.5E-02	2.46E-07	3.90E-06	5.22E-06
79016	Trichloroethene	C	N/A	N/A	1.3E+00	=	UG/L	041W061002	1 / 1	NAV	1.3E+00	1.3E-06	1.2E-02	5.68E-08	1.28E-07	4.29E-07

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).

EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound,
calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 11-2-22
Wetland 6 Phase IV
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	1.2E-03	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	4.9E-04	N/A	6.6E-04	N/A
	Barium	N	4.6E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	3.9E-04	N/A	5.2E-04	N/A
	Beryllium	N	3.4E-07	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	1.0E-03	N/A	1.3E-03	N/A
	Cadmium	N	2.5E-06	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	8.2E-03	N/A	1.1E-02	N/A
	Chromium	N	2.1E-05	3.0E-03	N/A	2.5E-02	1	7.5E-05	N/A	1.2E-02	N/A	1.5E-02	N/A
	Copper	N	1.9E-05	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	6.5E-05	N/A	8.7E-05	N/A
	Iron	N	3.3E-03	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	4.0E-05	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.1E-04	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	8.1E-04	N/A	1.1E-03	N/A
	Selenium	N	6.9E-06	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	1.0E-04	N/A	1.4E-04	N/A
	Vanadium	N	3.4E-06	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	7.7E-04	N/A	1.0E-03	N/A
	Zinc	N	7.8E-05	3.0E-01	N/A	2.0E-01	2, 4	6.0E-02	N/A	3.2E-05	N/A	4.3E-05	N/A
	1,1-Dichloroethane	N	8.0E-07	1.0E-01	N/A	1.0E+00	3	1.0E-01	N/A	2.8E-06	N/A	3.8E-06	N/A
	1,1-Dichloroethene	N	9.8E-07	5.0E-02	N/A	1.0E+00	3	5.0E-02	N/A	1.2E-05	N/A	1.7E-05	N/A
	Chlorobenzene	N	1.1E-05	2.0E-02	N/A	7.3E-02	3	1.5E-03	N/A	1.1E-02	N/A	1.5E-02	N/A
	cis-1,2-Dichloroethene	N	5.1E-06	1.0E-02	N/A	1.0E+00	3	1.0E-02	N/A	3.9E-04	N/A	5.2E-04	N/A
	Trichloroethene	C	1.3E-06	3.0E-04	4.0E-01	8.0E-01	3	2.4E-04	5.0E-01	5.3E-04	6.4E-08	1.8E-03	2.1E-07

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 11-2-23
Wetland 6 Phase IV
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

						Child Trespasser		Maintenance Worker	
Exposure Route	**COPC**		**Maximum concentration (mg/cm^3)**	**Oral RfD (mg/kg-day)**	**Oral SF (mg/kg-day)-1**	**Ingestion Hazard Quotient**	**Ingestion Cancer Risk**	**Ingestion Hazard Quotient**	**Ingestion Cancer Risk**
SW Incidental Ingestion	Aluminum	N	1.2E-03	1.0E+00	N/A	3.8E-08	N/A	2.4E-08	N/A
	Barium	N	4.6E-05	7.0E-02	N/A	2.1E-08	N/A	1.3E-08	N/A
	Beryllium	N	3.4E-07	2.0E-03	N/A	5.4E-09	N/A	3.5E-09	N/A
	Cadmium	N	2.5E-06	5.0E-04	N/A	1.6E-07	N/A	1.0E-07	N/A
	Chromium	N	2.1E-05	3.0E-03	N/A	2.2E-07	N/A	1.4E-07	N/A
	Copper	N	1.9E-05	4.0E-02	N/A	1.5E-08	N/A	9.7E-09	N/A
	Iron	N	3.3E-03	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	4.0E-05	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.1E-04	1.4E-01	N/A	2.5E-08	N/A	1.6E-08	N/A
	Selenium	N	6.9E-06	5.0E-03	N/A	4.4E-08	N/A	2.8E-08	N/A
	Vanadium	N	3.4E-06	7.0E-03	N/A	1.5E-08	N/A	9.9E-09	N/A
	Zinc	N	7.8E-05	3.0E-01	N/A	8.2E-09	N/A	5.3E-09	N/A
	1,1-Dichloroethane	N	8.0E-07	1.0E-01	N/A	2.5E-10	N/A	1.6E-10	N/A
	1,1-Dichloroethene	N	9.8E-07	5.0E-02	N/A	6.2E-10	N/A	4.0E-10	N/A
	Chlorobenzene	N	1.1E-05	2.0E-02	N/A	1.7E-08	N/A	1.1E-08	N/A
	cis-1,2-Dichloroethene	N	5.1E-06	1.0E-02	N/A	1.6E-08	N/A	1.0E-08	N/A
	Trichloroethene	C	1.3E-06	3.0E-04	4.0E-01	2.0E-08	2.4E-12	3.1E-08	3.8E-12

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

11.3 Wetland 64 — Screening Level Problem Formulation

11.3.1 Site Description and Habitats Present at Wetland 64

Wetland 64 is an approximately 41-acre area on the eastern shore of the upstream side of the NAS Pensacola Yacht Basin, which is in the northeastern quadrant of the base (Figure 11-1). For the Site 41 RI, the Wetland 64 complex investigation incorporated several areas surrounding NAS Pensacola Yacht Basin: the southeast shore of the Yacht Basin, the open water area of the Yacht Basin, and adjacent Wetlands 7 and 8. The open water portion of the Wetland 64 complex is approximately 20 acres in size, ranging from about 2 to 15 feet in depth, and is 600 to 900 feet wide.

Photograph 1 Wetland 64 — Looking south across Yacht Basin toward headwater. Shoreline of Magazine Point in left background.

Adjacent Wetland 7 encompasses the downstream end of the tile-lined storm water conduit (Wetland 6) that drains into the Yacht Basin. Wetland 6 drains storm water runoff from the area directly around Naval Air Technical Training Center (NATTC) and the NAS Chapel. The NATTC was previously the Naval Aviation Depot or NADEP. Wetlands 5A and 5B (Section 11.1) contribute additional discharge to Wetland 6 (Section 11.2), which ultimately discharges into Wetland 64.

Adjacent Wetland 8 includes the western shore of Magazine Point. The western shore of the Yacht Basin also contains the NAS Pensacola Yacht Club and marina. A concrete seawall exists along the shoreline of the marina, from which several docks housing numerous boats extend into the

Yacht Basin. The western shore of the Yacht Basin also contains buildings, a paved parking area, a fenced area for boat storage, and road access. The eastern bank of the Yacht Basin remains relatively undisturbed.

Evaluation of maps and aerial photography from 1939 and 1951 reveal the Wetland 64 area was once approximately one-third larger than the current area. Sometime after 1939, approximately 15 acres in the southwest portion (the area now encompassing IR Site 11, North Chevalier Disposal Site), and approximately 10 acres along the west side (the area now containing the building and parking areas associated with the Yacht Basin), were filled; apparently coincident with the construction of the marina. The filled area along Site 11 constricts the width of the open water portion of Wetland 64 to approximately 8 to 10 feet from where Wetland 6 discharges into this water body to the southern end of the marina.

IR sites potentially affecting Wetland 64 include Site 10, OU 2 (Sites 11, 12, and 30), and OU 6 (Sites 9, 29, and 34). OU 6 may affect Wetland 64 based on potential contaminant transport from Wetland 6. From the late 1930s until the early 1950s, industrial waste was disposed of and burned at Site 11 (North Chevalier Disposal Site). Wastes disposed of at this site included waste oils. Site 12 (Scrap Bins) was active from the early 1930s through the 1940s as an area where wet garbage was deposited in receptacles.

Site 9 (Navy Yard Disposal Site) was used as the station disposal site for the old Navy yard. The earliest existing records indicate this disposal site was used from 1917 to the early 1930s and was used primarily to dispose of ordinary domestic trash and refuse. Contaminants detected in the soil include semi-volatiles and pesticides (E/A&H, 1997f). The semi-volatiles may be associated with Site 23, a UST site. Pesticides are believed to represent normal application residue through basewide applications.

Site 10, Commodore's Pond, was used in the mid-1800s for underwater storage of wooden timbers for shipbuilding. There is no evidence of hazardous material use, storage, or disposal at this site.

Site 11 was a former landfill in the North Chavalier Field Disposal Area where industrial and municipal wastes were disposed and burned from the late 1930s to the mid-1940s. Two prefabricated buildings (3627 and 3628) are near the center of the site. Building 3445, at the site's southeastern corner, is used to store outdated office equipment. A fenced area north and south of Building 3445 is used for outside storage of boats, trucks, and heavy equipment.

Site 12 (Scrap Bins) was the location where wet garbage was deposited in receptacles from the early 1930s through the 1940s. There is no evidence that hazardous materials were stored or disposed of in this area; although it is possible that hazardous waste or PCB-containing oil was also stored. Site 12 is approximately 600 feet west of Site 11. Most of the site is enclosed by a fence and paved with concrete.

Site 29 (Soil South of Building 3460) is the location where several evacuation workers received minor skin burns from contact with a liquid in soil south of Building 3460 in 1981. The chemical was never identified.

Site 30 (Buildings 648, 649, and 755) was active from the 1940s through the 1970s as the NADEP Dynamic Components Division. Historical accounts note the periodic discharge of metal plating complex effluents into Wetland 5. Site 34 is identified as the location of solvent spill that occurred north of Building 3557.

11.3.2 Wetland 64 — Sample Location Description

Phase II Sediment Sample Location Description

Twenty-four sediment samples were collected and analyzed for the Wetland 64 ERA. Sample locations for Wetland 64 covered the aerial extent of the wetland, focusing on groundwater seeps and depositional areas. Wetland 64's shape (resembling an inverted bottle) was conducive to a sampling design allowing for three station intervals at the wider parts, narrowing down to two station intervals in the southern (neck of the bottle) region, and eventually one sample. Table 11-3-1 (tables are located at the end of each section) provides a physical description of the Phase II sediments collected at Wetland 64 during the Site 41 RI Phase II investigations in November 1995 and February 1996. Sediments at Wetland 64 were composed of dark gray organic silt (041M641001) to dark brown silty sand with gravel, organics (041M642201). TOC concentrations ranged from 0.07% at sample location 041M642401 to 19.4% at sample location 041M640301.

Phase III Sediment Sample Location Description

Three sediment samples were collected during the Phase III investigation of Wetland 64. Phase III sampling was initiated to confirm elevated detections at sediment locations 041M640401, 041M640501, and 041M640601. Table 11-3-2 provides a physical description of the sediments collected in 1997. Phase III sediments at Wetland 64 were dominated by fine sands and superfine silt and clay. TOC concentrations ranged from 6.00% to 8.60%.

Phase III Surface Water Sample Location Description

Two surface water samples were collected during the 1997 Phase III investigation of Wetland 64. Surface water locations 041W640101 and 041W640501 (Figure 11-4) were collocated with sediment locations collected during the Phase II investigation. However, no analyses for physical parameters were performed on these samples.

Phase IV/2001 Sediment Sample Location Description

Seven sediment samples were collected and analyzed for the Phase IV Wetland 64 ERA. Sample locations were concentrated around the area identified as Site 11, and included 041M640202, 041M640302, 041M640502 through 041M640702, 041M641102, and 041M642402 (Figure 11-4). Grain size analysis was not performed on these sediments, although TOC levels were analyzed. TOC levels ranged from 0.14% to 18.0%.

Sediment locations 041M640202 through 041M640702 were collocated at depths ranging from 1.5 to 3.5 feet. Locations 041M641102 and 041M642402 were in the deeper portion of the wetland, with depths greater than 8 feet.

11.3.3 Nature and Extent of Contamination

Phase II Sediment

Figure 11-4 presents the Phase II sediment sampling locations for Wetland 64. Table 11-3-3 presents a summary of the analytical results of the 24 Phase II sediment samples.

Metals — Twenty-three inorganic constituents were detected during Phase II sediment sampling at Wetland 64. Inorganic detections were distributed across the entirety of Wetland 64. However, estuarine reference value exceedances were mostly concentrated along the northwestern border of the sampling grid, specifically sampling points 041M641001, 041M641101, 041M641301, 041M641401, 041M641601, and 041M641901. Each of these sampling points yielded analytical results exceeding estuarine reference values for each of the 23 inorganic analytes. Estuarine reference values were exceeded in sampling points surrounding these five locations in the northwest and center of Wetland 64. Estuarine values were also exceeded in the southern portion of Wetland 64 during the Phase II sediment sampling event. Twenty-two of the 23 detected constituents were found to exceed estuarine reference concentrations at sample location 041M640301. Sampling points surrounding 041M640301 were found to contain fewer constituents exceeding estuarine reference concentrations.

Pesticides and PCBs — Fourteen pesticide compounds and two PCBs (aroclor-1254 and aroclor-1260) were detected during Phase II sediment sampling at Wetland 64. Total DDT was calculated for each location by adding the concentrations of 4,4′-DDD, 4,4′-DDE and 4,4′-DDT. Likewise, a basewide total DDT reference concentration was calculated using the basewide concentrations for these same constituents.

The greatest number of pesticides detected in Wetland 64 sediments was situated in the south central portion of the wetland at locations 041M640101, 041M640201, 041M640301, 041M640501, 041M640601, and 041M640801. Each of these locations had five or more detections of pesticide compounds. All other sampling locations had four or fewer pesticide detections. PCBs were detected at all sampling locations, except for the following: 041M642101, 041M642201, 041M642301, and 041M642401.

SVOCs — Twenty-seven SVOCs were detected in sediment samples collected during Phase II sampling. Three of the sample locations (041M641201, 041M642101, and 041M642401) exhibited no detections of SVOCs. Locations 041M640101 and 041M640501 had the greatest numbers of SVOC detections with 19 and 20 compounds detected, respectively. These sampling locations also yielded some of the highest constituent concentrations, especially for benzo(b)fluoranthene and fluoranthene.

VOCs — Four VOCs were detected in sediments collected from Wetland 64 during Phase II sampling. The greatest numbers of constituents detected were at location 041M641601 located in the northern portion of the wetland. However, the highest constituent concentrations were located at 041M641401, located closer to the center of the wetland than 041M641601. Locations 041M641401 and 041M641901 (directly north of 041M641601) each had two detections.

Phase III Sediment

Based on the results of the Phase II sampling, Phase III was initiated to confirm elevated detections at sediment locations 041M640401, 041M640501, and 041M640601. Figure 11-4 presents the Phase III sediment sampling locations for Wetland 64. Table 11-3-4 presents a summary the analytical results of the Phase III sediment sampling.

Metals — Twenty-two metals were detected at the Phase III sediment samples collected at Wetland 64. All 22 constituents were detected at sample location 041M640501. Metals detected exceeded reference concentration at the majority of the sediment sample locations.

The Phase III sample results were in close agreement with the Phase II results, with the exception of sample location 041M640601. Results from this sampling location differed by up to five times the original concentration.

Pesticides and PCBs — Seven pesticide compounds and one PCB (aroclor-1260) were detected during Phase III sediment sampling. In general, the Phase II and III pesticide and PCB analytical results were not in agreement. Sampling location 041M640401 contained the greatest number of constituents, as well as highest concentrations during Phase III. Concentrations during Phase III varied from Phase II by multiples of five or even by factors of 10.

SVOCs — Eighteen SVOCs were detected during Phase III at Wetland 64. All sample locations had detections. All constituents, except for dibenzofuran, were detected at sampling location 041W640401. Concentrations of many constituents during Phase III differed from Phase II concentrations by as little as multiples of two or as great as factors of 10, with the greatest differences found at sampling location 041W640601.

VOCs — The only VOC detected in sediment samples during Phase III sampling was acetone. Concentrations for acetone found at sampling locations 041W640401 and 041W640501 were comparable to concentrations found during Phase II. Acetone was not detected during Phase III at sampling location 041W640601.

Phase IV Sediment

Figure 11-4 presents the Phase IV sediment sampling locations for Wetland 64. Table 11-3-5 presents a summary of the analytical results of the seven sediment samples.

Metals — Twenty metals were detected in sediment samples taken during Phase IV at Wetland 64. The distribution of detections and reference value exceedances were at locations 041M640202, 041M640302, 041M640502, 041M640602, and 041M641102, located within the south central area of the wetland. These locations generally exhibited the highest concentrations of metals as well as diversity. The other two locations exhibited multiple detections but only had two exceedances at 041M640702 and no exceedances at 041M642402.

Pesticides and PCBs — Four pesticides were detected during Phase IV at Wetland 64. All four constituents were detected at sampling location 041M640602, with 4,4′-DDD and total DDT exceeding their basewide reference values. Location 041M640202 exceeded its basewide reference concentration for 4,4′-DDE.

SVOCs — Ten SVOCs were detected in the seven sediment samples during Phase IV at Wetland 64. During Phase II, 27 constituents were detected in the 24 sediment samples collected. Similar constituents were compared and sampling location 041M640601/041M640602 had comparable detections. In general, the concentrations were similar to those observed during Phase II.

VOCs — No VOCs were detected during Phase IV at Wetland 64.

Phase III Surface Water

Figure 11-4 presents the Phase III surface water sampling locations for Wetland 64. Table 11-3-6 presents a summary of the analytical results of the two Phase III surface water samples.

Metals — Seventeen metals were detected during Phase III surface water sampling at Wetland 64. The distribution of metals detections and reference value exceedances during Phase III at Wetland 64 were equally distributed between sampling locations 041W640101 and 041W640501 both located toward the southern end of Wetland 64. Of the 17 detected metals, eight exceeded estuarine reference values. Six of the eight analytes exceeding reference values (barium, calcium, magnesium, manganese, potassium, and sodium) were found in both sample locations. Reference values for chromium were exceeded only at sampling point 041W640501, and reference values for zinc were exceeded only at sampling point 041W640101.

Pesticides and PCBs — Beta-BHC was the only pesticide compound detected during Phase III surface water sampling at Wetland 64. This compound was found at sample location 041W640101.

SVOCs — No SVOCs were detected during Phase III surface water sampling at Wetland 64.

VOCs — Six VOCs were detected in surface water samples collected from Wetland 64 during Phase III sampling. The greatest number of constituents detected and generally the highest concentrations were at location 041W640101, located toward the southern end of the wetland

11.3.4 Ecological Risk Assessment

11.3.4.1 Phase II Investigation Summary

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-3-7, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is

included in Table 11-3-8.

Baseline Problem Formulation — Wetland 64 Sediment COPC Refinement

During the COPC refinement, additional information was used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. This risk assessment presents a statement of potential risk for each of the COPCs.

The COPC refinement process included:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to basewide (reference) concentrations for total DDT
- Comparison of inorganic constituents to reference wetland values
- Regression analysis of inorganic constituents
- Di Toro EqP SQGs for VOCs
- Comparison to Swartz consensus values
- Mean ERM quotients
- Description of exceedances of RVs and their extent

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 11-3-9. COPCs retained after refinement are presented in Table 11-3-10. Additionally, the tables compare: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 64 concentrations to reference concentrations.

At Wetland 64, total DDT and its daughter product, 4,4'-DDD, were detected above basewide levels and were carried forward as COPCs (Table 11-3-9). Total DDT concentrations are presented in Figure 11-5. For Wetland 64, aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc exceeded their Site 41 freshwater sediment reference concentrations (Table 11-3-9). Arsenic and nickel concentrations were below RV; therefore, these constituents were not retained as COPCs. Calcium, magnesium, potassium, and sodium are essential nutrients and are not carried forward in the ERA process.

Based on regression analysis of the Phase II Wetland 64 data, when compared to aluminum concentrations, barium, cadmium, chromium, copper, lead, mercury, and zinc were identified as outliers at various sample locations. When compared to iron concentrations, various sample locations

concentrations were identified as outliers for barium, cadmium, chromium, copper, lead, mercury, and zinc.

Barium was identified as an outlier, when compared to aluminum at sample locations 041M640301 and 041M640501. Cadmium was identified as an outlier at sample locations 041M640201, 041M640301, 041M640501, 041M640601, and 041M641101; however, zinc was identified as an outlier, when compared to zinc for all the previous sample locations, except for 041M641101. Chromium and lead concentrations were identified as outliers, when compared to aluminum for sample locations 041M640201 through 041M640601. Chromium was also identified at sample location 041M641101. The following sample locations were identified as outlier for copper concentrations, when compared to aluminum concentrations: 041M640201, 041M640301, 041M640501, and 041M641001. Mercury concentrations at sample locations 041M640301 through 041M640501, 041M641901, and 041M642401 were identified as outliers, when compared to aluminum concentrations.

During regression analysis comparison between iron concentrations and copper and zinc concentrations, sample locations 041M640301 and 041M640501 were identified as outliers, where as barium concentrations were identified as outliers, only at sample location 041M640301. Chromium and lead concentrations were identified as outliers when compared to iron at sample locations 041M640201 through 041M640501. Lead concentrations were also identified as sample locations 041M640601 and 041M641001. When iron and cadmium concentrations were compared, sample locations 041M640201, 041M640301, 041M640501, and 041M641101 were identified as outliers. Sample locations 041M640301, 041M640401, 041M641901, and 041M642401 were identified as outliers, during the comparison of mercury concentrations to iron concentrations.

Several additional organic constituents were detected and retained during the ERA process due to exceeding HQs or no appropriate screening values. Nine PAHs, seven pesticides, 10 SVOCs, and four VOCs were detected and retained. When normalized to detected TOC concentrations, both VOCs and PAHs do not appear to be risk drivers for Wetland 64. Normalized Total PAHs are presented in Figure 11-6. Carbon disulfide was not addressed by this method and will be carried forward as a COPC in the ERA process.

Table 11-3-11 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Based on this approach, eight locations (041M6407, 041M6409, 041M6412, 041M6415, 041M6418, 041M6420, 041M6421, and 041M6423) were determined to be Category 1, indicating that these sediments were considered

nontoxic. Five locations (041M6404, 041M6408, 041M6417, 041M6422, and 041M6424) were determined to be Category 2, indicating sediments in these wetlands, according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this Category also has the highest level of uncertainly in predicting toxicity. Sample locations 041M6401 through 041M6403, 041M6405, 041M6406, 041M6410, 041M6411, 041M6413, 041M6414, 041M6416, and 041M6419 were determined to be Category 3, which according to the studies, about 50% of the samples were found to be toxic and average survival was about 60-70%. Figure 11-7 shows the Mean ERM quotient for each sediment sample location at Wetland 64.

At Wetland 64, the highest inorganic exceedances were all detected at sample location 041M640301. Cadmium generated the largest inorganic SV and RV HQs (57.1 and 9.17, respectively). Of the 24 sediment samples, 10 locations exceeded the cadmium RV. The other RV exceedances were for chromium, copper, lead, mercury, silver, and zinc, all of which were exceedances at location 041M640301. Based on the analysis of the inorganic constituents detected at Wetland 64, cadmium and chromium were the primary concern for potential risk due to high HQs and relatively widespread detections. Fifteen of 24 sample locations exceeded SVs, and 10 of 24 samples exceeded the RV for cadmium. Twelve of 24 sample locations exceeded SVs, and 11 of 24 exceeded the RV for chromium. Copper, lead, mercury, and zinc were present at concentrations that may affect ecological receptors and were carried forward as COPCs.

Sample location 041M640201 was the station with the highest 4,4'-DDD and 4,4'-DDT levels. This location is in the southern end of the wetland, where Wetland 6 discharges into Wetland 64. Total DDT and its daughter products were detected throughout the entire wetland. Based on total DDT widespread exceedance of SV and RV and magnitude of the HQs generated, it was included as a COPC and evaluated further. Total DDT was included as a COPC in the OU-wide food-chain models.

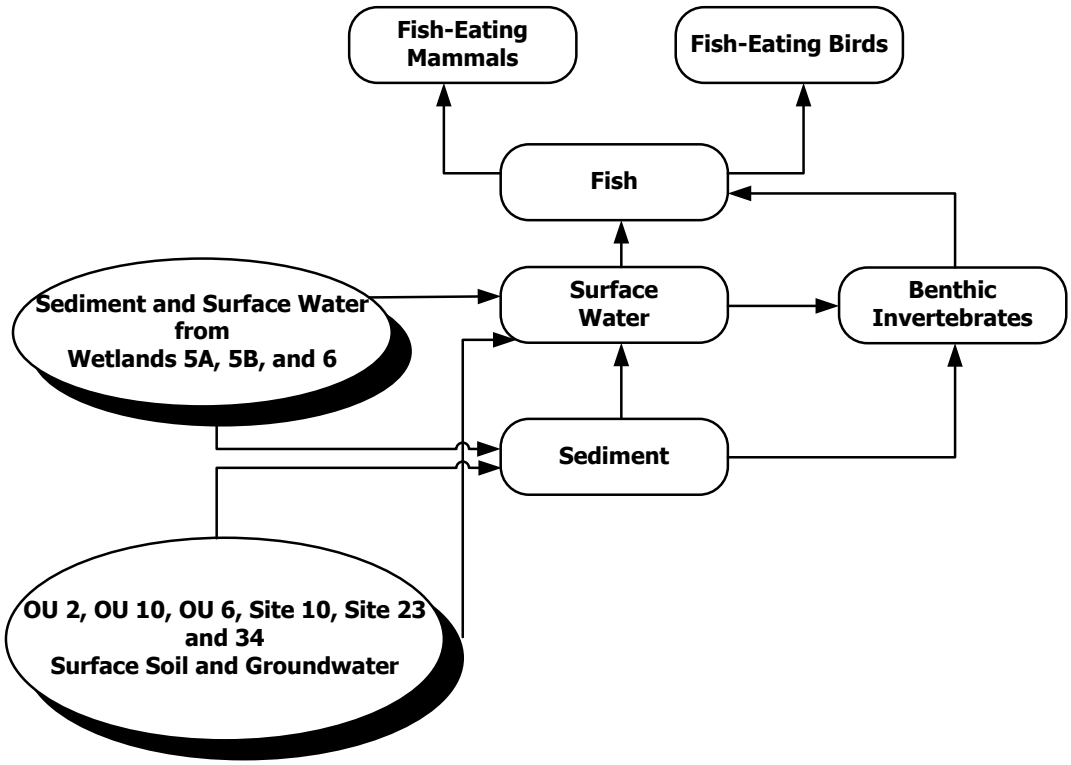
The remaining pesticides, PCBs, and SVOCs were detected at various locations throughout the wetland.

COPCs appeared clustered around the man-made spoil point adjacent to sample locations 041M640201 through 041M640701. The highest inorganic exceedances were consistently detected at location 041M640301 during the Phase II investigation. Boat activity is very high in this naturally sheltered inlet, and boat mooring has increased over 150%, since initial investigations were begun in 1992. PAH detections in sediments during Phase II and III may be attributable to surface water runoff from the parking area associated with the Navy Yacht Club and marina and nearby Site 11.

No surface water samples were collected during the Phase II investigation at Wetland 64.

The conceptual model below symbolizes which environmental habitats may be impacted by Wetland 64 Phase II sediment constituents retained during the ERA process. Wetland 6 was previously identified as a Red-Coded Wetland, indicating contaminants were detected and appear to be directly related to nearby IR sites.

Wetland 64 Complex
Conceptual Site Model



Note: The Wetland 64 Complex is composed of Wetlands 7, 8 and 64.

11.3.4.2 Phase III Investigation Summary

Additional investigation was determined to be necessary at Wetland 64 based on the Phase II results. The following assessment and measurement endpoints were selected:

Wetland Groups and Representative Wetlands(s)	Assessment Endpoints	Measurement Endpoints
Wetland 64	A) Survival of macro-invertebrates associated with the benthic environment	A1) 10-day amphipod, *Leptocheirus plumulosus*, survival A2) 10-day polychaete, Neanthes arnaceodentata, survival and growth (by weight) A3) Benthic community indicies
Wetland 64	B) Bioaccumulation in wading birds, mammals, and birds	B1) These endpoints will be evaluated in the Food-chain Model in Section 11.4

As detailed in the *Final RI/FS SAP Addendum* E/A&H, 1997d), additional data were collected from three locations (041M6404 through 041M6406) within Wetland 64 in 1997, where COPC concentrations were high.

These samples were analyzed for the following parameters:

- Laboratory analysis of full TAL/TCL List except for mercury
- TOC and other physical parameters
- Sediment toxicity testing
- Benthic Community Indices

In 2001, additional sediment and fish samples were collected for laboratory analysis for use in the Food-chain Models in Section 11.4.

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-3-12, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 11-3-13.

Baseline Problem Formulation — Sediment COPC Refinement

The same approach (Section 11.3.4.1) used to refine Wetland 64 Phase II sediments were applied to Wetland 64 Phase III sediments.

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 11-3-14. COCPs retained after refinement are presented in Table 11-3-15. Additionally, the tables compare: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 64 concentrations to reference concentrations.

At Wetland 64, total DDT and 4,4'-DDD were detected at concentrations greater than basewide and were retained as COPCs. To address this further, total DDT will be included as a COPC in the OU-wide food-chain models. Aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, potassium, selenium, silver, sodium, vanadium, and zinc exceeded their Site 41 estuarine reference concentrations.

Based on regression analysis of the Phase III Wetland 64 data collected in 1997, when compared to aluminum concentrations, copper was identified as an outlier for sample location 041M640501. When compared to iron concentrations, cadmium and chromium were identified as outliers at sample location 041M640601. Sample location 041M640401 was identified as an outlier during the comparison of zinc to iron concentrations.

Several organic constituents were detected and retained during the ERA process due to HQ exceedances or no appropriate screening values. Nine PAH constituents were detected and retained. Four pesticides (dieldrin, endosulfan I, total chlordane, and total BHC) were also evaluated further. Seven SVOCs and one VOC (acetone) were retained. When normalized to detected TOC concentrations, both VOCs and PAHs do not appear to be risk drivers for Wetland 64.

Table 11-3-16 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Based on this approach, two locations (041M640401 and 041M640501) were determined to be Category 3, which according to the studies, about 50% of the samples were found to be toxic and average survival was about 60-70%. Location 041M640601 was determined to be Category 4, indicating that sediments from this site have a high probability to cause adverse effects. Figure 11-7 shows the Mean ERM category for each 1997 Phase III sediment sample location at Wetland 64.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-3-17, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with

no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 11-3-18.

Baseline Problem Formulation — Wetland 64 Surface Water COPC Refinement

During the surface water COPC refinement, additional information was used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs.

The COPC refinement process included:

- Comparison of maximum SV concentrations to average SV concentrations
- Comparison of inorganic constituents to reference wetland values
- Description of surface water exceedances and their extent

The methods used in the COPC refinement in the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 11-3-19. COPCs retained after refinement are presented in Table 11-3-20. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland.

For Wetland 64, barium, calcium, magnesium, manganese, potassium, and sodium exceeded their Site 41 estuarine reference surface water concentrations (Table 11-3-19) and were retained as COPCs for Wetland 64 surface water. One pesticide (total BHC), and four VOCs (1,1-dichloroethane, 1,2-dichloroethene (total), acetone, and trichloroethene) were detected at sample location 041W640101 and were retained as surface water COPCs.

11.3.4.3 Comparison of Phase II and III Sediment Results

Both the Phase II and III results indicated inorganic constituents, pesticides, and SVOCs were of greatest concern in Wetland 64. Concentrations decreased among inorganic constituents common between the two phases; however, organic compound generally increased. Surface water was only collected during the 1997 Phase III site investigation; therefore, comparisons to Phase II cannot be made.

The differences between the Phase II and III sampling efforts are presented below.

Sediment

Constituent	Wetland 64 Phase II	Wetland 64 Phase III	Difference
Metals (mg/kg)			
Aluminum	26,800	8,900	-17,900 decrease
Barium	1,280	17.1	-1,262.9 decrease
Beryllium	1.3	0.34	-0.96 decrease
Cadmium	38.6	21	-17.6 decrease
Calcium	6,630	3,210	-3,420 decrease
Chromium	1,800	868	-932 decrease
Cobalt	6.1	3.4	-2.7 decrease
Copper	255	146	-109 decrease
Iron	38,200	13,600	24,600 decrease
Lead	634	346	-288 decrease
Magnesium	9,390	4,190	-5,200 decrease
Potassium	3,560	1,350	-2,210 decrease
Selenium	3.1	1.6	-1.5 decrease
Silver	5.1	3	-2.1 decrease
Sodium	30,200	18,300	-11,900 decrease
Vanadium	43.4	18.4	-25 decrease
Zinc	481	468	-13 decrease
Organics (g/kg)			
Endosulfan I	0.76	2.4	+1.64 increase
Total BHCs	2.98	21.7	+18.72 increase
Total Chlordanes	18.5	11.7	-6.8 decrease
4,4′-DDD	140	89	-51 decrease
Total DDT	214	196	-18 decrease
Total PCBs	640	1,220	+580 increase
Benzo(b)fluoranthene	2,600	1,800	-800 decrease
Benzo(g,h,i)perylene	590	980	+390 increase
Benzo(k)fluoranthene	250	1,900	+1,650 increase
Carbazole	400	800	+400 increase
Dibenzofuran	85	250	+165 increase
Indeno(1,2,3-cd)pyrene	600	1,000	+400 increase
Acetone	420	32	-388 decrease

Notes:
mg/kg = Milligrams per Kilograms
µg/kg = Micrograms per Kilograms

Evaluation of Assessment Endpoints

In addition to the chemical analyses during the Phase III sampling effort, three sediment samples were collected for whole sediment toxicity tests, as well as species diversity analysis. Section 8 describes the rationale and intent for this additional information.

Assessment Endpoint A — Survival, Growth, and Emergence of Macroinvertebrates Associated with the Benthic Environment

The benthic invertebrate communities inhabiting the sediments in the fresh and salt water marshes included in Site 41 were selected as important biological resources to be evaluated in these habitats. This assessment endpoint is aimed at maintaining an ecologically viable benthic community and organism sustainability.

The benthic macroinvertebrates were selected because:

- Their relatively sessile life habits cause potential for increased exposure to contaminated sediments
- They are important component in the aquatic food web
- They are a food source for many species of fish and crustaceans harvested for recreational and commercial purposes
- Benthos has been documented to be an excellent indicator of habitat condition

Risk Questions

- Is the toxicity of COPCs to benthic macroinvertebrates in onsite sediments significantly greater that those of control sediments?
- Are the toxic responses lethal or sublethal?
- Do the results of this study show any stressor-response relationship?

To address the risk questions for this assessment endpoint, the following measurement endpoints were proposed:

- Measurement Endpoint A1: Evaluate the toxicity of COPCs in sediment to the *Neanthes arenaceodentata* by conducting the 10-day, whole-sediment laboratory, toxicity tests measuring the survival and growth (measured by weight)
- Measurement Endpoint A2: Evaluate the toxicity of COPCs in sediment to the amphipod *Leptocheirus plumulosus* by conducting the acute, whole sediment toxicity tests measuring survival.

- Measurement Endpoint A3: Evaluate the health of the onsite benthic community using benthic community indices.

Measurement Endpoints A1 and A2

Additional sediments were collected at locations 041M640401 through 041M640601 during the Phase III portion of the investigation. Sediments from this estuarine wetland were prepared for testing with the epibenthic amphipod, *Leptocheirus plumulosus*, and the burrowing polychaete, *Neanthes arnaceodentata.* Both organisms represent species which are an integral part of the food web. The endpoint for the amphipod test was survival. The endpoint for the polychaete test was survival and growth, in which growth was determined by weight. Wetland 64 sediments were also tested against a laboratory control, which has a documented record of good survival and growth, to determine if Wetland 64 sediments could be impacting benthic species. The test results are shown and explained below:

Sample Location	Leptocheirus Survival/100	Neanthes Survival/100	Neanthes Weight (mg)
Laboratory Control	98	100	8.5
041M640401	78*	100	8.0
041M640501	96	96	7.2*
041M640601	74*	88	8.5

Note:
* = Statistically significant difference from the control

The TAC are met when control survival rates are 90% or above for the laboratory control and 80% or above for the sediment being tested. The TAC for the control performance includes a minimum weight of 2.5 mg and at least 50% emergence. A simple T-test can be performed on sediment performance compared to the control performance once the TAC is met.

Two sample locations (041M640401 and 041M640601) were statistically different from the control sample in the survival portion of the test. Sample location 041M640501 was found to be statistically different, when compared to the control performance for growth, which was measured by weight. These differences were denoted with an asterisk in the table above.

Measurement Endpoint A3

In addition to collecting sediments for chemical characterization and toxicity tests, sediments were also collected at locations 041M640401 through 041M640601 during the 1997 Phase III portion of the investigation for species identification. Section 8 describes the process for diversity sampling and

explains the importance of evenness and richness. The diversity findings for Wetland 64 are presented below:

Sample Location	Diversity Results
041M640401	2.42 Diversity 1.01 Evenness 10.76 Richness
041M640501	3.30 Diversity 1.22 Evenness 14.76 Richness
041M640601	2.64 Diversity 1.14 Evenness 9.79 Richness

Diversity, evenness, and richness of organisms were best at location 041M640501, when compared to the other locations. Sample location 041M640401 exhibited a lower diversity (2.42) when compared to the other locations within this wetland. A total of 37 organisms were collected and sorted into five dominant species. Representation was fairly even between namtodes, gastropods, polychaetes, and isopods. Between seven and 15 representatives from the 'pollution tolerant' polychaete species were found, which would be expected in a highly organic environment that has experienced an impact. Cumacean representatives found at locations 041M640501 and 041M640601 indicated a healthy environment, and their appearance in this area may indicate an overall improvement. Blue crabs (*Callinectes sapidus*) and other decapods were sampled in this area, as were isopods and copepods. These crustaceans and zooplankton were identified as a major part of the food web.

Assessment Endpoint A: Conclusions

This assessment endpoint was assessed by evaluating sediment chemistry, two toxicity test results and community analysis. The Wetland 64 Phase II investigation identified several constituents which were retained through the ERA process. Based on the results of the chemistry and toxicity data, sample locations 041M640401 and 041M640601 exhibited conditions in which toxic chemicals were probably stressing the system. Sediment samples from 041M640401 and 041M640601 were noted to have strong petroleum odors, which may account for the effects noted in the toxicity and chemistry results at these locations.

Assessment Endpoint B: Bioaccumulation in Wading Birds, Mammals, and Fish

To assess risk from contaminants that bioaccumulate, the results from Wetland 64 are used in the OU 2 food-chain models presented in Section 11.4.

11.3.4.4 Phase IV/2001 Investigation Summary

A review of activity at and around Wetland 64 (including the Naval Yacht Club expansion) and the previously collected data from Phase II (1995) and Phase III (1997) revealed several data gaps, which could be alleviated by an additional sampling effort. An additional sampling event was conducted, with the emphasis focused on mercury contamination in forage fish at Wetland 64. Sediment and fish tissue samples were analyzed for TAL metals, TCL SVOCs, and TCL pesticides and PCBs.

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 11-3-21, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 11-3-22.

Baseline Problem Formulation — Phase IV Sediment COPC Refinement

The same approach (Section 11.3.4.1) used to refine Wetland 64 Phase II sediments were applied to Wetland 64 Phase IV sediment data.

The methods used in the COPC refinement for the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values are presented in Table 11-3-23. COPCs retained after refinement are presented in Table 11-3-24. Additionally, the tables compare: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 64 concentrations to reference concentrations.

At Wetland 64, 4,4'-DDD and total DDT were above the basewide levels, indicating that applications of this pesticide may have been above recommended usage. As a result, these pesticides were carried forward as COPCs.

For Wetland 64, aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, potassium, silver, sodium, vanadium, and zinc exceeded their Site 41 estuarine sediment reference concentrations (Table 11-3-23). Calcium, magnesium, potassium, and sodium are essential nutrients and are not carried forward in the ERA process.

Sample location 041M641102 was identified as an outlier through regression analysis for barium, cadmium, chromium, copper, lead, and zinc, when compared to aluminum and iron concentrations. Sediment sample 041M640502 was identified as an outlier during the comparison of copper to

aluminum concentrations, and sample 041M640702 was identified when barium concentrations were compared to iron concentration during regression analysis.

Several organic constituents were detected and retained due to values exceeding HQs or no appropriate screening values. Two pesticides (heptachlor epoxide and total BHC) were retained. Three SVOCs, benzo(b)fluoranthene, benzo(g,h,i)perylene, and benzo(k)fluoranthene, were also detected and retained. Total PAHs appeared to be of concern at this wetland. Five PAHs were detected and retained: benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, and pyrene. Total PAHs exceeded the screening level TEC, and the refinement level MEC and were retained as COPCs in the ERA process. VOCs were not analyzed for during the Phase IV investigation.

Table 11-3-25 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Figure 11-7 shows the Mean ERM Category of the sediment samples collected at Wetland 64 during the 2001 investigation. Based on the methods and the approach detailed in Section 8, sediments from sample locations 041M640702 and 041M642402 were determined to be Category 1, indicating sediments were considered nontoxic. Sample locations 041M640202 and 041M641102 were determined to be Category 2, which according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this Category also has the highest level of uncertainty in predicting toxicity. Sample locations 041M640302, 041M640502, and 041M640602 were determined to be Category 3, which according to the studies, about 50% of the samples were found to be toxic and average survival was about 60-70%.

For Wetland 64 Phase IV sediments, a majority of the maximum inorganic detections occurred at location 041M640502 and 041M641102. Pesticide detections were divided between locations 041M640202, 041M640602, and 041M641102. All the maximum detections for PAHs were identified at sediment sample 041M640502.

Surface water samples were not collected during the Phase IV investigation of Wetland 64.

11.3.4.5 Comparison of Phase II, Phase III, and Phase IV Sediment Results

Based on all three sampling event results, inorganic constituents, pesticides and PAHs were of concern for Wetland 64. The majority of inorganic constituents detected have decreased over time. Several of the inorganic constituents considered essential nutrients increased, specifically, magnesium, manganese, potassium, and sodium. A decrease in pesticides and PAHs was also noted.

The differences between the Phase II, Phase III, and Phase IV sampling efforts are presented below.

Sediments

Constituent	Phase II (1995)	Phase III (1997)	Phase IV (2001)	Difference from 1995 to 2001
Metals (mg/kg)				
Aluminum	26,800	8,900	18,000	-8,800 decrease
Barium	1,280	17.1	18	-1,262 decrease
Beryllium	1.3	0.34	1.1	-0.2 decrease
Cadmium	38.6	21	23	-15.6 decrease
Chromium	1,800	868	700	-1,100 decrease
Cobalt	6.1	3.4	4.8	-1.3 decrease
Copper	255	146	200	-55 decrease
Iron	38,200	13,600	33,000	-5,200 decrease
Lead	634	346	430	-204 decrease
Magnesium	9,390	4,190	10,000	+610 increase
Manganese	203	65.8	230	+27 increase
Potassium	3,560	1,350	4,200	+640 increase
Silver	5.1	3	4	-1.1 decrease
Sodium	30,200	18,300	48,000	+17,800 increase
Vanadium	43.4	18.4	37	-6.4 decrease
Zinc	481	468	380	-101 decrease
Organics (g/kg)				
4,4'-DDD	140	89	100	-40 decrease
Total DDT	214	196	154	-60 decrease
Benzo(b)fluoranthene	2,600	1,800	780	-1,820 decrease
Benzo(g,h,i)perylene	590	980	490	-100 decrease

Notes:
mg/kg = Milligrams per Kilograms
µg/kg = Micrograms per Kilograms

11.3.4.6 Fish Tissue Analysis — Wetland 64 — Phase IV/2001

Approximately, 60 pinfish, Lagodon rhomboids, and killifish, *Fundulus grandis*, were collected in Wetland 64 during the 2001 site investigation. The length of these fish ranged from 1.5 to 2 inches. Fish tissue samples were analyzed for TAL metals, TCL SVOCs, and TCL pesticides and PCBs. The pinfish and killifish were collected to develop models for the protection of fish viability, which would be expected to inhabit this wetland. The following table provides the size, number, and species of fish collected, as well as levels of mercury detected in tissue analysis, and lipid content.

Fish Tissue Mercury Results
Wetland 64

Sample Location	Fish Species Collected	Size (inches)	Approximate #	Mercury in Fish Tissue (ppm)	% Lipid
041M6402	Pinfish			0.009[a]	
041J640202	Pinfish	2	8		0.34%
041M6403	Diamond killifish			0.012[a]	
041J640302	Diamond killifish	1.5	12		0.71%
041M6403-K	Gulf killifish			0.028	
041J64030-K	Gulf killifish	1.8	12		1.1%
041M6405	Pinfish			0.011	
041J640502	Pinfish	2	8		0.5%
041M6406	Gulf killifish			0.045	
041M640602	Gulf killifish	1.8	8		0.92%
041M6407	Gulf killifish			0.078	
041M640702	Gulf killifish	1.8	8		1.3%
041M6411	No fish collected			—	
041M6411	No fish collected		0		
041M6424	Pinfish			0.096	
041M642402	Pinfish	2	4		0.41%

These data are used in the food-chain model presented in Section 11.4 for OU 2 to assess impact.

Wetland 64 Phase IV Summary

Wetland 64 sediments have retained similar constituents over time. The constituent levels have decreased over time, as have the TOC levels detected in the sediments.

11.3.5 Wetland 64 — Human Health Risk Assessment

Wetland 64 is described in Section 11.3.2, and the HHRA is summarized below.

11.3.5.1 Site Data

Section 11.3.3 summarizes the nature and extent of contamination for this wetland. Surface water and sediment data were collected at Wetland 64 during Phases II and III and of the RI. Additional sediment and fish tissue data were collected in 2001. Surface water and sediment data are summarized in Table 11-3-3 (Phase II data), Tables 11-3-4 and 11-3-6 (Phase III data), and Table 11-3-5 (Phase IV data).

11.3.5.2 Conceptual Site Model

As described in Section 11.3.1, Wetland 64 is an approximately 41-acre area of the NAS Pensacola Yacht Basin. Because Wetland 64 is located in an unrestricted area of the base, the wetland is accessible to both trespassers and Navy personnel.

Wetland 64 is continually inundated. Therefore, in accordance with USEPA Region IV Supplemental Guidance to RAGS Bulletins (USEPA Region 4, 2000) described in Section 9, sediment exposure was not assessed in this HHRA, because it was assumed to be an insignificant exposure pathway. Based on the species present, depth of surface water, and available habitat, fishing could occur. Contact with surface water, while wading and game fish ingestion, would be the likely exposure scenarios. In addition, a subsistence fishing scenario is possible at this wetland, because wetland access is not restricted.

The following scenarios and exposure pathways were evaluated for this wetland:

Scenario	Medium	Ingestion	Dermal
Maintenance	Surface water	√	√
Trespasser	Surface water	√	√
Fishermen	Fish Tissue	√	NA

11.3.5.3 Risk Characterization

The child trespasser and adult maintenance worker scenarios for surface water (Phase III data) and the recreational and subsistence fishermen scenarios for game fish tissue ingestion (all sampling phases) were assessed for this wetland as described in Section 9.

Phase II Data

Recreational Fisherman

As shown in Tables 11-3-26, game fish tissue ingestion risk estimates for recreational fishermen exceeded the FDEP risk threshold of 1E-6 for 4,4'-DDD, 4,4'-DDE, aldrin, aroclor-1254, and aroclor-1260. The hazard index was above 1.0 for aroclor-1254.

Subsistence Fishermen

As shown in Tables 11-3-26, game fish tissue ingestion risk estimates for subsistence fishermen exceeded the FDEP risk threshold of 1E-6 for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, alpha-BHC, alpha-chlordane, aroclor-1254, aroclor-1260, and gamma-chlordane. The hazard index was above 1.0 for aroclor-1254.

Summary of Wetland 64 Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Fishermen	Fish tissue	2.90E+00	1.35E-04

Based on Phase II data, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, alpha-BHC, alpha-chlordane, aroclor-1254, aroclor-1260, and gamma-chlordane were identified as COCs for Wetland 64.

Phase III Data

Trespasser

As shown in Tables 11-3-27 through 11-3-29, surface water ingestion and dermal contact risk estimates for trespassers were below the FDEP risk threshold. Hazard indices were below 1.0.

Maintenance Worker

As shown in Tables 11-3-27 through 11-3-29, surface water ingestion and dermal contact risk estimates for maintenance workers were below the FDEP risk threshold. Hazard indices were below 1.0.

Recreational Fisherman

As shown in Table 11-3-30, game fish tissue ingestion risk estimates for recreational fishermen exceeded the FDEP risk threshold of 1E-6 for 4,4'-DDD, 4,4'-DDE, and aroclor-1260. Hazard indices were below 1.0.

Subsistence Fishermen

As shown in Table 11-3-30, game fish tissue ingestion risk estimates for subsistence fishermen exceeded the FDEP risk threshold of 1E-6 for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, aroclor-1260, delta-BHC, and BEHP. Hazard indices were below 1.0.

Summary of Wetland 64 Phase III Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Surface water	1.72E-02	1.02E-06
Trespasser	Surface water	1.15E-02	3.05E-07
Fishermen	Fish tissue	1.78E-01	8.98E-05

Based on Phase III data, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, aroclor-1260, delta-BHC, and BEHP were identified as COCs for Wetland 64.

Phase IV Data

Recreational Fisherman

As shown in Table 11-3-31, game fish tissue ingestion risk estimates for recreational fishermen exceeded the FDEP risk threshold of 1E-6 for 4,4'-DDD, 4,4'-DDE, and delta-BHC. Hazard indices were below 1.0.

Subsistence Fishermen

As shown in Table 11-3-31, game fish tissue ingestion risk estimates for subsistence fishermen exceeded the FDEP risk threshold of 1E-6 for 4,4'-DDD, 4,4'-DDE, delta-BHC, and BEHP. Hazard indices were below 1.0.

Summary of Wetland 64 Phase IV Risk Estimates

Scenario	Medium	Hazard Index	Risk
Fishermen	Fish tissue	2.10E-01	4.95E-06

Based on Phase IV data collected in 2001, 4,4'-DDD, 4,4'-DDE, delta-BHC, and BEHP were identified as COCs for Wetland 64.

Wetland 64 HHRA COC Summary

The following parameters were determined in the HHRA to be COCs for Wetland 64:

- 4-4'-DDD
- 4,4'-DDE
- 4,4'-DDT
- Aldrin
- Alpha-BHC
- Delta-BHC
- Alpha-Chlordane
- Aroclor-1254
- Aroclor-1260
- Gamma-Chlordane
- BEHP

11.3.6 Wetland 64 — Fate and Transport Analysis

Because these two wetlands (Wetlands 7 and 64) are contiguous and inherently connected, they were evaluated as a single complex. This wetland complex connects to the upper channelized reaches of Wetland 6 and flows out into the Yacht Basin on the north side of the facility, eventually emptying into the area where Bayou Grande meets Pensacola Bay proper. Wetland 7 encompasses the shallower tidal flat portion of the wetland complex; Wetland 64 encompasses the Yacht Basin, a more open portion of the wetland (see Figure 11-1). This complex drains the northeastern side of OU 2, and generally flows from south to north under static (non-storm and normal tides) conditions.

Twenty-five sediment samples and two surface water samples were collected from this wetland prior to its intersection with Pensacola Bay proper. Although this wetland spans a large distance, this fate and transport evaluation was not segmented and utilized the entire span because of the tidal flux potential.

The sediment and surface water COPCs retained after refinement for this wetland are summarized in Tables 11-3-10 (sediment, Phase II), 11-3-15 (sediment, Phase III), 11-3-20 (surface water, Phase III) and 11-3-24 (sediment, Phase IV). Also provided are the associated soil borings and monitoring wells used for comparing data for the fate and transport analysis.

Associated Monitoring Wells for Wetlands 7/64: 011GS011, 011GI012, 011GI51, 011GI010, 011GS009, 030GS103, 011GI015, 011GLF01, 011GS049, 011GI008, 011GS007, 011GGS48, 033GGM77, 033GGI08, 033GGS03, 011GGS47, 011GLF11, 033GGM78, 011GGS28, 011GGS46

Associated Borings for Wetlands 7/64: 011SS011, 011SLF09, 011SLF05, 011SRA09, 011SRA05, 030S0103, 011SI015, 030S0102, 011SLF08, 011SRA08, 011SLF01, 011SRA01, 011SRA07, 011SLF07, 011SS007, 033SS45D, 011SRA03, 011SLF03, 011SRA11

Surface Water/Sediment Transport into the Wetland Medias:

Surface Water — Although there is significant storm water drainage into this wetland, there is no directly comparable storm water data from the area proximal to this wetland complex. Because of the lack of data, no definitive statement can be made regarding the validation of the pathway via storm water runoff into the wetland complex. The vast majority of surface drainage to this wetland is from the northeastern side of OU 2 (including Sites 12, 26, and 11), direct drainage from Wetland 6, storm water inflow from the northern part of the former Chevalier Field area, and from the western side of OU 10 (encompassing the NASP Wastewater treatment plant).

Sediment — Based on the data from surface soil proximal to this wetland complex, the storm water to wetland sediment pathway was validated for the following parameters:

Phase II	Phase III	Phase IV
Aluminum	Aluminum	Aluminum
Barium	Barium	Barium
Beryllium	Beryllium	Beryllium
Cadmium	Cadmium	Cadmium
Chromium	Chromium	Chromium
Cobalt	Cobalt	Cobalt
Copper	Copper	Copper
Iron	Iron	Iron

Phase II	Phase III	Phase IV
Lead	Lead	Lead
Manganese	Manganese	Manganese
Mercury	Selenium	Silver
Selenium	Silver	Vanadium
Silver	Vanadium	Zinc
Vanadium	Zinc	4,4'-DDD
Zinc	Dieldrin	Total DDT
alpha-Chlordane	Endosulfan I	
gamma-Chlordane	4,4'-DDD	
4,4'-DDD	Aroclor-1260	
Total Chlordane	Total Chlordane	
Total DDT	Total DDT	
4,4 DDE	Total PCBs	
4,4 DDT	bis(2-Ethylhexyl)phthalate (BEHP)	
Total PCBs	Carbazole	
BEHP	Dibenzofuran	
Carbon disulfide		

Groundwater Discharge into the Wetland Media:

Surface Water — Based on the data from associated monitoring wells, this groundwater to wetland surface water pathway was validated and significant for the following parameters (note that metals data from the 1993 sampling were not used due to potential bias introduced by the sampling methodology):

Phase III
Barium
Manganese
1,1-Dichloroethane

Sediment — Based on the data from associated monitoring wells, the groundwater to wetland sediment pathway was validated and significant for the following parameters (note that metals data from the 1993 sampling were not used due to potential bias introduced by the sampling methodology):

Phase II	Phase III	Phase IV/2001
Aluminum	Aluminum	Aluminum
Barium	Barium	Barium
Cadmium	Cadmium	Cadmium
Iron	Iron	Manganese
Lead	Lead	Vanadium
Manganese	Manganese	Zinc
Mercury	Vanadium	4,4'-DDD
Vanadium	4,4'-DDD	Total BHCs
Alpha-chlordane	Total BHC	Total DDT

Phase II	Phase III	Phase IV/2001
Gamma chlordane	Total Chlordane	
4,4'-DDD	Total DDT	
Total BHC	Bis(2-Ethylhexyl)phthalate (BEHP)	
Total Chlordane	Dibenzofuran	
Total DDT		

Surface Water/Sediment Transport within the Wetlands:

To more easily evaluate these pathways in the Wetland 7/64 complex, the complex was segmented into the marshier Wetland 7 and the more open water Wetland 64. The rationale behind this involved the principle of brackish water mixing zones: fresh water (or water relatively lower in TDS) will tend to precipitate and flocculate particulate matter upon contact with salt water. Therefore, the surface water and sediment chemistry can be expected to be different between these two parts of the wetland complex based upon physical chemistry alone, not to mention potential differences due to potential contaminant influx. In order to evaluate these pathways in Wetland 7, upstream location 041M6401/041W6401 (sediment sampled in Phase II, surface water sampled in Phase III) was compared with downstream location 041M6405/041W6405 (sediment sampled in Phase II, surface water sampled in Phase III). To evaluate these pathways in Wetland 64, a trend along the deeper central portion of the wetland was chosen. Shallower waters along the perimeter experience much more random movement due to storm and tide currents, whereas the deeper samples will exhibit more consistent trends.

The locations compared were 041M6408 (upstream, at the Wetland 7 and 64 transition); 041M6417 (midpoint, in the central area of the Yacht Basin); and 041M6423 (downstream, at the entry point into Pensacola Bay proper). Comparison criteria of note were the number of detected parameters and the apparent general trend in concentrations.

Wetland 7

Surface Water — Evaluation of locations 041W6401 and 041W6405 (both sampled during Phase III for surface water) indicated a decrease in detected parameters (15 metals and six organics versus 14 metals and two organics, respectively). For metals, there was no clear trend in concentrations. One parameter was present downgradient that was not detected upgradient, and ones detected at both locations, six constituents decreased in concentration and seven increased. Organics detected upgradient were primarily low concentration VOCs. For downgradient organics, which were also low concentration VOCs, one compound was present downgradient that was not detected upgradient, and one compound decreased in concentration.

Sediment — Evaluation of Wetland 7 upstream location 041W6401 and downstream location 041W6405 (both sampled during Phase II) indicated a higher number of detections in the downgradient location (16 metals and 27 organics upgradient versus 19 metals and 30 metals downgradient). In general, both metals and organics increased from upgradient to downgradient. For metals, 17 constituents exhibited an increase, while two metals were present in the downgradient locations that were not detected in the upgradient. For organics, 19 compounds exhibited an increase in concentrations downgradient, two organics exhibited a decrease, and nine compounds were present in the downgradient locations that were not detected in the upgradient locations. The organics consisted of PCBs, pesticides, and SVOCs. TOC exhibited a marked increase and may account for the increases in detected parameters and concentrations by providing more adsorption sites. Input from runoff and groundwater discharge from IR Site 11 may also be contributing to the general increases.

Wetland 64

Sediment — Surface water was not sampled in the more open portion of this wetland complex; therefore, this fate and transport evaluation was based on sediment concentrations. For metals, evaluation of upgradient and mid-point locations 041M6408 and 041M6417 indicated an increase in inorganic detections and a decrease in the number of organics (17 metals and 21 organics upgradient versus 19 metals and six organics downgradient). For the metals, two parameters were present at the downgradient locations that were not detected upgradient. Of the 17 metals detected at both locations, all parameters increased in concentration. For the detected organics, most of which were pesticides and SVOCs, a marked decrease in detections and concentrations was notable. One compound was present at the downgradient location that was not detected upgradient, but the remaining five all exhibited a decrease. TOC also increased downgradient. Overall, this evaluation suggested that some mechanism(s), perhaps binding to TOC and biodegradation (or uptake) of organics was fixing the contaminants in the more upgradient reaches of the wetland. Clearly, the increase in TOC was playing a role by increasing the adsorption sites for metals. There may also be some hydraulic separation by Pensacola Bay and/or tidal currents, which were stronger in the more downstream portions of the wetland.

Evaluation of the mid-point location 041M6417 with the most downstream central location 041M6423 indicated a marked decrease in the number and concentration of detected parameters (19 metals and six organics at mid-point location 041M6417 and 16 metals and three organics at the downgradient location 041M6423). All 16 detected metals and three organics at the downstream location exhibited a decrease in concentration. TOC also exhibited a marked decrease downgradient.

Again, this suggests some mechanism(s) we efficiently fixing the contaminants in the more upgradient areas of the wetland complex.

Evaluation of Phase II Versus Phase III Data:

Sediment — This section includes a brief comparison of Phase II and Phase III sediment data (surface water was only sampled during Phase III and was therefore not evaluated) to define general trends in sediment contamination (disregarding to some degree the inherent heterogeneity of sediment media). Three locations (041M6404, 041M6405, and 041M6406) were sampled during both phases. These were located in the transitional area between Wetlands 7 and 64. Criteria to be noted included the number of parameters detected and the apparent trend of parameter concentrations.

- **Location 041M6404** — 18 metals and 11 organics were detected at this location in Phase II, while 21 metals and 26 organics were detected in Phase III. For the metals, five parameters were present in Phase III that were not detected in Phase II. Of 16 the metals detected during both events, three exhibited a decrease, and 13 parameters exhibited an increase. For the organics, 21 compounds were present in Phase III that were not detected during Phase II. Of the five organics detected during both events, all compounds exhibited an increase. The most notable change was the increase in SVOCs. TOC exhibited a decrease in concentration from Phase II to Phase III.

- **Location 041M6405** — 19 metals and 30 organics were detected during Phase II versus 22 metals and 24 organics during Phase III. For the metals, four parameters were present in Phase III that were not detected in Phase II. Of the 8 detected metals during both phases, 17 constituents exhibited an increase and one a decrease. For the organics, three compounds were present during Phase III that were not detected in Phase II. Of the 21 detected organics during both events, 19 compounds exhibited an increase and two a decrease. Again the majority of organics were pesticides and SVOCs. TOC exhibited a decrease in concentration from Phase II to Phase III.

- **Location 041M6406** — 21 metals and eight organics were detected in Phase II, while 21 metals and 25 organics were detected in Phase III. For the metals, only one parameter was present in Phase III that was not detected in Phase II. Of the 20 detected metals in both phases, 19 parameters exhibited an increase, and one metal exhibited a decrease. For the organics, 20 compounds were present in Phase III that were not detected during Phase II. Of

the five detected compounds in both phases, all five organics exhibited an increase in concentration. TOC exhibited an increase in Phase III.

Overall, the trend in sediment contamination was upward, both in terms of parameters detected and in concentrations. Most of the organics were pesticides and SVOCs, which suggests the source, may be related to storm water runoff supplemented by hydraulic sediment mobilization. It was doubtful that groundwater discharges play a large role, as most of the proximal well samples did not yield large detections of SVOCs. Because of the setting of the wetland area, storm water runoff would be expected to have concentrations of pesticides (from routine application over the years) and SVOCs (runoff from asphalt-paved areas such as former Chevalier Field). In the absence of dredging or storm surges to remove sediment, as is the case with the Yacht Basin over this time period, accumulation of sediment containing these parameters is to be expected.

Table 11-3-1
Wetland 64 Phase II
Sediment Physical Parameters

	November 1995 Data							
Parameter	**041M640101**	**041M640201**	**041M640301**	**041M640401**	**041M640501**	**041M640601**	**041M640701**	**041M640801**
TOC (%)	0.752	4.42	19.4	18.7	8.35	2.81	0.478	0.851
Percent Solids (%)	71.8	60.7	12.8	11.6	19	56.3	76	73
Grain Size Analysis (percent of composition[1])								
Coarse Gravel	No Data	0	0	No Data	0	0	0	No Data
Fine Gravel	No Data	0	0	No Data	0	0	1	No Data
Coarse Sand	No Data	0	0	No Data	2	2	1	No Data
Medium Sand	No Data	4	7	No Data	21	25	13	No Data
Fine Sand	No Data	25	5	No Data	70	59	82	No Data
Silt and Clay	No Data	71	88	No Data	7	14	3	No Data
Description	N/A	Dark Brown Sandy Organic Silt	Dark Brown Sandy Organic Silt	N/A	Dark Brown Sand with Silt, Organics	Black Silty Sand with Organics	Dark Brown Poorly Graded Sand, Fine	N/A

Parameter	**041M640901**	**041M641001**	**041M641101**	**041M641201**	**041M641301**	**041M641401**	**041M641501**	**041M641601**
TOC (mg/kg)	1,620	89,700	40,100	1,760	76,100	68,700	1,990	67,500
TOC(%)	0.162	8.97	4.01	0.176	7.61	6.87	0.199	6.75
Percent Solids (%)	79.9	16.4	25.4	80.1	16.3	15.6	75.4	17.9
Grain Size Analysis (percent of composition[1])								
Coarse Gravel	0	0	0	0	0	0	0	0
Fine Gravel	0	0	0	0	0	0	1	0
Coarse Sand	0	0	0	0	0	0	0	0
Medium Sand	54	0	7	45	2	1	11	1
Fine Sand	43	6	57	54	3	10	87	10
Silt and Clay	3	94	36	1	95	89	1	89
Description	Light Brown and Dark Gray Poorly Graded Sand	Dark Gray Organic Silt	Dark Gray Silty Sand with Organics	Brown Poorly Graded Sand, Fine	Dark Gray Organic Silt	Dark Gray Sandy Organic Silt	Brown Poorly Graded Sand, Fine	Dark Gray Sandy Organic Silt

Parameter	**041M641701**	**041M641801**	**041M641901**	**041M642001**	**041M642101**	**041M642201**	**041M642301**	**041M642401**
TOC (mg/kg)	14,600	3,680	64,000	4,200	1,380	9,270	4,040	739
TOC (%)	1.46	0.368	6.4	0.42	0.138	0.927	0.404	0.0739
Percent Solids (%)	54.9	79.5	15.8	78.9	73.4	41.1	69.7	73.2
Grain Size Analysis (percent of composition[1])								
Coarse Gravel	0	No Data	No Data	0	0	0	0	0
Fine Gravel	10	No Data	No Data	0	0	36	0	0
Coarse Sand	1	No Data	No Data	0	0	4	0	0
Medium Sand	19	No Data	No Data	17	20	13	13	15
Fine Sand	64	No Data	No Data	78	78	41	86	83
Silt and Clay	6	No Data	No Data	5	2	6	1	2
Description	Dark Gray Sand with Silt, Organics	N/A	N/A	Olive Brown Poorly Graded Sand, Medium to Fine	Light Gray Poorly Graded Sand, Medium to Fine	Dark Brown Silty Sand with Gravel, Organics	Dark Brown Poorly Graded Sand, Medium to Fine	Light Brown Poorly Graded Sand, Medium to Fine

Note:
1 = Derived from sieve analyses.

Table 11-3-2
Wetland 64 Phase III
Sediment Physical Parameters

Parameter	041M640401	041M640501	041M640601
TOC (%)	7	6	8.6
Grain Size Analysis (percent of composition[1])			
Fine Gravel	1.4	0.4	0
Coarse Sand	2.2	1.3	1.1
Medium Sand	10.6	6	6.4
Fine Sand	50.7	39	49.1
Clay	35.1	53.3	43.4

Note:
[1] = Derived from sieve analyses.

Table 11-3-3
Wetland 64 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	4,274.0	8	24	24	28.90	26,800.0	7,430.0	041M641601
Antimony	0.260	7	4	10	0.190	10.80	1.510	041M640401
Arsenic	2.140	11	19	24	0.160	18.70	5.550	041M641601
Barium	3.840	14	22	24	0.350	1,280.0	60.90	041M640301
Beryllium	0.130	10	10	24	0.110	1.30	0.355	041M641901
Cadmium	0.390	18	22	24	0.190	38.60	8.680	041M640301
Calcium	1,978.80	10	24	24	64.40	6,630.0	1,960.0	041M641701
Chromium	13.10	17	24	24	0.550	1,800.0	426.0	041M640301
Cobalt	0.910	10	15	24	0.130	6.10	1.50	041M640301
Copper	8.440	13	22	24	0.740	255.0	47.40	041M640301
Iron	2,684.40	12	24	24	26.0	38,200.0	11,000.0	041M641601
Lead	21.040	14	23	24	0.650	634.0	132.0	041M640301
Magnesium	2,943.60	8	24	24	47.10	9,390.0	2,770.0	041M641601
Manganese	9.810	14	24	24	0.120	203.0	59.70	041M641601
Mercury	0.110	13	14	24	0.10	0.880	0.231	041M640301
Nickel	3.690	11	17	24	0.790	27.10	6.510	041M640301
Potassium	899.720	7	24	24	19.90	3,560.0	940.0	041M641901
Selenium	0.660	10	11	24	0.340	3.10	0.771	041M640301
Silver	0.520	8	4	24	0.370	5.10	0.569	041M640301
Sodium	11,439.60	6		24	43.80	30,200.0	8,130.0	041M641901
Thallium	0.390	8	2	24	0.650	1.20	0.314	041M640301
Vanadium	8.590	9	22	24	0.420	43.40	13.30	041M641601
Zinc	14.360	18	23	24	2.20	481.0	123.0	041M640301
PAHs (g/kg)								
2-Methylnaphthalene	N/A	0	1	24	30.0	30.0	161.0	041M640101
Acenaphthene	N/A	0	2	24	120.0	230.0	91.60	041M640501
Acenaphthylene	N/A	0	1	24	90.0	90.0	196.0	041M640501
Anthracene	N/A	0	2	24	230.0	330.0	216.0	041M640501
Benzo(a)anthracene	N/A	0	12	24	27.0	1,400.0	255.0	041M640201
Benzo(a)pyrene	N/A	0	13	24	25.0	910.0	266.0	041M640501
Chrysene	N/A	0	13	24	23.0	1,500.0	271.0	041M640201
Dibenz(a,h)anthracene	N/A	0	1	24	25.0	25.0	161.0	041M640101
Fluoranthene	N/A	0	19	24	24.0	5,700.0	624.0	041M640201
Fluorene	N/A	0	2	24	160.0	210.0	92.40	041M640501
Naphthalene	N/A	0	2	24	56.0	71.0	163.0	041M640501
Phenanthrene	N/A	0	12	24	42.0	2,800.0	358.0	041M640201
Pyrene	N/A	0	19	24	22.0	4,600.0	533.0	041M640201
Total PAHs	N/A	0	19	24	255.0	25,100.0	3,390.0	041M640201
Pesticides and PCBs (g/kg)								
Aroclor-1254	N/A	0	8	24	1.30	370.0	28.90	041M640201
Aroclor-1260	N/A	0	12	24	1.30	50.0	14.60	041M641901
Total PCBs	N/A	0	20	24	8.950	640.0	88.30	041M640301
Aldrin	N/A	0	6	24	0.170	4.0	0.521	041M640301
Dieldrin	N/A	0	5	24	0.790	3.30	0.703	041M640201
Endosulfan I	N/A	0	1	24	0.760	0.760	0.402	041M641401
Endosulfan II	N/A	0	1	24	1.70	1.70	0.517	041M641901
Heptachlor	N/A	0	1	24	0.120	0.120	0.233	041M640101
alpha-Chlordane	N/A	0	4	24	0.280	10.0	0.864	041M640301
gamma-Chlordane	N/A	0	5	24	0.650	8.50	0.712	041M640301
Total Chlordane	N/A	0	6	24	0.345	18.50	1.580	041M640301
Endrin	N/A	0	5	24	0.460	8.0	1.140	041M640101
Endrin aldehyde	N/A	0	1	24	0.290	0.290	0.475	041M640801
Total Endrin	N/A	0	5	24	0.880	8.230	2.080	041M640101
alpha-BHC	N/A	0	9	24	0.120	0.940	0.356	041M641401
gamma-BHC (Lindane)	N/A	0	5	24	0.130	1.60	0.305	041M640401
Total BHC	N/A	0	11	24	0.315	2.980	1.120	041M640401
4,4'-DDD	50.0	1	14	24	0.20	140.0	12.20	041M640201
4,4'-DDE	40.0	2	14	24	0.350	78.0	9.480	041M640301
4,4'-DDT	20.0	0	6	24	0.60	14.0	1.580	041M640301
Total DDT	110.0	2	15	24	0.470	213.650	23.20	041M640201
SVOCs (g/kg)								
1,2-Dichlorobenzene	N/A	0	1	24	190.0	190.0	1,540.0	041M640401
1,4-Dichlorobenzene	N/A	0	2	24	70.0	260.0	1,520.0	041M640401
Benzo(b)fluoranthene	N/A	0	16	24	21.0	2,600.0	424.0	041M640201
Benzo(g,h,i)perylene	N/A	0	9	24	29.0	590.0	213.0	041M640501
Benzo(k)fluoranthene	N/A	0	7	24	35.0	250.0	190.0	041M640301
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	3	24	33.0	530.0	1,670.0	041M641901
Butylbenzylphthalate	N/A	0	8	24	28.0	280.0	1,410.0	041M640501
Carbazole	N/A	0	2	24	230.0	400.0	1,600.0	041M640501
Dibenzofuran	N/A	0	2	24	72.0	85.0	1,580.0	041M640501
Diethylphthalate	N/A	0	3	24	80.0	2,000.0	1,680.0	041M640101
Dimethylphthalate	N/A	0	1	24	510.0	510.0	1,620.0	041M642201
Di-n-butylphthalate	N/A	0	9	24	28.0	430.0	1,430.0	041M641501
Indeno(1,2,3-cd)pyrene	N/A	0	8	24	39.0	600.0	214.0	041M640501
Phenol	N/A	0	1	24	220.0	220.0	1,540.0	041M640401
VOCs (g/kg)								
Acetone	N/A	0	10	24	9.0	420.0	322.0	041M641401
Carbon disulfide	N/A	0	1	24	11.0	11.0	147.0	041M641601
Chlorobenzene	N/A	0	1	24	48.0	48.0	270.0	041M640401
Methylene chloride	N/A	0	5	24	64.0	400.0	345.0	041M641401

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 11-3-4
Wetland 64 Phase III
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	4,274.0	3	3	3	7,600.0	8,900.0	8,460.0	041M640601
Antimony	0.260	3	1	3	2.50	2.50	2.030	041M640501
Arsenic	2.140	3	3	3	6.90	7.80	7.230	041M640601
Barium	3.840	3	3	3	15.20	17.10	16.40	041M640401
Beryllium	0.130	3	3	3	0.30	0.340	0.327	041M640601
Cadmium	0.390	3	3	3	17.70	21.0	19.60	041M640601
Calcium	1,978.80	3	3	3	2,660.0	3,210.0	2,950.0	041M640401
Chromium	13.10	3	3	3	592.0	868.0	745.0	041M640601
Cobalt	0.910	3	3	3	2.70	3.40	3.030	041M640501
Copper	8.440	3	3	3	102.0	146.0	121.0	041M640501
Iron	2,684.40	3	3	3	12,100.0	13,600.0	13,000.0	041M640401
Lead	21.040	3	3	3	330.0	346.0	338.0	041M640401
Magnesium	2,943.60	3	3	3	3,230.0	4,190.0	3,650.0	041M640401
Manganese	9.810	3	3	3	44.90	65.80	53.20	041M640501
Mercury	0.110	3	3	3	0.250	0.260	0.257	041M640501
Nickel	3.690	3	3	3	9.80	12.30	11.10	041M640501
Potassium	899.720	3	3	3	1,090.0	1,350.0	1,200.0	041M640401
Selenium	0.660	3	3	3	1.30	1.60	1.470	041M640401
Silver	0.520	3	3	3	1.90	3.0	2.30	041M640501
Sodium	11,439.60	2	3	3	10,100.0	18,300.0	14,100.0	041M640401
Vanadium	8.590	3	3	3	15.90	18.40	17.20	041M640401
Zinc	14.360	3	3	3	306.0	468.0	368.0	041M640401
PAHs (g/kg)								
Acenaphthene	N/A	0	3	3	260.0	750.0	440.0	041M640601
Anthracene	N/A	0	3	3	310.0	1,000.0	550.0	041M640601
Benzo(a)anthracene	N/A	0	3	3	1,100.0	2,100.0	1,500.0	041M640601
Benzo(a)pyrene	N/A	0	3	3	1,000.0	1,700.0	1,300.0	041M640601
Chrysene	N/A	0	3	3	1,200.0	2,100.0	1,530.0	041M640601
Fluoranthene	N/A	0	3	3	2,700.0	5,000.0	3,500.0	041M640601
Fluorene	N/A	0	3	3	210.0	750.0	417.0	041M640601
Naphthalene	N/A	0	3	3	110.0	310.0	177.0	041M640601
Phenanthrene	N/A	0	3	3	1,800.0	4,300.0	2,700.0	041M640601
Pyrene	N/A	0	3	3	3,000.0	4,800.0	3,630.0	041M640601
Total PAHs	N/A	0	3	3	13,740.0	24,460.0	17,400.0	041M640601
Pesticides and PCBs (g/kg)								
Aroclor-1260	N/A	0	3	3	180.0	300.0	253.0	041M640401
Total PCBs	N/A	0	3	3	565.0	1,220.0	888.0	041M640401
Dieldrin	N/A	0	3	3	7.70	20.0	14.90	041M640401
Endosulfan I	N/A	0	2	3	1.30	2.40	1.380	041M640401
alpha-Chlordane	N/A	0	2	3	2.90	3.70	2.60	041M640401
Total Chlordane	N/A	0	2	3	4.650	11.70	6.450	041M640401
delta-BHC	N/A	0	2	3	0.690	0.940	2.030	041M640601
Total BHC	N/A	0	2	3	7.115	21.690	15.50	041M640401
4,4'-DDD	50.0	2	3	3	30.0	89.0	57.30	041M640401
4,4'-DDE	40.0	2	3	3	33.0	89.0	55.30	041M640401
4,4'-DDT	20.0	0	2	3	18.0	19.0	13.60	041M640601
Total DDT	110.0	2	3	3	66.850	196.0	126.0	041M640401
SVOCs (g/kg)								
Benzo(b)fluoranthene	N/A	0	3	3	1,100.0	1,800.0	1,430.0	041M640601
Benzo(g,h,i)perylene	N/A	0	3	3	470.0	980.0	777.0	041M640601
Benzo(k)fluoranthene	N/A	0	3	3	1,300.0	1,900.0	1,500.0	041M640601
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	3	3	2,000.0	3,900.0	3,070.0	041M640601
Butylbenzylphthalate	N/A	0	3	3	240.0	710.0	427.0	041M640401
Carbazole	N/A	0	3	3	320.0	800.0	490.0	041M640601
Dibenzofuran	N/A	0	2	3	130.0	350.0	377.0	041M640601
Indeno(1,2,3-cd)pyrene	N/A	0	3	3	680.0	1,000.0	833.0	041M640601
VOCs (g/kg)								
Acetone	N/A	0	2	3	32.0	32.0	31.20	041M640501

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 11-3-5
Wetland 64 Phase IV
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	4,274.0	3	7	7	59.0	18,000.0	5,400.0	041M641102
Arsenic	2.140	5	5	7	3.20	13.0	5.430	041M641102
Barium	3.840	6	7	7	0.170	18.0	9.580	041M641102
Beryllium	0.130	5	5	7	0.150	1.10	0.314	041M641102
Cadmium	0.390	5	6	7	0.070	23.0	10.20	041M640502
Calcium	1,978.80	4	7	7	58.0	4,300.0	1,860.0	041M641102
Chromium	13.10	5	7	7	1.0	700.0	360.0	041M640502
Cobalt	0.910	5	5	7	1.0	4.80	1.840	041M640502
Copper	8.440	6	6	7	12.0	200.0	75.80	041M640502
Iron	2,684.40	5	7	7	48.0	33,000.0	11,300.0	041M641102
Lead	21.040	5	7	7	0.380	430.0	164.0	041M640502
Magnesium	2,943.60	2	7	7	110.0	10,000.0	2,900.0	041M641102
Manganese	9.810	5	7	7	0.310	230.0	59.90	041M641102
Mercury	0.110	5	6	7	0.007	0.460	0.188	041M641102
Nickel	3.690	5	6	7	0.260	15.0	7.060	041M640502
Potassium	899.720	2	7	7	44.0	4,200.0	1,090.0	041M641102
Silver	0.520	5	5	7	1.30	4.0	1.440	041M640502
Sodium	11,439.60	2	7	7	560.0	48,000.0	12,500.0	041M641102
Vanadium	8.590	4	7	7	0.120	37.0	13.20	041M641102
Zinc	14.360	5	6	7	3.0	380.0	180.0	041M640502
PAHs (g/kg)								
Benzo(a)anthracene	N/A	0	2	7	660.0	870.0	2,000.0	041M640502
Benzo(a)pyrene	N/A	0	2	7	540.0	800.0	1,970.0	041M640502
Chrysene	N/A	0	2	7	840.0	860.0	2,020.0	041M640502
Fluoranthene	N/A	0	2	7	1,600.0	1,800.0	2,270.0	041M640502
Phenanthrene	N/A	0	3	7	230.0	1,100.0	1,800.0	041M640502
Pyrene	N/A	0	2	7	1,400.0	1,600.0	2,210.0	041M640502
Total PAHs	N/A	0	3	7	22,810.0	28,030.0	30,100.0	041M640502
Pesticides and PCBs (g/kg)								
Heptachlor epoxide	N/A	0	2	7	4.40	6.20	10.70	041M640602
delta-BHC	N/A	0	5	7	0.660	6.90	4.240	041M641102
Total BHC	N/A	0	5	7	3.810	108.90	43.90	041M641102
4,4'-DDD	50.0	2	1	7	100.0	100.0	28.90	041M640602
4,4'-DDE	40.0	2	4	7	8.40	43.0	26.10	041M640202
Total DDT	110.0	2	4	7	36.90	154.0	80.50	041M640602
SVOCs (g/kg)								
Benzo(b)fluoranthene	N/A	0	2	7	630.0	780.0	1,980.0	041M640502
Benzo(g,h,i)perylene	N/A	0	2	7	420.0	490.0	1,910.0	041M640502
Benzo(k)fluoranthene	N/A	0	2	7	510.0	910.0	1,980.0	041M640502
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	3	7	980.0	1,500.0	1,830.0	041M640502

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 11-3-6
Wetland 64 Phase III
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections		Range of Detections			Maximum Detection Location
			Number Detected	Number Analyzed	Minimum Detection	Maximum Detection	Average Detection	
Metals (g/L)								
Aluminum	2,927.50	0	1	2	298.0	298.0	298.0	041W640501
Antimony	4.15	0	1	2	3.8	3.8	3.8	041W640101
Barium	9.43	2	2	2	33.6	36.4	35.0	041W640101
Cadmium	2.40	0	1	2	0.84	0.84	0.84	041W640101
Calcium	76,800.00	2	2	2	99,000.0	137,000.0	118,000.0	041W640501
Chromium	10.87	1	2	2	8.5	12.5	10.5	041W640501
Copper	7.03	0	2	2	4.2	5.8	5.0	041W640101
Iron	1,352.00	0	2	2	702.0	829.0	766.0	041W640101
Lead	13.75	0	2	2	5.8	8.6	7.2	041W640501
Magnesium	243,650.00	2	2	2	274,000.0	421,000.0	348,000.0	041W640501
Manganese	12.15	2	2	2	28.3	37.1	32.7	041W640101
Mercury	0.21	0	1	2	0.06	0.06	0.06	041W640501
Nickel	9.30	0	1	2	2.6	2.6	2.6	041W640101
Potassium	81,250.00	2	2	2	113,000.0	205,000.0	159,000.0	041W640501
Silver	3.01	0	2	2	0.04	0.05	0.045	041W640101
Sodium	1,952,000.00	2	2	2	2,290,000.0	3,600,000.0	2,950,000.0	041W640501
Zinc	12.88	1	2	2	10.1	24.1	17.1	041W640101
Pesticides (g/L)								
beta-BHC	N/A	0	1	2	0.0072	0.0072	0.0072	041W640101
Total BHC	N/A	0	1	2	0.05845	0.05845	0.0585	041W640101
VOCs (g/L)								
1,1,1-Trichloroethane	N/A	0	1	2	0.21	0.21	0.21	041W640101
1,1-Dichloroethane	N/A	0	1	2	0.9	0.9	0.9	041W640101
1,2-Dichloroethene (total)	N/A	0	2	2	0.21	0.59	0.4	041W640101
Acetone	N/A	0	1	2	24.0	24.0	24.0	041W640101
Toluene	N/A	0	1	2	0.36	0.36	0.36	041W640501
Trichloroethene	N/A	0	1	2	0.34	0.34	0.34	041W640101

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 11-3-7
Wetland 64 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	24	24			28.9	26,800	041M641601	26,800			N/A		Yes	No SV
Antimony	4	10	0.065	1.6	0.19	10.8	041M640401	10.8	J	12	2	0.9	No	Max Detect < SV
Arsenic	**19**	**24**	**0.06**	**0.13**	**0.16**	**18.7**	**041M641601**	**18.7**		**7.24**	**1, 2**	**2.58**	**Yes**	**Max Detect > SV**
Barium	22	24	0.08	0.14	0.35	1,280	041M640301	1,280			N/A		Yes	No SV
Beryllium	10	24	0.03	0.22	0.11	1.3	041M641901	1.3	J		N/A		Yes	No SV
Cadmium	**22**	**24**	**0.1**	**0.105**	**0.19**	**38.6**	**041M640301**	**38.6**		**0.68**	**1**	**57.1**	**Yes**	**Max Detect > SV**
Calcium	24	24			64.4	6,630	041M641701	6,630			N/A		Yes	No SV
Chromium	**24**	**24**			**0.55**	**1,800**	**041M640301**	**1,800**		**52.3**	**1, 2**	**34.4**	**Yes**	**Max Detect > SV**
Cobalt	15	24	0.09	0.435	0.13	6.1	041M640301	6.1	J		N/A		Yes	No SV
Copper	**22**	**24**	**0.285**	**0.75**	**0.74**	**255**	**041M640301**	**255**	**J**	**18.7**	**1, 2**	**13.6**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	24	0.295	2.05			ND	2.05	U		N/A		Yes	No SV
Iron	24	24			26	38,200	041M641601	38,200			N/A		Yes	No SV
Lead	**23**	**24**	**0.145**	**0.145**	**0.65**	**634**	**041M640301**	**634**	**J**	**30.2**	**1, 2**	**21**	**Yes**	**Max Detect > SV**
Magnesium	24	24			47.1	9,390	041M641601	9,390			N/A		Yes	No SV
Manganese	24	24			0.12	203	041M641601	203			N/A		Yes	No SV
Mercury	**14**	**24**	**0.025**	**0.04**	**0.1**	**0.88**	**041M640301**	**0.88**		**0.13**	**1, 2**	**6.77**	**Yes**	**Max Detect > SV**
Nickel	**17**	**24**	**0.285**	**0.41**	**0.79**	**27.1**	**041M640301**	**27.1**		**15.9**	**1, 2**	**1.7**	**Yes**	**Max Detect > SV**
Potassium	24	24			19.9	3,560	041M641901	3,560			N/A		Yes	No SV
Selenium	11	24	0.09	0.85	0.34	3.1	041M640301	3.1	J		N/A		Yes	No SV
Silver	**4**	**24**	**0.12**	**1.1**	**0.37**	**5.1**	**041M640301**	**5.1**	**J**	**0.73**	**1**	**6.96**	**Yes**	**Max Detect > SV**
Sodium	23	24	2.5	2.5	43.8	30,200	041M641901	30,200			N/A		Yes	No SV
Thallium	2	24	0.09	0.85	0.65	1.2	041M640301	1.2	J		N/A		Yes	No SV
Vanadium	22	24	0.105	0.75	0.42	43.4	041M641601	43.4			N/A		Yes	No SV
Zinc	**23**	**24**	**0.7**	**0.7**	**2.2**	**481**	**041M640301**	**481**	**J**	**124**	**1, 2**	**3.88**	**Yes**	**Max Detect > SV**
PAHs (g/kg)														
2-Methylnaphthalene	**1**	**24**	**20.5**	**1,350**	**30**	**30**	**041M640101**	**30**	**J**	**20.2**	**1**	**1.49**	**Yes**	**Max Detect > SV**
Acenaphthene	**2**	**24**	**10**	**650**	**120**	**230**	**041M640501**	**230**		**6.71**	**1**	**34.3**	**Yes**	**Max Detect > SV**
Acenaphthylene	**1**	**24**	**20.5**	**1,350**	**90**	**90**	**041M640501**	**90**	**J**	**5.87**	**1**	**15.3**	**Yes**	**Max Detect > SV**
Anthracene	**2**	**24**	**20.5**	**1,350**	**230**	**330**	**041M640501**	**330**		**46.9**	**1**	**7.04**	**Yes**	**Max Detect > SV**
Benzo(a)anthracene	**12**	**24**	**20.5**	**1,350**	**27**	**1,400**	**041M640201**	**1,400**	**J**	**74.8**	**1**	**18.7**	**Yes**	**Max Detect > SV**
Benzo(a)pyrene	**13**	**24**	**20.5**	**1,350**	**25**	**910**	**041M640501**	**910**		**88.8**	**1**	**10.2**	**Yes**	**Max Detect > SV**
Chrysene	**13**	**24**	**18.5**	**1,350**	**23**	**1,500**	**041M640201**	**1,500**	**J**	**108**	**1**	**13.9**	**Yes**	**Max Detect > SV**
Dibenz(a,h)anthracene	**1**	**24**	**20.5**	**1,350**	**25**	**25**	**041M640101**	**25**	**J**	**6.22**	**1**	**4.02**	**Yes**	**Max Detect > SV**
Fluoranthene	**19**	**24**	**20.5**	**22**	**24**	**5,700**	**041M640201**	**5,700**		**113**	**1**	**50.4**	**Yes**	**Max Detect > SV**
Fluorene	**2**	**24**	**10**	**650**	**160**	**210**	**041M640501**	**210**		**21.2**	**1**	**9.91**	**Yes**	**Max Detect > SV**
Naphthalene	**2**	**24**	**20.5**	**1,350**	**56**	**71**	**041M640501**	**71**	**J**	**34.6**	**1**	**2.05**	**Yes**	**Max Detect > SV**
Phenanthrene	**12**	**24**	**20.5**	**1,350**	**42**	**2,800**	**041M640201**	**2,800**		**86.7**	**1**	**32.3**	**Yes**	**Max Detect > SV**
Pyrene	**19**	**24**	**20.5**	**21.5**	**22**	**4,600**	**041M640201**	**4,600**		**153**	**1**	**30.1**	**Yes**	**Max Detect > SV**
Total PAHs	**19**	**24**	**246**	**440**	**255**	**25,100**	**041M640201**	**25,100**		**1684**	**1, 2**	**14.9**	**Yes**	**Max Detect > SV**
TOC Normalized PAHs	**19**	**24**	**69.97**	**595.4**	**12.17**	**735.84**	**041M640101**	**735.8**		**290**	**3**	**2.54**	**Yes**	**Max Detect > SV**
PCBs (g/kg)														
Aroclor-1016	0	24	1.05	70			ND	70	UJ	21.6	N/A	3.24	Yes	Max SQL > SV
Aroclor-1221	0	24	2.1	140			ND	140	UJ	67	2	2.09	Yes	Max SQL > SV
Aroclor-1232	0	24	1.05	70			ND	70	UJ	21.6	N/A	3.24	Yes	Max SQL > SV
Aroclor-1242	0	24	1.05	70			ND	70	UJ	21.6	N/A	3.24	Yes	Max SQL > SV
Aroclor-1248	0	24	1.05	70			ND	70	UJ	21.6	N/A	3.24	Yes	Max SQL > SV
Aroclor-1254	**8**	**24**	**1.05**	**9.5**	**1.3**	**370**	**041M641501**	**370**	**J**	**21.6**	**N/A**	**17.1**	**Yes**	**Max Detect > SV**
Aroclor-1260	**12**	**24**	**1.05**	**70**	**1.3**	**50**	**041M642001**	**50**	**J**	**21.6**	**N/A**	**2.31**	**Yes**	**Max Detect > SV**
Total PCBs	**20**	**24**	**8.4**	**18.5**	**8.95**	**640**	**041M642001**	**640**		**21.6**	**1**	**29.6**	**Yes**	**Max Detect > SV**
Pesticides (g/kg)														
Aldrin	6	24	0.05	0.8	0.17	4	041M640301	4	J		N/A		Yes	No SV
Dieldrin	**5**	**24**	**0.105**	**3.5**	**0.79**	**3.3**	**041M640201**	**3.3**	**J**	**0.72**	**1**	**4.61**	**Yes**	**Max Detect > SV**
Endosulfan I	1	24	0.055	3.5	0.76	0.76	041M641401	0.76	J		N/A		Yes	No SV
Endosulfan II	1	24	0.105	3.5	1.7	1.7	041M641901	1.7	J		N/A		Yes	No SV
Endosulfan sulfate	0	24	0.105	3.5			ND	3.5	U		N/A		Yes	No SV
Heptachlor	1	24	0.05	1.7	0.12	0.12	041M640101	0.12	J		N/A		Yes	No SV
Heptachlor epoxide	0	24	0.05	1.7			ND	1.7	U		N/A		Yes	No SV
Methoxychlor	0	24	0.5	17			ND	17	U		N/A		Yes	No SV
Toxaphene	0	24	10.5	350			ND	350	U		N/A		Yes	No SV
alpha-Chlordane	**4**	**24**	**0.05**	**0.46**	**0.28**	**10**	**041M640301**	**10**	**J**	**1.7**	**1**	**5.88**	**Yes**	**Max Detect > SV**
gamma-Chlordane	**5**	**24**	**0.05**	**0.46**	**0.65**	**8.5**	**041M640301**	**8.5**	**J**	**1.7**	**1**	**5**	**Yes**	**Max Detect > SV**
Total Chlordane	**6**	**24**	**0.1**	**0.92**	**0.345**	**18.5**	**041M640301**	**18.5**		**1.7**	**1**	**10.9**	**Yes**	**Max Detect > SV**
Endrin	**5**	**24**	**0.105**	**3.5**	**0.46**	**8**	**041M640101**	**8**	**DJ**	**3.3**	**2**	**2.42**	**Yes**	**Max Detect > SV**
Endrin aldehyde	1	24	0.105	3.5	0.29	0.29	041M640801	0.29	J	3.3	2	0.09	No	Max Detect < SV
Endrin ketone	0	24	0.105	3.5			ND	3.5	U	3.3	2	1.06	Yes	Max SQL > SV
Total Endrin	**5**	**24**	**0.315**	**10.5**	**0.88**	**8.23**	**041M640101**	**8.23**		**3.3**	**2**	**2.49**	**Yes**	**Max Detect > SV**
alpha-BHC	9	24	0.055	1.7	0.12	0.94	041M642401	0.94	J		N/A		Yes	No SV
beta-BHC	0	24	0.05	1.7			ND	1.7	UJ	0.32	N/A	5.31	Yes	Max SQL > SV
delta-BHC	0	24	0.05	1.7			ND	1.7	UJ	0.32	N/A	5.31	Yes	Max SQL > SV
gamma-BHC (Lindane)	**5**	**24**	**0.05**	**1.7**	**0.13**	**1.6**	**041M641801**	**1.6**	**J**	**0.32**	**1**	**5**	**Yes**	**Max Detect > SV**
Total BHC	**11**	**24**	**0.22**	**6.8**	**0.315**	**2.98**	**041M642401**	**2.98**		**0.32**	**2**	**9.31**	**Yes**	**Max Detect > SV**
4,4'-DDD	**14**	**24**	**0.105**	**0.5**	**0.2**	**140**	**041M640201**	**140**	**D**	**1.22**	**1**	**115**	**Yes**	**Max Detect > SV**
4,4'-DDE	**14**	**24**	**0.105**	**0.5**	**0.35**	**78**	**041M640301**	**78**		**2.07**	**1**	**37.7**	**Yes**	**Max Detect > SV**
4,4'-DDT	**6**	**24**	**0.105**	**1.65**	**0.6**	**14**	**041M640301**	**14**	**J**	**1.19**	**1**	**11.8**	**Yes**	**Max Detect > SV**
Total DDT	**15**	**24**	**0.315**	**1.5**	**0.47**	**214**	**041M640201**	**214**		**3.3**	**2**	**64.7**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
1,2-Dichlorobenzene	1	24	205	13,500	190	190	041M640401	190	J		N/A		Yes	No SV
1,3-Dichlorobenzene	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
1,4-Dichlorobenzene	2	24	205	13,500	70	260	041M640401	260	J		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	21	205	13,000			ND	13,000	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	24	495	33,000			ND	33,000	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	24	495	33,000			ND	33,000	UJ		N/A		Yes	No SV
2,4-Dinitrotoluene	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
2-Chloronaphthalene	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
2-Chlorophenol	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	24	495	33,000			ND	33,000	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
2-Nitroaniline	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
2-Nitrophenol	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	24	205	13,500			ND	13,500	UJ		N/A		Yes	No SV
3-Nitroaniline	0	22	495	31,500			ND	31,500	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
4-Chloroaniline	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
4-Nitroaniline	0	24	495	33,000			ND	33,000	UJ		N/A		Yes	No SV
4-Nitrophenol	0	24	495	33,000			ND	33,000	U		N/A		Yes	No SV
Benzo(b)fluoranthene	16	24	20.5	1,350	21	2,600	041M640201	2,600			N/A		Yes	No SV

Table 11-3-7
Wetland 64 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
Benzo(g,h,i)perylene	9	24	20.5	1,350	29	590	041M640501	590			N/A		Yes	No SV
Benzo(k)fluoranthene	7	24	20.5	1,350	35	250	041M640301	250	J		N/A		Yes	No SV
bis(2-Chloroethoxy)methane	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	24	20.5	1,350			ND	1,350	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**3**	**24**	**205**	**13,500**	**33**	**530**	**041M641901**	**530**	**J**	**182**	**1, 2**	**2.91**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	**8**	**24**	**205**	**13,500**	**28**	**280**	**041M640501**	**280**	**J**	**182**	**1, 2**	**1.54**	**Yes**	**Max Detect > SV**
Carbazole	2	24	205	13,500	230	400	041M640501	400	J		N/A		Yes	No SV
Dibenzofuran	2	24	205	13,500	72	85	041M640501	85	J		N/A		Yes	No SV
Diethylphthalate	**3**	**24**	**205**	**13,500**	**80**	**2,000**	**041M640101**	**2,000**		**182**	**1, 2**	**11**	**Yes**	**Max Detect > SV**
Dimethylphthalate	**1**	**24**	**205**	**13,500**	**510**	**510**	**041M642201**	**510**		**182**	**1, 2**	**2.8**	**Yes**	**Max Detect > SV**
Di-n-butylphthalate	**9**	**24**	**205**	**13,500**	**28**	**430**	**041M641501**	**430**		**182**	**1, 2**	**2.36**	**Yes**	**Max Detect > SV**
Di-n-octylphthalate	0	24	205	13,500			ND	13,500	U	182	1, 2	74.2	Yes	Max SQL > SV
Hexachlorobenzene	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
Hexachlorobutadiene	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	24	205	13,500			ND	13,500	UJ		N/A		Yes	No SV
Hexachloroethane	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	8	24	20.5	1,350	39	600	041M640501	600			N/A		Yes	No SV
Isophorone	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
Nitrobenzene	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	24	20.5	1,350			ND	1,350	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	24	205	13,500			ND	13,500	U		N/A		Yes	No SV
Pentachlorophenol	0	24	495	33,000			ND	33,000	U		N/A		Yes	No SV
Phenol	1	24	205	13,500	220	220	041M640401	220	J		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
1,1-Dichloroethane	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
1,1-Dichloroethene	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
1,2-Dichloroethane	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
1,2-Dichloropropane	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
2-Butanone (MEK)	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
2-Hexanone	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Acetone	10	24	6	6,000	9	420	041M641401	420			N/A		Yes	No SV
Benzene	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Bromodichloromethane	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Bromoform	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Bromomethane	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Carbon disulfide	1	24	6	3,100	11	11	041M641601	11	J		N/A		Yes	No SV
Carbon tetrachloride	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Chlorobenzene	1	24	6	6,000	48	48	041M640401	48			N/A		Yes	No SV
Chloroethane	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Chloroform	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Chloromethane	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Dibromochloromethane	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Ethylbenzene	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Methylene chloride	5	24	6	7,000	64	400	041M641401	400	J		N/A		Yes	No SV
Styrene	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Tetrachloroethene	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Toluene	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Trichloroethene	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV
Vinyl chloride	0	24	2	6,000			ND	6,000	U		N/A		Yes	No SV
Xylene (Total)	0	24	6	6,000			ND	6,000	U		N/A		Yes	No SV

Notes:
Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient
D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 11-3-8
Wetland 64 Phase II
Sediment Parameters Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDD	1,2-Dichlorobenzene	Acetone
Arsenic	4,4'-DDE	1,4-Dichlorobenzene	Carbon disulfide
Barium	4,4'-DDT	2-Methylnaphthalene	Chlorobenzene
Beryllium	Aldrin	Acenaphthene	Methylene chloride
Cadmium	alpha-BHC	Acenaphthylene	
Calcium	alpha-Chlordane	Anthracene	
Chromium	Dieldrin	Benzo(a)anthracene	
Cobalt	Endosulfan I	Benzo(a)pyrene	
Copper	Endosulfan II	Benzo(b)fluoranthene	
Iron	Endrin	Benzo(g,h,i)perylene	
Lead	gamma-BHC (Lindane)	Benzo(k)fluoranthene	
Magnesium	gamma-Chlordane	bis(2-Ethylhexyl)phthalate (BEHP)	
Manganese	Heptachlor	Butylbenzylphthalate	
Mercury	Total BHC	Carbazole	
Nickel	Total Chlordane	Chrysene	
Potassium	Total DDT	Dibenz(a,h)anthracene	
Selenium	Total Endrin	Dibenzofuran	
Silver	Aroclor-1254	Diethylphthalate	
Sodium	Aroclor-1260	Dimethylphthalate	
Thallium	Total PCBs	Di-n-butylphthalate	
Vanadium		Fluoranthene	
Zinc		Fluorene	
		Indeno(1,2,3-cd)pyrene	
		Naphthalene	
		Phenanthrene	
		Phenol	
		Pyrene	
		TOC Normalized PAHs	
		Total PAHs	
		Not Detected Parameters	
Cyanide (CN)	beta-BHC	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
	delta-BHC	1,3-Dichlorobenzene	1,1,2,2-Tetrachloroethane
	Endosulfan sulfate	2,2'-oxybis(1-Chloropropane)/bis(2-chlor	1,1,2-Trichloroethane
	Endrin ketone	2,4,5-Trichlorophenol	1,1-Dichloroethane
	Heptachlor epoxide	2,4,6-Trichlorophenol	1,1-Dichloroethene
	Methoxychlor	2,4-Dichlorophenol	1,2-Dichloroethane
	Toxaphene	2,4-Dimethylphenol	1,2-Dichloroethene (total)
	Aroclor-1016	2,4-Dinitrophenol	1,2-Dichloropropane
	Aroclor-1221	2,4-Dinitrotoluene	2-Butanone (MEK)
	Aroclor-1232	2,6-Dinitrotoluene	2-Hexanone
	Aroclor-1242	2-Chloronaphthalene	4-Methyl-2-Pentanone (MIBK)
	Aroclor-1248	2-Chlorophenol	Benzene
		2-Methyl-4,6-Dinitrophenol	Bromodichloromethane
		2-Methylphenol (o-Cresol)	Bromoform
		2-Nitroaniline	Bromomethane
		2-Nitrophenol	Carbon tetrachloride
		3,3'-Dichlorobenzidine	Chloroethane
		3-Nitroaniline	Chloroform
		4-Bromophenyl-phenylether	Chloromethane
		4-Chloro-3-methylphenol	cis-1,3-Dichloropropene
		4-Chloroaniline	Dibromochloromethane
		4-Chlorophenylphenyl ether	Ethylbenzene
		4-Methylphenol (p-Cresol)	Styrene
		4-Nitroaniline	Tetrachloroethene
		4-Nitrophenol	Toluene
		bis(2-Chloroethoxy)methane	trans-1,3-Dichloropropene
		bis(2-Chloroethyl)ether	Trichloroethene
		Di-n-octylphthalate	Vinyl chloride
		Hexachlorobenzene	Xylene (Total)
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	

Table 11-3-9
Wetland 64 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)
Metals (mg/kg)																						
Aluminum	24	24				7,430	28.9	26,800	26,800		041M641601			NA					0	4,274	8	Yes
Arsenic	19	24	0.078	0.06	0.13	5.55	0.16	18.7	18.7		041M641601	7.24	41.6	PEL	2.58	0.77	0.45	0.13	0	2.14	11	No
Barium	22	24	0.11	0.08	0.14	60.9	0.35	1,280	1,280		041M640301			NA					0	3.84	14	Yes
Beryllium	10	24	0.0557	0.03	0.22	0.355	0.11	1.3	1.3	J	041M641901			NA					0	0.13	10	Yes
Cadmium	**22**	**24**	**0.103**	**0.1**	**0.105**	**8.68**	**0.19**	**38.6**	**38.6**		**041M640301**	**0.676**	**4.21**	**PEL**	**57.1**	**12.8**	**9.17**	**2.06**	**10**	**0.39**	**18**	**Yes**
Calcium	24	24				1,960	64.4	6,630	6,630		041M641701			NA					0	1,978.80	10	No
Chromium	**24**	**24**				**426**	**0.55**	**1,800**	**1,800**		**041M640301**	**52.3**	**160**	**PEL**	**34.4**	**8.14**	**11.3**	**2.66**	**11**	**13.1**	**17**	**Yes**
Cobalt	15	24	0.147	0.09	0.435	1.5	0.13	6.1	6.1	J	041M640301			NA					0	0.91	10	Yes
Copper	**22**	**24**	**0.518**	**0.285**	**0.75**	**47.4**	**0.74**	**255**	**255**	**J**	**041M640301**	**18.7**	**108**	**PEL**	**13.6**	**2.54**	**2.36**	**0.44**	**4**	**8.44**	**13**	**Yes**
Cyanide (CN)	0	24	0.795	0.295	2.05	0.795			2.05	U	ND			NA					0	1.29	7	No
Iron	24	24				11,000	26	38,200	38,200		041M641601			NA					0	2,684.40	12	Yes
Lead	**23**	**24**	**0.145**	**0.145**	**0.145**	**132**	**0.65**	**634**	**634**	**J**	**041M640301**	**30.2**	**112**	**PEL**	**21**	**4.37**	**5.66**	**1.18**	**11**	**21.04**	**14**	**Yes**
Magnesium	24	24				2,770	47.1	9390	9390		041M641601			NA					0	2,943.60	8	No
Manganese	24	24				59.7	0.12	203	203		041M641601			NA					0	9.81	14	Yes
Mercury	**14**	**24**	**0.03**	**0.025**	**0.04**	**0.231**	**0.1**	**0.88**	**0.88**		**041M640301**	**0.13**	**0.696**	**PEL**	**6.77**	**1.78**	**1.26**	**0.33**	**1**	**0.11**	**13**	**Yes**
Nickel	17	24	0.374	0.285	0.41	6.51	0.79	27.1	27.1		041M640301	15.9	42.8	PEL	1.7	0.41	0.63	0.15	0	3.69	11	No
Potassium	24	24				940	19.9	3,560	3,560		041M641901			NA					0	899.72	7	No
Selenium	11	24	0.173	0.09	0.85	0.771	0.34	3.1	3.1	J	041M640301			NA					0	0.66	10	Yes
Silver	**4**	**24**	**0.353**	**0.12**	**1.1**	**0.569**	**0.37**	**5.1**	**5.1**	**J**	**041M640301**	**0.733**	**1.77**	**PEL**	**6.96**	**0.78**	**2.88**	**0.32**	**1**	**0.52**	**8**	**Yes**
Sodium	23	24	2.5	2.5	2.5	8,130	43.8	30,200	30,200		041M641901			NA					0	11,439.60	6	No
Thallium	2	24	0.259	0.09	0.85	0.314	0.65	1.2	1.2	J	041M640301			NA					0	0.39	8	Yes
Vanadium	22	24	0.427	0.105	0.75	13.3	0.42	43.4	43.4		041M641601			NA					0	8.59	9	Yes
Zinc	**23**	**24**	**0.7**	**0.7**	**0.7**	**123**	**2.2**	**481**	**481**	**J**	**041M640301**	**124**	**271**	**PEL**	**3.88**	**0.99**	**1.77**	**0.45**	**5**	**14.36**	**18**	**Yes**
PAHs (g/kg)																						
2-Methylnaphthalene	1	24	167	20.5	1,350	161	30	30	30	J	041M640101	20.2	201	PEL	1.49	7.99	0.15	0.80	0		0	No
Acenaphthene	2	24	84	10	650	91.6	120	230	230		041M640501	6.71	88.9	PEL	34.3	13.7	2.59	1.03	2		0	No
Acenaphthylene	1	24	200	20.5	1,350	196	90	90	90	J	041M640501	5.87	128	PEL	15.3	33.3	0.70	1.53	0		0	No
Anthracene	2	24	211	20.5	1,350	216	230	330	330		041M640501	46.9	245	PEL	7.04	4.61	1.35	0.88	1		0	No
Benzo(a)anthracene	12	24	153	20.5	1,350	255	27	1,400	1,400	J	041M640201	74.8	693	PEL	18.7	3.41	2.02	0.37	2		0	No
Benzo(a)pyrene	13	24	273	20.5	1,350	266	25	910	910		041M640501	88.8	763	PEL	10.2	2.99	1.19	0.35	1		0	No
Chrysene	13	24	156	18.5	1,350	271	23	1,500	1,500	J	041M640201	108	846	PEL	13.9	2.51	1.77	0.32	1		0	No
Dibenz(a,h)anthracene	1	24	167	20.5	1,350	161	25	25	25	J	041M640101	6.22	135	PEL	4.02	25.9	0.19	1.19	0		0	No
Fluoranthene	19	24	20.8	20.5	21.5	624	24	5,700	5,700		041M640201	113	1,494	PEL	50.4	5.52	3.82	0.42	3		0	No
Fluorene	2	24	84	10	650	92.4	160	210	210		041M640501	21.2	144	PEL	9.91	4.36	1.46	0.64	2		0	No
Naphthalene	2	24	172	20.5	1,350	163	56	71	71	J	041M640501	34.6	391	PEL	2.05	4.7	0.18	0.42	0		0	No
Phenanthrene	12	24	176	20.5	1,350	358	42	2,800	2,800		041M640201	86.7	544	PEL	32.3	4.13	5.15	0.66	3		0	No
Pyrene	19	24	20.8	20.5	21.5	533	22	4,600	4,600		041M640201	153	1,398	PEL	30.1	3.48	3.29	0.38	3		0	No
Total PAHs	19	24	287	246	440	3,390	255	25,100	25,100		041M640201	1684	16,770	PEL	14.9	2.01	1.5	0.20	1		0	No
TOC Normalized PAHs	19	24	226.86	69.97	595.4	165.51	12.17	735.84	735.84		041M640101	290	1,800	MEC	2.54	0.57	0.41	0.09	0		0	No
PCBs (g/kg)																						
Aroclor-1016	0	24	7.45	1.05	70	7.45			70	UJ	ND	21.6	189	PEL	3.24	0.35	0.37	0.04	0		0	No
Aroclor-1221	0	24	14.9	2.1	140	14.9			140	UJ	ND	67	189	PEL	2.09	0.22	0.74	0.08	0		0	No
Aroclor-1232	0	24	7.45	1.05	70	7.45			70	UJ	ND	21.6	189	PEL	3.24	0.35	0.37	0.04	0		0	No
Aroclor-1242	0	24	7.45	1.05	70	7.45			70	UJ	ND	21.6	189	PEL	3.24	0.35	0.37	0.04	0		0	No
Aroclor-1248	0	24	7.45	1.05	70	7.45			70	UJ	ND	21.6	189	PEL	3.24	0.35	0.37	0.04	0		0	No
Aroclor-1254	**8**	**24**	**3.19**	**1.05**	**9.5**	**28.9**	**1.3**	**370**	**370**	**J**	**041M641501**	**21.6**	**189**	**PEL**	**17.1**	**1.34**	**1.96**	**0.15**	**1**		**0**	**Yes**
Aroclor-1260	12	24	11.3	1.05	70	14.6	1.3	50	50	J	041M642001	21.6	189	PEL	2.31	0.68	0.27	0.08	0		0	No
Total PCBs	**20**	**24**	**15.4**	**8.4**	**18.5**	**88.3**	**8.95**	**640**	**640**		**041M642001**	**21.6**	**189**	**PEL**	**29.6**	**4.09**	**3.39**	**0.47**	**2**		**0**	**Yes**
Pesticides (g/kg)																						
Aldrin	6	24	0.167	0.05	0.8	0.521	0.17	4	4	J	041M640301			NA					0		0	Yes
Dieldrin	5	24	0.431	0.105	3.5	0.703	0.79	3.3	3.3	J	041M640201	0.716	4.3	PEL	4.61	0.98	0.77	0.16	0		0	No
Endosulfan I	1	24	0.387	0.055	3.5	0.402	0.76	0.76	0.76	J	041M641401			NA					0		0	Yes
Endosulfan II	1	24	0.465	0.105	3.5	0.517	1.7	1.7	1.7	J	041M641901			NA					0		0	Yes
Endosulfan sulfate	0	24	0.469	0.105	3.5	0.469			3.5	U	ND			NA					0		0	No
Heptachlor	1	24	0.237	0.05	1.7	0.233	0.12	0.12	0.12	J	041M640101			NA					0		0	Yes
Heptachlor epoxide	0	24	0.23	0.05	1.7	0.23			1.7	U	ND			NA					0		0	No
Methoxychlor	0	24	2.3	0.5	17	2.3			17	U	ND			NA					0		0	No
Toxaphene	0	24	47.3	10.5	350	47.3			350	U	ND			NA					0		0	No
alpha-Chlordane	**4**	**24**	**0.143**	**0.05**	**0.46**	**0.864**	**0.28**	**10**	**10**	**J**	**041M640301**	**1.7**	**4.79**	**PEL**	**5.88**	**0.51**	**2.09**	**0.18**	**2**		**0**	**Yes**
gamma-Chlordane	**5**	**24**	**0.123**	**0.05**	**0.46**	**0.713**	**0.65**	**8.5**	**8.5**	**J**	**041M640301**	**1.7**	**4.79**	**PEL**	**5**	**0.42**	**1.77**		**1**		**0**	**Yes**
Total Chlordane	**6**	**24**	**0.253**	**0.1**	**0.92**	**1.58**	**0.345**	**18.5**	**18.5**		**041M640301**	**1.7**	**4.79**	**PEL**	**10.9**	**0.93**	**3.86**	**0.33**	**2**		**0**	**Yes**
Endrin	5	24	0.433	0.105	3.5	1.14	0.46	8	8	DJ	041M640101	3.3		NA	2.42	0.35			0		0	Yes
Endrin aldehyde	1	24	0.483	0.105	3.5	0.475	0.29	0.29	0.29	J	041M640801	3.3		NA	0.09	0.14			0		0	Yes
Endrin ketone	0	24	0.469	0.105	3.5	0.469			3.5	U	ND	3.3		NA	1.06	0.14			0		0	No
Total Endrin	5	24	1.3	0.315	10.5	2.08	0.88	8.23	8.23		041M640101	3.3		NA	2.49	0.63			0		0	Yes
alpha-BHC	9	24	0.312	0.055	1.7	0.356	0.12	0.94	0.94	J	041M642401		0.99	PEL			0.95	0.36	0		0	No
beta-BHC	0	24	0.23	0.05	1.7	0.23			1.7	UJ	ND	0.32	0.99	PEL	5.31	0.72	1.72	0.23	0		0	No
delta-BHC	0	24	0.23	0.05	1.7	0.23			1.7	UJ	ND	0.32	0.99	PEL	5.31	0.72	1.72	0.23	0		0	No
gamma-BHC (Lindane)	**5**	**24**	**0.255**	**0.05**	**1.7**	**0.305**	**0.13**	**1.6**	**1.6**	**J**	**041M641801**	**0.32**	**0.99**	**PEL**	**5**	**0.95**	**1.62**	**0.31**	**1**		**0**	**Yes**
Total BHC	**11**	**24**	**1.22**	**0.22**	**6.8**	**1.12**	**0.315**	**2.98**	**2.98**		**041M642401**	**0.32**	**0.99**	**PEL**	**9.31**	**3.5**	**3.01**	**1.13**	**4**		**0**	**Yes**
4,4'-DDD	**14**	**24**	**0.227**	**0.105**	**0.5**	**12.2**	**0.2**	**140**	**140**	**D**	**041M640201**	**1.22**	**7.81**	**PEL**	**115**	**9.98**	**17.9**	**1.56**	**7**	**50**	**1**	**Yes**
4,4'-DDE	14	24	0.191	0.105	0.5	9.48	0.35	78	78		041M640301	2.07	374	PEL	37.7	4.58	0.21	0.03	0	40	2	No
4,4'-DDT	**6**	**24**	**0.362**	**0.105**	**1.65**	**1.58**	**0.6**	**14**	**14**	**J**	**041M640301**	**1.19**	**4.77**	**PEL**	**11.8**	**1.33**	**2.94**	**0.33**	**2**	**20**	**0**	**No**
Total DDT	**15**	**24**	**0.602**	**0.315**	**1.5**	**23.2**	**0.47**	**214**	**214**		**041M640201**	**3.3**	**51.7**	**PEL**	**64.7**	**7.04**	**4.13**	**0.45**	**3**	**110**	**2**	**Yes**
SVOCs (g/kg)																						
1,2,4-Trichlorobenzene	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
1,2-Dichlorobenzene	1	24	1,600	205	13,500	1,540	190	190	190	J	041M640401			NA					0		0	Yes
1,3-Dichlorobenzene	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
1,4-Dichlorobenzene	2	24	1,640	205	13,500	1,520	70	260	260	J	041M640401			NA					0		0	Yes
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	21	1,180	205	13,000	1,180			13,000	U	ND			NA					0		0	No
2,4,5-Trichlorophenol	0	24	3,920	495	33,000	3,920			33,000	U	ND			NA					0		0	No
2,4,6-Trichlorophenol	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
2,4-Dichlorophenol	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No

Table 11-3-9
Wetland 64 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)
SVOCs (g/kg) - cont.																						
2,4-Dimethylphenol	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
2,4-Dinitrophenol	0	24	3,920	495	33,000	3,920			33,000	UJ	ND			NA					0		0	No
2,4-Dinitrotoluene	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
2,6-Dinitrotoluene	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
2-Chloronaphthalene	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
2-Chlorophenol	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
2-Methyl-4,6-Dinitrophenol	0	24	3,920	495	33,000	3,920			33,000	U	ND			NA					0		0	No
2-Methylphenol (o-Cresol)	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
2-Nitroaniline	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
2-Nitrophenol	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
3,3'-Dichlorobenzidine	0	24	1,610	205	13,500	1,610			13,500	UJ	ND			NA					0		0	No
3-Nitroaniline	0	22	2,750	495	31,500	2,750			31,500	U	ND			NA					0		0	No
4-Bromophenyl-phenylether	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
4-Chloro-3-methylphenol	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
4-Chloroaniline	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
4-Chlorophenylphenyl ether	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
4-Methylphenol (p-Cresol)	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
4-Nitroaniline	0	24	3,920	495	33,000	3,920			33,000	UJ	ND			NA					0		0	No
4-Nitrophenol	0	24	3,920	495	33,000	3,920			33,000	U	ND			NA					0		0	No
Benzo(b)fluoranthene	16	24	208	20.5	1,350	424	21	2,600	2,600		041M640201			NA					0		0	No
Benzo(g,h,i)perylene	9	24	217	20.5	1,350	213	29	590	590		041M640501			NA					0		0	No
Benzo(k)fluoranthene	7	24	196	20.5	1,350	190	35	250	250	J	041M640301			NA					0		0	No
bis(2-Chloroethoxy)methane	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
bis(2-Chloroethyl)ether	0	24	161	20.5	1,350	161			1,350	U	ND			NA					0		0	No
bis(2-Ethylhexyl)phthalate (BEHP)	3	24	1,870	205	13,500	1,670	33	530	530	J	041M641901	182	2,647	PEL	2.91	9.19	0.2	0.63	0		0	No
Butylbenzylphthalate	8	24	2,050	205	13,500	1,410	28	280	280	J	041M640501	182	2,647	PEL	1.54	7.76	0.106	0.53	0		0	No
Carbazole	2	24	1,720	205	13,500	1,600	230	400	400	J	041M640501			NA					0		0	Yes
Dibenzofuran	2	24	1,720	205	13,500	1,580	72	85	85	J	041M640501			NA					0		0	Yes
Diethylphthalate	3	24	1,770	205	13,500	1,680	80	2,000	2,000		041M640101	182	2,647	PEL	11	9.22	0.76	0.63	0		0	No
Dimethylphthalate	1	24	1,670	205	13,500	1,620	510	510	510		041M642201	182	2,647	PEL	2.8	8.91	0.19	0.61	0		0	No
Di-n-butylphthalate	9	24	2,190	205	13,500	1,430	28	430	430		041M641501	182	2,647	PEL	2.36	7.84	0.16	0.54	0		0	No
Di-n-octylphthalate	0	24	1,610	205	13,500	1,610			13,500	U	ND	182	2,647	PEL	74.2	8.85	5.1	0.61	0		0	No
Hexachlorobenzene	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
Hexachlorobutadiene	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
Hexachlorocyclopentadiene	0	24	1,610	205	13,500	1,610			13,500	UJ	ND			NA					0		0	No
Hexachloroethane	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
Indeno(1,2,3-cd)pyrene	8	24	205	20.5	1,350	214	39	600	600		041M640501			NA					0		0	No
Isophorone	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
Nitrobenzene	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
N-Nitroso-di-n-propylamine	0	24	161	20.5	1,350	161			1,350	U	ND			NA					0		0	No
N-Nitrosodiphenylamine	0	24	1,610	205	13,500	1,610			13,500	U	ND			NA					0		0	No
Pentachlorophenol	0	24	3,920	495	33,000	3,920			33,000	U	ND			NA					0		0	No
Phenol	1	24	1,600	205	13,500	1,540	220	220	220	J	041M640401			NA					0		0	Yes
VOCs (g/kg)																						
1,1,1-Trichloroethane	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
1,1,2,2-Tetrachloroethane	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
1,1,2-Trichloroethane	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
1,1-Dichloroethane	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
1,1-Dichloroethene	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
1,2-Dichloroethane	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
1,2-Dichloroethene (total)	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
1,2-Dichloropropane	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
2-Butanone (MEK)	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
2-Hexanone	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
4-Methyl-2-Pentanone (MIBK)	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Acetone	10	24	443	6	6,000	322	9	420	420		041M641401			NA					0		0	Yes
Benzene	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Bromodichloromethane	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Bromoform	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Bromomethane	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Carbon disulfide	1	24	153	6	3,100	147	11	11	11	J	041M641601			NA					0		0	Yes
Carbon tetrachloride	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Chlorobenzene	1	24	279	6	6,000	270	48	48	48		041M640401			NA					0		0	Yes
Chloroethane	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Chloroform	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Chloromethane	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
cis-1,3-Dichloropropene	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Dibromochloromethane	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Ethylbenzene	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Methylene chloride	5	24	388	6	7,000	345	64	400	400	J	041M641401			NA					0		0	Yes
Styrene	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Tetrachloroethene	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Toluene	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
trans-1,3-Dichloropropene	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Trichloroethene	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No
Vinyl chloride	0	24	256	2	6,000	256			6,000	U	ND			NA					0		0	No
Xylene (Total)	0	24	268	6	6,000	268			6,000	U	ND			NA					0		0	No

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected pa
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 11-3-10
Wetland 64 Phase II
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	Aldrin	1,2-Dichlorobenzene	Carbon Disulfide
Barium	Endosulfan I	1,4-Dichlorobenzene	
Beryllium	Endosulfan II	Carbazole	
Cadmium	Heptachlor	Dibenzofuran	
Chromium	alpha-Chlordane	Phenol	
Cobalt	gamma-Chlordane		
Copper	Total Chlordane		
Iron	Endrin		
Lead	Endrin aldehyde		
Manganese	Total Endrin		
Mercury	gamma-BHC (Lindane)		
Selenium	Total BHC		
Silver	4,4'-DDD		
Thallium	Total DDT		
Vanadium	Aroclor-1254		
Zinc	Total PCBs		

Table 11-3-11
Wetland 64 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M640101	2/9/1996	mg/kg	0.78	J	Arsenic	8.2	70	0.01
041M640101	2/9/1996	mg/kg	1.6		Cadmium	1.2	9.6	0.17
041M640101	2/9/1996	mg/kg	11.1		Chromium	81	370	0.03
041M640101	2/9/1996	mg/kg	4.3		Copper	34	270	0.02
041M640101	2/9/1996	mg/kg	38		Lead	46.7	218	0.17
041M640101	2/9/1996	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M640101	2/9/1996	mg/kg	0.79	J	Nickel	20.9	51.6	0.02
041M640101	2/9/1996	mg/kg	0.18	U	Silver	1	3.7	0.05
041M640101	2/9/1996	mg/kg	22.5		Zinc	150	410	0.05
041M640101	2/9/1996	g/kg	3.7	J	4,4'-DDE	2.2	27	0.14
041M640101	2/9/1996	g/kg	14	DJ	4,4'-DDT	1.58	46.1	0.30
041M640101	2/9/1996	g/kg	20		Total PCBs	22.7	180	0.11
041M640101	2/9/1996	g/kg	30	J	2-Methylnaphthalene	70	670	0.04
041M640101	2/9/1996	g/kg	120		Acenaphthene	16	500	0.24
041M640101	2/9/1996	g/kg	22.5	U	Acenaphthylene	44	640	0.04
041M640101	2/9/1996	g/kg	230		Anthracene	85.3	1,100	0.21
041M640101	2/9/1996	g/kg	590		Benzo(a)anthracene	261	1,600	0.37
041M640101	2/9/1996	g/kg	470		Benzo(a)pyrene	430	1,600	0.29
041M640101	2/9/1996	g/kg	580		Chrysene	384	2,800	0.21
041M640101	2/9/1996	g/kg	25	J	Dibenz(a,h)anthracene	63.4	260	0.10
041M640101	2/9/1996	g/kg	1,200		Fluoranthene	600	5,100	0.24
041M640101	2/9/1996	g/kg	160		Fluorene	19	540	0.30
041M640101	2/9/1996	g/kg	56		Naphthalene	160	2,100	0.03
041M640101	2/9/1996	g/kg	950		Phenanthrene	240	1,500	0.63
041M640101	2/9/1996	g/kg	1,100	J	Pyrene	665	2,600	0.42
041M640101	2/9/1996				ERM Quotient Sum			4.22
041M640101	2/9/1996				Mean ERM Quotient			0.17
041M640101	2/9/1996				Mean ERM Quotient without ND			0.16
041M640101	2/9/1996				Mean ERM Quotient Category			2
041M640201	11/15/1995	mg/kg	9.8		Arsenic	8.2	70	0.14
041M640201	**11/15/1995**	**mg/kg**	**18.9**		**Cadmium**	**1.2**	**9.6**	**1.97**
041M640201	**11/15/1995**	**mg/kg**	**1,600**		**Chromium**	**81**	**370**	**4.32**
041M640201	11/15/1995	mg/kg	39.8	J	Copper	34	270	0.15
041M640201	**11/15/1995**	**mg/kg**	**346**	**J**	**Lead**	**46.7**	**218**	**1.59**
041M640201	11/15/1995	mg/kg	0.17		Mercury	0.15	0.71	0.24
041M640201	11/15/1995	mg/kg	4.6		Nickel	20.9	51.6	0.09
041M640201	11/15/1995	mg/kg	0.42	J	Silver	1	3.7	0.11
041M640201	11/15/1995	mg/kg	145	J	Zinc	150	410	0.35
041M640201	**11/15/1995**	**g/kg**	**72**	**DJ**	**4,4'-DDE**	**2.2**	**27**	**2.67**
041M640201	11/15/1995	g/kg	1.65	U	4,4'-DDT	1.58	46.1	0.04
041M640201	**11/15/1995**	**g/kg**	**597.5**		**Total PCBs**	**22.7**	**180**	**3.32**
041M640201	11/15/1995	g/kg	1,300	U	2-Methylnaphthalene	70	670	1.94
041M640201	11/15/1995	g/kg	650	U	Acenaphthene	16	500	1.30
041M640201	11/15/1995	g/kg	1,300	U	Acenaphthylene	44	640	2.03
041M640201	11/15/1995	g/kg	1,300	U	Anthracene	85.3	1,100	1.18
041M640201	11/15/1995	g/kg	1,400	J	Benzo(a)anthracene	261	1,600	0.88
041M640201	11/15/1995	g/kg	1,300	U	Benzo(a)pyrene	430	1,600	0.81
041M640201	11/15/1995	g/kg	1,500	J	Chrysene	384	2,800	0.54
041M640201	11/15/1995	g/kg	1,300	U	Dibenz(a,h)anthracene	63.4	260	5
041M640201	**11/15/1995**	**g/kg**	**5,700**		**Fluoranthene**	**600**	**5,100**	**1.12**
041M640201	11/15/1995	g/kg	650	U	Fluorene	19	540	1.20
041M640201	11/15/1995	g/kg	1,300	U	Naphthalene	160	2,100	0.62
041M640201	**11/15/1995**	**g/kg**	**2,800**		**Phenanthrene**	**240**	**1,500**	**1.87**
041M640201	**11/15/1995**	**g/kg**	**4,600**		**Pyrene**	**665**	**2,600**	**1.77**
041M640201	11/15/1995				ERM Quotient Sum			35.24
041M640201	11/15/1995				Mean ERM Quotient			1.41
041M640201	11/15/1995				Mean ERM Quotient without ND			0.84
041M640201	11/15/1995				Mean ERM Quotient Category			3
041M640301	11/15/1995	mg/kg	11.2		Arsenic	8.2	70	0.16
041M640301	**11/15/1995**	**mg/kg**	**38.6**		**Cadmium**	**1.2**	**9.6**	**4.02**
041M640301	**11/15/1995**	**mg/kg**	**1,800**		**Chromium**	**81**	**370**	**4.86**
041M640301	11/15/1995	mg/kg	255	J	Copper	34	270	0.94
041M640301	**11/15/1995**	**mg/kg**	**634**	**J**	**Lead**	**46.7**	**218**	**2.91**
041M640301	**11/15/1995**	**mg/kg**	**0.88**		**Mercury**	**0.15**	**0.71**	**1.24**
041M640301	11/15/1995	mg/kg	27.1		Nickel	20.9	51.6	0.53
041M640301	**11/15/1995**	**mg/kg**	**5.1**	**J**	**Silver**	**1**	**3.7**	**1.38**
041M640301	**11/15/1995**	**mg/kg**	**481**	**J**	**Zinc**	**150**	**410**	**1.17**
041M640301	**11/15/1995**	**g/kg**	**78**		**4,4'-DDE**	**2.2**	**27**	**2.89**
041M640301	11/15/1995	g/kg	14	J	4,4'-DDT	1.58	46.1	0.30
041M640301	**11/15/1995**	**g/kg**	**640**		**Total PCBs**	**22.7**	**180**	**3.56**
041M640301	11/15/1995	g/kg	135	U	2-Methylnaphthalene	70	670	0.20
041M640301	11/15/1995	g/kg	65	U	Acenaphthene	16	500	0.13
041M640301	11/15/1995	g/kg	135	U	Acenaphthylene	44	640	0.21
041M640301	11/15/1995	g/kg	135	U	Anthracene	85.3	1,100	0.12
041M640301	11/15/1995	g/kg	340		Benzo(a)anthracene	261	1,600	0.21
041M640301	11/15/1995	g/kg	580		Benzo(a)pyrene	430	1,600	0.36
041M640301	11/15/1995	g/kg	500		Chrysene	384	2,800	0.18
041M640301	11/15/1995	g/kg	135	U	Dibenz(a,h)anthracene	63.4	260	0.52
041M640301	11/15/1995	g/kg	770		Fluoranthene	600	5,100	0.15
041M640301	11/15/1995	g/kg	65	U	Fluorene	19	540	0.12
041M640301	11/15/1995	g/kg	135	U	Naphthalene	160	2,100	0.06
041M640301	11/15/1995	g/kg	230	J	Phenanthrene	240	1,500	0.15
041M640301	11/15/1995	g/kg	660		Pyrene	665	2,600	0.25
041M640301	11/15/1995				ERM Quotient Sum			26.64
041M640301	11/15/1995				Mean ERM Quotient			1.07
041M640301	11/15/1995				Mean ERM Quotient without ND			1.01
041M640301	11/15/1995				Mean ERM Quotient Category			3

Table 11-3-11
Wetland 64 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M640401	2/9/1996	mg/kg	3	J	Arsenic	8.2	70	0.04
041M640401	2/9/1996	mg/kg	2.8		Cadmium	1.2	9.6	0.29
041M640401	**2/9/1996**	**mg/kg**	**1,610**		**Chromium**	**81**	**370**	**4.35**
041M640401	2/9/1996	mg/kg	23.8		Copper	34	270	0.09
041M640401	2/9/1996	mg/kg	146		Lead	46.7	218	0.67
041M640401	2/9/1996	mg/kg	0.43	J	Mercury	0.15	0.71	0.61
041M640401	2/9/1996	mg/kg	5.3	J	Nickel	20.9	51.6	0.10
041M640401	2/9/1996	mg/kg	1.1	U	Silver	1	3.7	0.30
041M640401	2/9/1996	mg/kg	31.8		Zinc	150	410	0.08
041M640401	2/9/1996	g/kg	18		4,4'-DDE	2.2	27	0.67
041M640401	2/9/1996	g/kg	0.95	U	4,4'-DDT	1.58	46.1	0.02
041M640401	2/9/1996	g/kg	88.5		Total PCBs	22.7	180	0.49
041M640401	2/9/1996	g/kg	185	U	2-Methylnaphthalene	70	670	0.28
041M640401	2/9/1996	g/kg	90	U	Acenaphthene	16	500	0.18
041M640401	2/9/1996	g/kg	185	U	Acenaphthylene	44	640	0.29
041M640401	2/9/1996	g/kg	185	U	Anthracene	85.3	1,100	0.17
041M640401	2/9/1996	g/kg	185	U	Benzo(a)anthracene	261	1,600	0.12
041M640401	2/9/1996	g/kg	185	U	Benzo(a)pyrene	430	1,600	0.12
041M640401	2/9/1996	g/kg	185	U	Chrysene	384	2,800	0.07
041M640401	2/9/1996	g/kg	185	U	Dibenz(a,h)anthracene	63.4	260	0.71
041M640401	2/9/1996	g/kg	230	J	Fluoranthene	600	5,100	0.05
041M640401	2/9/1996	g/kg	90	U	Fluorene	19	540	0.17
041M640401	2/9/1996	g/kg	185	U	Naphthalene	160	2,100	0.09
041M640401	2/9/1996	g/kg	185	U	Phenanthrene	240	1,500	0.12
041M640401	2/9/1996	g/kg	200	J	Pyrene	665	2,600	0.08
041M640401	2/9/1996				ERM Quotient Sum			10.13
041M640401	2/9/1996				Mean ERM Quotient			0.41
041M640401	2/9/1996				Mean ERM Quotient without ND			0.30
041M640401	2/9/1996				Mean ERM Quotient Category			2
041M640501	11/15/1995	mg/kg	6.1		Arsenic	8.2	70	0.09
041M640501	**11/15/1995**	**mg/kg**	**18.5**		**Cadmium**	**1.2**	**9.6**	**1.93**
041M640501	**11/15/1995**	**mg/kg**	**466**		**Chromium**	**81**	**370**	**1.26**
041M640501	11/15/1995	mg/kg	88.6	J	Copper	34	270	0.33
041M640501	**11/15/1995**	**mg/kg**	**262**	**J**	**Lead**	**46.7**	**218**	**1.20**
041M640501	11/15/1995	mg/kg	0.27	J	Mercury	0.15	0.71	0.38
041M640501	11/15/1995	mg/kg	8.1	J	Nickel	20.9	51.6	0.16
041M640501	11/15/1995	mg/kg	0.5	UJ	Silver	1	3.7	0.14
041M640501	11/15/1995	mg/kg	290	J	Zinc	150	410	0.71
041M640501	11/15/1995	g/kg	27	DJ	4,4'-DDE	2.2	27	1
041M640501	11/15/1995	g/kg	0.74	J	4,4'-DDT	1.58	46.1	0.02
041M640501	11/15/1995	g/kg	82		Total PCBs	22.7	180	0.46
041M640501	11/15/1995	g/kg	70	U	2-Methylnaphthalene	70	670	0.10
041M640501	11/15/1995	g/kg	230		Acenaphthene	16	500	0.46
041M640501	11/15/1995	g/kg	90	J	Acenaphthylene	44	640	0.14
041M640501	11/15/1995	g/kg	330		Anthracene	85.3	1,100	0.30
041M640501	11/15/1995	g/kg	840		Benzo(a)anthracene	261	1,600	0.53
041M640501	11/15/1995	g/kg	910		Benzo(a)pyrene	430	1,600	0.57
041M640501	11/15/1995	g/kg	830		Chrysene	384	2,800	0.30
041M640501	11/15/1995	g/kg	70	U	Dibenz(a,h)anthracene	63.4	260	0.27
041M640501	11/15/1995	g/kg	2,300		Fluoranthene	600	5,100	0.45
041M640501	11/15/1995	g/kg	210		Fluorene	19	540	0.39
041M640501	11/15/1995	g/kg	71	J	Naphthalene	160	2,100	0.03
041M640501	11/15/1995	g/kg	1,400		Phenanthrene	240	1,500	0.93
041M640501	11/15/1995	g/kg	2,100		Pyrene	665	2,600	0.81
041M640501	11/15/1995				ERM Quotient Sum			12.93
041M640501	11/15/1995				Mean ERM Quotient			0.52
041M640501	11/15/1995				Mean ERM Quotient without ND			0.50
041M640501	11/15/1995				Mean ERM Quotient Category			2
041M640601	11/15/1995	mg/kg	1.6		Arsenic	8.2	70	0.02
041M640601	11/15/1995	mg/kg	8.8		Cadmium	1.2	9.6	0.92
041M640601	11/15/1995	mg/kg	324		Chromium	81	370	0.88
041M640601	11/15/1995	mg/kg	29.4	J	Copper	34	270	0.11
041M640601	11/15/1995	mg/kg	156	J	Lead	46.7	218	0.72
041M640601	11/15/1995	mg/kg	0.12	J	Mercury	0.15	0.71	0.17
041M640601	11/15/1995	mg/kg	3	J	Nickel	20.9	51.6	0.06
041M640601	11/15/1995	mg/kg	0.37	J	Silver	1	3.7	0.10
041M640601	11/15/1995	mg/kg	105	J	Zinc	150	410	0.26
041M640601	11/15/1995	g/kg	16	J	4,4'-DDE	2.2	27	0.59
041M640601	11/15/1995	g/kg	1.4	J	4,4'-DDT	1.58	46.1	0.03
041M640601	11/15/1995	g/kg	151		Total PCBs	22.7	180	0.84
041M640601	11/15/1995	g/kg	1,350	U	2-Methylnaphthalene	70	670	2.01
041M640601	11/15/1995	g/kg	650	U	Acenaphthene	16	500	1.30
041M640601	11/15/1995	g/kg	1,350	U	Acenaphthylene	44	640	2.11
041M640601	11/15/1995	g/kg	1,350	U	Anthracene	85.3	1,100	1.23
041M640601	11/15/1995	g/kg	1,350	U	Benzo(a)anthracene	261	1,600	0.84
041M640601	11/15/1995	g/kg	1,350	U	Benzo(a)pyrene	430	1,600	0.84
041M640601	11/15/1995	g/kg	1,350	U	Chrysene	384	2,800	0.48
041M640601	11/15/1995	g/kg	1,350	U	Dibenz(a,h)anthracene	63.4	260	5.19
041M640601	11/15/1995	g/kg	1,700	J	Fluoranthene	600	5,100	0.33
041M640601	11/15/1995	g/kg	650	U	Fluorene	19	540	1.20
041M640601	11/15/1995	g/kg	1,350	U	Naphthalene	160	2,100	0.64
041M640601	11/15/1995	g/kg	1,350	U	Phenanthrene	240	1,500	0.90

Table 11-3-11
Wetland 64 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M640601	11/15/1995	g/kg	1,500	J	Pyrene	665	2,600	0.58
041M640601	11/15/1995				ERM Quotient Sum			22.36
041M640601	11/15/1995				Mean ERM Quotient			0.89
041M640601	11/15/1995				Mean ERM Quotient without ND			0.22
041M640601	11/15/1995				Mean ERM Quotient Category			2
041M640701	11/15/1995	mg/kg	0.26	J	Arsenic	8.2	70	0.00
041M640701	11/15/1995	mg/kg	0.53		Cadmium	1.2	9.6	0.06
041M640701	11/15/1995	mg/kg	19		Chromium	81	370	0.05
041M640701	11/15/1995	mg/kg	17.6	J	Copper	34	270	0.07
041M640701	11/15/1995	mg/kg	12.2	J	Lead	46.7	218	0.06
041M640701	11/15/1995	mg/kg	0.1	J	Mercury	0.15	0.71	0.14
041M640701	11/15/1995	mg/kg	0.98	J	Nickel	20.9	51.6	0.02
041M640701	11/15/1995	mg/kg	0.13	UJ	Silver	1	3.7	0.04
041M640701	11/15/1995	mg/kg	14.7	J	Zinc	150	410	0.04
041M640701	11/15/1995	g/kg	0.61		4,4'-DDE	2.2	27	0.02
041M640701	11/15/1995	g/kg	0.115	U	4,4'-DDT	1.58	46.1	0.00
041M640701	11/15/1995	g/kg	18.75		Total PCBs	22.7	180	0.10
041M640701	11/15/1995	g/kg	22	U	2-Methylnaphthalene	70	670	0.03
041M640701	11/15/1995	g/kg	10.5	U	Acenaphthene	16	500	0.02
041M640701	11/15/1995	g/kg	22	U	Acenaphthylene	44	640	0.03
041M640701	11/15/1995	g/kg	22	U	Anthracene	85.3	1,100	0.02
041M640701	11/15/1995	g/kg	27	J	Benzo(a)anthracene	261	1,600	0.02
041M640701	11/15/1995	g/kg	40	J	Benzo(a)pyrene	430	1,600	0.03
041M640701	11/15/1995	g/kg	23	J	Chrysene	384	2,800	0.01
041M640701	11/15/1995	g/kg	22	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M640701	11/15/1995	g/kg	78		Fluoranthene	600	5,100	0.02
041M640701	11/15/1995	g/kg	10.5	U	Fluorene	19	540	0.02
041M640701	11/15/1995	g/kg	22	U	Naphthalene	160	2,100	0.01
041M640701	11/15/1995	g/kg	42	J	Phenanthrene	240	1,500	0.03
041M640701	11/15/1995	g/kg	50		Pyrene	665	2,600	0.02
041M640701	11/15/1995				ERM Quotient Sum			0.93
041M640701	11/15/1995				Mean ERM Quotient			0.04
041M640701	11/15/1995				Mean ERM Quotient without ND			0.03
041M640701	11/15/1995				Mean ERM Quotient Category			1.00
041M640801	2/1/1996	mg/kg	0.59	J	Arsenic	8.2	70	0.01
041M640801	2/1/1996	mg/kg	1.2		Cadmium	1.2	9.6	0.13
041M640801	2/1/1996	mg/kg	32.3		Chromium	81	370	0.09
041M640801	2/1/1996	mg/kg	6.9		Copper	34	270	0.03
041M640801	2/1/1996	mg/kg	17.6		Lead	46.7	218	0.08
041M640801	2/1/1996	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M640801	2/1/1996	mg/kg	0.79	J	Nickel	20.9	51.6	0.02
041M640801	2/1/1996	mg/kg	0.18	U	Silver	1	3.7	0.05
041M640801	2/1/1996	mg/kg	21.1		Zinc	150	410	0.05
041M640801	2/1/1996	g/kg	2.4		4,4'-DDE	2.2	27	0.09
041M640801	2/1/1996	g/kg	0.66	J	4,4'-DDT	1.58	46.1	0.01
041M640801	2/1/1996	g/kg	20.05		Total PCBs	22.7	180	0.11
041M640801	2/1/1996	g/kg	25.5	U	2-Methylnaphthalene	70	670	0.04
041M640801	2/1/1996	g/kg	12.5	U	Acenaphthene	16	500	0.03
041M640801	2/1/1996	g/kg	25.5	U	Acenaphthylene	44	640	0.04
041M640801	2/1/1996	g/kg	25.5	U	Anthracene	85.3	1,100	0.02
041M640801	2/1/1996	g/kg	51		Benzo(a)anthracene	261	1,600	0.03
041M640801	2/1/1996	g/kg	51		Benzo(a)pyrene	430	1,600	0.03
041M640801	2/1/1996	g/kg	61		Chrysene	384	2,800	0.02
041M640801	2/1/1996	g/kg	25.5	U	Dibenz(a,h)anthracene	63.4	260	0.10
041M640801	2/1/1996	g/kg	120		Fluoranthene	600	5,100	0.02
041M640801	2/1/1996	g/kg	12.5	U	Fluorene	19	540	0.02
041M640801	2/1/1996	g/kg	25.5	U	Naphthalene	160	2,100	0.01
041M640801	2/1/1996	g/kg	59		Phenanthrene	240	1,500	0.04
041M640801	2/1/1996	g/kg	120	J	Pyrene	665	2,600	0.05
041M640801	2/1/1996				ERM Quotient Sum			1.15
041M640801	2/1/1996				Mean ERM Quotient			0.05
041M640801	2/1/1996				Mean ERM Quotient without ND			0.03
041M640801	2/1/1996				Mean ERM Quotient Category			2
041M640901	11/15/1995	mg/kg	0.06	U	Arsenic	8.2	70	0.00
041M640901	11/15/1995	mg/kg	0.38		Cadmium	1.2	9.6	0.04
041M640901	11/15/1995	mg/kg	9.4		Chromium	81	370	0.03
041M640901	11/15/1995	mg/kg	1.8	J	Copper	34	270	0.01
041M640901	11/15/1995	mg/kg	6.1	J	Lead	46.7	218	0.03
041M640901	11/15/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M640901	11/15/1995	mg/kg	0.37	U	Nickel	20.9	51.6	0.01
041M640901	11/15/1995	mg/kg	0.125	UJ	Silver	1	3.7	0.03
041M640901	11/15/1995	mg/kg	4.2	J	Zinc	150	410	0.01
041M640901	11/15/1995	g/kg	0.35		4,4'-DDE	2.2	27	0.01
041M640901	11/15/1995	g/kg	0.105	U	4,4'-DDT	1.58	46.1	0.00
041M640901	11/15/1995	g/kg	15.7		Total PCBs	22.7	180	0.09
041M640901	11/15/1995	g/kg	20.5	U	2-Methylnaphthalene	70	670	0.03
041M640901	11/15/1995	g/kg	10	U	Acenaphthene	16	500	0.02
041M640901	11/15/1995	g/kg	20.5	U	Acenaphthylene	44	640	0.03
041M640901	11/15/1995	g/kg	20.5	U	Anthracene	85.3	1,100	0.02
041M640901	11/15/1995	g/kg	20.5	U	Benzo(a)anthracene	261	1,600	0.01
041M640901	11/15/1995	g/kg	20.5	U	Benzo(a)pyrene	430	1,600	0.01
041M640901	11/15/1995	g/kg	20.5	U	Chrysene	384	2,800	0.01
041M640901	11/15/1995	g/kg	20.5	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M640901	11/15/1995	g/kg	20.5	U	Fluoranthene	600	5,100	0.00
041M640901	11/15/1995	g/kg	10	U	Fluorene	19	540	0.02
041M640901	11/15/1995	g/kg	20.5	U	Naphthalene	160	2,100	0.01

Table 11-3-11
Wetland 64 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M640901	11/15/1995	g/kg	20.5	U	Phenanthrene	240	1,500	0.01
041M640901	11/15/1995	g/kg	20.5	U	Pyrene	665	2,600	0.01
041M640901	11/15/1995				ERM Quotient Sum			0.56
041M640901	11/15/1995				Mean ERM Quotient			0.02
041M640901	11/15/1995				Mean ERM Quotient without ND			0.01
041M640901	11/15/1995				Mean ERM Quotient Category			1.00
041M641001	11/16/1995	mg/kg	16.2		Arsenic	8.2	70	0.23
041M641001	**11/16/1995**	**mg/kg**	**23.2**		**Cadmium**	**1.2**	**9.6**	**2.42**
041M641001	**11/16/1995**	**mg/kg**	**806**		**Chromium**	**81**	**370**	**2.18**
041M641001	11/16/1995	mg/kg	140		Copper	34	270	0.52
041M641001	**11/16/1995**	**mg/kg**	**324**		**Lead**	**46.7**	**218**	**1.49**
041M641001	11/16/1995	mg/kg	0.5	J	Mercury	0.15	0.71	0.70
041M641001	11/16/1995	mg/kg	20.1		Nickel	20.9	51.6	0.39
041M641001	11/16/1995	mg/kg	0.6	U	Silver	1	3.7	0.16
041M641001	11/16/1995	mg/kg	377		Zinc	150	410	0.92
041M641001	11/16/1995	g/kg	2.5	J	4,4'-DDE	2.2	27	0.09
041M641001	11/16/1995	g/kg	0.485	U	4,4'-DDT	1.58	46.1	0.01
041M641001	11/16/1995	g/kg	57.75		Total PCBs	22.7	180	0.32
041M641001	11/16/1995	g/kg	95	U	2-Methylnaphthalene	70	670	0.14
041M641001	11/16/1995	g/kg	47	U	Acenaphthene	16	500	0.09
041M641001	11/16/1995	g/kg	95	U	Acenaphthylene	44	640	0.15
041M641001	11/16/1995	g/kg	95	U	Anthracene	85.3	1,100	0.09
041M641001	11/16/1995	g/kg	240		Benzo(a)anthracene	261	1,600	0.15
041M641001	11/16/1995	g/kg	290		Benzo(a)pyrene	430	1,600	0.18
041M641001	11/16/1995	g/kg	320		Chrysene	384	2,800	0.11
041M641001	11/16/1995	g/kg	95	U	Dibenz(a,h)anthracene	63.4	260	0.37
041M641001	11/16/1995	g/kg	720		Fluoranthene	600	5,100	0.14
041M641001	11/16/1995	g/kg	47	U	Fluorene	19	540	0.09
041M641001	11/16/1995	g/kg	95	U	Naphthalene	160	2,100	0.05
041M641001	11/16/1995	g/kg	300		Phenanthrene	240	1,500	0.20
041M641001	11/16/1995	g/kg	590		Pyrene	665	2,600	0.23
041M641001	11/16/1995				ERM Quotient Sum			11.41
041M641001	11/16/1995				Mean ERM Quotient			0.46
041M641001	11/16/1995				Mean ERM Quotient without ND			0.41
041M641001	11/16/1995				Mean ERM Quotient Category			2
041M641101	11/16/1995	mg/kg	10.8		Arsenic	8.2	70	0.15
041M641101	**11/16/1995**	**mg/kg**	**20.1**		**Cadmium**	**1.2**	**9.6**	**2.09**
041M641101	**11/16/1995**	**mg/kg**	**659**		**Chromium**	**81**	**370**	**1.78**
041M641101	11/16/1995	mg/kg	66.4		Copper	34	270	0.25
041M641101	**11/16/1995**	**mg/kg**	**221**		**Lead**	**46.7**	**218**	**1.01**
041M641101	11/16/1995	mg/kg	0.3	J	Mercury	0.15	0.71	0.42
041M641101	11/16/1995	mg/kg	12.9		Nickel	20.9	51.6	0.25
041M641101	11/16/1995	mg/kg	0.4	U	Silver	1	3.7	0.11
041M641101	11/16/1995	mg/kg	192		Zinc	150	410	0.47
041M641101	11/16/1995	g/kg	2	J	4,4'-DDE	2.2	27	0.07
041M641101	11/16/1995	g/kg	0.295	U	4,4'-DDT	1.58	46.1	0.01
041M641101	11/16/1995	g/kg	49.75		Total PCBs	22.7	180	0.28
041M641101	11/16/1995	g/kg	60	U	2-Methylnaphthalene	70	670	0.09
041M641101	11/16/1995	g/kg	28.5	U	Acenaphthene	16	500	0.06
041M641101	11/16/1995	g/kg	60	U	Acenaphthylene	44	640	0.09
041M641101	11/16/1995	g/kg	60	U	Anthracene	85.3	1,100	0.05
041M641101	11/16/1995	g/kg	130		Benzo(a)anthracene	261	1,600	0.08
041M641101	11/16/1995	g/kg	150		Benzo(a)pyrene	430	1,600	0.09
041M641101	11/16/1995	g/kg	96	J	Chrysene	384	2,800	0.03
041M641101	11/16/1995	g/kg	60	U	Dibenz(a,h)anthracene	63.4	260	0.23
041M641101	11/16/1995	g/kg	220		Fluoranthene	600	5,100	0.04
041M641101	11/16/1995	g/kg	28.5	U	Fluorene	19	540	0.05
041M641101	11/16/1995	g/kg	60	U	Naphthalene	160	2,100	0.03
041M641101	11/16/1995	g/kg	100	J	Phenanthrene	240	1,500	0.07
041M641101	11/16/1995	g/kg	200		Pyrene	665	2,600	0.08
041M641101	11/16/1995				ERM Quotient Sum			7.90
041M641101	11/16/1995				Mean ERM Quotient			0.32
041M641101	11/16/1995				Mean ERM Quotient without ND			0.29
041M641101	11/16/1995				Mean ERM Quotient Category			2
041M641201	11/15/1995	mg/kg	0.06	U	Arsenic	8.2	70	0.00
041M641201	11/15/1995	mg/kg	0.27	J	Cadmium	1.2	9.6	0.03
041M641201	11/15/1995	mg/kg	7.2		Chromium	81	370	0.02
041M641201	11/15/1995	mg/kg	1.9	J	Copper	34	270	0.01
041M641201	11/15/1995	mg/kg	3.6	J	Lead	46.7	218	0.02
041M641201	11/15/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M641201	11/15/1995	mg/kg	0.365	U	Nickel	20.9	51.6	0.01
041M641201	11/15/1995	mg/kg	0.12	UJ	Silver	1	3.7	0.03
041M641201	11/15/1995	mg/kg	4.2	J	Zinc	150	410	0.01
041M641201	11/15/1995	g/kg	0.105	U	4,4'-DDE	2.2	27	0.00
041M641201	11/15/1995	g/kg	0.105	U	4,4'-DDT	1.58	46.1	0.00
041M641201	11/15/1995	g/kg	16.1		Total PCBs	22.7	180	0.09
041M641201	11/15/1995	g/kg	20.5	U	2-Methylnaphthalene	70	670	0.03
041M641201	11/15/1995	g/kg	10	U	Acenaphthene	16	500	0.02
041M641201	11/15/1995	g/kg	20.5	U	Acenaphthylene	44	640	0.03
041M641201	11/15/1995	g/kg	20.5	U	Anthracene	85.3	1,100	0.02
041M641201	11/15/1995	g/kg	20.5	U	Benzo(a)anthracene	261	1,600	0.01
041M641201	11/15/1995	g/kg	20.5	U	Benzo(a)pyrene	430	1,600	0.01
041M641201	11/15/1995	g/kg	20.5	U	Chrysene	384	2,800	0.01
041M641201	11/15/1995	g/kg	20.5	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M641201	11/15/1995	g/kg	20.5	U	Fluoranthene	600	5,100	0.00
041M641201	11/15/1995	g/kg	10	U	Fluorene	19	540	0.02
041M641201	11/15/1995	g/kg	20.5	U	Naphthalene	160	2,100	0.01

Table 11-3-11
Wetland 64 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M641201	11/15/1995	g/kg	20.5	U	Phenanthrene	240	1,500	0.01
041M641201	11/15/1995	g/kg	20.5	U	Pyrene	665	2,600	0.01
041M641201	11/15/1995				ERM Quotient Sum			0.52
041M641201	11/15/1995				Mean ERM Quotient			0.02
041M641201	11/15/1995				Mean ERM Quotient without ND			0.01
041M641201	11/15/1995				Mean ERM Quotient Category			1
041M641301	11/16/1995	mg/kg	15.3		Arsenic	8.2	70	0.22
041M641301	**11/16/1995**	**mg/kg**	**16.9**		**Cadmium**	**1.2**	**9.6**	**1.76**
041M641301	**11/16/1995**	**mg/kg**	**699**		**Chromium**	**81**	**370**	**1.89**
041M641301	11/16/1995	mg/kg	102		Copper	34	270	0.38
041M641301	**11/16/1995**	**mg/kg**	**231**		**Lead**	**46.7**	**218**	**1.06**
041M641301	11/16/1995	mg/kg	0.46	J	Mercury	0.15	0.71	0.65
041M641301	11/16/1995	mg/kg	13.4		Nickel	20.9	51.6	0.26
041M641301	11/16/1995	mg/kg	0.65	U	Silver	1	3.7	0.18
041M641301	11/16/1995	mg/kg	268		Zinc	150	410	0.65
041M641301	11/16/1995	g/kg	1.4	J	4,4'-DDE	2.2	27	0.05
041M641301	11/16/1995	g/kg	0.46	UJ	4,4'-DDT	1.58	46.1	0.01
041M641301	11/16/1995	g/kg	59		Total PCBs	22.7	180	0.33
041M641301	11/16/1995	g/kg	90	U	2-Methylnaphthalene	70	670	0.13
041M641301	11/16/1995	g/kg	44.5	U	Acenaphthene	16	500	0.09
041M641301	11/16/1995	g/kg	900	U	Acenaphthylene	44	640	1.41
041M641301	11/16/1995	g/kg	90	U	Anthracene	85.3	1,100	0.08
041M641301	11/16/1995	g/kg	180	J	Benzo(a)anthracene	261	1,600	0.11
041M641301	11/16/1995	g/kg	190		Benzo(a)pyrene	430	1,600	0.12
041M641301	11/16/1995	g/kg	160	J	Chrysene	384	2,800	0.06
041M641301	11/16/1995	g/kg	90	U	Dibenz(a,h)anthracene	63.4	260	0.35
041M641301	11/16/1995	g/kg	410		Fluoranthene	600	5,100	0.08
041M641301	11/16/1995	g/kg	44.5	U	Fluorene	19	540	0.08
041M641301	11/16/1995	g/kg	90	U	Naphthalene	160	2,100	0.04
041M641301	11/16/1995	g/kg	190		Phenanthrene	240	1,500	0.13
041M641301	11/16/1995	g/kg	370		Pyrene	665	2,600	0.14
041M641301	11/16/1995				ERM Quotient Sum			10.25
041M641301	11/16/1995				Mean ERM Quotient			0.41
041M641301	11/16/1995				Mean ERM Quotient without ND			0.32
041M641301	11/16/1995				Mean ERM Quotient Category			2
041M641401	11/16/1995	mg/kg	16.1		Arsenic	8.2	70	0.23
041M641401	**11/16/1995**	**mg/kg**	**17.2**		**Cadmium**	**1.2**	**9.6**	**1.79**
041M641401	**11/16/1995**	**mg/kg**	**631**		**Chromium**	**81**	**370**	**1.71**
041M641401	11/16/1995	mg/kg	83.9		Copper	34	270	0.31
041M641401	11/16/1995	mg/kg	205		Lead	46.7	218	0.94
041M641401	11/16/1995	mg/kg	0.41	J	Mercury	0.15	0.71	0.58
041M641401	11/16/1995	mg/kg	15.1		Nickel	20.9	51.6	0.29
041M641401	11/16/1995	mg/kg	0.65	U	Silver	1	3.7	0.18
041M641401	11/16/1995	mg/kg	260		Zinc	150	410	0.63
041M641401	11/16/1995	g/kg	0.5	U	4,4'-DDE	2.2	27	0.02
041M641401	11/16/1995	g/kg	0.5	U	4,4'-DDT	1.58	46.1	0.01
041M641401	11/16/1995	g/kg	51.5		Total PCBs	22.7	180	0.29
041M641401	11/16/1995	g/kg	100	U	2-Methylnaphthalene	70	670	0.15
041M641401	11/16/1995	g/kg	49.5	U	Acenaphthene	16	500	0.10
041M641401	11/16/1995	g/kg	100	U	Acenaphthylene	44	640	0.16
041M641401	11/16/1995	g/kg	100	U	Anthracene	85.3	1,100	0.09
041M641401	11/16/1995	g/kg	100	U	Benzo(a)anthracene	261	1,600	0.06
041M641401	11/16/1995	g/kg	120	J	Benzo(a)pyrene	430	1,600	0.08
041M641401	11/16/1995	g/kg	130	J	Chrysene	384	2,800	0.05
041M641401	11/16/1995	g/kg	100	U	Dibenz(a,h)anthracene	63.4	260	0.38
041M641401	11/16/1995	g/kg	250		Fluoranthene	600	5,100	0.05
041M641401	11/16/1995	g/kg	49.5	U	Fluorene	19	540	0.09
041M641401	11/16/1995	g/kg	100	U	Naphthalene	160	2,100	0.05
041M641401	11/16/1995	g/kg	100	U	Phenanthrene	240	1,500	0.07
041M641401	11/16/1995	g/kg	190	J	Pyrene	665	2,600	0.07
041M641401	11/16/1995				ERM Quotient Sum			8.37
041M641401	11/16/1995				Mean ERM Quotient			0.33
041M641401	11/16/1995				Mean ERM Quotient without ND			0.28
041M641401	11/16/1995				Mean ERM Quotient Category			2
041M641501	11/15/1995	mg/kg	0.16	J	Arsenic	8.2	70	0.00
041M641501	11/15/1995	mg/kg	0.21	J	Cadmium	1.2	9.6	0.02
041M641501	11/15/1995	mg/kg	9.4		Chromium	81	370	0.03
041M641501	11/15/1995	mg/kg	2.6	J	Copper	34	270	0.01
041M641501	11/15/1995	mg/kg	5.7	J	Lead	46.7	218	0.03
041M641501	11/15/1995	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M641501	11/15/1995	mg/kg	0.395	U	Nickel	20.9	51.6	0.01
041M641501	11/15/1995	mg/kg	0.13	UJ	Silver	1	3.7	0.04
041M641501	11/15/1995	mg/kg	4.4	J	Zinc	150	410	0.01
041M641501	11/15/1995	g/kg	0.43	J	4,4'-DDE	2.2	27	0.02
041M641501	11/15/1995	g/kg	0.6	J	4,4'-DDT	1.58	46.1	0.01
041M641501	11/15/1995	g/kg	18.45		Total PCBs	22.7	180	0.10
041M641501	11/15/1995	g/kg	21.5	U	2-Methylnaphthalene	70	670	0.03
041M641501	11/15/1995	g/kg	10.5	U	Acenaphthene	16	500	0.02
041M641501	11/15/1995	g/kg	21.5	U	Acenaphthylene	44	640	0.03
041M641501	11/15/1995	g/kg	21.5	U	Anthracene	85.3	1,100	0.02
041M641501	11/15/1995	g/kg	21.5	U	Benzo(a)anthracene	261	1,600	0.01
041M641501	11/15/1995	g/kg	21.5	U	Benzo(a)pyrene	430	1,600	0.01
041M641501	11/15/1995	g/kg	21.5	U	Chrysene	384	2,800	0.01
041M641501	11/15/1995	g/kg	21.5	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M641501	11/15/1995	g/kg	28	J	Fluoranthene	600	5,100	0.01
041M641501	11/15/1995	g/kg	10.5	U	Fluorene	19	540	0.02
041M641501	11/15/1995	g/kg	21.5	U	Naphthalene	160	2,100	0.01

Table 11-3-11
Wetland 64 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M641501	11/15/1995	g/kg	21.5	U	Phenanthrene	240	1,500	0.01
041M641501	11/15/1995	g/kg	25	J	Pyrene	665	2,600	0.01
041M641501	11/15/1995				ERM Quotient Sum			0.60
041M641501	11/15/1995				Mean ERM Quotient			0.02
041M641501	11/15/1995				Mean ERM Quotient without ND			0.01
041M641501	11/15/1995				Mean ERM Quotient Category			1
041M641601	11/16/1995	mg/kg	18.7		Arsenic	8.2	70	0.27
041M641601	**11/16/1995**	**mg/kg**	**19**		**Cadmium**	**1.2**	**9.6**	**1.98**
041M641601	**11/16/1995**	**mg/kg**	**756**		**Chromium**	**81**	**370**	**2.04**
041M641601	11/16/1995	mg/kg	119		Copper	34	270	0.44
041M641601	**11/16/1995**	**mg/kg**	**249**		**Lead**	**46.7**	**218**	**1.14**
041M641601	11/16/1995	mg/kg	0.49	J	Mercury	0.15	0.71	0.69
041M641601	11/16/1995	mg/kg	18.6		Nickel	20.9	51.6	0.36
041M641601	11/16/1995	mg/kg	0.55	U	Silver	1	3.7	0.15
041M641601	11/16/1995	mg/kg	300		Zinc	150	410	0.73
041M641601	11/16/1995	g/kg	0.485	U	4,4'-DDE	2.2	27	0.02
041M641601	11/16/1995	g/kg	0.485	U	4,4'-DDT	1.58	46.1	0.01
041M641601	11/16/1995	g/kg	49.75		Total PCBs	22.7	180	0.28
041M641601	11/16/1995	g/kg	95	U	2-Methylnaphthalene	70	670	0.14
041M641601	11/16/1995	g/kg	47	U	Acenaphthene	16	500	0.09
041M641601	11/16/1995	g/kg	95	U	Acenaphthylene	44	640	0.15
041M641601	11/16/1995	g/kg	95	U	Anthracene	85.3	1,100	0.09
041M641601	11/16/1995	g/kg	120	J	Benzo(a)anthracene	261	1,600	0.08
041M641601	11/16/1995	g/kg	140	J	Benzo(a)pyrene	430	1,600	0.09
041M641601	11/16/1995	g/kg	160	J	Chrysene	384	2,800	0.06
041M641601	11/16/1995	g/kg	95	U	Dibenz(a,h)anthracene	63.4	260	0.37
041M641601	11/16/1995	g/kg	330		Fluoranthene	600	5,100	0.06
041M641601	11/16/1995	g/kg	47	U	Fluorene	19	540	0.09
041M641601	11/16/1995	g/kg	95	U	Naphthalene	160	2,100	0.05
041M641601	11/16/1995	g/kg	140	J	Phenanthrene	240	1,500	0.09
041M641601	11/16/1995	g/kg	250		Pyrene	665	2,600	0.10
041M641601	11/16/1995				ERM Quotient Sum			9.55
041M641601	11/16/1995				Mean ERM Quotient			0.38
041M641601	11/16/1995				Mean ERM Quotient without ND			0.34
041M641601	11/16/1995				Mean ERM Quotient Category			2
041M641701	11/16/1995	mg/kg	3.3		Arsenic	8.2	70	0.05
041M641701	11/16/1995	mg/kg	2.4		Cadmium	1.2	9.6	0.25
041M641701	11/16/1995	mg/kg	78.2		Chromium	81	370	0.21
041M641701	11/16/1995	mg/kg	16.3		Copper	34	270	0.06
041M641701	11/16/1995	mg/kg	31.9		Lead	46.7	218	0.15
041M641701	11/16/1995	mg/kg	0.04	U	Mercury	0.15	0.71	0.06
041M641701	11/16/1995	mg/kg	2.2	J	Nickel	20.9	51.6	0.04
041M641701	11/16/1995	mg/kg	0.185	U	Silver	1	3.7	0.05
041M641701	11/16/1995	mg/kg	52.4		Zinc	150	410	0.13
041M641701	11/16/1995	g/kg	0.155	U	4,4'-DDE	2.2	27	0.01
041M641701	11/16/1995	g/kg	0.155	U	4,4'-DDT	1.58	46.1	0.00
041M641701	11/16/1995	g/kg	15.65		Total PCBs	22.7	180	0.09
041M641701	11/16/1995	g/kg	30.5	U	2-Methylnaphthalene	70	670	0.05
041M641701	11/16/1995	g/kg	15	U	Acenaphthene	16	500	0.03
041M641701	11/16/1995	g/kg	30.5	U	Acenaphthylene	44	640	0.05
041M641701	11/16/1995	g/kg	305	U	Anthracene	85.3	1,100	0.28
041M641701	11/16/1995	g/kg	30.5	U	Benzo(a)anthracene	261	1,600	0.02
041M641701	11/16/1995	g/kg	45	J	Benzo(a)pyrene	430	1,600	0.03
041M641701	11/16/1995	g/kg	18.5	U	Chrysene	384	2,800	0.01
041M641701	11/16/1995	g/kg	30.5	U	Dibenz(a,h)anthracene	63.4	260	0.12
041M641701	11/16/1995	g/kg	83		Fluoranthene	600	5,100	0.02
041M641701	11/16/1995	g/kg	15	U	Fluorene	19	540	0.03
041M641701	11/16/1995	g/kg	30.5	U	Naphthalene	160	2,100	0.01
041M641701	11/16/1995	g/kg	305	U	Phenanthrene	240	1,500	0.20
041M641701	11/16/1995	g/kg	74		Pyrene	665	2,600	0.03
041M641701	11/16/1995				ERM Quotient Sum			1.95
041M641701	11/16/1995				Mean ERM Quotient			0.08
041M641701	11/16/1995				Mean ERM Quotient without ND			0.04
041M641701	11/16/1995				Mean ERM Quotient Category			2
041M641801	2/6/1996	mg/kg	0.19	J	Arsenic	8.2	70	0.00
041M641801	2/6/1996	mg/kg	0.19	J	Cadmium	1.2	9.6	0.02
041M641801	2/6/1996	mg/kg	5.2		Chromium	81	370	0.01
041M641801	2/6/1996	mg/kg	0.75	U	Copper	34	270	0.00
041M641801	2/6/1996	mg/kg	2.6		Lead	46.7	218	0.01
041M641801	2/6/1996	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M641801	2/6/1996	mg/kg	0.285	U	Nickel	20.9	51.6	0.01
041M641801	2/6/1996	mg/kg	0.16	U	Silver	1	3.7	0.04
041M641801	2/6/1996	mg/kg	2.6		Zinc	150	410	0.01
041M641801	2/6/1996	g/kg	0.11	U	4,4'-DDE	2.2	27	0.00
041M641801	2/6/1996	g/kg	0.11	U	4,4'-DDT	1.58	46.1	0.00
041M641801	2/6/1996	g/kg	8.95		Total PCBs	22.7	180	0.05
041M641801	2/6/1996	g/kg	21.5	U	2-Methylnaphthalene	70	670	0.03
041M641801	2/6/1996	g/kg	10.5	U	Acenaphthene	16	500	0.02
041M641801	2/6/1996	g/kg	21.5	U	Acenaphthylene	44	640	0.03
041M641801	2/6/1996	g/kg	21.5	U	Anthracene	85.3	1,100	0.02
041M641801	2/6/1996	g/kg	21.5	U	Benzo(a)anthracene	261	1,600	0.01
041M641801	2/6/1996	g/kg	21.5	U	Benzo(a)pyrene	430	1,600	0.01
041M641801	2/6/1996	g/kg	21.5	U	Chrysene	384	2,800	0.01
041M641801	2/6/1996	g/kg	21.5	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M641801	2/6/1996	g/kg	21.5	U	Fluoranthene	600	5,100	0.00
041M641801	2/6/1996	g/kg	10.5	U	Fluorene	19	540	0.02
041M641801	2/6/1996	g/kg	21.5	U	Naphthalene	160	2,100	0.01

Table 11-3-11
Wetland 64 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M641801	2/6/1996	g/kg	21.5	U	Phenanthrene	240	1,500	0.01
041M641801	2/6/1996	g/kg	21.5	U	Pyrene	665	2,600	0.01
041M641801	2/6/1996				ERM Quotient Sum			0.48
041M641801	2/6/1996				Mean ERM Quotient			0.02
041M641801	2/6/1996				Mean ERM Quotient without ND			0.00
041M641801	2/6/1996				Mean ERM Quotient Category			1
041M641901	2/1/1996	mg/kg	17		Arsenic	8.2	70	0.24
041M641901	**2/1/1996**	**mg/kg**	**14.8**		**Cadmium**	**1.2**	**9.6**	**1.54**
041M641901	**2/1/1996**	**mg/kg**	**638**		**Chromium**	**81**	**370**	**1.72**
041M641901	2/1/1996	mg/kg	121		Copper	34	270	0.45
041M641901	**2/1/1996**	**mg/kg**	**224**		**Lead**	**46.7**	**218**	**1.03**
041M641901	2/1/1996	mg/kg	0.66		Mercury	0.15	0.71	0.93
041M641901	2/1/1996	mg/kg	15.9		Nickel	20.9	51.6	0.31
041M641901	2/1/1996	mg/kg	0.85	U	Silver	1	3.7	0.23
041M641901	2/1/1996	mg/kg	308		Zinc	150	410	0.75
041M641901	2/1/1996	g/kg	1.3	J	4,4'-DDE	2.2	27	0.05
041M641901	2/1/1996	g/kg	0.55	U	4,4'-DDT	1.58	46.1	0.01
041M641901	2/1/1996	g/kg	88		Total PCBs	22.7	180	0.49
041M641901	2/1/1996	g/kg	95	U	2-Methylnaphthalene	70	670	0.14
041M641901	2/1/1996	g/kg	47	U	Acenaphthene	16	500	0.09
041M641901	2/1/1996	g/kg	95	U	Acenaphthylene	44	640	0.15
041M641901	2/1/1996	g/kg	95	U	Anthracene	85.3	1,100	0.09
041M641901	2/1/1996	g/kg	340		Benzo(a)anthracene	261	1,600	0.21
041M641901	2/1/1996	g/kg	360		Benzo(a)pyrene	430	1,600	0.23
041M641901	2/1/1996	g/kg	390		Chrysene	384	2,800	0.14
041M641901	2/1/1996	g/kg	95	U	Dibenz(a,h)anthracene	63.4	260	0.37
041M641901	2/1/1996	g/kg	580		Fluoranthene	600	5,100	0.11
041M641901	2/1/1996	g/kg	47	U	Fluorene	19	540	0.09
041M641901	2/1/1996	g/kg	95	U	Naphthalene	160	2,100	0.05
041M641901	2/1/1996	g/kg	210		Phenanthrene	240	1,500	0.14
041M641901	2/1/1996	g/kg	550		Pyrene	665	2,600	0.21
041M641901	2/1/1996				ERM Quotient Sum			9.76
041M641901	2/1/1996				Mean ERM Quotient			0.39
041M641901	2/1/1996				Mean ERM Quotient without ND			0.34
041M641901	2/1/1996				Mean ERM Quotient Category			2
041M642001	11/16/1995	mg/kg	0.8		Arsenic	8.2	70	0.01
041M642001	11/16/1995	mg/kg	0.56		Cadmium	1.2	9.6	0.06
041M642001	11/16/1995	mg/kg	13.8		Chromium	81	370	0.04
041M642001	11/16/1995	mg/kg	4.3		Copper	34	270	0.02
041M642001	11/16/1995	mg/kg	7.5		Lead	46.7	218	0.03
041M642001	11/16/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M642001	11/16/1995	mg/kg	0.39	U	Nickel	20.9	51.6	0.01
041M642001	11/16/1995	mg/kg	0.13	U	Silver	1	3.7	0.04
041M642001	11/16/1995	mg/kg	15.8		Zinc	150	410	0.04
041M642001	11/16/1995	g/kg	0.105	U	4,4'-DDE	2.2	27	0.00
041M642001	11/16/1995	g/kg	0.105	U	4,4'-DDT	1.58	46.1	0.00
041M642001	11/16/1995	g/kg	9.3		Total PCBs	22.7	180	0.05
041M642001	11/16/1995	g/kg	21	U	2-Methylnaphthalene	70	670	0.03
041M642001	11/16/1995	g/kg	10	U	Acenaphthene	16	500	0.02
041M642001	11/16/1995	g/kg	21	U	Acenaphthylene	44	640	0.03
041M642001	11/16/1995	g/kg	21	U	Anthracene	85.3	1,100	0.02
041M642001	11/16/1995	g/kg	21	U	Benzo(a)anthracene	261	1,600	0.01
041M642001	11/16/1995	g/kg	21	U	Benzo(a)pyrene	430	1,600	0.01
041M642001	11/16/1995	g/kg	21	U	Chrysene	384	2,800	0.01
041M642001	11/16/1995	g/kg	21	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M642001	11/16/1995	g/kg	24	J	Fluoranthene	600	5,100	0.00
041M642001	11/16/1995	g/kg	10	U	Fluorene	19	540	0.02
041M642001	11/16/1995	g/kg	21	U	Naphthalene	160	2,100	0.01
041M642001	11/16/1995	g/kg	21	U	Phenanthrene	240	1,500	0.01
041M642001	11/16/1995	g/kg	22	J	Pyrene	665	2,600	0.01
041M642001	11/16/1995				ERM Quotient Sum			0.61
041M642001	11/16/1995				Mean ERM Quotient			0.02
041M642001	11/16/1995				Mean ERM Quotient without ND			0.01
041M642001	11/16/1995				Mean ERM Quotient Category			1.00
041M642101	11/16/1995	mg/kg	0.07	U	Arsenic	8.2	70	0.00
041M642101	11/16/1995	mg/kg	0.105	U	Cadmium	1.2	9.6	0.01
041M642101	11/16/1995	mg/kg	1.2		Chromium	81	370	0.00
041M642101	11/16/1995	mg/kg	0.74	J	Copper	34	270	0.00
041M642101	11/16/1995	mg/kg	0.65		Lead	46.7	218	0.00
041M642101	11/16/1995	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M642101	11/16/1995	mg/kg	0.41	U	Nickel	20.9	51.6	0.01
041M642101	11/16/1995	mg/kg	0.135	U	Silver	1	3.7	0.04
041M642101	11/16/1995	mg/kg	2.2		Zinc	150	410	0.01
041M642101	11/16/1995	g/kg	0.105	U	4,4'-DDE	2.2	27	0.00
041M642101	11/16/1995	g/kg	0.105	U	4,4'-DDT	1.58	46.1	0.00
041M642101	11/16/1995	g/kg	8.4	U	Total PCBs	22.7	180	0.05
041M642101	11/16/1995	g/kg	20.5	U	2-Methylnaphthalene	70	670	0.03
041M642101	11/16/1995	g/kg	10	U	Acenaphthene	16	500	0.02
041M642101	11/16/1995	g/kg	20.5	U	Acenaphthylene	44	640	0.03
041M642101	11/16/1995	g/kg	20.5	U	Anthracene	85.3	1,100	0.02
041M642101	11/16/1995	g/kg	20.5	U	Benzo(a)anthracene	261	1,600	0.01
041M642101	11/16/1995	g/kg	20.5	U	Benzo(a)pyrene	430	1,600	0.01
041M642101	11/16/1995	g/kg	20.5	U	Chrysene	384	2,800	0.01
041M642101	11/16/1995	g/kg	20.5	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M642101	11/16/1995	g/kg	20.5	U	Fluoranthene	600	5,100	0.00
041M642101	11/16/1995	g/kg	10	U	Fluorene	19	540	0.02

Table 11-3-11
Wetland 64 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M642101	11/16/1995	g/kg	20.5	U	Naphthalene	160	2,100	0.01
041M642101	11/16/1995	g/kg	20.5	U	Phenanthrene	240	1,500	0.01
041M642101	11/16/1995	g/kg	20.5	U	Pyrene	665	2,600	0.01
041M642101	11/16/1995				ERM Quotient Sum			0.43
041M642101	11/16/1995				Mean ERM Quotient			0.02
041M642101	11/16/1995				Mean ERM Quotient without ND			0.00
041M642101	11/16/1995				Mean ERM Quotient Category			1
041M642201	11/17/1995	mg/kg	0.13	UJ	Arsenic	8.2	70	0.00
041M642201	11/17/1995	mg/kg	1.6		Cadmium	1.2	9.6	0.17
041M642201	11/17/1995	mg/kg	21.3		Chromium	81	370	0.06
041M642201	11/17/1995	mg/kg	7.2		Copper	34	270	0.03
041M642201	11/17/1995	mg/kg	36.3	J	Lead	46.7	218	0.17
041M642201	11/17/1995	mg/kg	0.15	J	Mercury	0.15	0.71	0.21
041M642201	11/17/1995	mg/kg	3.9	J	Nickel	20.9	51.6	0.08
041M642201	11/17/1995	mg/kg	0.72	J	Silver	1	3.7	0.19
041M642201	11/17/1995	mg/kg	21.3		Zinc	150	410	0.05
041M642201	11/17/1995	g/kg	0.12	U	4,4'-DDE	2.2	27	0.00
041M642201	11/17/1995	g/kg	0.12	U	4,4'-DDT	1.58	46.1	0.00
041M642201	11/17/1995	g/kg	18.5	U	Total PCBs	22.7	180	0.10
041M642201	11/17/1995	g/kg	23	U	2-Methylnaphthalene	70	670	0.03
041M642201	11/17/1995	g/kg	11	U	Acenaphthene	16	500	0.02
041M642201	11/17/1995	g/kg	23	U	Acenaphthylene	44	640	0.04
041M642201	11/17/1995	g/kg	230	U	Anthracene	85.3	1,100	0.21
041M642201	11/17/1995	g/kg	38	J	Benzo(a)anthracene	261	1,600	0.02
041M642201	11/17/1995	g/kg	25	J	Benzo(a)pyrene	430	1,600	0.02
041M642201	11/17/1995	g/kg	35	J	Chrysene	384	2,800	0.01
041M642201	11/17/1995	g/kg	23	U	Dibenz(a,h)anthracene	63.4	260	0.09
041M642201	11/17/1995	g/kg	92		Fluoranthene	600	5,100	0.02
041M642201	11/17/1995	g/kg	11	U	Fluorene	19	540	0.02
041M642201	11/17/1995	g/kg	23	U	Naphthalene	160	2,100	0.01
041M642201	11/17/1995	g/kg	57		Phenanthrene	240	1,500	0.04
041M642201	11/17/1995	g/kg	68		Pyrene	665	2,600	0.03
041M642201	11/17/1995				ERM Quotient Sum			1.62
041M642201	11/17/1995				Mean ERM Quotient			0.06
041M642201	11/17/1995				Mean ERM Quotient without ND			0.04
041M642201	11/17/1995				Mean ERM Quotient Category			2
041M642301	11/17/1995	mg/kg	0.88	J	Arsenic	8.2	70	0.01
041M642301	11/17/1995	mg/kg	0.44		Cadmium	1.2	9.6	0.05
041M642301	11/17/1995	mg/kg	19.4		Chromium	81	370	0.05
041M642301	11/17/1995	mg/kg	4.4		Copper	34	270	0.02
041M642301	11/17/1995	mg/kg	8.8	J	Lead	46.7	218	0.04
041M642301	11/17/1995	mg/kg	0.035	U	Mercury	0.15	0.71	0.05
041M642301	11/17/1995	mg/kg	0.96	J	Nickel	20.9	51.6	0.02
041M642301	11/17/1995	mg/kg	0.145	UJ	Silver	1	3.7	0.04
041M642301	11/17/1995	mg/kg	18.8		Zinc	150	410	0.05
041M642301	11/17/1995	g/kg	0.11	U	4,4'-DDE	2.2	27	0.00
041M642301	11/17/1995	g/kg	0.11	U	4,4'-DDT	1.58	46.1	0.00
041M642301	11/17/1995	g/kg	16.85	U	Total PCBs	22.7	180	0.09
041M642301	11/17/1995	g/kg	21	U	2-Methylnaphthalene	70	670	0.03
041M642301	11/17/1995	g/kg	10	U	Acenaphthene	16	500	0.02
041M642301	11/17/1995	g/kg	21	U	Acenaphthylene	44	640	0.03
041M642301	11/17/1995	g/kg	210	U	Anthracene	85.3	1,100	0.19
041M642301	11/17/1995	g/kg	21	U	Benzo(a)anthracene	261	1,600	0.01
041M642301	11/17/1995	g/kg	21	U	Benzo(a)pyrene	430	1,600	0.01
041M642301	11/17/1995	g/kg	21	U	Chrysene	384	2,800	0.01
041M642301	11/17/1995	g/kg	21	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M642301	11/17/1995	g/kg	26	J	Fluoranthene	600	5,100	0.01
041M642301	11/17/1995	g/kg	10	U	Fluorene	19	540	0.02
041M642301	11/17/1995	g/kg	21	U	Naphthalene	160	2,100	0.01
041M642301	11/17/1995	g/kg	21	U	Phenanthrene	240	1,500	0.01
041M642301	11/17/1995	g/kg	22	J	Pyrene	665	2,600	0.01
041M642301	11/17/1995				ERM Quotient Sum			0.87
041M642301	11/17/1995				Mean ERM Quotient			0.03
041M642301	11/17/1995				Mean ERM Quotient without ND			0.01
041M642301	11/17/1995				Mean ERM Quotient Category			1
041M642401	11/17/1995	mg/kg	0.07	UJ	Arsenic	8.2	70	0.00
041M642401	11/17/1995	mg/kg	0.1	U	Cadmium	1.2	9.6	0.01
041M642401	11/17/1995	mg/kg	0.55	J	Chromium	81	370	0.00
041M642401	11/17/1995	mg/kg	0.285	U	Copper	34	270	0.00
041M642401	11/17/1995	mg/kg	0.145	UJ	Lead	46.7	218	0.00
041M642401	11/17/1995	mg/kg	0.3		Mercury	0.15	0.71	0.42
041M642401	11/17/1995	mg/kg	0.405	U	Nickel	20.9	51.6	0.01
041M642401	11/17/1995	mg/kg	0.135	UJ	Silver	1	3.7	0.04
041M642401	11/17/1995	mg/kg	0.7	U	Zinc	150	410	0.00
041M642401	11/17/1995	g/kg	0.115	UJ	4,4'-DDE	2.2	27	0.00
041M642401	11/17/1995	g/kg	0.115	UJ	4,4'-DDT	1.58	46.1	0.00
041M642401	11/17/1995	g/kg	17.7	U	Total PCBs	22.7	180	0.10
041M642401	11/17/1995	g/kg	21	U	2-Methylnaphthalene	70	670	0.03
041M642401	11/17/1995	g/kg	10	U	Acenaphthene	16	500	0.02
041M642401	11/17/1995	g/kg	21	U	Acenaphthylene	44	640	0.03
041M642401	11/17/1995	g/kg	210	U	Anthracene	85.3	1,100	0.19
041M642401	11/17/1995	g/kg	21	U	Benzo(a)anthracene	261	1,600	0.01
041M642401	11/17/1995	g/kg	21	U	Benzo(a)pyrene	430	1,600	0.01
041M642401	11/17/1995	g/kg	21	U	Chrysene	384	2,800	0.01
041M642401	11/17/1995	g/kg	21	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M642401	11/17/1995	g/kg	21	U	Fluoranthene	600	5,100	0.00
041M642401	11/17/1995	g/kg	10	U	Fluorene	19	540	0.02

Table 11-3-11
Wetland 64 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M642401	11/17/1995	g/kg	21	U	Naphthalene	160	2,100	0.01
041M642401	11/17/1995	g/kg	21	U	Phenanthrene	240	1,500	0.01
041M642401	11/17/1995	g/kg	21	U	Pyrene	665	2,600	0.01
041M642401	11/17/1995				ERM Quotient Sum			1.03
041M642401	11/17/1995				Mean ERM Quotient			0.04
041M642401	11/17/1995				Mean ERM Quotient without ND			0.02
041M642401	11/17/1995				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 11-3-12
Wetland 64 Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	3	3			7,600	8,900	041M640601	8,900	J		N/A		Yes	No SV
Antimony	1	3	1.6	2	2.5	2.5	041M640501	2.5	J	12	2	0.21	No	Max Detect < SV
Arsenic	**3**	**3**			**6.9**	**7.8**	**041M640601**	**7.8**		**7.24**	**1, 2**	**1.08**	**Yes**	**Max Detect > SV**
Barium	3	3			15.2	17.1	041M640401	17.1			N/A		Yes	No SV
Beryllium	3	3			0.3	0.34	041M640601	0.34			N/A		Yes	No SV
Cadmium	**3**	**3**			**17.7**	**21**	**041M640601**	**21**		**0.68**	**1**	**31.1**	**Yes**	**Max Detect > SV**
Calcium	3	3			2,660	3,210	041M640401	3,210			N/A		Yes	No SV
Chromium	**3**	**3**			**592**	**868**	**041M640601**	**868**		**52.3**	**1, 2**	**16.6**	**Yes**	**Max Detect > SV**
Cobalt	3	3			2.7	3.4	041M640501	3.4			N/A		Yes	No SV
Copper	**3**	**3**			**102**	**146**	**041M640501**	**146**		**18.7**	**1, 2**	**7.81**	**Yes**	**Max Detect > SV**
Iron	3	3			12,100	13,600	041M640401	13,600			N/A		Yes	No SV
Lead	**3**	**3**			**330**	**346**	**041M640401**	**346**		**30.2**	**1, 2**	**11.5**	**Yes**	**Max Detect > SV**
Magnesium	3	3			3,230	4,190	041M640401	4,190			N/A		Yes	No SV
Manganese	3	3			44.9	65.8	041M640501	65.8			N/A		Yes	No SV
Mercury	**3**	**3**			**0.25**	**0.26**	**041M640501**	**0.26**		**0.13**	**1, 2**	**2**	**Yes**	**Max Detect > SV**
Nickel	3	3			9.8	12.3	041M640501	12.3		15.9	1, 2	0.77	No	Max Detect < SV
Potassium	3	3			1,090	1,350	041M640401	1,350			N/A		Yes	No SV
Selenium	3	3			1.3	1.6	041M640401	1.6	J		N/A		Yes	No SV
Silver	**3**	**3**			**1.9**	**3**	**041M640501**	**3**		**0.73**	**1**	**4.09**	**Yes**	**Max Detect > SV**
Sodium	3	3			10,100	18,300	041M640401	18,300			N/A		Yes	No SV
Thallium	0	3	0.5	0.8			ND	0.8	UJ		N/A		Yes	No SV
Vanadium	3	3			15.9	18.4	041M640401	18.4			N/A		Yes	No SV
Zinc	**3**	**3**			**306**	**468**	**041M640401**	**468**		**124**	**1, 2**	**3.77**	**Yes**	**Max Detect > SV**
PAHs (g/kg)														
2-Methylnaphthalene	0	3	435	650			ND	650	U	20.2	1	32.2	No	TOC normalized PAHs<TEC
Acenaphthene	3	3			260	750	041M640601	750	J	6.71	1	112	No	TOC normalized PAHs<TEC
Acenaphthylene	0	3	435	650			ND	650	U	5.87	1	111	No	TOC normalized PAHs<TEC
Anthracene	3	3			310	1,000	041M640601	1,000	J	46.9	1	21.3	No	TOC normalized PAHs<TEC
Benzo(a)anthracene	3	3			1,100	2,100	041M640601	2,100		74.8	1	28.1	No	TOC normalized PAHs<TEC
Benzo(a)pyrene	3	3			1,000	1,700	041M640601	1,700		88.8	1	19.1	No	TOC normalized PAHs<TEC
Chrysene	3	3			1,200	2,100	041M640601	2,100		108	1	19.4	No	TOC normalized PAHs<TEC
Dibenz(a,h)anthracene	0	3	435	650			ND	650	UJ	6.22	1	105	No	TOC normalized PAHs<TEC
Fluoranthene	3	3			2,700	5,000	041M640601	5,000		113	1	44.2	No	TOC normalized PAHs<TEC
Fluorene	3	3			210	750	041M640601	750	J	21.2	1	35.4	No	TOC normalized PAHs<TEC
Naphthalene	3	3			110	310	041M640601	310	J	34.6	1	8.96	No	TOC normalized PAHs<TEC
Phenanthrene	3	3			1,800	4,300	041M640601	4,300		86.7	1	49.6	No	TOC normalized PAHs<TEC
Pyrene	3	3			3,000	4,800	041M640601	4,800	J	153	1	31.4	No	TOC normalized PAHs<TEC
Total PAHs	3	3			13,700	24,500	041M640601	24,500		1,684	1, 2	14.5	No	TOC normalized PAHs<TEC
TOC Normalized PAHs	3	3			196.29	284.42	041M640601	284.42		290	3	0.98	No	Max Detect < SV
PCBs (g/kg)														
Aroclor-1016	0	3	55	130			ND	130	U	21.6	N/A	6.02	Yes	Max SQL > SV
Aroclor-1221	0	3	110	270			ND	270	U	67	2	4.03	Yes	Max SQL > SV
Aroclor-1232	0	3	55	130			ND	130	U	21.6	N/A	6.02	Yes	Max SQL > SV
Aroclor-1242	0	3	55	130			ND	130	U	21.6	N/A	6.02	Yes	Max SQL > SV
Aroclor-1248	0	3	55	130			ND	130	U	21.6	N/A	6.02	Yes	Max SQL > SV
Aroclor-1254	0	3	55	130			ND	130	U	21.6	N/A	6.02	Yes	Max SQL > SV
Aroclor-1260	**3**	**3**			**180**	**300**	**041M640601**	**300**		**21.6**	**N/A**	**13.9**	**Yes**	**Max Detect > SV**
Total PCBs	**3**	**3**			**565**	**1,220**	**041M640601**	**1,220**		**21.6**	**1**	**56.5**	**Yes**	**Max Detect > SV**
Pesticides (g/kg)														
Aldrin	0	3	0.455	0.85			ND	0.85	U		N/A		Yes	No SV
Dieldrin	**3**	**3**			**7.7**	**20**	**041M640401**	**20**	**J**	**0.72**	**1**	**27.9**	**Yes**	**Max Detect > SV**
Endosulfan I	2	3	0.43	0.43	1.3	2.4	041M640401	2.4	J		N/A		Yes	No SV
Endosulfan II	0	3	5.5	13			ND	13	U		N/A		Yes	No SV
Endosulfan sulfate	0	3	5.5	13			ND	13	U		N/A		Yes	No SV
Heptachlor	0	3	2.85	7			ND	7	U		N/A		Yes	No SV
Heptachlor epoxide	0	3	0.49	7			ND	7	U		N/A		Yes	No SV
Methoxychlor	0	3	28.5	70			ND	70	U		N/A		Yes	No SV
Toxaphene	0	3	285	700			ND	700	U		N/A		Yes	No SV
alpha-Chlordane	**2**	**3**	**1.2**	**1.2**	**2.9**	**3.7**	**041M640401**	**3.7**	**J**	**1.7**	**1**	**2.18**	**Yes**	**Max Detect > SV**
gamma-Chlordane	0	3	1.75	8			ND	8	U	1.7	1	4.71	Yes	Max SQL > SV
Total Chlordane	**2**	**3**	**3**	**3**	**4.65**	**11.7**	**041M640401**	**11.7**		**1.7**	**1**	**6.88**	**Yes**	**Max Detect > SV**
Endrin	0	3	5.5	13			ND	13	U	3.3	2	3.94	Yes	Max SQL > SV
Endrin aldehyde	0	3	5.5	13			ND	13	U	3.3	2	3.94	Yes	Max SQL > SV
Endrin ketone	0	3	5.5	13			ND	13	U	3.3	2	3.94	Yes	Max SQL > SV
Total Endrin	0	3	16.5	39			ND	39	U	3.3	2	11.8	Yes	Max SQL > SV
alpha-BHC	0	3	2.85	7			ND	7	U		N/A		Yes	No SV
beta-BHC	0	3	2.85	7			ND	7	U	0.32	N/A	21.9	Yes	Max SQL > SV
delta-BHC	**2**	**3**	**4.45**	**4.45**	**0.69**	**0.94**	**041M640601**	**0.94**	**NJ**	**0.32**	**N/A**	**2.94**	**Yes**	**Max Detect > SV**
gamma-BHC (Lindane)	0	3	0.475	7			ND	7	U	0.32	1	21.9	Yes	Max SQL > SV
Total BHC	**2**	**3**	**17.8**	**17.8**	**7.12**	**21.7**	**041M640601**	**21.7**		**0.32**	**2**	**67.8**	**Yes**	**Max Detect > SV**
4,4'-DDD	**3**	**3**			**30**	**89**	**041M640401**	**89**		**1.22**	**1**	**73**	**Yes**	**Max Detect > SV**
4,4'-DDE	**3**	**3**			**33**	**89**	**041M640401**	**89**		**2.07**	**1**	**43**	**Yes**	**Max Detect > SV**
4,4'-DDT	**2**	**3**	**3.85**	**3.85**	**18**	**19**	**041M640601**	**19**		**1.19**	**1**	**16**	**Yes**	**Max Detect > SV**
Total DDT	**3**	**3**			**66.8**	**196**	**041M640401**	**196**		**3.3**	**2**	**59.4**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	3	435	650			ND	650	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	3	435	650			ND	650	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	3	435	650			ND	650	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	3	435	650			ND	650	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	3	435	650			ND	650	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	3	435	650			ND	650	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	3	435	650			ND	650	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	3	435	650			ND	650	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	3	435	650			ND	650	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	3	1,050	1,600			ND	1,600	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	3	435	650			ND	650	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	3	435	650			ND	650	U		N/A		Yes	No SV
2-Chloronaphthalene	0	3	435	650			ND	650	U		N/A		Yes	No SV
2-Chlorophenol	0	3	435	650			ND	650	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	3	1,050	1,600			ND	1,600	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	3	435	650			ND	650	U		N/A		Yes	No SV
2-Nitroaniline	0	3	1,050	1,600			ND	1,600	U		N/A		Yes	No SV
2-Nitrophenol	0	3	435	650			ND	650	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	3	850	1,300			ND	1,300	U		N/A		Yes	No SV
3-Methylphenol/4-Methylphenol	0	3	435	650			ND	650	U				Yes	No SV
3-Nitroaniline	0	3	1,050	1,600			ND	1,600	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	3	435	650			ND	650	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	3	435	650			ND	650	U		N/A		Yes	No SV
4-Chloroaniline	0	3	435	650			ND	650	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	3	435	650			ND	650	U		N/A		Yes	No SV
4-Nitroaniline	0	3	1,050	1,600			ND	1,600	U		N/A		Yes	No SV
4-Nitrophenol	0	3	1,050	1,600			ND	1,600	U		N/A		Yes	No SV
Benzo(b)fluoranthene	3	3			1,100	1,800	041M640601	1,800			N/A		No	TOC normalized PAHs<TEC
Benzo(g,h,i)perylene	3	3			470	980	041M640601	980	J		N/A		No	TOC normalized PAHs<TEC
Benzo(k)fluoranthene	3	3			1,300	1,900	041M640601	1,900			N/A		No	TOC normalized PAHs<TEC
bis(2-Chloroethoxy)methane	0	3	435	650			ND	650	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	3	435	650			ND	650	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**3**	**3**			**2,000**	**3,900**	**041M640601**	**3,900**		**182**	**1, 2**	**21.4**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	**3**	**3**			**240**	**710**	**041M640401**	**710**	**J**	**182**	**1, 2**	**3.9**	**Yes**	**Max Detect > SV**
Carbazole	3	3			320	800	041M640601	800	J		N/A		Yes	No SV
Dibenzofuran	2	3	650	650	130	350	041M640601	350	J		N/A		Yes	No SV
Diethylphthalate	0	3	435	650			ND	650	U	182	1, 2	3.57	Yes	Max SQL > SV
Dimethylphthalate	0	3	435	650			ND	650	U	182	1, 2	3.57	Yes	Max SQL > SV
Di-n-butylphthalate	0	3	435	650			ND	650	U	182	1, 2	3.57	Yes	Max SQL > SV

Table 11-3-12
Wetland 64 Phase III
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
Di-n-octylphthalate	0	3	435	650			ND	650	UJ	182	1, 2	3.57	Yes	Max SQL > SV
Hexachlorobenzene	0	3	435	650			ND	650	U		N/A		Yes	No SV
Hexachlorobutadiene	0	3	435	650			ND	650	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	3	435	650			ND	650	U		N/A		Yes	No SV
Hexachloroethane	0	3	435	650			ND	650	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	3	3			680	1,000	041M640601	1,000	J		N/A		No	TOC normalized PAHs<TEC
Isophorone	0	3	435	650			ND	650	U		N/A		Yes	No SV
Nitrobenzene	0	3	435	650			ND	650	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	3	435	650			ND	650	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	3	435	650			ND	650	U		N/A		Yes	No SV
Pentachlorophenol	0	3	1,050	1,600			ND	1,600	U		N/A		Yes	No SV
Phenol	0	3	435	650			ND	650	U		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
1,1-Dichloroethane	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
1,2-Dichloropropane	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
2-Butanone (MEK)	0	3	13	29.5			ND	29.5	U		N/A		Yes	No SV
2-Hexanone	0	3	13	29.5			ND	29.5	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	3	13	29.5			ND	29.5	U		N/A		Yes	No SV
Acetone	2	3	29.5	29.5	32	32	041M640501	32	J		N/A		Yes	No SV
Benzene	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Bromodichloromethane	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Bromoform	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Bromomethane	0	3	13	29.5			ND	29.5	U		N/A		Yes	No SV
Carbon disulfide	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Carbon tetrachloride	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Chlorobenzene	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Chloroethane	0	3	13	29.5			ND	29.5	U		N/A		Yes	No SV
Chloroform	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Chloromethane	0	3	13	29.5			ND	29.5	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Dibromochloromethane	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Ethylbenzene	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Methylene chloride	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Styrene	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Tetrachloroethene	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Toluene	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Trichloroethene	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV
Vinyl chloride	0	3	13	29.5			ND	29.5	U		N/A		Yes	No SV
Xylene (Total)	0	3	6.5	14.5			ND	14.5	U		N/A		Yes	No SV

Notes:
Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Sectio
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient
D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 11-3-13
Wetland 64 Phase III
Sediment Parameters Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDD	bis(2-Ethylhexyl)phthalate (BEHP)	Acetone
Arsenic	4,4'-DDE	Butylbenzylphthalate	
Barium	4,4'-DDT	Carbazole	
Beryllium	alpha-Chlordane	Dibenzofuran	
Cadmium	delta-BHC		
Calcium	Dieldrin		
Chromium	Endosulfan I		
Cobalt	Total BHC		
Copper	Total Chlordane		
Iron	Total DDT		
Lead	Aroclor-1260		
Magnesium	Total PCBs		
Manganese			
Mercury			
Potassium			
Selenium			
Silver			
Sodium			
Vanadium			
Zinc			
		Not Detected Parameters	
Thallium	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
	alpha-BHC	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
	beta-BHC	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Endosulfan II	1,4-Dichlorobenzene	1,1-Dichloroethane
	Endosulfan sulfate	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Endrin	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Endrin aldehyde	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
	Endrin ketone	2,4-Dichlorophenol	1,2-Dichloropropane
	gamma-BHC (Lindane)	2,4-Dimethylphenol	2-Butanone (MEK)
	gamma-Chlordane	2,4-Dinitrophenol	2-Hexanone
	Heptachlor	2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
	Heptachlor epoxide	2,6-Dinitrotoluene	Benzene
	Methoxychlor	2-Chloronaphthalene	Bromodichloromethane
	Total Endrin	2-Chlorophenol	Bromoform
	Toxaphene	2-Methyl-4,6-Dinitrophenol	Bromomethane
	Aroclor-1016	2-Methylphenol (o-Cresol)	Carbon disulfide
	Aroclor-1221	2-Nitroaniline	Carbon tetrachloride
	Aroclor-1232	2-Nitrophenol	Chlorobenzene
	Aroclor-1242	3,3'-Dichlorobenzidine	Chloroethane
	Aroclor-1248	3-Methylphenol/4-Methylphenol	Chloroform
	Aroclor-1254	3-Nitroaniline	Chloromethane
		4-Bromophenyl-phenylether	cis-1,3-Dichloropropene
		4-Chloro-3-methylphenol	Dibromochloromethane
		4-Chloroaniline	Ethylbenzene
		4-Chlorophenylphenyl ether	Methylene chloride
		4-Nitroaniline	Styrene
		4-Nitrophenol	Tetrachloroethene
		bis(2-Chloroethoxy)methane	Toluene
		bis(2-Chloroethyl)ether	trans-1,3-Dichloropropene
		Dibenz(a,h)anthracene	Trichloroethene
		Diethylphthalate	Vinyl chloride
		Dimethylphthalate	Xylene (Total)
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 11-3-14
Wetland 64 Phase III
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	3	3				8,460	7,600	8,900	8,900	J	041M640601			NA					0	4,274	3	Yes	EPC > RC and no RV
Arsenic	3	3				7.23	6.9	7.8	7.8		041M640601	7.24	41.6	PEL	1.08	1.00	0.19	0.17	0	2.14	3	No	EPC > RC, but < RV
Barium	3	3				16.4	15.2	17.1	17.1		041M640401			NA					0	3.84	3	Yes	EPC > RC and no RV
Beryllium	3	3				0.327	0.3	0.34	0.34		041M640601			NA					0	0.13	3	Yes	EPC > RC and no RV
Cadmium	**3**	**3**				**19.6**	**17.7**	**21**	**21**		**041M640601**	**0.676**	**4.21**	**PEL**	**31.1**	**29**	**4.99**	**4.66**	**3**	**0.39**	**3**	**Yes**	**EPC > RV and RC**
Calcium	3	3				2,950	2,660	3,210	3,210		041M640401			NA					0	1,978.80	3	No	Essential Nutrient
Chromium	**3**	**3**				**745**	**592**	**868**	**868**		**041M640601**	**52.3**	**160**	**PEL**	**16.6**	**14.2**	**5.42**	**4.65**	**3**	**13.1**	**3**	**Yes**	**EPC > RV and RC**
Cobalt	3	3				3.03	2.7	3.4	3.4		041M640501			NA					0	0.91	3	Yes	EPC > RC and no RV
Copper	**3**	**3**				**121**	**102**	**146**	**146**		**041M640501**	**18.7**	**108**	**PEL**	**7.81**	**6.47**	**1.35**	**1.12**	**2**	**8.44**	**3**	**Yes**	**EPC > RV and RC**
Iron	3	3				13,000	12,100	13,600	13,600		041M640401			NA					0	2,684.40	3	Yes	EPC > RC and no RV
Lead	**3**	**3**				**338**	**330**	**346**	**346**		**041M640401**	**30.2**	**112**	**PEL**	**11.5**	**11.2**	**3.09**	**3.02**	**3**	**21.04**	**3**	**Yes**	**EPC > RV and RC**
Magnesium	3	3				3,650	3,230	4,190	4,190		041M640401			NA					0	2,943.60	3	No	Essential Nutrient
Manganese	3	3				53.2	44.9	65.8	65.8		041M640501			NA					0	9.81	3	Yes	EPC > RC and no RV
Mercury	3	3				0.257	0.25	0.26	0.26		041M640501	0.13	0.696	PEL	2	1.97	0.37	0.37	0	0.11	3	No	EPC > RC, but < RV
Potassium	3	3				1,200	1,090	1,350	1,350		041M640401			NA					0	899.72	3	No	Essential Nutrient
Selenium	3	3				1.47	1.3	1.6	1.6	J	041M640401			NA					0	0.66	3	Yes	EPC > RC and no RV
Silver	**3**	**3**				**2.3**	**1.9**	**3**	**3**		**041M640501**	**0.733**	**1.77**	**PEL**	**4.09**	**3.14**	**1.69**	**1.3**	**3**	**0.52**	**3**	**Yes**	**EPC > RV and RC**
Sodium	3	3				14,100	10,100	18,300	18,300		041M640401			NA					0	11,439.60	2	No	Essential Nutrient
Thallium	0	3	0.65	0.5	0.8	0.65			0.8	UJ	ND			NA					0	0.39	3	No	Parameter Not Detected
Vanadium	3	3				17.2	15.9	18.4	18.4		041M640401			NA					0	8.59	3	Yes	EPC > RC and no RV
Zinc	**3**	**3**				**368**	**306**	**468**	**468**		**041M640401**	**124**	**271**	**PEL**	**3.77**	**2.97**	**1.73**	**1.36**	**3**	**14.36**	**3**	**Yes**	**EPC > RV and RC**
PCBs (g/kg)																							
Aroclor-1016	0	3	90	55	130	90			130	U	ND	21.6	189	PEL	6.02	4.17	0.69	0.48	0		0	No	Parameter Not Detected
Aroclor-1221	0	3	185	110	270	185			270	U	ND	67	189	PEL	4.03	2.76	1.43	0.98	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1232	0	3	90	55	130	90			130	U	ND	21.6	189	PEL	6.02	4.17	0.69	0.48	0		0	No	Parameter Not Detected
Aroclor-1242	0	3	90	55	130	90			130	U	ND	21.6	189	PEL	6.02	4.17	0.69	0.48	0		0	No	Parameter Not Detected
Aroclor-1248	0	3	90	55	130	90			130	U	ND	21.6	189	PEL	6.02	4.17	0.69	0.48	0		0	No	Parameter Not Detected
Aroclor-1254	0	3	90	55	130	90			130	U	ND	21.6	189	PEL	6.02	4.17	0.69	0.48	0		0	No	Parameter Not Detected
Aroclor-1260	**3**	**3**				**253**	**180**	**300**	**300**		**041M640401**	**21.6**	**189**	**PEL**	**13.9**	**11.7**	**1.59**	**1.34**	**2**		**0**	**Yes**	**RV HQ > 1 and no RC**
Total PCBs	**3**	**3**				**888**	**565**	**1,220**	**1,220**		**041M640401**	**21.6**	**189**	**PEL**	**56.5**	**41.1**	**6.46**	**4.7**	**3**		**0**	**Yes**	**RV HQ > 1 and no RC**
Pesticides (g/kg)																							
Aldrin	0	3	0.652	0.455	0.85	0.652			0.85	U	ND			NA					0		0	No	Parameter Not Detected
Dieldrin	**3**	**3**				**14.9**	**7.7**	**20**	**20**	**J**	**041M640401**	**0.716**	**4.3**	**PEL**	**27.9**	**20.8**	**4.65**	**3.47**	**3**		**0**	**Yes**	**RV HQ > 1 and no RC**
Endosulfan I	2	3	0.43	0.43	0.43	1.38	1.3	2.4	2.4	J	041M640401			NA					0		0	Yes	No SV, no RV, and no RC
Endosulfan II	0	3	9	5.5	13	9			13	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	0	3	9	5.5	13	9			13	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor	0	3	4.77	2.85	7	4.77			7	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	3	2.81	0.49	7	2.81			7	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	3	47.7	28.5	70	47.7			70	U	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	3	477	285	700	477			700	U	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	2	3	1.2	1.2	1.2	2.6	2.9	3.7	3.7	J	041M640401	1.7	4.79	PEL	2.18	1.53	0.77	0.54	0		0	No	RV HQ <1 and no RC
gamma-Chlordane	0	3	3.85	1.75	8	3.85			8	U	ND	1.7	4.79	PEL	4.71	2.26	1.67	0.80	0		0	No	Parameter Not Detected; Max SQL > RV
Total Chlordane	**2**	**3**	**3**	**3**	**3**	**6.45**	**4.65**	**11.7**	**11.7**		**041M640401**	**1.7**	**4.79**	**PEL**	**6.88**	**3.79**	**2.44**	**1.35**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Endrin	0	3	9	5.5	13	9			13	U	ND	3.3		NA	3.94	2.73			0		0	No	Parameter Not Detected
Endrin aldehyde	0	3	9	5.5	13	9			13	U	ND	3.3		NA	3.94	2.73			0		0	No	Parameter Not Detected
Endrin ketone	0	3	9	5.5	13	9			13	U	ND	3.3		NA	3.94	2.73			0		0	No	Parameter Not Detected
Total Endrin	0	3	27	16.5	39	27			39	U	ND	3.3		NA	11.8	8.18			0		0	No	Parameter Not Detected
alpha-BHC	0	3	4.77	2.85	7	4.77			7	U	ND		0.99	PEL			7.07	4.81	0		0	No	Parameter Not Detected; Max SQL > RV
beta-BHC	0	3	4.77	2.85	7	4.77			7	U	ND	0.32	0.99	PEL	21.9	14.9	7.07	4.81	0		0	No	Parameter Not Detected; Max SQL > RV
delta-BHC	2	3	4.45	4.45	4.45	2.03	0.69	0.94	0.94	NJ	041M640601	0.32	0.99	PEL	2.94	6.33	0.95	2.05	0		0	No	RV HQ <1 and no RC
gamma-BHC (Lindane)	0	3	3.98	0.475	7	3.98			7	U	ND	0.32	0.99	PEL	21.9	12.4	7.07	4.02	0		0	No	Parameter Not Detected; Max SQL > RV
Total BHC	**2**	**3**	**17.8**	**17.8**	**17.8**	**15.5**	**7.12**	**21.7**	**21.7**		**041M640401**	**0.32**	**0.99**	**PEL**	**67.8**	**48.5**	**21.9**	**15.7**	**2**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	**3**	**3**				**57.3**	**30**	**89**	**89**		**041M640401**	**1.22**	**7.81**	**PEL**	**73**	**47**	**11.4**	**7.34**	**3**	**50**	**2**	**Yes**	**EPC > RV and RC**
4,4'-DDE	3	3				55.3	33	89	89		041M640401	2.07	374	PEL	43	26.7	0.24	0.15	0	40	2	No	EPC > RC, but < RV
4,4'-DDT	**2**	**3**	**3.85**	**3.85**	**3.85**	**13.6**	**18**	**19**	**19**		**041M640601**	**1.19**	**4.77**	**PEL**	**16**	**11.4**	**3.98**	**2.85**	**2**	**20**	**0**	**No**	**EPC > RV, but < RC**
Total DDT	**3**	**3**				**126**	**66.8**	**196**	**196**		**041M640401**	**3.3**	**51.7**	**PEL**	**59.4**	**38.3**	**3.79**	**2.44**	**3**	**110**	**2**	**Yes**	**EPC > RV and RC**
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	3	1,330	1,050	1,600	1,330			1600	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	3	1,330	1,050	1,600	1,330			1600	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	3	1,330	1,050	1,600	1,330			1600	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	3	1,080	850	1,300	1,080			1300	U	ND			NA					0		0	No	Parameter Not Detected
3-Methylphenol/4-Methylphenol	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	3	1,330	1,050	1,600	1,330			1600	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected

Table 11-3-14
Wetland 64 Phase III
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
4-Chlorophenylphenyl ether	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	3	1,330	1,050	1,600	1,330			1600	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	3	1,330	1,050	1,600	1,330			1600	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	**3**	**3**				**3,070**	**2,000**	**3,900**	**3900**		**041M640601**	**182**	**2,647**	**PEL**	**21.4**	**16.8**	**1.47**	**1.16**	**2**		**0**	**Yes**	**RV HQ > 1 and no RC**
Butylbenzylphthalate	3	3				427	240	710	710	J	041M640401	182	2,647	PEL	3.9	2.34	0.27	0.16	0		0	No	RV HQ <1 and no RC
Carbazole	3	3				490	320	800	800	J	041M640601			NA					0		0	Yes	No SV, no RV, and no RC
Dibenzofuran	2	3	650	650	650	377	130	350	350	J	041M640601			NA					0		0	Yes	No SV, no RV, and no RC
Diethylphthalate	0	3	545	435	650	545			650	U	ND	182	2,647	PEL	3.57	2.99	0.25	0.21	0		0	No	Parameter Not Detected
Dimethylphthalate	0	3	545	435	650	545			650	U	ND	182	2,647	PEL	3.57	2.99	0.25	0.21	0		0	No	Parameter Not Detected
Di-n-butylphthalate	0	3	545	435	650	545			650	U	ND	182	2,647	PEL	3.57	2.99	0.25	0.21	0		0	No	Parameter Not Detected
Di-n-octylphthalate	0	3	545	435	650	545			650	UJ	ND	182	2,647	PEL	3.57	2.99	0.25	0.21	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	3	1,330	1,050	1,600	1,330			1600	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	3	545	435	650	545			650	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	3	20.8	13	29.5	20.8			29.5	U	ND			NA					0		0	No	Parameter Not Detected
2-Hexanone	0	3	20.8	13	29.5	20.8			29.5	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	3	20.8	13	29.5	20.8			29.5	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	2	3	29.5	29.5	29.5	31.2	32	32	32	J	041M640501			NA					0		0	Yes	No SV, no RV, and no RC
Benzene	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	3	20.8	13	29.5	20.8			29.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroethane	0	3	20.8	13	29.5	20.8			29.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	3	20.8	13	29.5	20.8			29.5	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Styrene	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	3	20.8	13	29.5	20.8			29.5	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	3	10.3	6.5	14.5	10.3			14.5	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result
Parameters in bold were detected and exceeded screening values.

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 11-3-15
Wetland 64 Phase III
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
	Detected Parameters		
Aluminum	Dieldrin	bis(2-Ethylhexyl)phthalate (BEHP)	None
Barium	Endosulfan I	Carbazole	
Beryllium	Total Chlordane	Dibenzofuran	
Cadmium	Total BHC		
Chromium	4,4'-DDD		
Cobalt	Total DDT		
Copper	Aroclor-1260		
Iron	Total PCBs		
Lead			
Manganese			
Selenium			
Silver			
Vanadium			
Zinc			

Table 11-3-16
Wetland 64 Phase III
Mean ERM Quotient

Sample_ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M640401	9/4/1997	mg/kg	7		Arsenic	8.2	70	0.10
041M640401	**9/4/1997**	**mg/kg**	**20.2**		**Cadmium**	**1.2**	**9.6**	**2.10**
041M640401	**9/4/1997**	**mg/kg**	**774**		**Chromium**	**81**	**370**	**2.09**
041M640401	9/4/1997	mg/kg	102		Copper	34	270	0.38
041M640401	**9/4/1997**	**mg/kg**	**346**		**Lead**	**46.7**	**218**	**1.59**
041M640401	9/4/1997	mg/kg	0.26		Mercury	0.15	0.71	0.37
041M640401	9/4/1997	mg/kg	9.8		Nickel	20.9	51.6	0.19
041M640401	9/4/1997	mg/kg	2	J	Silver	1	3.7	0.54
041M640401	**9/4/1997**	**mg/kg**	**468**		**Zinc**	**150**	**410**	**1.14**
041M640401	**9/4/1997**	**g/kg**	**89**		**4,4'-DDE**	**2.2**	**27**	**3.30**
041M640401	9/4/1997	g/kg	18	J	4,4'-DDT	1.58	46.1	0.39
041M640401	**9/4/1997**	**g/kg**	**1,220**		**Total PCBs**	**22.7**	**180**	**6.78**
041M640401	9/4/1997	g/kg	650	U	2-Methylnaphthalene	70	670	0.97
041M640401	9/4/1997	g/kg	260	J	Acenaphthene	16	500	0.52
041M640401	9/4/1997	g/kg	650	U	Acenaphthylene	44	640	1.02
041M640401	9/4/1997	g/kg	310	J	Anthracene	85.3	1,100	0.28
041M640401	9/4/1997	g/kg	1,100	J	Benzo(a)anthracene	261	1,600	0.69
041M640401	9/4/1997	g/kg	1,000	J	Benzo(a)pyrene	430	1,600	0.63
041M640401	9/4/1997	g/kg	1,200	J	Chrysene	384	2,800	0.43
041M640401	9/4/1997	g/kg	650	UJ	Dibenz(a,h)anthracene	63.4	260	2.50
041M640401	9/4/1997	g/kg	2,700		Fluoranthene	600	5,100	0.53
041M640401	9/4/1997	g/kg	210	J	Fluorene	19	540	0.39
041M640401	9/4/1997	g/kg	110	J	Naphthalene	160	2,100	0.05
041M640401	**9/4/1997**	**g/kg**	**1,800**		**Phenanthrene**	**240**	**1,500**	**1.20**
041M640401	**9/4/1997**	**g/kg**	**3,100**	**J**	**Pyrene**	**665**	**2,600**	**1.19**
041M640401	9/4/1997				ERM Quotient Sum			29.36
041M640401	9/4/1997				Mean ERM Quotient			1.17
041M640401	9/4/1997				Mean ERM Quotient without ND			0.99
041M640401	9/4/1997				Mean ERM Quotient Category			3
041M640501	9/4/1997	mg/kg	6.9		Arsenic	8.2	70	0.10
041M640501	**9/4/1997**	**mg/kg**	**17.7**		**Cadmium**	**1.2**	**9.6**	**1.84**
041M640501	**9/4/1997**	**mg/kg**	**592**		**Chromium**	**81**	**370**	**1.60**
041M640501	9/4/1997	mg/kg	146		Copper	34	270	0.54
041M640501	**9/4/1997**	**mg/kg**	**330**		**Lead**	**46.7**	**218**	**1.51**
041M640501	9/4/1997	mg/kg	0.26		Mercury	0.15	0.71	0.37
041M640501	9/4/1997	mg/kg	12.3		Nickel	20.9	51.6	0.24
041M640501	9/4/1997	mg/kg	3		Silver	1	3.7	0.81
041M640501	9/4/1997	mg/kg	306		Zinc	150	410	0.75
041M640501	**9/4/1997**	**g/kg**	**33**		**4,4'-DDE**	**2.2**	**27**	**1.22**
041M640501	9/4/1997	g/kg	3.85	U	4,4'-DDT	1.58	46.1	0.08
041M640501	**9/4/1997**	**g/kg**	**880**		**Total PCBs**	**22.7**	**180**	**4.89**
041M640501	9/4/1997	g/kg	435	U	2-Methylnaphthalene	70	670	0.65
041M640501	9/4/1997	g/kg	310	J	Acenaphthene	16	500	0.62
041M640501	9/4/1997	g/kg	435	U	Acenaphthylene	44	640	0.68
041M640501	9/4/1997	g/kg	340	J	Anthracene	85.3	1,100	0.31
041M640501	9/4/1997	g/kg	1,300		Benzo(a)anthracene	261	1,600	0.81
041M640501	9/4/1997	g/kg	1,200	J	Benzo(a)pyrene	430	1,600	0.75
041M640501	9/4/1997	g/kg	1,300		Chrysene	384	2,800	0.46
041M640501	9/4/1997	g/kg	435	UJ	Dibenz(a,h)anthracene	63.4	260	1.67
041M640501	9/4/1997	g/kg	2,800		Fluoranthene	600	5,100	0.55
041M640501	9/4/1997	g/kg	290	J	Fluorene	19	540	0.54
041M640501	9/4/1997	g/kg	110	J	Naphthalene	160	2,100	0.05
041M640501	**9/4/1997**	**g/kg**	**2,000**		**Phenanthrene**	**240**	**1,500**	**1.33**
041M640501	**9/4/1997**	**g/kg**	**3,000**	**J**	**Pyrene**	**665**	**2,600**	**1.15**

Table 11-3-16
Wetland 64 Phase III
Mean ERM Quotient

Sample_ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M640501	9/4/1997				ERM Quotient Sum			23.54
041M640501	9/4/1997				Mean ERM Quotient			0.94
041M640501	9/4/1997				Mean ERM Quotient without ND			0.82
041M640501	9/4/1997				Mean ERM Quotient Category			3
041M640601	9/3/1997	mg/kg	7.8		Arsenic	8.2	70	0.11
041M640601	**9/3/1997**	**mg/kg**	**21**		**Cadmium**	**1.2**	**9.6**	**2.19**
041M640601	**9/3/1997**	**mg/kg**	**868**		**Chromium**	**81**	**370**	**2.35**
041M640601	9/3/1997	mg/kg	115		Copper	34	270	0.43
041M640601	**9/3/1997**	**mg/kg**	**339**		**Lead**	**46.7**	**218**	**1.56**
041M640601	9/3/1997	mg/kg	0.25		Mercury	0.15	0.71	0.35
041M640601	9/3/1997	mg/kg	11.3		Nickel	20.9	51.6	0.22
041M640601	9/3/1997	mg/kg	1.9	J	Silver	1	3.7	0.51
041M640601	9/3/1997	mg/kg	330		Zinc	150	410	0.80
041M640601	**9/3/1997**	**g/kg**	**44**		**4,4'-DDE**	**2.2**	**27**	**1.63**
041M640601	9/3/1997	g/kg	19		4,4'-DDT	1.58	46.1	0.41
041M640601	**9/3/1997**	**g/kg**	**565**		**Total PCBs**	**22.7**	**180**	**3.14**
041M640601	9/3/1997	g/kg	550	U	2-Methylnaphthalene	70	670	0.82
041M640601	**9/3/1997**	**g/kg**	**750**	**J**	**Acenaphthene**	**16**	**500**	**1.50**
041M640601	9/3/1997	g/kg	550	U	Acenaphthylene	44	640	0.86
041M640601	9/3/1997	g/kg	1,000	J	Anthracene	85.3	1,100	0.91
041M640601	**9/3/1997**	**g/kg**	**2,100**		**Benzo(a)anthracene**	**261**	**1,600**	**1.31**
041M640601	**9/3/1997**	**g/kg**	**1,700**		**Benzo(a)pyrene**	**430**	**1,600**	**1.06**
041M640601	9/3/1997	g/kg	2,100		Chrysene	384	2,800	0.75
041M640601	9/3/1997	g/kg	550	U	Dibenz(a,h)anthracene	63.4	260	2.12
041M640601	9/3/1997	g/kg	5,000		Fluoranthene	600	5,100	0.98
041M640601	**9/3/1997**	**g/kg**	**750**	**J**	**Fluorene**	**19**	**540**	**1.39**
041M640601	9/3/1997	g/kg	310	J	Naphthalene	160	2,100	0.15
041M640601	**9/3/1997**	**g/kg**	**4,300**		**Phenanthrene**	**240**	**1,500**	**2.87**
041M640601	**9/3/1997**	**g/kg**	**4,800**	**J**	**Pyrene**	**665**	**2,600**	**1.85**
041M640601	9/3/1997				ERM Quotient Sum			30.26
041M640601	9/3/1997				Mean ERM Quotient			1.21
041M640601	9/3/1997				Mean ERM Quotient without ND			1.06
041M640601	9/3/1997				Mean ERM Quotient Category			4

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 11-3-17
Wetland 64 Phase III
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement	Rationale
Metals (g/L)																
Aluminum	1	2	72	72	72	185	298	298	041W640501	298			NA		Yes	No SV
Antimony	1	2	1.3	1.3	1.3	2.55	3.8	3.8	041W640101	3.8	J		NA		Yes	No SV
Arsenic	0	2	1.1	1.1	1.1	1.1			ND	1.1	U	36	EPA	0.03	No	Max SQL< SV
Barium	2	2				35	33.6	36.4	041W640101	36.4			NA		Yes	No SV
Beryllium	0	2	0.095	0.095	0.095	0.095			ND	0.095	U		NA		Yes	No SV
Cadmium	1	2	0.29	0.29	0.29	0.565	0.84	0.84	041W640101	0.84	J	9.3	EPA	0.09	No	Max Detect < SV
Calcium	2	2				118,000	99,000	137,000	041W640501	137,000			NA		Yes	No SV
Chromium	2	2				10.5	8.5	12.5	041W640501	12.5		50	EPA	0.25	No	Max Detect < SV
Cobalt	0	2	0.265	0.265	0.265	0.265			ND	0.265	U		NA		Yes	No SV
Copper	**2**	**2**				**5**	**4.2**	**5.8**	**041W640101**	**5.8**		**2.9**	**EPA**	**2**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	2	0.7	0.7	0.7	0.7			ND	0.7	U	1	EPA	0.7	No	Max SQL< SV
Iron	2	2				766	702	829	041W640101	829			NA		Yes	No SV
Lead	**2**	**2**				**7.2**	**5.8**	**8.6**	**041W640501**	**8.6**		**8.5**	**EPA**	**1.01**	**Yes**	**Max Detect > SV**
Magnesium	2	2				348,000	274,000	421,000	041W640501	421,000			NA		Yes	No SV
Manganese	2	2				32.7	28.3	37.1	041W640101	37.1			NA		Yes	No SV
Mercury	**1**	**2**	**0.025**	**0.025**	**0.025**	**0.0425**	**0.06**	**0.06**	**041W640501**	**0.06**	**J**	**0.025**	**EPA**	**2.4**	**Yes**	**Max Detect > SV**
Nickel	1	2	0.6	0.6	0.6	1.6	2.6	2.6	041W640101	2.6	J	8.3	EPA	0.31	No	Max Detect < SV
Potassium	2	2				159,000	113,000	205,000	041W640501	205,000	J		NA		Yes	No SV
Selenium	0	2	1.3	1.3	1.3	1.3			ND	1.3	U	71	EPA	0.02	No	Max SQL< SV
Silver	2	2				0.045	0.04	0.05	041W640101	0.05	J	0.23	EPA	0.22	No	Max Detect < SV
Sodium	2	2				2,950,000	2,290,000	3,600,000	041W640501	3,600,000			NA		Yes	No SV
Thallium	0	2	0.6	0.6	0.6	0.6			ND	0.6	UJ	6.3	FDEP	0.10	No	Max SQL< SV
Vanadium	0	2	1.35	0.95	1.75	1.35			ND	1.75	U		NA		Yes	No SV
Zinc	2	2				17.1	10.1	24.1	041W640101	24.1	J	86	EPA	0.28	No	Max Detect < SV
Pesticides (g/L)																
Aldrin	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0087	EPA	2.87	Yes	Max SQL > SV
Endosulfan II	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0036	EPA	6.94	Yes	Max SQL > SV
Heptachlor epoxide	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	2	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.004	EPA	12.5	Yes	Max SQL > SV
Endrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.005	FDEP	5	Yes	Max SQL > SV
beta-BHC	1	2	0.0031	0.0031	0.0031	0.00515	0.0072	0.0072	041W640101	0.0072	J		NA		Yes	No SV
delta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	2	0.0016	0.00125	0.00195	0.0016			ND	0.00195	U	0.016	EPA	0.12	No	Max SQL< SV
Total BHC	1	2	0.0551	0.05505	0.05505	0.0568	0.05845	0.05845	041W640101	0.05845			NA		Yes	No SV
4,4'-DDD	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	2	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	FDEP	35.7	Yes	Max SQL > SV
Total PCB	0	2	4	4	4	4			ND	4	U		NA		Yes	No SV
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	2	5	5	5	5			ND	5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	2	5	5	5	5			ND	5	U	19.7	EPA	0.25	No	Max SQL< SV
1,3-Dichlorobenzene	0	2	5	5	5	5			ND	5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	2	5	5	5	5			ND	5	U	3	FDEP	1.67	Yes	Max SQL > SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV

Table 11-3-17
Wetland 64 Phase III
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement	Rationale
SVOCs (g/L) - cont.																
2,4-Dimethylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chloronaphthalene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Nitrophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
3-Methylphenol/4-Methylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloroaniline	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Nitrophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Butylbenzylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Carbazole	0	2	5	5	5	5			ND	5	U		NA		Yes	No SV
Dibenzofuran	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Diethylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dimethylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Di-n-butylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	3.4	EPA	0.74	No	Max SQL< SV
Di-n-octylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobenzene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobutadiene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachloroethane	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Isophorone	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Nitrobenzene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pentachlorophenol	0	2	10	10	10	10			ND	10	U		NA		Yes	No SV
Phenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Acenaphthene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Acenaphthylene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Anthracene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzo(a)anthracene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzo(a)pyrene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Chrysene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Fluoranthene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Fluorene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Naphthalene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	23.5	EPA	0.11	No	Max SQL< SV
Phenanthrene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pyrene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Total PAH	0	2	32.5	32.5	32.5	32.5			ND	32.5	U		NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	1	2	0.5	0.5	0.5	0.355	0.21	0.21	041W640101	0.21	J	270	FDEP	0.00	No	Max Detect < SV
1,1,2,2-Tetrachloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	1	2	0.5	0.5	0.5	0.7	0.9	0.9	041W640101	0.9	J		NA		Yes	No SV
1,1-Dichloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.16	No	Max SQL< SV
1,2-Dichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloroethene (total)	2	2				0.4	0.21	0.59	041W640101	0.59	J		NA		Yes	No SV
1,2-Dichloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
2-Butanone (MEK)	0	2	5	5	5	5			ND	5	U		NA		Yes	No SV

Table 11-3-17
Wetland 64 Phase III
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement	Rationale
VOCs (g/L) - cont.																
2-Hexanone	0	2	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	2	5	5	5	5			ND	5	U		NA		Yes	No SV
Acetone	1	2	12.5	12.5	12.5	18.3	24	24	041W640101	24	J		NA		Yes	No SV
Benzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	71.28	FDEP	0.01	No	Max SQL< SV
Bromodichloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	17	FDEP	0.03	No	Max SQL< SV
Chloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	470.8	FDEP	0.00	No	Max SQL< SV
Chloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	4.3	EPA	0.12	No	Max SQL< SV
Methylene chloride	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	1,580	FDEP	0.00	No	Max SQL< SV
Styrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	1	2	0.5	0.5	0.5	0.43	0.36	0.36	041W640501	0.36	J	37	EPA	0.01	No	Max Detect < SV
trans-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	1	2	0.5	0.5	0.5	0.42	0.34	0.34	041W640101	0.34	J		NA		Yes	No SV
Vinyl chloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	2	1	1	1	1			ND	1	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 11-3-18
Wetland 64 Phase III
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	beta-BHC	None	1,1-Dichloroethane
Antimony	Total BHC		1,2-Dichloroethene (total)
Barium			Acetone
Calcium			Trichloroethene
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Mercury			
Potassium			
Sodium			
		Not Detected Parameters	
Beryllium	Aldrin	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
Cobalt	Dieldrin	1,3-Dichlorobenzene	1,1,2-Trichloroethane
Vanadium	Endosulfan I	1,4-Dichlorobenzene	1,2-Dichloroethane
	Endosulfan II	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,2-Dichloropropane
	Endosulfan sulfate	2,4,5-Trichlorophenol	2-Butanone (MEK)
	Heptachlor	2,4,6-Trichlorophenol	2-Hexanone
	Heptachlor epoxide	2,4-Dichlorophenol	4-Methyl-2-Pentanone (MIBK)
	Methoxychlor	2,4-Dimethylphenol	Bromodichloromethane
	Toxaphene	2,4-Dinitrophenol	Bromoform
	alpha-Chlordane	2,4-Dinitrotoluene	Bromomethane
	gamma-Chlordane	2,6-Dinitrotoluene	Carbon disulfide
	Total Chlordane	2-Chloronaphthalene	Carbon tetrachloride
	Endrin	2-Chlorophenol	Chloroethane
	Endrin aldehyde	2-Methyl-4,6-Dinitrophenol	Chloromethane
	Endrin ketone	2-Methylphenol (o-Cresol)	cis-1,3-Dichloropropene
	Total Endrin	2-Nitroaniline	Dibromochloromethane
	alpha-BHC	2-Nitrophenol	Styrene
	delta-BHC	3,3'-Dichlorobenzidine	Tetrachloroethene
	4,4'-DDD	3-Methylphenol/4-Methylphenol	trans-1,3-Dichloropropene
	4,4'-DDE	3-Nitroaniline	Vinyl chloride
	4,4'-DDT	4-Bromophenyl-phenylether	Xylene (Total)
	Total DDT	4-Chloro-3-methylphenol	
	Aroclor-1016	4-Chloroaniline	
	Aroclor-1221	4-Chlorophenylphenyl ether	
	Aroclor-1232	4-Nitroaniline	
	Aroclor-1242	4-Nitrophenol	
	Aroclor-1248	Benzo(b)fluoranthene	
	Aroclor-1254	Benzo(g,h,i)perylene	
	Aroclor-1260	Benzo(k)fluoranthene	
	Total PCBs	bis(2-Chloroethoxy)methane	
		bis(2-Chloroethyl)ether	
		bis(2-Ethylhexyl)phthalate (BEHP)	
		Butylbenzylphthalate	
		Carbazole	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 11-3-19
Wetland 64 Phase III
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Metals (g/L)																			
Aluminum	1	2	72	72	72	185	298	298	041W640501	298			NA			2,927.50	0	No	Max Result < Ref. Conc.
Antimony	1	2	1.3	1.3	1.3	2.55	3.8	3.8	041W640101	3.8	J		NA			4.15	0	No	Max Result < Ref. Conc.
Barium	**2**	**2**				**35**	**33.6**	**36.4**	**041W640101**	**36.4**			**NA**			**9.43**	**2**	**Yes**	**Max Result > Ref. Conc.**
Beryllium	0	2	0.095	0.095	0.095	0.095			ND	0.095	U		NA			0.82	0	No	Max SQL < Ref. Conc.
Calcium	**2**	**2**				**118,000**	**99,000**	**137,000**	**041W640501**	**137,000**			**NA**			**76,800**	**2**	**No**	**Essential Nutrient**
Cobalt	0	2	0.265	0.265	0.265	0.265			ND	0.265	U		NA			2.38	0	No	Max SQL < Ref. Conc.
Copper	2	2				5	4.2	5.8	041W640101	5.8		2.9	EPA	2	1.72	7.03	0	No	Max Result < Ref. Conc.
Iron	2	2				766	702	829	041W640101	829			NA			1352	0	No	Max Result < Ref. Conc.
Lead	2	2				7.2	5.8	8.6	041W640501	8.6		8.5	EPA	1.01	0.85	13.75	0	No	Max Result < Ref. Conc.
Magnesium	**2**	**2**				**348,000**	**274,000**	**421,000**	**041W640501**	**421,000**			**NA**			**243,650**	**2**	**No**	**Essential Nutrient**
Manganese	**2**	**2**				**32.7**	**28.3**	**37.1**	**041W640101**	**37.1**			**NA**			**12.15**	**2**	**Yes**	**Max Result > Ref. Conc.**
Mercury	1	2	0.025	0.025	0.025	0.0425	0.06	0.06	041W640501	0.06	J	0.025	EPA	2.4	1.7	0.21	0	No	Max Result < Ref. Conc.
Potassium	**2**	**2**				**159,000**	**113,000**	**205,000**	**041W640501**	**205,000**	**J**		**NA**			**81,250**	**2**	**No**	**Essential Nutrient**
Sodium	**2**	**2**				**2,950,000**	**2,290,000**	**3,600,000**	**041W640501**	**3,600,000**			**NA**			**1,952,000**	**2**	**No**	**Essential Nutrient**
Vanadium	0	2	1.35	0.95	1.75	1.35			ND	1.75	U		NA			6.69	0	No	Max SQL < Ref. Conc.
Pesticides (g/L)																			
Aldrin	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Dieldrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan I	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0087	EPA	3	2.87		0	No	Parameter Not Detected; Max SQL > SV
Endosulfan II	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan sulfate	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Heptachlor	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.0036	EPA	7	6.94		0	No	Parameter Not Detected; Max SQL > SV
Heptachlor epoxide	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	No	Parameter Not Detected; Max SQL > SV
Methoxychlor	0	2	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	No	Parameter Not Detected
Toxaphene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
alpha-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
gamma-Chlordane	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Total Chlordane	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.004	EPA	12.5	12.5		0	No	Parameter Not Detected; Max SQL > SV
Endrin	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin aldehyde	0	2	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin ketone	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22	21.7		0	No	Parameter Not Detected; Max SQL > SV
Total Endrin	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
alpha-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U	0.005	FDEP	5	5		0	No	Parameter Not Detected; Max SQL > SV
beta-BHC	1	2	0.0031	0.0031	0.0031	0.00515	0.0072	0.0072	041W640101	0.0072	J		NA				0	Yes	No SV
delta-BHC	0	2	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
gamma-BHC (Lindane)	0	2	0.0016	0.00125	0.00195	0.0016			ND	0.00195	U	0.016	EPA	0.12	0.1		0	No	Parameter Not Detected; Max SQL > SV
Total BHC	1	2	0.0551	0.05505	0.05505	0.0568	0.05845	0.05845	041W640101	0.05845			NA				0	Yes	No SV
4,4'-DDD	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	No	Parameter Not Detected; Max SQL > SV
4,4'-DDE	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	No	Parameter Not Detected; Max SQL > SV
4,4'-DDT	0	2	0.05	0.05	0.05	0.05			ND	0.05	U	0.00059	FDEP	85	84.7		0	No	Parameter Not Detected; Max SQL > SV
Total DDT	0	2	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
PCBs (g/L)																			
Aroclor-1016	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1221	0	2	1	1	1	1			ND	1	U		NA				0	No	Parameter Not Detected
Aroclor-1232	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1242	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1248	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1254	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1260	0	2	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	FDEP	36	35.7		0	No	Parameter Not Detected; Max SQL > SV
Total PCB	0	2	4	4	4	4			ND	4	U		NA				0	No	Parameter Not Detected
SVOCs (g/L)																			
1,2,4-Trichlorobenzene	0	2	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	2	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	2	5	5	5	5			ND	5	U	3	FDEP	2	1.67		0	No	Parameter Not Detected; Max SQL > SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dichlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dimethylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dinitrophenol	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Chloronaphthalene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Chlorophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2-Nitrophenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected

Table 11-3-19
Wetland 64 Phase III
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
SVOCs (g/L) - cont.																			
3,3'-Dichlorobenzidine	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
3-Methylphenol/4-Methylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
3-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chloroaniline	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Nitroaniline	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
4-Nitrophenol	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Butylbenzylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Carbazole	0	2	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Dibenzofuran	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Diethylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Dimethylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Di-n-octylphthalate	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorobenzene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorobutadiene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachloroethane	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Isophorone	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Nitrobenzene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Pentachlorophenol	0	2	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
Phenol	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
PAHs (g/L)																			
2-Methylnaphthalene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Acenaphthene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Acenaphthylene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Anthracene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Benzo(a)anthracene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Benzo(a)pyrene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Chrysene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Fluoranthene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Fluorene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Naphthalene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U	23.5	EPA	0.11	0.11		0	No	Max SQL < SV
Phenanthrene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Pyrene	0	2	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Total PAH	0	2	32.5	32.5	32.5	32.5			ND	32.5	U		NA				0	No	Parameter Not Detected
VOCs (g/L)																			
1,1,2,2-Tetrachloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,1-Dichloroethane	1	2	0.5	0.5	0.5	0.7	0.9	0.9	041W640101	0.9	J		NA				0	Yes	No SV
1,2-Dichloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dichloroethene (total)	2	2				0.4	0.21	0.59	041W640101	0.59	J		NA				0	Yes	No SV
1,2-Dichloropropane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
2-Butanone (MEK)	0	2	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
2-Hexanone	0	2	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	2	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Acetone	1	2	12.5	12.5	12.5	18.3	24	24	041W640101	24	J		NA				0	Yes	No SV
Bromodichloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromoform	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromomethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Carbon disulfide	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Carbon tetrachloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chloroethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Dibromochloromethane	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Styrene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected

Table 11-3-19
Wetland 64 Phase III
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
VOCs (g/L) - cont.																			
Tetrachloroethene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Trichloroethene	1	2	0.5	0.5	0.5	0.42	0.34	0.34	041W640101	0.34	J		NA				0	Yes	No SV
Vinyl chloride	0	2	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Xylene (Total)	0	2	1	1	1	1			ND	1	U		NA				0	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQl
UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8)
RV = Refinement value (detailed explanation of RVs provided in Section 8)
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detectec
parameters. As a result, some average detections may exceed the Max detections
Parameters in bold were detected and exceeded Ref. Conc.s

Table 11-3-20
Wetland 64 Phase III
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Manganese	beta-BHC	None	1,2-Dichloroethene (total)
Barium	Total BHC		Acetone
			1,1-Dichloroethane
			Trichloroethene

Table 11-3-21
Wetland 64 Phase IV
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	7	7			59	18,000	041M641102	18,000			N/A		Yes	No SV
Antimony	0	7	0.215	1.25			ND	1.25	U	12	2	0.10	No	Max SQL< SV
Arsenic	**5**	**7**	**0.225**	**0.275**	**3.2**	**13**	**041M641102**	**13**		**7.24**	**1, 2**	**1.8**	**Yes**	**Max Detect > SV**
Barium	7	7			0.17	18	041M641102	18			N/A		Yes	No SV
Beryllium	5	7	0.005	0.0065	0.15	1.1	041M641102	1.1	J		N/A		Yes	No SV
Cadmium	**6**	**7**	**0.032**	**0.0315**	**0.07**	**23**	**041M640502**	**23**		**0.676**	**1**	**34**	**Yes**	**Max Detect > SV**
Calcium	7	7			58	4,300	041M641102	4,300			N/A		Yes	No SV
Chromium	**7**	**7**			**1**	**700**	**041M640502**	**700**		**52.3**	**1, 2**	**13.4**	**Yes**	**Max Detect > SV**
Cobalt	5	7	0.0405	0.05	1	4.8	041M640502	4.8			N/A		Yes	No SV
Copper	**6**	**7**	**0.5**	**0.5**	**12**	**200**	**041M640502**	**200**		**18.7**	**1, 2**	**10.7**	**Yes**	**Max Detect > SV**
Iron	7	7			48	33,000	041M641102	33,000			N/A		Yes	No SV
Lead	**7**	**7**			**0.38**	**430**	**041M640502**	**430**		**30.2**	**1, 2**	**14.2**	**Yes**	**Max Detect > SV**
Magnesium	7	7			110	10,000	041M641102	10,000			N/A		Yes	No SV
Manganese	7	7			0.31	230	041M641102	230			N/A		Yes	No SV
Mercury	**6**	**7**	**0.003**	**0.00285**	**0.0066**	**0.46**	**041M641102**	**0.46**		**0.13**	**1, 2**	**3.54**	**Yes**	**Max Detect > SV**
Nickel	6	7	0.09	0.09	0.26	15	041M640502	15		15.9	1, 2	0.94	No	Max Detect < SV
Potassium	7	7			44	4,200	041M641102	4,200			N/A		Yes	No SV
Selenium	0	7	0.185	1.1			ND	1.1	U		N/A		Yes	No SV
Silver	**5**	**7**	**0.036**	**0.044**	**1.3**	**4**	**041M640502**	**4**		**0.733**	**1**	**5.46**	**Yes**	**Max Detect > SV**
Sodium	7	7			560	48,000	041M641102	48,000			N/A		Yes	No SV
Thallium	0	7	0.23	1.35			ND	1.35	U		N/A		Yes	No SV
Vanadium	7	7			0.12	37	041M641102	37			N/A		Yes	No SV
Zinc	**6**	**7**	**0.065**	**0.065**	**3**	**380**	**041M640502**	**380**		**124**	**1, 2**	**3.06**	**Yes**	**Max Detect > SV**
PAHs (g/kg)														
2-Methylnaphthalene	0	7	200	6,500			ND	6,500	U	20.2	1	322	Yes	Max SQL > SV
Acenaphthene	0	7	200	6,500			ND	6,500	U	6.71	1	969	Yes	Max SQL > SV
Acenaphthylene	0	7	200	6,500			ND	6,500	U	5.87	1	1,110	Yes	Max SQL > SV
Anthracene	0	7	200	6,500			ND	6,500	U	46.9	1	139	Yes	Max SQL > SV
Benzo(a)anthracene	**2**	**7**	**200**	**6,500**	**660**	**870**	**041M640502**	**870**	**J**	**74.8**	**1**	**11.6**	**Yes**	**Max Detect > SV**
Benzo(a)pyrene	**2**	**7**	**200**	**6,500**	**540**	**800**	**041M640502**	**800**	**J**	**88.8**	**1**	**9.01**	**Yes**	**Max Detect > SV**
Chrysene	**2**	**7**	**200**	**6,500**	**840**	**860**	**041M640502**	**860**	**J**	**108**	**1**	**7.96**	**Yes**	**Max Detect > SV**
Dibenz(a,h)anthracene	0	7	200	6,500			ND	6,500	U	6.22	1	1,050	Yes	Max SQL > SV
Fluoranthene	**2**	**7**	**200**	**6,500**	**1,600**	**1,800**	**041M640502**	**1,800**	**J**	**113**	**1**	**15.9**	**Yes**	**Max Detect > SV**
Fluorene	0	7	200	6,500			ND	6,500	U	21.2	1	307	Yes	Max SQL > SV
Naphthalene	0	7	200	6,500			ND	6,500	U	34.6	1	188	Yes	Max SQL > SV
Phenanthrene	**3**	**7**	**200**	**6,500**	**230**	**1,100**	**041M640502**	**1,100**	**J**	**86.7**	**1**	**12.7**	**Yes**	**Max Detect > SV**
Pyrene	**2**	**7**	**200**	**6,500**	**1,400**	**1,600**	**041M640502**	**1,600**	**J**	**153**	**1**	**10.5**	**Yes**	**Max Detect > SV**
Total PAHs	**3**	**7**	**2,600**	**84,500**	**22,800**	**28,000**	**041M640502**	**28,000**		**1,684**	**1, 2**	**16.63**	**Yes**	**Max Detect > SV**
TOC Normalized PAHs	**3**	**7**	**963**	**1,903.57**	**144.61**	**651.71**	**041M640602**	**651.7**		**290**	**3**	**2.25**	**Yes**	**Max Detect > SV**
PCBs (g/kg)														
Aroclor-1016	0	7	20	650			ND	650	UJ	21.6	N/A	30.1	No	Max SQL< SV
Aroclor-1221	0	7	41	1,350			ND	1,350	UJ	67	2	20.1	No	Max SQL< SV
Aroclor-1232	0	7	20	650			ND	650	UJ	21.6	N/A	30.1	No	Max SQL< SV
Aroclor-1242	0	7	20	650			ND	650	UJ	21.6	N/A	30.1	No	Max SQL< SV
Aroclor-1248	0	7	20	650			ND	650	UJ	21.6	N/A	30.1	No	Max SQL< SV
Aroclor-1254	0	7	20	650			ND	650	UJ	21.6	N/A	30.1	No	Max SQL< SV
Aroclor-1260	0	7	20	650			ND	650	UJ	21.6	N/A	30.1	No	Max SQL< SV
Total PCBs	0	7	161	5,250			ND	5,250	U	21.6	1	243	Yes	Max SQL > SV
Pesticides (g/kg)														
Aldrin	0	7	1.05	34			ND	34	UJ		N/A		Yes	No SV
Dieldrin	0	7	2	65			ND	65	UJ	0.716	1	90.8	Yes	Max SQL > SV
Endosulfan I	0	7	1.05	34			ND	34	UJ		N/A		Yes	No SV
Endosulfan II	0	7	2	65			ND	65	UJ		N/A		Yes	No SV
Endosulfan sulfate	0	7	2	65			ND	65	UJ		N/A		Yes	No SV
Heptachlor	0	7	1.05	34			ND	34	UJ		N/A		Yes	No SV
Heptachlor epoxide	2	7	1.05	34	4.4	6.2	041M640602	6.2	J		N/A		Yes	No SV
Methoxychlor	0	7	10.5	340			ND	340	UJ		N/A		Yes	No SV
Toxaphene	0	7	105	3,400			ND	3,400	UJ		N/A		Yes	No SV
alpha-Chlordane	0	7	1.05	34			ND	34	UJ	1.7	1	20	No	Max SQL< SV
gamma-Chlordane	0	7	1.05	34			ND	34	UJ	1.7	1	20	No	Max SQL< SV
Total Chlordane	0	7	2.1	68			ND	68	U	1.7	1	40	Yes	Max SQL > SV
Endrin	0	7	2	65			ND	65	UJ	3.3	2	19.7	No	Max SQL< SV
Endrin aldehyde	0	7	2	65			ND	65	UJ	3.3	2	19.7	No	Max SQL< SV
Endrin ketone	0	7	2	65			ND	65	UJ	3.3	2	19.7	No	Max SQL< SV
Total Endrin	0	7	6	195			ND	195	U	3.3	2	59.1	Yes	Max SQL > SV
alpha-BHC	0	7	1.05	34			ND	34	UJ		N/A		Yes	No SV
beta-BHC	0	7	1.05	34			ND	34	UJ	0.32	N/A	106	Yes	Max SQL > SV
delta-BHC	**5**	**7**	**1.05**	**11**	**0.66**	**6.9**	**041M641102**	**6.9**	**J**	**0.32**	**N/A**	**21.6**	**Yes**	**Max Detect > SV**
gamma-BHC (Lindane)	0	7	1.05	34			ND	34	UJ	0.32	1	106	Yes	Max SQL > SV
Total BHC	**5**	**7**	**4.2**	**44**	**3.81**	**109**	**041M641102**	**109**		**0.32**	**2**	**340**	**Yes**	**Max Detect > SV**
4,4'-DDD	**1**	**7**	**2**	**65**	**100**	**100**	**041M640602**	**100**	**J**	**1.22**	**1**	**82**	**Yes**	**Max Detect > SV**
4,4'-DDE	**4**	**7**	**2**	**65**	**8.4**	**43**	**041M640202**	**43**	**J**	**2.07**	**1**	**20.8**	**Yes**	**Max Detect > SV**
4,4'-DDT	0	7	2	65			ND	65	UJ	1.19	1	54.6	Yes	Max SQL > SV
Total DDT	**4**	**7**	**6**	**195**	**36.9**	**154**	**041M640602**	**154**		**3.3**	**2**	**46.7**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	7	1,050	34,000			ND	34,000	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
2-Chloronaphthalene	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
2-Chlorophenol	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	7	1,050	34,000			ND	34,000	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
2-Nitroaniline	0	7	1,050	34,000			ND	34,000	U		N/A		Yes	No SV
2-Nitrophenol	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	7	400	13,000			ND	13,000	U		N/A		Yes	No SV
3-Methylphenol/4-Methylphenol	0	7	200	6,500			ND	6,500	U				Yes	No SV
3-Nitroaniline	0	7	1,050	34,000			ND	34,000	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
4-Chloroaniline	0	7	400	13,000			ND	13,000	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
4-Nitroaniline	0	7	1,050	34,000			ND	34,000	U		N/A		Yes	No SV
4-Nitrophenol	0	7	1,050	34,000			ND	34,000	U		N/A		Yes	No SV
Benzidine	0	7	1,650	55,000			ND	55,000	UJ				Yes	No SV
Benzo(b)fluoranthene	2	7	200	6,500	630	780	041M640502	780	J		N/A		Yes	No SV
Benzo(g,h,i)perylene	2	7	200	6,500	420	490	041M640502	490	J		N/A		Yes	No SV
Benzo(k)fluoranthene	2	7	200	6,500	510	910	041M640502	910	J		N/A		Yes	No SV
Benzoic acid	0	7	1,050	34,000			ND	34,000	U				Yes	No SV
Benzyl alcohol	0	7	200	6,500			ND	6,500	U				Yes	No SV
bis(2-Chloroethoxy)methane	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	**3**	**7**	**200**	**6,500**	**980**	**1,500**	**041M640502**	**1,500**	**J**	**182**	**1, 2**	**8.24**	**Yes**	**Max Detect > SV**
Butylbenzylphthalate	0	7	200	6,500			ND	6,500	U	182	1, 2	35.7	Yes	Max SQL > SV
Dibenzofuran	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV

Table 11-3-21
Wetland 64 Phase IV
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
Diethylphthalate	0	7	200	6,500			ND	6,500	U	182	1, 2	35.7	Yes	Max SQL > SV
Dimethylphthalate	0	7	200	6,500			ND	6,500	U	182	1, 2	35.7	Yes	Max SQL > SV
Di-n-butylphthalate	0	7	200	6,500			ND	6,500	U	182	1, 2	35.7	Yes	Max SQL > SV
Di-n-octylphthalate	0	7	200	6,500			ND	6,500	U	182	1, 2	35.7	Yes	Max SQL > SV
DiphenylaMaxe	0	7	200	6,500			ND	6,500	U				Yes	No SV
Hexachlorobenzene	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
Hexachlorobutadiene	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
Hexachloroethane	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
Isophorone	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
Nitrobenzene	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
N-Nitrosodimethylamine	0	7	200	6,500			ND	6,500	U				Yes	No SV
N-Nitroso-di-n-propylamine	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV
Pentachlorophenol	0	7	1,050	34,000			ND	34,000	U		N/A		Yes	No SV
Phenol	0	7	200	6,500			ND	6,500	U		N/A		Yes	No SV

Notes:
Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient
D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 11-3-22
Wetland 64 Phase IV
Sediment Parameters Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDD	Benzo(a)anthracene	Not Analyzed
Arsenic	4,4'-DDE	Benzo(a)pyrene	
Barium	delta-BHC	Benzo(b)fluoranthene	
Beryllium	Heptachlor epoxide	Benzo(g,h,i)perylene	
Cadmium	Total BHC	Benzo(k)fluoranthene	
Calcium	Total DDT	bis(2-Ethylhexyl)phthalate (BEHP)	
Chromium		Chrysene	
Cobalt		Fluoranthene	
Copper		Phenanthrene	
Iron		Pyrene	
Lead		TOC Normalized PAHs	
Magnesium		Total PAHs	
Manganese			
Mercury			
Potassium			
Silver			
Sodium			
Vanadium			
Zinc			
		Not Detected Parameters	
Selenium	4,4'-DDT	1,2,4-Trichlorobenzene	Not Analyzed
Thallium	Aldrin	1,2-Dichlorobenzene	
	alpha-BHC	1,3-Dichlorobenzene	
	beta-BHC	1,4-Dichlorobenzene	
	Dieldrin	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	
	Endosulfan I	2,4,5-Trichlorophenol	
	Endosulfan II	2,4,6-Trichlorophenol	
	Endosulfan sulfate	2,4-Dichlorophenol	
	gamma-BHC (Lindane)	2,4-Dimethylphenol	
	Heptachlor	2,4-Dinitrophenol	
	Methoxychlor	2,4-Dinitrotoluene	
	Total Chlordane	2,6-Dinitrotoluene	
	Total Endrin	2-Chloronaphthalene	
	Toxaphene	2-Chlorophenol	
	Total PCBs	2-Methyl-4,6-Dinitrophenol	
		2-Methylnaphthalene	
		2-Methylphenol (o-Cresol)	
		2-Nitroaniline	
		2-Nitrophenol	
		3,3'-Dichlorobenzidine	
		3-Methylphenol/4-Methylphenol	
		3-Nitroaniline	
		4-Bromophenyl-phenylether	
		4-Chloro-3-methylphenol	
		4-Chloroaniline	
		4-Chlorophenylphenyl ether	
		4-Nitroaniline	
		4-Nitrophenol	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzidine	
		Benzoic acid	
		Benzyl alcohol	
		bis(2-Chloroethoxy)methane	
		bis(2-Chloroethyl)ether	
		Butylbenzylphthalate	
		Dibenz(a,h)anthracene	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		DiphenylaMaxe	
		Fluorene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Naphthalene	
		Nitrobenzene	
		N-NitrosodimethylaMaxe	
		N-Nitroso-di-n-propylaMaxe	
		Pentachlorophenol	
		Phenol	

Table 11-3-23
Wetland 64 Phase IV
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	7	7				5,400	59	18,000	18,000		041M641102			NA					0	4,274	3	Yes	EPC > RC and no RV
Arsenic	5	7	0.25	0.225	0.275	5.43	3.2	13	13		041M641102	7.24	41.6	PEL	1.8	0.75	0.31	0.13	0	2.14	5	No	EPC > RC, but < RV
Barium	7	7				9.58	0.17	18	18		041M641102			NA					0	3.84	6	Yes	EPC > RC and no RV
Beryllium	5	7	0.00575	0.005	0.0065	0.314	0.15	1.1	1.1	J	041M641102			NA					0	0.13	5	Yes	EPC > RC and no RV
Cadmium	**6**	**7**	**0.0315**	**0.0315**	**0.0315**	**10.2**	**0.07**	**23**	**23**		**041M640502**	**0.68**	**4.21**	**PEL**	**34**	**15.2**	**5.46**	**2.43**	**5**	**0.39**	**5**	**Yes**	**EPC > RV and RC**
Calcium	7	7				1,860	58	4,300	4,300		041M641102			NA					0	1,978.80	4	No	Essential Nutrient
Chromium	**7**	**7**				**360**	**1**	**700**	**700**		**041M640502**	**52.3**	**160**	**PEL**	**13.4**	**6.88**	**4.38**	**2.25**	**5**	**13.1**	**5**	**Yes**	**EPC > RV and RC**
Cobalt	5	7	0.0452	0.0405	0.05	1.84	1	4.8	4.8		041M640502			NA					0	0.91	5	Yes	EPC > RC and no RV
Copper	**6**	**7**	**0.5**	**0.5**	**0.5**	**75.8**	**12**	**200**	**200**		**041M640502**	**18.7**	**108**	**PEL**	**10.7**	**4.05**	**1.85**	**0.70**	**2**	**8.44**	**6**	**Yes**	**EPC > RV and RC**
Iron	7	7				11,300	48	33,000	33,000		041M641102			NA					0	2,684.40	5	Yes	EPC > RC and no RV
Lead	**7**	**7**				**164**	**0.38**	**430**	**430**		**041M640502**	**30.2**	**112**	**PEL**	**14.2**	**5.44**	**3.84**	**1.47**	**5**	**21.04**	**5**	**Yes**	**EPC > RV and RC**
Magnesium	7	7				2,900	110	10,000	10,000		041M641102			NA					0	2,943.60	2	No	Essential Nutrient
Manganese	7	7				59.9	0.31	230	230		041M641102			NA					0	9.81	5	Yes	EPC > RC and no RV
Mercury	6	7	0.00285	0.00285	0.00285	0.188	0.0066	0.46	0.46		041M641102	0.13	0.696	PEL	3.54	1.45	0.66	0.27	0	0.11	5	No	EPC > RC, but < RV
Potassium	7	7				1,090	44	4,200	4,200		041M641102			NA					0	899.72	2	No	Essential Nutrient
Selenium	0	7	0.478	0.185	1.1	0.478			1.1	U	ND			NA					0	0.66	1	No	Parameter Not Detected
Silver	**5**	**7**	**0.0397**	**0.0355**	**0.044**	**1.44**	**1.3**	**4**	**4**		**041M640502**	**0.73**	**1.77**	**PEL**	**5.46**	**1.96**	**2.26**	**0.81**	**2**	**0.52**	**5**	**Yes**	**EPC > RV and RC**
Sodium	7	7				12,500	560	48,000	48,000		041M641102			NA					0	11,439.60	2	No	Essential Nutrient
Thallium	0	7	0.593	0.23	1.35	0.593			1.35	U	ND			NA					0	0.39	5	No	Parameter Not Detected
Vanadium	7	7				13.2	0.12	37	37		041M641102			NA					0	8.59	4	Yes	EPC > RC and no RV
Zinc	**6**	**7**	**0.065**	**0.065**	**0.065**	**180**	**3**	**380**	**380**		**041M640502**	**124**	**271**	**PEL**	**3.06**	**1.46**	**1.4**	**0.67**	**2**	**14.36**	**5**	**Yes**	**EPC > RV and RC**
PAHs (g/kg)																							
2-Methylnaphthalene	0	7	2,550	200	6,500	2,550			6,500	U	ND	20.2	201	PEL	322	126	32.3	12.7	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthene	0	7	2,550	200	6,500	2,550			6,500	U	ND	6.71	88.9	PEL	969	380	73.1	28.7	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthylene	0	7	2,550	200	6,500	2,550			6,500	U	ND	5.87	128	PEL	1,110	435	50.8	19.9	0		0	No	Parameter Not Detected; Max SQL > RV
Anthracene	0	7	2,550	200	6,500	2,550			6,500	U	ND	46.9	245	PEL	139	54.4	26.5	10.4	0		0	No	Parameter Not Detected; Max SQL > RV
Benzo(a)anthracene	**2**	**7**	**2,490**	**200**	**6,500**	**2,000**	**660**	**870**	**870**	**J**	**041M640502**	**74.8**	**693**	**PEL**	**11.6**	**26.7**	**1.26**	**2.88**	**1**		**0**	**No**	**TOC normalized PAHs<MEC**
Benzo(a)pyrene	**2**	**7**	**2,490**	**200**	**6,500**	**1,970**	**540**	**800**	**800**	**J**	**041M640502**	**88.8**	**763**	**PEL**	**9.01**	**22.2**	**1.05**	**2.58**	**1**		**0**	**No**	**TOC normalized PAHs<MEC**
Chrysene	**2**	**7**	**2,490**	**200**	**6,500**	**2,020**	**840**	**860**	**860**	**J**	**041M640502**	**108**	**846**	**PEL**	**7.96**	**18.7**	**1.02**	**2.39**	**1**		**0**	**No**	**TOC normalized PAHs<MEC**
Dibenz(a,h)anthracene	0	7	2,550	200	6,500	2,550			6,500	U	ND	6.22	135	PEL	1,050	410	48.1	18.9	0		0	No	Parameter Not Detected; Max SQL > RV
Fluoranthene	**2**	**7**	**2,490**	**200**	**6,500**	**2,270**	**1,600**	**1,800**	**1,800**	**J**	**041M640502**	**113**	**1,494**	**PEL**	**15.9**	**20**	**1.2**	**1.52**	**2**		**0**	**No**	**TOC normalized PAHs<MEC**
Fluorene	0	7	2,550	200	6,500	2,550			6,500	U	ND	21.2	144	PEL	307	120	45.1	17.7	0		0	No	Parameter Not Detected; Max SQL > RV
Naphthalene	0	7	2,550	200	6,500	2,550			6,500	U	ND	34.6	391	PEL	188	73.7	16.6	6.52	0		0	No	Parameter Not Detected; Max SQL > RV
Phenanthrene	**3**	**7**	**2,580**	**200**	**6,500**	**1,800**	**230**	**1,100**	**1,100**	**J**	**041M640502**	**86.7**	**544**	**PEL**	**12.7**	**20.8**	**2.02**	**3.31**	**2**		**0**	**No**	**TOC normalized PAHs<MEC**
Pyrene	**2**	**7**	**2,490**	**200**	**6,500**	**2,210**	**1,400**	**1,600**	**1,600**	**J**	**041M640502**	**153**	**1,398**	**PEL**	**10.5**	**14.4**	**1.14**	**1.58**	**2**		**0**	**No**	**TOC normalized PAHs<MEC**
Total PAHs	**3**	**7**	**33,500**	**2,600**	**84,500**	**30,100**	**22,800**	**28,000**	**28,000**		**041M640502**	**1,684**	**16,770**	**PEL**	**16.6**	**17.9**	**1.67**	**1.8**	**3**		**0**	**No**	**TOC normalized PAHs<MEC**
TOC Normalized PAHs	3	7	1,216.30	962.96	1,903.57	881.59	144.61	651.71	651.71		041M640602	290	1,800	MEC	2.25	3.04	0.362	0.49	0		0	No	RV HQ <1 and no RC
PCBs (g/kg)																							
Aroclor-1016	0	7	255	20	650	255			650	UJ	ND	21.6	189	PEL	30.1	11.8	3.44	1.35	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1221	0	7	523	41	1,350	523			1,350	UJ	ND	67	189	PEL	20.1	7.8	7.14	2.76	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1232	0	7	255	20	650	255			650	UJ	ND	21.6	189	PEL	30.1	11.8	3.44	1.35	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1242	0	7	255	20	650	255			650	UJ	ND	21.6	189	PEL	30.1	11.8	3.44	1.35	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1248	0	7	255	20	650	255			650	UJ	ND	21.6	189	PEL	30.1	11.8	3.44	1.35	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1254	0	7	255	20	650	255			650	UJ	ND	21.6	189	PEL	30.1	11.8	3.44	1.35	0		0	No	Parameter Not Detected; Max SQL > RV
Aroclor-1260	0	7	255	20	650	255			650	UJ	ND	21.6	189	PEL	30.1	11.8	3.44	1.35	0		0	No	Parameter Not Detected; Max SQL > RV
Total PCBs	0	7	2,050	161	5,250	2,050			5,250	U	ND	21.6	189	PEL	243	95	27.8	10.9	0		0	No	Parameter Not Detected; Max SQL > RV
Pesticides (g/kg)																							
Aldrin	0	7	13.2	1.05	34	13.2			34	UJ	ND			NA					0		0	No	Parameter Not Detected
Dieldrin	0	7	25.5	2	65	25.5			65	UJ	ND	0.716	4.3	PEL	90.8	35.6	15.1	5.93	0		0	No	Parameter Not Detected; Max SQL > RV
Endosulfan I	0	7	13.2	1.05	34	13.2			34	UJ	ND			NA					0		0	No	Parameter Not Detected
Endosulfan II	0	7	25.5	2	65	25.5			65	UJ	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	0	7	25.5	2	65	25.5			65	UJ	ND			NA					0		0	No	Parameter Not Detected
Heptachlor	0	7	13.2	1.05	34	13.2			34	UJ	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	2	7	12.9	1.05	34	10.7	4.4	6.2	6.2	J	041M640602			NA					0		0	Yes	No SV, no RV, and no RC
Methoxychlor	0	7	132	10.5	340	132			340	UJ	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	7	1,320	105	3,400	1,320			3,400	UJ	ND			NA					0		0	No	Parameter Not Detected
alpha-Chlordane	0	7	13.2	1.05	34	13.2			34	UJ	ND	1.7	4.79	PEL	20	7.78	7.1	2.76	0		0	No	Parameter Not Detected; Max SQL > RV
gamma-Chlordane	0	7	13.2	1.05	34	13.2			34	UJ	ND	1.7	4.79	PEL	20	7.78	7.1	2.76	0		0	No	Parameter Not Detected; Max SQL > RV
Total Chlordane	0	7	26.5	2.1	68	26.5			68	U	ND	1.7	4.79	PEL	40	15.6	14.2	5.52	0		0	No	Parameter Not Detected; Max SQL > RV
Endrin	0	7	25.5	2	65	25.5			65	UJ	ND	3.3		NA	19.7	7.73			0		0	No	Parameter Not Detected
Endrin aldehyde	0	7	25.5	2	65	25.5			65	UJ	ND	3.3		NA	19.7	7.73			0		0	No	Parameter Not Detected
Endrin ketone	0	7	25.5	2	65	25.5			65	UJ	ND	3.3		NA	19.7	7.73			0		0	No	Parameter Not Detected
Total Endrin	0	7	76.5	6	195	76.5			195	U	ND	3.3		NA	59.1	23.2			0		0	No	Parameter Not Detected
alpha-BHC	0	7	13.2	1.05	34	13.2			34	UJ	ND		0.99	PEL			34.3	13.4	0		0	No	Parameter Not Detected; Max SQL > RV
beta-BHC	0	7	13.2	1.05	34	13.2			34	UJ	ND	0.32	0.99	PEL	106	41.3	34.3	13.4	0		0	No	Parameter Not Detected; Max SQL > RV
delta-BHC	**5**	**7**	**6.03**	**1.05**	**11**	**4.24**	**0.66**	**6.9**	**6.9**	**J**	**041M641102**	**0.32**	**0.99**	**PEL**	**21.6**	**13.3**	**6.97**	**4.29**	**4**		**0**	**Yes**	**RV HQ > 1 and no RC**
gamma-BHC (Lindane)	0	7	13.2	1.05	34	13.2			34	UJ	ND	0.32	0.99	PEL	106	41.3	34.3	13.4	0		0	No	Parameter Not Detected; Max SQL > RV
Total BHC	**5**	**7**	**24.1**	**4.2**	**44**	**43.9**	**3.81**	**109**	**109**		**041M641102**	**0.32**	**0.99**	**PEL**	**340**	**137**	**110**	**44.4**	**5**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	**1**	**7**	**17.1**	**2**	**65**	**28.9**	**100**	**100**	**100**	**J**	**041M640602**	**1.22**	**7.81**	**PEL**	**82**	**23.7**	**12.8**	**3.7**	**1**	**50**	**2**	**Yes**	**EPC > RV and RC**
4,4'-DDE	4	7	23	2	65	26.1	8.4	43	43	J	041M640202	2.07	374	PEL	20.8	12.6	0.12	0.07	0	40	2	No	EPC > RC, but < RV
4,4'-DDT	0	7	25.5	2	65	25.5			65	UJ	ND	1.19	4.77	PEL	54.6	21.4	13.6	5.35	0	20	5	No	Parameter Not Detected; Max SQL > RV
Total DDT	**4**	**7**	**69**	**6**	**195**	**80.5**	**36.9**	**154**	**154**		**041M640602**	**3.3**	**51.7**	**PEL**	**46.7**	**24.4**	**2.98**	**1.56**	**3**	**110**	**2**	**Yes**	**EPC > RV and RC**
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	7	13,200	1,050	34,000	13,200			34,000	U	ND			NA					0		0	No	Parameter Not Detected

Table 11-3-23
Wetland 64 Phase IV
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
2,4-Dinitrotoluene	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	7	13,200	1,050	34,000	13,200			34,000	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	7	13,200	1,050	34,000	13,200			34,000	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	7	5,130	400	13,000	5,130			13,000	U	ND			NA					0		0	No	Parameter Not Detected
3-Methylphenol/4-Methylphenol	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	7	13,200	1,050	34,000	13,200			34,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	7	5,130	400	13,000	5,130			13,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	7	13,200	1,050	34,000	13,200			34,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	7	13,200	1,050	34,000	13,200			34,000	U	ND			NA					0		0	No	Parameter Not Detected
Benzidine	0	7	21,200	1,650	55,000	21,200			55,000	UJ	ND			NA					0		0	No	Parameter Not Detected
Benzo(b)fluoranthene	2	7	2,490	200	6,500	1,980	630	780	780	J	041M640502			NA					0		0	No	TOC normalized PAHs<MEC
Benzo(g,h,i)perylene	2	7	2,490	200	6,500	1,910	420	490	490	J	041M640502			NA					0		0	No	TOC normalized PAHs<MEC
Benzo(k)fluoranthene	2	7	2,490	200	6,500	1,980	510	910	910	J	041M640502			NA					0		0	No	TOC normalized PAHs<MEC
Benzoic acid	0	7	13,200	1,050	34,000	13,200			34,000	U	ND			NA					0		0	No	Parameter Not Detected
Benzyl alcohol	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	3	7	2,260	200	6,500	1,830	980	1,500	1,500	J	041M640502	182	2,647	PEL	8.24	10.1	0.57	0.69	0		0	No	RV HQ <1 and no RC
Butylbenzylphthalate	0	7	2,550	200	6,500	2,550			6,500	U	ND	182	2,647	PEL	35.7	14	2.46	0.96	0		0	No	Parameter Not Detected; Max SQL > RV
Dibenzofuran	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	0	7	2,550	200	6,500	2,550			6,500	U	ND	182	2,647	PEL	35.7	14	2.46	0.96	0		0	No	Parameter Not Detected; Max SQL > RV
Dimethylphthalate	0	7	2,550	200	6,500	2,550			6,500	U	ND	182	2,647	PEL	35.7	14	2.46	0.96	0		0	No	Parameter Not Detected; Max SQL > RV
Di-n-butylphthalate	0	7	2,550	200	6,500	2,550			6,500	U	ND	182	2,647	PEL	35.7	14	2.46	0.96	0		0	No	Parameter Not Detected; Max SQL > RV
Di-n-octylphthalate	0	7	2,550	200	6,500	2,550			6,500	U	ND	182	2,647	PEL	35.7	14	2.46	0.96	0		0	No	Parameter Not Detected; Max SQL > RV
Diphenylamine	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobenzene	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodimethylamine	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	7	13,200	1,050	34,000	13,200			34,000	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	7	2,550	200	6,500	2,550			6,500	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8)
RV = Refinement value (detailed explanation of RVs provided in Section 8)
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detection

Table 11-3-24
Wetland 64 Phase IV
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Aluminum	Heptachlor epoxide	None	Not Analyzed
Barium	delta-BHC		
Beryllium	Total BHC		
Cadmium	4,4'-DDD		
Chromium	Total DDT		
Cobalt			
Copper			
Iron			
Lead			
Manganese			
Silver			
Vanadium			

Table 11-3-25
Wetland 64 Phase IV
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M640202	8/1/2001	MG/KG	7.1		Arsenic	8.2	70	0.10
041M640202	**8/1/2001**	**MG/KG**	**14**		**Cadmium**	**1.2**	**9.6**	**1.46**
041M640202	**8/1/2001**	**MG/KG**	**500**		**Chromium**	**81**	**370**	**1.35**
041M640202	8/1/2001	MG/KG	80		Copper	34	270	0.30
041M640202	8/1/2001	MG/KG	210		Lead	46.7	218	0.96
041M640202	8/1/2001	MG/KG	0.24		Mercury	0.15	0.71	0.34
041M640202	8/1/2001	MG/KG	7.2	J	Nickel	20.9	51.6	0.14
041M640202	8/1/2001	MG/KG	1.5	J	Silver	1	3.7	0.41
041M640202	8/1/2001	MG/KG	250		Zinc	150	410	0.61
041M640202	**8/1/2001**	**UG/KG**	**43**	**J**	**4,4'-DDE**	**2.2**	**27**	**1.59**
041M640202	8/1/2001	UG/KG	34	U	4,4'-DDT	1.58	46.1	0.74
041M640202	8/1/2001	UG/KG	3,400	U	2-Methylnaphthalene	70	670	5.07
041M640202	8/1/2001	UG/KG	3,400	U	Acenaphthene	16	500	6.80
041M640202	8/1/2001	UG/KG	3,400	U	Acenaphthylene	44	640	5.31
041M640202	8/1/2001	UG/KG	3,400	U	Anthracene	85.3	1,100	3.09
041M640202	8/1/2001	UG/KG	3,400	U	Benzo(a)anthracene	261	1,600	2.13
041M640202	8/1/2001	UG/KG	3,400	U	Benzo(a)pyrene	430	1,600	2.13
041M640202	8/1/2001	UG/KG	3,400	U	Chrysene	384	2,800	1.21
041M640202	8/1/2001	UG/KG	3,400	U	Dibenz(a,h)anthracene	63.4	260	13.08
041M640202	8/1/2001	UG/KG	3,400	U	Fluoranthene	600	5,100	0.67
041M640202	8/1/2001	UG/KG	3,400	U	Fluorene	19	540	6.30
041M640202	8/1/2001	UG/KG	3,400	U	Naphthalene	160	2,100	1.62
041M640202	8/1/2001	UG/KG	3,400	U	Phenanthrene	240	1,500	2.27
041M640202	8/1/2001	UG/KG	3,400	U	Pyrene	665	2,600	1.31
041M640202	8/1/2001				ERM Quotient Sum			74.19
041M640202	8/1/2001				Mean ERM Quotient			2.97
041M640202	8/1/2001				Mean ERM Quotient without ND			0.29
041M640202	8/1/2001				Mean ERM Quotient Category			4
041M640302	8/1/2001	MG/KG	3.2		Arsenic	8.2	70	0.05
041M640302	**8/1/2001**	**MG/KG**	**11**		**Cadmium**	**1.2**	**9.6**	**1.15**
041M640302	8/1/2001	MG/KG	310		Chromium	81	370	0.84
041M640302	8/1/2001	MG/KG	60		Copper	34	270	0.22
041M640302	8/1/2001	MG/KG	140		Lead	46.7	218	0.64
041M640302	8/1/2001	MG/KG	0.18		Mercury	0.15	0.71	0.25
041M640302	8/1/2001	MG/KG	6	J	Nickel	20.9	51.6	0.12
041M640302	8/1/2001	MG/KG	1.4	J	Silver	1	3.7	0.38
041M640302	8/1/2001	MG/KG	200		Zinc	150	410	0.49
041M640302	8/1/2001	UG/KG	8.4	J	4,4'-DDE	2.2	27	0.31
041M640302	8/1/2001	UG/KG	21.5	UJ	4,4'-DDT	1.58	46.1	0.47
041M640302	8/1/2001	UG/KG	2,150	U	2-Methylnaphthalene	70	670	3.21
041M640302	8/1/2001	UG/KG	2,150	U	Acenaphthene	16	500	4.30
041M640302	8/1/2001	UG/KG	2,150	U	Acenaphthylene	44	640	3.36
041M640302	8/1/2001	UG/KG	2,150	U	Anthracene	85.3	1,100	1.95
041M640302	8/1/2001	UG/KG	2,150	U	Benzo(a)anthracene	261	1,600	1.34
041M640302	8/1/2001	UG/KG	2,150	U	Benzo(a)pyrene	430	1,600	1.34
041M640302	8/1/2001	UG/KG	2,150	U	Chrysene	384	2,800	0.77
041M640302	8/1/2001	UG/KG	2,150	U	Dibenz(a,h)anthracene	63.4	260	8.27
041M640302	8/1/2001	UG/KG	2,150	U	Fluoranthene	600	5,100	0.42
041M640302	8/1/2001	UG/KG	2,150	U	Fluorene	19	540	3.98
041M640302	8/1/2001	UG/KG	2,150	U	Naphthalene	160	2,100	1.02
041M640302	8/1/2001	UG/KG	230	J	Phenanthrene	240	1,500	0.15
041M640302	8/1/2001	UG/KG	2,150	U	Pyrene	665	2,600	0.83
041M640302	8/1/2001				ERM Quotient Sum			45.45
041M640302	8/1/2001				Mean ERM Quotient			1.82
041M640302	8/1/2001				Mean ERM Quotient without ND			0.18
041M640302	8/1/2001				Mean ERM Quotient Category			3
041M640502	8/2/2001	MG/KG	9.4		Arsenic	8.2	70	0.13
041M640502	**8/2/2001**	**MG/KG**	**23**		**Cadmium**	**1.2**	**9.6**	**2.40**
041M640502	**8/2/2001**	**MG/KG**	**700**		**Chromium**	**81**	**370**	**1.89**
041M640502	8/2/2001	MG/KG	200		Copper	34	270	0.74
041M640502	**8/2/2001**	**MG/KG**	**430**		**Lead**	**46.7**	**218**	**1.97**
041M640502	8/2/2001	MG/KG	0.31		Mercury	0.15	0.71	0.44
041M640502	8/2/2001	MG/KG	15		Nickel	20.9	51.6	0.29
041M640502	**8/2/2001**	**MG/KG**	**4**		**Silver**	**1**	**3.7**	**1.08**
041M640502	8/2/2001	MG/KG	380		Zinc	150	410	0.93
041M640502	**8/2/2001**	**UG/KG**	**32**	**J**	**4,4'-DDE**	**2.2**	**27**	**1.19**
041M640502	8/2/2001	UG/KG	30	U	4,4'-DDT	1.58	46.1	0.65
041M640502	8/2/2001	UG/KG	3,000	U	2-Methylnaphthalene	70	670	4.48
041M640502	8/2/2001	UG/KG	3,000	U	Acenaphthene	16	500	6
041M640502	8/2/2001	UG/KG	3,000	U	Acenaphthylene	44	640	4.69
041M640502	8/2/2001	UG/KG	3,000	U	Anthracene	85.3	1,100	2.73
041M640502	8/2/2001	UG/KG	870	J	Benzo(a)anthracene	261	1,600	0.54
041M640502	8/2/2001	UG/KG	800	J	Benzo(a)pyrene	430	1,600	0.50
041M640502	8/2/2001	UG/KG	860	J	Chrysene	384	2,800	0.31
041M640502	8/2/2001	UG/KG	3,000	U	Dibenz(a,h)anthracene	63.4	260	11.54
041M640502	8/2/2001	UG/KG	1,800	J	Fluoranthene	600	5,100	0.35
041M640502	8/2/2001	UG/KG	3,000	U	Fluorene	19	540	5.56
041M640502	8/2/2001	UG/KG	3,000	U	Naphthalene	160	2,100	1.43
041M640502	8/2/2001	UG/KG	1,100	J	Phenanthrene	240	1,500	0.73
041M640502	8/2/2001	UG/KG	1,600	J	Pyrene	665	2,600	0.62
041M640502	8/2/2001				ERM Quotient Sum			64.51
041M640502	8/2/2001				Mean ERM Quotient			2.58
041M640502	8/2/2001				Mean ERM Quotient without ND			0.56
041M640502	8/2/2001				Mean ERM Quotient Category			4

Table 11-3-25
Wetland 64 Phase IV
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M640602	8/1/2001	MG/KG	4.8		Arsenic	8.2	70	0.07
041M640602	8/1/2001	MG/KG	8.6		Cadmium	1.2	9.6	0.90
041M640602	8/1/2001	MG/KG	370		Chromium	81	370	1
041M640602	8/1/2001	MG/KG	58		Copper	34	270	0.21
041M640602	8/1/2001	MG/KG	150		Lead	46.7	218	0.69
041M640602	8/1/2001	MG/KG	0.12		Mercury	0.15	0.71	0.17
041M640602	8/1/2001	MG/KG	6.9	J	Nickel	20.9	51.6	0.13
041M640602	8/1/2001	MG/KG	1.3	J	Silver	1	3.7	0.35
041M640602	8/1/2001	MG/KG	140		Zinc	150	410	0.34
041M640602	**8/1/2001**	**UG/KG**	**30**	**J**	**4,4'-DDE**	**2.2**	**27**	**1.11**
041M640602	8/1/2001	UG/KG	24	U	4,4'-DDT	1.58	46.1	0.52
041M640602	8/1/2001	UG/KG	2,400	U	2-Methylnaphthalene	70	670	3.58
041M640602	8/1/2001	UG/KG	2,400	U	Acenaphthene	16	500	4.80
041M640602	8/1/2001	UG/KG	2,400	U	Acenaphthylene	44	640	3.75
041M640602	8/1/2001	UG/KG	2,400	U	Anthracene	85.3	1,100	2.18
041M640602	8/1/2001	UG/KG	660	J	Benzo(a)anthracene	261	1,600	0.41
041M640602	8/1/2001	UG/KG	540	J	Benzo(a)pyrene	430	1,600	0.34
041M640602	8/1/2001	UG/KG	840	J	Chrysene	384	2,800	0.30
041M640602	8/1/2001	UG/KG	2,400	U	Dibenz(a,h)anthracene	63.4	260	9.23
041M640602	8/1/2001	UG/KG	1,600	J	Fluoranthene	600	5,100	0.31
041M640602	8/1/2001	UG/KG	2,400	U	Fluorene	19	540	4.44
041M640602	8/1/2001	UG/KG	2,400	U	Naphthalene	160	2,100	1.14
041M640602	8/1/2001	UG/KG	970	J	Phenanthrene	240	1,500	0.65
041M640602	8/1/2001	UG/KG	1,400	J	Pyrene	665	2,600	0.54
041M640602	8/1/2001				ERM Quotient Sum			47.90
041M640602	8/1/2001				Mean ERM Quotient			1.92
041M640602	8/1/2001				Mean ERM Quotient without ND			0.30
041M640602	8/1/2001				Mean ERM Quotient Category			4
041M640702	8/1/2001	MG/KG	0.225	U	Arsenic	8.2	70	0.00
041M640702	8/1/2001	MG/KG	0.07	J	Cadmium	1.2	9.6	0.01
041M640702	8/1/2001	MG/KG	7.8		Chromium	81	370	0.02
041M640702	8/1/2001	MG/KG	12		Copper	34	270	0.04
041M640702	8/1/2001	MG/KG	9.7		Lead	46.7	218	0.04
041M640702	8/1/2001	MG/KG	0.0066	J	Mercury	0.15	0.71	0.01
041M640702	8/1/2001	MG/KG	0.26	J	Nickel	20.9	51.6	0.01
041M640702	8/1/2001	MG/KG	0.0355	U	Silver	1	3.7	0.01
041M640702	8/1/2001	MG/KG	3	J	Zinc	150	410	0.01
041M640702	8/1/2001	UG/KG	2	U	4,4'-DDE	2.2	27	0.07
041M640702	8/1/2001	UG/KG	2	U	4,4'-DDT	1.58	46.1	0.04
041M640702	8/1/2001	UG/KG	200	U	2-Methylnaphthalene	70	670	0.30
041M640702	8/1/2001	UG/KG	200	U	Acenaphthene	16	500	0.40
041M640702	8/1/2001	UG/KG	200	U	Acenaphthylene	44	640	0.31
041M640702	8/1/2001	UG/KG	200	U	Anthracene	85.3	1,100	0.18
041M640702	8/1/2001	UG/KG	200	U	Benzo(a)anthracene	261	1,600	0.13
041M640702	8/1/2001	UG/KG	200	U	Benzo(a)pyrene	430	1,600	0.13
041M640702	8/1/2001	UG/KG	200	U	Chrysene	384	2,800	0.07
041M640702	8/1/2001	UG/KG	200	U	Dibenz(a,h)anthracene	63.4	260	0.77
041M640702	8/1/2001	UG/KG	200	U	Fluoranthene	600	5,100	0.04
041M640702	8/1/2001	UG/KG	200	U	Fluorene	19	540	0.37
041M640702	8/1/2001	UG/KG	200	U	Naphthalene	160	2,100	0.10
041M640702	8/1/2001	UG/KG	200	U	Phenanthrene	240	1,500	0.13
041M640702	8/1/2001	UG/KG	200	U	Pyrene	665	2,600	0.08
041M640702	8/1/2001				ERM Quotient Sum			4.16
041M640702	8/1/2001				Mean ERM Quotient			0.17
041M640702	8/1/2001				Mean ERM Quotient without ND			0.01
041M640702	8/1/2001				Mean ERM Quotient Category			1
041M641102	8/2/2001	MG/KG	13		Arsenic	8.2	70	0.19
041M641102	**8/2/2001**	**MG/KG**	**15**		**Cadmium**	**1.2**	**9.6**	**1.56**
041M641102	**8/2/2001**	**MG/KG**	**630**		**Chromium**	**81**	**370**	**1.70**
041M641102	8/2/2001	MG/KG	120		Copper	34	270	0.44
041M641102	8/2/2001	MG/KG	210		Lead	46.7	218	0.96
041M641102	8/2/2001	MG/KG	0.46		Mercury	0.15	0.71	0.65
041M641102	8/2/2001	MG/KG	14	J	Nickel	20.9	51.6	0.27
041M641102	8/2/2001	MG/KG	1.8	J	Silver	1	3.7	0.49
041M641102	8/2/2001	MG/KG	290		Zinc	150	410	0.71
041M641102	8/2/2001	UG/KG	65	UJ	4,4'-DDE	2.2	27	2.41
041M641102	8/2/2001	UG/KG	65	UJ	4,4'-DDT	1.58	46.1	1.41
041M641102	8/2/2001	UG/KG	6,500	U	2-Methylnaphthalene	70	670	9.70
041M641102	8/2/2001	UG/KG	6,500	U	Acenaphthene	16	500	13
041M641102	8/2/2001	UG/KG	6,500	U	Acenaphthylene	44	640	10.16
041M641102	8/2/2001	UG/KG	6,500	U	Anthracene	85.3	1,100	5.91
041M641102	8/2/2001	UG/KG	6,500	U	Benzo(a)anthracene	261	1,600	4.06
041M641102	8/2/2001	UG/KG	6,500	U	Benzo(a)pyrene	430	1,600	4.06
041M641102	8/2/2001	UG/KG	6,500	U	Chrysene	384	2,800	2.32
041M641102	8/2/2001	UG/KG	6,500	U	Dibenz(a,h)anthracene	63.4	260	25
041M641102	8/2/2001	UG/KG	6,500	U	Fluoranthene	600	5,100	1.27
041M641102	8/2/2001	UG/KG	6,500	U	Fluorene	19	540	12.04
041M641102	8/2/2001	UG/KG	6,500	U	Naphthalene	160	2,100	3.10
041M641102	8/2/2001	UG/KG	6,500	U	Phenanthrene	240	1,500	4.33
041M641102	8/2/2001	UG/KG	6,500	U	Pyrene	665	2,600	2.50
041M641102	8/2/2001				ERM Quotient Sum			137.41
041M641102	8/2/2001				Mean ERM Quotient			5.50
041M641102	8/2/2001				Mean ERM Quotient without ND			0.28
041M641102	8/2/2001				Mean ERM Quotient Category			2

Table 11-3-25
Wetland 64 Phase IV
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M642402	8/1/2001	MG/KG	0.275	U	Arsenic	8.2	70	0.00
041M642402	8/1/2001	MG/KG	0.0315	UJ	Cadmium	1.2	9.6	0.00
041M642402	8/1/2001	MG/KG	1	J	Chromium	81	370	0.00
041M642402	8/1/2001	MG/KG	0.5	U	Copper	34	270	0.00
041M642402	8/1/2001	MG/KG	0.38	J	Lead	46.7	218	0.00
041M642402	8/1/2001	MG/KG	0.00285	U	Mercury	0.15	0.71	0.00
041M642402	8/1/2001	MG/KG	0.09	U	Nickel	20.9	51.6	0.00
041M642402	8/1/2001	MG/KG	0.044	U	Silver	1	3.7	0.01
041M642402	8/1/2001	MG/KG	0.065	UJ	Zinc	150	410	0.00
041M642402	8/1/2001	UG/KG	2.05	UJ	4,4'-DDE	2.2	27	0.08
041M642402	8/1/2001	UG/KG	2.05	UJ	4,4'-DDT	1.58	46.1	0.04
041M642402	8/1/2001	UG/KG	205	U	2-Methylnaphthalene	70	670	0.31
041M642402	8/1/2001	UG/KG	205	U	Acenaphthene	16	500	0.41
041M642402	8/1/2001	UG/KG	205	U	Acenaphthylene	44	640	0.32
041M642402	8/1/2001	UG/KG	205	U	Anthracene	85.3	1,100	0.19
041M642402	8/1/2001	UG/KG	205	U	Benzo(a)anthracene	261	1,600	0.13
041M642402	8/1/2001	UG/KG	205	U	Benzo(a)pyrene	430	1,600	0.13
041M642402	8/1/2001	UG/KG	205	U	Chrysene	384	2,800	0.07
041M642402	8/1/2001	UG/KG	205	U	Dibenz(a,h)anthracene	63.4	260	0.79
041M642402	8/1/2001	UG/KG	205	U	Fluoranthene	600	5,100	0.04
041M642402	8/1/2001	UG/KG	205	U	Fluorene	19	540	0.38
041M642402	8/1/2001	UG/KG	205	U	Naphthalene	160	2,100	0.10
041M642402	8/1/2001	UG/KG	205	U	Phenanthrene	240	1,500	0.14
041M642402	8/1/2001	UG/KG	205	U	Pyrene	665	2,600	0.08
041M642402	8/1/2001				ERM Quotient Sum			4.14
041M642402	8/1/2001				Mean ERM Quotient			0.17
041M642402	8/1/2001				Mean ERM Quotient without ND			0.00
041M642402	8/1/2001				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 11-3-26
Wetland 64 Phase II
Fish Tissue Ingestion Exposure Recreational and Subsistence Fishermen

Exposure Route	COPC		Sediment Concentration (mg/kg)	BSAF	Estimated Tissue Concentration [a] (mg/kg)	Trophic transfer factor	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Recreational Ingestion Hazard Quotient	Recreational Ingestion Cancer Risk	Subsistence Ingestion Hazard Quotient	Subsistence Ingestion Cancer Risk
Fish Tissue Ingestion	Aluminum	N	26,800	N/A	N/A	N/A	1.00E+00	N/A	N/A	N/A	N/A	N/A
	Arsenic	C	18.7	N/A	N/A	N/A	3.00E-04	1.50E+00	N/A	N/A	N/A	N/A
	Barium	N	1,280	N/A	N/A	N/A	7.00E-02	N/A	N/A	N/A	N/A	N/A
	Beryllium	N	1.3	N/A	N/A	N/A	2.00E-03	N/A	N/A	N/A	N/A	N/A
	Cadmium	N	38.6	N/A	N/A	N/A	5.00E-04	N/A	N/A	N/A	N/A	N/A
	Chromium	N	1,800	0.030354	5.46E+01	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Cobalt	C	6.1	N/A	N/A	N/A	2.00E-02	N/A	N/A	N/A	N/A	N/A
	Copper	N	255	0.405286	1.03E+02	1.00E+00	4.00E-02	N/A	2.13E-01	N/A	8.94E-01	N/A
	Iron	N	38,200	0.000458	1.75E+01	1.00E+00	3.00E-01	N/A	4.80E-03	N/A	2.02E-02	N/A
	Lead	N	634	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	203	N/A	N/A	N/A	2.40E-02	N/A	N/A	N/A	N/A	N/A
	Mercury	N	0.88	N/A	N/A	N/A	3.00E-04	N/A	N/A	N/A	N/A	N/A
	Nickel	N	27.1	N/A	N/A	N/A	2.00E-02	N/A	N/A	N/A	N/A	N/A
	Selenium	N	3.1	N/A	N/A	N/A	5.00E-03	N/A	N/A	N/A	N/A	N/A
	Silver	N	5.1	N/A	N/A	N/A	5.00E-03	N/A	N/A	N/A	N/A	N/A
	Thallium	N	1.2	N/A	N/A	N/A	6.60E-05	N/A	N/A	N/A	N/A	N/A
	Vanadium	N	43.4	N/A	N/A	N/A	7.00E-03	N/A	N/A	N/A	N/A	N/A
	Zinc	N	481	0.383051	1.84E+02	1.00E+00	3.00E-01	N/A	5.06E-02	N/A	2.12E-01	N/A
	4,4'-DDD	C	0.14	1.93	2.70E-01	3.08E+00	N/A	2.40E-01	N/A	**2.35E-06**	N/A	**2.47E-05**
	4,4'-DDE	C	0.078	1.93	1.51E-01	3.64E+00	N/A	3.40E-01	N/A	**2.19E-06**	N/A	**2.30E-05**
	4,4'-DDT	C	0.014	1.93	2.70E-02	3.69E+00	5.00E-04	3.40E-01	2.34E-03	3.99E-07	2.46E-02	**4.19E-06**
	Aldrin	C	0.004	3.383085	1.35E-02	3.64E+00	3.00E-05	1.70E+01	1.93E-02	**9.84E-06**	2.03E-01	**1.03E-04**
	alpha-BHC	C	0.00094	3.550914	3.34E-03	1.08E+00	5.00E-04	6.30E+00	8.48E-05	2.67E-07	8.91E-04	**2.81E-06**
	alpha-Chlordane	C	0.01	3.897638	3.90E-02	3.25E+00	5.00E-04	3.50E-01	2.98E-03	5.21E-07	3.13E-02	**5.48E-06**
	Aroclor-1254	C	0.37	3.213918	1.19E+00	3.73E+00	2.00E-05	2.00E+00	**2.61E+00**	**1.04E-04**	**2.74E+01**	**1.10E-03**
	Aroclor-1260	C	0.05	3.213918	1.61E-01	3.73E+00	N/A	2.00E+00	N/A	**1.41E-05**	N/A	**1.48E-04**
	Dieldrin	C	0.0033	N/A	N/A	N/A	5.00E-05	1.60E+01	N/A	N/A	N/A	N/A
	Endosulfan I	N	0.00076	N/A	N/A	N/A	6.00E-03	N/A	N/A	N/A	N/A	N/A
	Endosulfan II	N	0.0017	N/A	N/A	N/A	6.00E-03	N/A	N/A	N/A	N/A	N/A
	Endrin	N	0.008	4.01	3.21E-02	1.60E+00	3.00E-04	N/A	1.41E-02	N/A	5.93E-02	N/A
	Endrin aldehyde	N	0.00029	4.01	1.16E-03	1.60E+00	3.00E-04	N/A	5.11E-04	N/A	2.15E-03	N/A
	gamma-BHC (Lindane)	C	0.0016	3.550914	5.68E-03	1.08E+00	3.00E-04	1.30E+00	2.41E-04	9.38E-08	2.53E-03	9.86E-07
	gamma-Chlordane	C	0.0085	3.897638	3.31E-02	3.25E+00	5.00E-04	3.50E-01	2.53E-03	4.43E-07	2.66E-02	**4.66E-06**
	Heptachlor	C	0.00012	N/A	N/A	N/A	5.00E-04	4.50E+00	N/A	N/A	N/A	N/A
	1,2-Dichlorobenzene	C	0.19	N/A	N/A	N/A	9.00E-02	N/A	N/A	N/A	N/A	N/A
	1,4-Dichlorobenzene	C	0.26	N/A	N/A	N/A	3.00E-02	2.40E-02	N/A	N/A	N/A	N/A
	2-Methylnaphthalene	N	0.03	N/A	N/A	N/A	8.00E-02	N/A	N/A	N/A	N/A	N/A
	Acenaphthene	N	0.23	N/A	N/A	N/A	6.00E-02	N/A	N/A	N/A	N/A	N/A
	Anthracene	N	0.33	N/A	N/A	N/A	3.00E-01	N/A	N/A	N/A	N/A	N/A
	Benzo(a)anthracene	C	1.4	N/A	N/A	N/A	N/A	7.30E-01	N/A	N/A	N/A	N/A
	Benzo(a)pyrene	C	0.91	N/A	N/A	N/A	N/A	7.30E+00	N/A	N/A	N/A	N/A
	Benzo(b)fluoranthene	C	2.6	N/A	N/A	N/A	N/A	7.30E-01	N/A	N/A	N/A	N/A
	Benzo(g,h,i)perylene	C	0.59	N/A	N/A	N/A	N/A	7.30E-01	N/A	N/A	N/A	N/A
	Benzo(k)fluoranthene	C	0.25	N/A	N/A	N/A	N/A	7.30E-02	N/A	N/A	N/A	N/A
	bis(2-Ethylhexyl)phthalate (BEHP)	C	0.53	0.184	9.75E-02	2.27E+00	2.00E-02	1.40E-02	1.30E-04	3.64E-08	1.37E-03	3.83E-07
	Butylbenzylphthalate	N	0.28	N/A	N/A	N/A	2.00E-01	N/A	N/A	N/A	N/A	N/A
	Carbazole	C	0.4	N/A	N/A	N/A	N/A	2.00E-02	N/A	N/A	N/A	N/A
	Chrysene	C	1.5	N/A	N/A	N/A	7.30E-03	N/A	N/A	N/A	N/A	N/A
	Dibenz(a,h)anthracene	C	0.025	N/A	N/A	N/A	N/A	7.30E+00	N/A	N/A	N/A	N/A
	Dibenzofuran	N	0.085	N/A	N/A	N/A	4.00E-03	N/A	N/A	N/A	N/A	N/A
	Diethylphthalate	N	2	N/A	N/A	N/A	8.00E-01	N/A	N/A	N/A	N/A	N/A
	Dimethylphthalate	N	0.51	N/A	N/A	N/A	1.00E+01	N/A	N/A	N/A	N/A	N/A
	Di-n-butylphthalate	N	0.43	N/A	N/A	N/A	1.00E-01	N/A	N/A	N/A	N/A	N/A
	Fluoranthene	N	5.7	N/A	N/A	N/A	N/A	4.00E-02	N/A	N/A	N/A	N/A
	Fluorene	N	0.21	N/A	N/A	N/A	4.00E-02	N/A	N/A	N/A	N/A	N/A
	Indeno(1,2,3-cd)pyrene	C	0.6	N/A	N/A	N/A	7.30E-01	N/A	N/A	N/A	N/A	N/A
	Naphthalene	N	0.071	N/A	N/A	N/A	2.00E-02	N/A	N/A	N/A	N/A	N/A
	Phenanthrene	N	2.8	N/A	N/A	N/A	N/A	3.00E-02	N/A	N/A	N/A	N/A
	Phenol	N	0.22	N/A	N/A	N/A	6.00E-01	N/A	N/A	N/A	N/A	N/A
	Pyrene	N	4.6	N/A	N/A	N/A	N/A	3.00E-02	N/A	N/A	N/A	N/A
	Acetone	N	0.42	N/A	N/A	N/A	1.00E-01	N/A	N/A	N/A	N/A	N/A
	Carbon disulfide	N	0.011	N/A	N/A	N/A	1.00E-01	N/A	N/A	N/A	N/A	N/A
	Chlorobenzene	N	0.048	N/A	N/A	N/A	2.00E-02	N/A	N/A	N/A	N/A	N/A
	Methylene chloride	C	0.4	N/A	N/A	N/A	6.00E-02	7.50E-03	N/A	N/A	N/A	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
a = Tissue concentration determined as described in Section 8 of the text; see Table 10-1-1-X.

$$CDI = \frac{EPC_t \times IR_t \times EF \times ED \times CF}{BW \times AT}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_t = Exposure point concentration in sediment (mg/kg).
IR_t = Incidental ingestion rate for sediment (mg/day).
EF = Exposure Frequency (days/year).
ED = Exposure duration (years).
CF = Conversion Factor (0.001 kg/g)
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:
IR_t = Fish tissue ingestion rate for sediment (recreational: 26 g/day; subsistence: 170 g/day).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Risk calculation equation, cancer:

$$Risk = CDI \times SF_{oral}$$

Risk calculation equation, non cancer:

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Table 11-3-27
Wetland 64 Phase III
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	N/A	N/A	3.0E+02	=	UG/L	041W640501	1 / 2	N/A / 1.4E+02	1.9E+02	3.0E-04	1.0E-03	7.75E-07	1.23E-05	1.64E-05
7440393	Barium	N	3.4E+01	=	3.6E+01	=	UG/L	041W640101	2 / 2	NAV	3.5E+01	3.6E-05	1.0E-03	9.46E-08	1.50E-06	2.00E-06
7440439	Cadmium	N	N/A	N/A	8.4E-01	J	UG/L	041W640101	1 / 2	N/A / 5.8E-01	5.7E-01	8.4E-07	1.0E-03	2.18E-09	3.46E-08	4.62E-08
7440473	Chromium	N	8.5E+00	J	1.3E+01	=	UG/L	041W640501	2 / 2	NAV	1.1E+01	1.3E-05	1.0E-03	3.25E-08	5.14E-07	6.88E-07
7439921	Lead	N	5.8E+00	=	8.6E+00	=	UG/L	041W640501	2 / 2	NAV	7.2E+00	8.6E-06	3.4E-04	7.60E-09	1.20E-07	1.61E-07
7439965	Manganese	N	2.8E+01	=	3.7E+01	=	UG/L	041W640101	2 / 2	NAV	3.3E+01	3.7E-05	1.0E-03	9.65E-08	1.53E-06	2.04E-06
7487947	Mercury	N	N/A	N/A	6.0E-02	J	UG/L	041W640501	1 / 2	N/A / 5.0E-02	4.3E-02	6.0E-08	1.0E-03	1.56E-10	2.47E-09	3.30E-09
7440224	Silver	N	4.0E-02	J	5.0E-02	J	UG/L	041W640101	2 / 2	NAV	4.5E-02	5.0E-08	6.0E-04	7.80E-11	1.23E-09	1.65E-09
319857	beta-BHC	C	N/A	N/A	7.2E-03	J	UG/L	041W640101	1 / 2	N/A / 6.2E-03	5.2E-03	7.2E-09	2.8E-02	1.00E-09	2.27E-09	7.60E-09
71556	1,1,1-Trichloroethane	N	N/A	N/A	2.1E-01	J	UG/L	041W640101	1 / 2	N/A / 1.0E+00	3.6E-01	2.1E-07	6.7E-03	4.73E-09	7.48E-08	1.00E-07
75343	1,1-Dichloroethane	N	N/A	N/A	9.0E-01	J	UG/L	041W640101	1 / 2	N/A / 1.0E+00	7.0E-01	9.0E-07	6.7E-03	2.00E-08	3.16E-07	4.23E-07
156605	1,2-Dichloroethene (total)	N	2.1E-01	J	5.9E-01	J	UG/L	041W640101	2 / 2	NAV	4.0E-01	5.9E-07	7.7E-03	1.52E-08	2.40E-07	3.21E-07
67641	Acetone	N	N/A	N/A	2.4E+01	J	UG/L	041W640101	1 / 2	N/A / 2.5E+01	1.8E+01	2.4E-05	5.7E-04	4.48E-08	7.10E-07	9.49E-07
108883	Toluene	N	N/A	N/A	3.6E-01	J	UG/L	041W640501	1 / 2	N/A / 1.0E+00	4.3E-01	3.6E-07	3.1E-02	3.50E-08	5.53E-07	7.40E-07
79016	Trichloroethene	C	N/A	N/A	3.4E-01	J	UG/L	041W640101	1 / 2	N/A / 1.0E+00	4.2E-01	3.4E-07	1.2E-02	1.48E-08	3.36E-08	1.12E-07

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr). Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr). Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr). Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker). Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker). Cancer — 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 11-3-28
Wetland 64 Phase III
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	3.0E-04	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	1.2E-04	N/A	1.6E-04	N/A
	Barium	N	3.6E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	3.1E-04	N/A	4.1E-04	N/A
	Cadmium	N	8.4E-07	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	2.8E-03	N/A	3.7E-03	N/A
	Chromium	N	1.3E-05	3.0E-03	N/A	2.5E-02	1	7.5E-05	N/A	6.9E-03	N/A	9.2E-03	N/A
	Lead	N	8.6E-06	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	3.7E-05	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	2.7E-04	N/A	3.6E-04	N/A
	Mercury	N	6.0E-08	3.0E-04	N/A	7.0E-02	1	2.1E-05	N/A	1.2E-04	N/A	1.6E-04	N/A
	Silver	N	5.0E-08	5.0E-03	N/A	1.8E-01	3	9.0E-04	N/A	1.4E-06	N/A	1.8E-06	N/A
	beta-BHC	C	7.2E-09	2.0E-04	1.8E+00	1.4E-02	3	2.8E-06	1.3E+02	8.0E-04	2.9E-07	2.7E-03	9.6E-07
	1,1,1-Trichloroethane	N	2.1E-07	2.8E-01	N/A	9.0E-01	3	2.5E-01	N/A	3.0E-07	N/A	4.0E-07	N/A
	1,1-Dichloroethane	N	9.0E-07	1.0E-01	N/A	1.0E+00	3	1.0E-01	N/A	3.2E-06	N/A	4.2E-06	N/A
	1,2-Dichloroethene (total)	N	5.9E-07	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	1.5E-05	N/A	2.0E-05	N/A
	Acetone	N	2.4E-05	1.0E-01	N/A	1.0E-01	2	1.0E-02	N/A	7.1E-05	N/A	9.5E-05	N/A
	Toluene	N	3.6E-07	2.0E-01	N/A	3.1E-01	3	6.2E-02	N/A	8.9E-06	N/A	1.2E-05	N/A
	Trichloroethene	C	3.4E-07	3.0E-04	4.0E-01	8.0E-01	3	2.4E-04	5.0E-01	1.4E-04	1.7E-08	4.7E-04	5.6E-08

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 11-3-29
Wetland 64 Phase III
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

						Child Trespasser		Maintenance Worker	
Exposure Route	**COPC**		**Maximum concentration (mg/cm^3)**	**Oral RfD (mg/kg-day)**	**Oral SF (mg/kg-day)-1**	**Ingestion Hazard Quotient**	**Ingestion Cancer Risk**	**Ingestion Hazard Quotient**	**Ingestion Cancer Risk**
SW Incidental Ingestion	Aluminum	N	3.0E-04	1.0E+00	N/A	9.4E-09	N/A	6.1E-09	N/A
	Barium	N	3.6E-05	7.0E-02	N/A	1.6E-08	N/A	1.1E-08	N/A
	Cadmium	N	8.4E-07	5.0E-04	N/A	5.3E-08	N/A	3.4E-08	N/A
	Chromium	N	1.3E-05	3.0E-03	N/A	1.3E-07	N/A	8.5E-08	N/A
	Lead	N	8.6E-06	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	3.7E-05	1.4E-01	N/A	8.4E-09	N/A	5.4E-09	N/A
	Mercury	N	6.0E-08	3.0E-04	N/A	6.3E-09	N/A	4.1E-09	N/A
	Silver	N	5.0E-08	5.0E-03	N/A	3.2E-10	N/A	2.0E-10	N/A
	beta-BHC	C	7.2E-09	2.0E-04	1.8E+00	1.6E-10	5.9E-14	2.6E-10	9.4E-14
	1,1,1-Trichloroethane	N	2.1E-07	2.8E-01	N/A	2.4E-11	N/A	1.5E-11	N/A
	1,1-Dichloroethane	N	9.0E-07	1.0E-01	N/A	2.8E-10	N/A	1.8E-10	N/A
	1,2-Dichloroethene (total)	N	5.9E-07	2.0E-02	N/A	9.3E-10	N/A	6.0E-10	N/A
	Acetone	N	2.4E-05	1.0E-01	N/A	7.6E-09	N/A	4.9E-09	N/A
	Toluene	N	3.6E-07	2.0E-01	N/A	5.7E-11	N/A	3.7E-11	N/A
	Trichloroethene	C	3.4E-07	3.0E-04	4.0E-01	5.1E-09	6.2E-13	8.2E-09	9.9E-13

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 11-3-30
Wetland 64 Phase III
Fish Tissue Ingestion Exposure Recreational and Subsistence Fishermen

Exposure Route	COPC		Sediment Concentration (mg/kg)	BSAF	Estimated Tissue Concentration [a] (mg/kg)	Atrophic transfer factor	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Recreational Ingestion Hazard Quotient	Recreational Ingestion Cancer Risk	Subsistence Ingestion Hazard Quotient	Subsistence Ingestion Cancer Risk
Fish Tissue Ingestion	Aluminum	N	8,900	N/A	N/A	N/A	1.00E+00	N/A	N/A	N/A	N/A	N/A
	Arsenic	C	7.8	N/A	N/A	N/A	3.00E-04	1.50E+00	N/A	N/A	N/A	N/A
	Barium	N	17.1	N/A	N/A	N/A	7.00E-02	N/A	N/A	N/A	N/A	N/A
	Beryllium	N	0.34	N/A	N/A	N/A	2.00E-03	N/A	N/A	N/A	N/A	N/A
	Cadmium	N	21	N/A	N/A	N/A	5.00E-04	N/A	N/A	N/A	N/A	N/A
	Chromium	N	868	0.030354	2.63E+01	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Cobalt	C	3.4	N/A	N/A	N/A	2.00E-02	N/A	N/A	N/A	N/A	N/A
	Copper	N	146	0.405286	5.92E+01	1.00E+00	4.00E-02	N/A	1.22E-01	N/A	5.12E-01	N/A
	Iron	N	13,600	0.000458	6.23E+00	1.00E+00	3.00E-01	N/A	1.71E-03	N/A	7.18E-03	N/A
	Lead	N	346	N/A	N/A	N/A	1.00E-07	N/A	N/A	N/A	N/A	N/A
	Manganese	N	65.8	N/A	N/A	N/A	2.40E-02	N/A	N/A	N/A	N/A	N/A
	Mercury	N	0.26	N/A	N/A	N/A	3.00E-04	N/A	N/A	N/A	N/A	N/A
	Selenium	N	1.6	N/A	N/A	N/A	5.00E-03	N/A	N/A	N/A	N/A	N/A
	Silver	N	3	N/A	N/A	N/A	5.00E-03	N/A	N/A	N/A	N/A	N/A
	Vanadium	N	18.4	N/A	N/A	N/A	7.00E-03	N/A	N/A	N/A	N/A	N/A
	Zinc	N	468	0.383051	1.79E+02	1.00E+00	3.00E-01	N/A	4.92E-02	N/A	2.07E-01	N/A
	4,4'-DDD	C	0.089	1.93	1.72E-01	3.08E+00	N/A	2.40E-01	N/A	1.49E-06	N/A	1.57E-05
	4,4'-DDE	C	0.089	1.93	1.72E-01	3.64E+00	N/A	3.40E-01	N/A	2.50E-06	N/A	2.63E-05
	4,4'-DDT	C	0.019	1.93	3.67E-02	3.69E+00	5.00E-04	3.40E-01	3.18E-03	5.41E-07	3.34E-02	5.68E-06
	alpha-Chlordane	C	0.0037	3.897638	1.44E-02	3.25E+00	5.00E-04	3.50E-01	1.10E-03	1.93E-07	1.16E-02	2.03E-06
	Aroclor-1260	C	0.3	3.213918	9.64E-01	3.73E+00	N/A	2.00E+00	N/A	8.46E-05	N/A	8.89E-04
	delta-BHC	C	0.00094	3.550914	3.34E-03	1.08E+00	5.00E-04	6.30E+00	8.48E-05	2.67E-07	8.91E-04	2.81E-06
	Dieldrin	C	0.02	N/A	N/A	N/A	5.00E-05	1.60E+01	N/A	N/A	N/A	N/A
	Endosulfan I	N	0.0024	N/A	N/A	N/A	6.00E-03	N/A	N/A	N/A	N/A	N/A
	Acenaphthene	N	0.75	N/A	N/A	N/A	6.00E-02	N/A	N/A	N/A	N/A	N/A
	Anthracene	N	1	N/A	N/A	N/A	3.00E-01	N/A	N/A	N/A	N/A	N/A
	Benzo(a)anthracene	C	2.1	N/A	N/A	N/A	N/A	7.30E-01	N/A	N/A	N/A	N/A
	Benzo(a)pyrene	C	1.7	N/A	N/A	N/A	N/A	7.30E+00	N/A	N/A	N/A	N/A
	Benzo(b)fluoranthene	C	1.8	N/A	N/A	N/A	N/A	7.30E-01	N/A	N/A	N/A	N/A
	Benzo(g,h,i)perylene	C	0.98	N/A	N/A	N/A	N/A	7.30E-01	N/A	N/A	N/A	N/A
	Benzo(k)fluoranthene	C	1.9	N/A	N/A	N/A	N/A	7.30E-02	N/A	N/A	N/A	N/A
	bis(2-Ethylhexyl)phthalate (BEHP)	C	3.9	0.184	7.18E-01	2.27E+00	2.00E-02	1.40E-02	9.58E-04	2.68E-07	1.01E-02	2.82E-06
	Butylbenzylphthalate	N	0.71	N/A	N/A	N/A	2.00E-01	N/A	N/A	N/A	N/A	N/A
	Carbazole	C	0.8	N/A	N/A	N/A	N/A	2.00E-02	N/A	N/A	N/A	N/A
	Chrysene	C	2.1	N/A	N/A	N/A	7.30E-03	N/A	N/A	N/A	N/A	N/A
	Dibenzofuran	N	0.35	N/A	N/A	N/A	4.00E-03	N/A	N/A	N/A	N/A	N/A
	Fluoranthene	N	5	N/A	N/A	N/A	N/A	4.00E-02	N/A	N/A	N/A	N/A
	Fluorene	N	0.75	N/A	N/A	N/A	4.00E-02	N/A	N/A	N/A	N/A	N/A
	Indeno(1,2,3-cd)pyrene	C	1	N/A	N/A	N/A	7.30E-01	N/A	N/A	N/A	N/A	N/A
	Naphthalene	N	0.31	N/A	N/A	N/A	2.00E-02	N/A	N/A	N/A	N/A	N/A
	Phenanthrene	N	4.3	N/A	N/A	N/A	N/A	3.00E-02	N/A	N/A	N/A	N/A
	Pyrene	N	4.8	N/A	N/A	N/A	N/A	3.00E-02	N/A	N/A	N/A	N/A
	Acetone	N	0.032	N/A	N/A	N/A	1.00E-01	N/A	N/A	N/A	N/A	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
a = Tissue concentration determined as described in Section 8 of the text; see Table 10-1-1-X.

$$CDI = \frac{EPC_t \times IR_t \times EF \times ED \times CF}{BW \times AT}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_t = Exposure point concentration in sediment (mg/kg).
IR_t = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = conversion factor (0.001 kg/g)
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:
IR_t = Fish tissue ingestion rate for sediment (recreational: 26 g/day; subsistence: 170 g/day).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Risk calculation equation, cancer:

$$Risk = CDI \times SF_{oral}$$

Risk calculation equation, non cancer:

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Table 11-3-31
Wetland 64 Phase IV
Fish Tissue Ingestion Exposure Recreational and Subsistence Fishermen

Exposure Route	COPC		Sediment Concentration (mg/kg)	BSAF	Estimated Tissue Concentration a (mg/kg)	Trophic Transfer Factor	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Recreational Ingestion Hazard Quotient	Recreational Ingestion Cancer Risk	Subsistence Ingestion Hazard Quotient	Subsistence Ingestion Cancer Risk
Fish Tissue Ingestion	Aluminum	N	18,000	N/A	N/A	N/A	1.00E+00	N/A	N/A	N/A	N/A	N/A
	Arsenic	C	13	N/A	N/A	N/A	3.00E-04	1.50E+00	N/A	N/A	N/A	N/A
	Barium	N	18	N/A	N/A	N/A	7.00E-02	N/A	N/A	N/A	N/A	N/A
	Beryllium	N	1.1	N/A	N/A	N/A	2.00E-03	N/A	N/A	N/A	N/A	N/A
	Cadmium	N	23	N/A	N/A	N/A	5.00E-04	N/A	N/A	N/A	N/A	N/A
	Chromium	N	700	3.04E-02	2.12E+01	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Cobalt	C	4.8	N/A	N/A	N/A	2.00E-02	N/A	N/A	N/A	N/A	N/A
	Copper	N	200	4.00E-01	8.00E+01	1.00E+00	4.00E-02	N/A	1.65E-01	N/A	6.92E-01	N/A
	Iron	N	33,000	4.58E-04	1.51E+01	1.00E+00	3.00E-01	N/A	4.15E-03	N/A	1.74E-02	N/A
	Lead	N	430	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	230	N/A	N/A	N/A	2.40E-02	N/A	N/A	N/A	N/A	N/A
	Mercury	N	0.46	N/A	N/A	N/A	3.00E-04	N/A	N/A	N/A	N/A	N/A
	Silver	N	4	N/A	N/A	N/A	5.00E-03	N/A	N/A	N/A	N/A	N/A
	Vanadium	N	37	N/A	N/A	N/A	7.00E-03	N/A	N/A	N/A	N/A	N/A
	Zinc	N	380	3.83E-01	1.46E+02	1.00E+00	3.00E-01	N/A	3.99E-02	N/A	1.68E-01	N/A
	4,4'-DDD	C	0.1	1.93E+00	1.93E-01	3.08E+00	N/A	2.40E-01	N/A	**1.68E-06**	N/A	**1.76E-05**
	4,4'-DDE	C	0.043	1.93E+00	8.30E-02	3.64E+00	N/A	3.40E-01	N/A	**1.21E-06**	N/A	**1.27E-05**
	delta-BHC	C	0.0069	3.55	2.45E-02	1.08E+00	5.00E-04	6.30E+00	6.21E-04	**1.96E-06**	6.53E-03	**2.06E-05**
	Heptachlor epoxide	C	0.0062	N/A	N/A	N/A	5.00E-04	4.50E+00	N/A	N/A	N/A	N/A
	Benzo(a)anthracene	C	0.87	N/A	N/A	N/A	N/A	7.30E-01	N/A	N/A	N/A	N/A
	Benzo(a)pyrene	C	0.8	N/A	N/A	N/A	N/A	7.30E+00	N/A	N/A	N/A	N/A
	Benzo(b)fluoranthene	C	0.78	N/A	N/A	N/A	N/A	7.30E-01	N/A	N/A	N/A	N/A
	Benzo(g,h,i)perylene	C	0.49	N/A	N/A	N/A	N/A	7.30E-01	N/A	N/A	N/A	N/A
	Benzo(k)fluoranthene	C	0.91	N/A	N/A	N/A	N/A	7.30E-02	N/A	N/A	N/A	N/A
	bis(2-Ethylhexyl)phthalate (BEHP)	C	1.5	0.184	2.76E-01	2.27E+00	2.00E-02	1.40E-02	3.68E-04	1.03E-07	3.87E-03	**1.08E-06**
	Chrysene	C	0.86	N/A	N/A	N/A	7.30E-03	N/A	N/A	N/A	N/A	N/A
	Fluoranthene	N	1.8	N/A	N/A	N/A	N/A	4.00E-02	N/A	N/A	N/A	N/A
	Phenanthrene	N	1.1	N/A	N/A	N/A	N/A	3.00E-02	N/A	N/A	N/A	N/A
	Pyrene	N	1.6	N/A	N/A	N/A	N/A	3.00E-02	N/A	N/A	N/A	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
a = Tissue concentration determined as described in Section 8 of the text; see Table 10-1-1-X.

$$CDI = \frac{EPC_t \times IR_t \times EF \times ED \times CF}{BW \times AT}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_t = Exposure point concentration in sediment (mg/kg).
IR_t = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (0.001 kg/g)
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:
IR_t = Fish tissue ingestion rate for sediment (recreational: 26 g/day; subsistence: 170 g/day).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Risk calculation equation, cancer:

$$Risk = CDI \times SF_{oral}$$

Risk calculation equation, non cancer:

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

11.4 OU 2 — Wide Evaluations and Discussion

All the OU 2 wetlands are evaluated collectively to help determine where the highest probabilities of unacceptable risk may occur and whether that risk is likely to be related to exposure from IR sites at NAS Pensacola. In the case of OU 2, the tools that best evaluate risk on an OU-wide basis include:

- **Food-Chain Models:** Many of the upper level predators likely to be present within Site 41 wetlands could be exposed to constituents from more than one wetland. To evaluate this scenario, food-chain models were conducted on an OU-wide basis.

- **Mean ERM Quotients:** This methodology is an effective way to pinpoint areas of potential excess risk from a mixture of constituents. It is also useful in identifying locations most likely to be impacted by direct toxicity.

- **Basewide DDT-Level Comparison:** A basewide level was established for DDT at NAS Pensacola. A comparison of site concentrations to the basewide levels is presented in a figure and will be discussed on a basewide level in this section.

- **TOC-Normalized PAH Concentrations:** PAHs are widespread across NAS Pensacola and have been evaluated based on their potential for adverse effects when the TOC at each sample location is taken into account. This method has been summarized in OU 2-wide figures to identify locations where PAHs may occur at levels most likely to cause adverse effects.

11.4.1 OU 2 — Wetlands Food-Chain Models

To evaluate the potential for risk to upper-trophic-level receptors that forage within the wetlands surrounding OU 2 — food-chain models were conducted as presented in Section 8. The wetlands in this evaluation include:

- 5A*
- Wetland 5B*
- Wetland 6
- Wetland 64*

Those wetlands with an asterisk were resampled and so are evaluated using both the original Phase II data as well as the Phase III data. During Phase III (September 1997) and later in 2001,

fish tissue was collected at Wetland 64 and was included in the food-chain models. The following constituents were evaluated in these food-chain models:

- Pesticides (total BHCs, total DDT, total chlordanes, and total endrin)
- Total PCBs
- Mercury

The exposure concentrations used in the food-chain models are presented in Appendix M.

Tables 11-4-3 through 11-4-8 show the results of the food-chain models for the following receptor groups:

- Piscivorous Birds (green heron) (Tables 11-4-1 and 11-4-4)
- Piscivorous Mammals (mink) (Tables 11-4-2 and 11-4-5)
- Predatory Fish (red drum) (Tables 11-4-3 and 11-4-6)

11.4.1.1 Food-Chain Modeling Results

Assessment Endpoint 1 — Health and Viability of Piscivorous Bird Communities that Forage in OU 2 Wetlands

Phase II Evaluation

The Phase II data indicates that concentrations of mercury generate HQs greater than 1 based on an estimated daily dose. No tissues were collected during Phase II, so this daily dose is estimated using literature-based BSAFs to estimate prey concentrations using OU 2 sediment concentrations. The only exposure concentration that generated an HQ greater than one was the maximum total DDT concentration (max concentration/NOAEL HQ = 1.58). This sample was located in Wetland 6 at location 041M60101. Based on these estimated mercury exposure concentrations there is a potential for unacceptable risk to the piscivorous bird communities foraging in OU 2 wetlands. This Phase II data was the basis for the Phase III and later sampling events.

Phase III Evaluation

Using the data collected during Phase III, 2001, and 2004, no constituents included in the FCM indicate unacceptable levels via bioaccumulation through the food web. In 1997, a total of six sediment samples were collected from OU 2 wetlands (three from Wetland 5A and three from Wetland 64). Of those samples, fish tissue was collected in Wetland 64 (at sample location 041M640101 and 041M6400601); however, the analysis of these samples did not include mercury. In 2001, fish tissue samples were collected from seven locations in Wetland 64

and analyzed for full analytical scans (including mercury). These tissue concentration results are used in the OU 2 food-chain models to replace the BSAF-derived prey concentrations used in Phase II.

Assessment Endpoint 2 — Health and Viability of Piscivorous Mammal Communities that Forage in OU 2 Wetlands

Phase II Evaluation

The Phase II data indicate that concentrations of mercury and PCBs generate HQs greater than 1 based on a maximum estimated daily dose. This daily dose is based on site-specific sediment and surface water concentrations and literature-based BSAFs for tissue concentrations. Using the maximum mercury exposure concentrations, the NOAEL HQs exceed 1 (HQs=3.47), all other evaluations generated HQs less than 1. The maximum mercury sediment concentration was detected in Wetland 5A. The maximum PCB exposure concentrations also generated a NOAEL HQ of 2.8 and a LOAEL HQ of 1.4. PCBs were detected in all three OU 2 wetlands, with the maximum concentration in Wetland 64 (041M640301). No other constituent generated any FCM HQ greater than 1.

Phase III Evaluation

When the site-specific exposure concentrations were updated using the Phase III data (as explained above), no constituent produced a HQ greater than 1 indicating no adverse effects to piscivorous mammals are expected through accumulation via the food web.

Assessment Endpoint 3 — Health and Viability of Predatory Fish Communities that Forage in OU 2 Wetlands

The Evans and Engels exposure model was used to evaluate risk to predatory fish communities. A summary of the results is presented below.

Phase II Evaluation

The Phase II data indicate that concentrations of mercury in the OU 2 wetlands generate HQs greater than 1 based on estimated concentrations of prey items. The HQs generated for OU 2 wetlands range from 17.13 (max concentrations/NOAEL) to 1.8 (average concentrations/LOAEL). Based on these estimated mercury exposure concentrations, there is a potential for unacceptable risk to predatory fish foraging in OU 2 wetlands.

Phase III

Using the data collected during Phase III, 2001, and 2004, exposure estimates and the resulting HQs decreased. The HQs generated using these data range from 3.54 (maximum concentrations/ NOAEL) to 0.64 (average concentrations/LOAEL) for the OU 2 wetlands. The highest mercury concentrations detected were located at the three sample IDs within Wetland 64. This evaluation replaces the estimated fish tissue concentrations with site-specific concentrations. However, the majority of the reduction in HQs results from generally lower mercury concentrations identified during later sampling events.

11.4.2 OU 2 — Wide Mean ERM Quotient Category Evaluation

Using Figure 11-7, it is apparent that Wetlands 5A and 5B, and Wetland 64 contain numerous sample locations that fall into mean ERM categories 3 and 4. Those locations consistently have levels of cadmium, chromium, and lead that exceed their respective ERM values. Since these exceedances represent conditions that would be expected to cause adverse effects on benthic macroinvertebrates, this area was selected for site-specific toxicity testing. Based on the mean ERM quotient category evaluation, the area adjacent to Site 11 seems to be an area where constituents have consistently exceeded ERM levels. Wetland 5 had very high levels of constituents when originally sampled during Phase II; however, those levels have not been repeated in two additional rounds of sampling in that wetland. As a result, it does not appear that Wetland 5A is acting as a constant source for Wetlands 5B and 64.

The results of those toxicity tests showed statistically significant reduction in survival for *Leptocheirus* (78% survival at 041M640401 and 74% at 041M640601) and growth in *Neanthes* (at 041M640501). The results of these site-specific toxicity tests verify adverse effects are occurring at the southern portion of Wetland 64.

11.4.3 Basewide DDT Levels

Figure 11-5 shows the distribution of total DDT levels throughout OU 2. Based on this figure, total DDT has exceeded its basewide levels at Wetlands 5A, 6, and the southern portion of 64. While DDT does exceed its basewide level, food-chain models using site-specific tissue concentrations did not indicate the levels present in OU 2 are of concern for upper-trophic-level predators.

11.4.4 TOC-Normalized Total PAH Concentrations

Figure 11-6 shows the distribution of TOC-normalized PAHs throughout OU 2. None of the sample locations within OU 2 exceeded the Swartz EEC indicating a virtual certainty of adverse effects.

However, a total of four locations in Wetland 5A (one during Phase II and three during Phase III), and three locations in Wetland 64 (all in the southern portion of the wetland) exceeded the Swartz TEC, indicating the potential for adverse effects. When these results are compared to the site-specific toxicity sampling conducted during Phase III, statistically significant differences were found at 5A05 and 5A06. While no statistically significant differences were identified at Wetland 64, two of the locations (6404 and 6406) did have a *Leptocheirus* survival of less than 80%. These results simply indicate that toxicity at these locations could be driven in part or in whole by PAHs identified in the sediments.

11.4.5 Conclusions

Using all the lines of evidence presented in this risk assessment, the areas of primary concern where an FS is recommended is the southern portion of Wetland 64 and Wetland 5A. Both of the FSs from these sites should evaluate direct toxicity to the benthic community and uptake of mercury in predatory fish in Wetland 64.

Table 11-4-1
OU 2 Wetlands FCM Phase II
Receptor: Green Heron (Butorides virescens)

Sediment Ingestion Rate[a] : 0.00023 kg/day
Surface Water Ingestion Rate[b]: 0.0227 L/day
Food Ingestion Rate[c]: 0.0115 kg/day

Body Weight[d]: 0.241 kg

Contaminant		Sediment Concentrations mg/kg	Surface Water Concentrations mg/L	Tissue Concentrations mg/kg	Sediment Exposure mg/day	Water Exposure mg/day	Prey Exposure mg/day	Total Exposure mg/day	Daily Dose mg/kgBW/day	NOAEL mg/kdBW/day	LOAEL mg/kdBW/day	NOAEL HQ	LOAEL HQ
Mercury													
	Max	1	0.00088	2	0.00023	0.0000	0.0230	0.023249976	0.0965	0.44	0.86	2.19E-01	1.12E-01
	Average	0.2169	0.0002	0.4338	0.000049887	0.0000	0.0050	0.005043127	0.0209	0.44	0.86	4.76E-02	2.43E-02
Total BHC													
	Max	0.0044	0	0.0044	0.000001012	0.0000	0.0001	0.000051612	0.0002	0.563	2.25	3.80E-04	9.52E-05
	Average	0.0013	0.0001	0.0013	0.000000299	0.0000	0.0000	0.000017519	0.0001	0.563	2.25	1.29E-04	3.23E-05
Total Chlordane													
	Max	0.0185	*0*	0.043475	0.000004255	0.0000	0.0005	0.000504218	0.0021	2.14	10.7	9.78E-04	1.96E-04
	Average	0.0013	0.0001	0.003055	0.000000299	0.0000	0.0000	3.77015E-05	0.0002	2.14	10.7	7.31E-05	1.46E-05
Dieldrin													
	Max	0.01	0	0.0483	0.0000023	0.0000	0.0006	0.00055775	0.0023	0.044	0.44	5.26E-02	5.26E-03
	Average	0.001	0	0.00483	0.00000023	0.0000	0.0001	0.000055775	0.0002	0.044	0.44	5.26E-03	5.26E-04
Total DDT													
	Max	0.3930	0	1.68597	0.00009039	0.0000	0.0194	0.019479045	0.0808	0.051	0.512	**1.58E+00**	1.58E-01
	Average	0.0320	0.0002	0.13728	0.00000736	0.0000	0.0016	0.00159062	0.0066	0.051	0.512	1.29E-01	1.29E-02
Total Endrin													
	Max	0.0082	0	0.0082	0.000001886	0.0000	0.0001	0.000096186	0.0004	0.1	0.01	3.99E-03	3.99E-02
	Average	0.0021	0.0002	0.0021	0.000000483	0.0000	0.0000	0.000029173	0.0001	0.1	0.01	1.21E-03	1.21E-02
Total PCB													
	Max	0.6400	*0*	1.050	0.0001472	0.0000	0.0121	0.0122176	0.0507	0.112	1.12	4.53E-01	4.53E-02
	Average	0.1014	0.0040	0.166	0.000023322	0.0001	0.0019	0.002026526	0.0084	0.112	1.12	7.51E-02	7.51E-03

Notes:
Sediment Exposure = Sediment Concentration * Sediment Ingestion Rate (mg/day)
Surface Water Exposure = Surface Water Concentration * Water Ingestion Rate (mg/day)
Prey Exposure = Tissue Concentration * Food Ingestion Rate (mg/day)
Total Exposure = Sediment Exposure + Surface Water Exposure + Prey Exposure (mg/day)

Daily Dose = Total Exposure / Body Weight (mg/kgBW/day)

NOAEL HQ = Daily Dose/NOAEL (mg/kgBW/day)
LOAEL HQ = Daily Dose/LOAEL (mg/kgBW/day)

a Estimated based on the results of Beyer et al 1994.
b Calder and Braun 1983.
c Kushlan 1978
d Niethammer and Kaiser 1983.

Tissue data collected from Wetland 64

Table 11-4-2
OU 2 Wetlands FCM (Phase II)
Receptor: Mink (*Mustella vison*)

Sediment Ingestion Rate[a] : 0.003 kg/day
Surface Water Ingestion Rate[b]: 0.0578 L/day
Food Ingestion Rate[c]: 0.029 kg/day

Body Weight[d]: 0.55 kg

Contaminant		Sediment Concentrations mg/kg	Surface Water Concentrations mg/L	Tissue Concentrations mg/kg	Sediment Exposure mg/day	Water Exposure mg/day	Prey Exposure mg/day	Total Exposure mg/day	Daily Dose mg/kgBW/day	NOAEL mg/kdBW/day	LOAEL mg/kdBW/day	NOAEL HQ	LOAEL HQ
Mercury													
	Max	1	0.00088	2	0.003	0.0001	0.0580	0.061050864	0.1110	0.032	0.16	**3.47E+00**	6.94E-01
	Average	0.2169	0.0002	0.4338	0.0006507	0.0000	0.0126	0.01324246	0.0241	0.032	0.16	7.52E-01	1.50E-01
Total BHC													
	Max	0.0044	0	0.0044	0.0000132	0.0000	0.0001	0.0001408	0.0003	0.014	0.14	1.83E-02	1.83E-03
	Average	0.0013	0.0001	0.0013	0.0000039	0.0000	0.0000	0.00004738	0.0001	0.014	0.14	6.15E-03	6.15E-04
Total Chlordane													
	Max	0.0185	*0*	0.043475	0.0000555	0.0000	0.0013	0.001316275	0.0024	3.9	7.8	6.14E-04	3.07E-04
	Average	0.0013	0.0001	0.003055	0.0000039	0.0000	0.0001	0.000098275	0.0002	3.9	7.8	4.58E-05	2.29E-05
Dieldrin													
	Max	0.01	0	0.0483	0.00003	0.0000	0.0014	0.0014307	0.0026	0.015	0.15	1.73E-01	1.73E-02
	Average	0.001	0	0.00483	0.000003	0.0000	0.0001	0.00014307	0.0003	0.015	0.15	1.73E-02	1.73E-03
Total DDT													
	Max	0.3930	0	1.68597	0.001179	0.0000	0.0489	0.05007213	0.0910	0.6	3	1.52E-01	3.03E-02
	Average	0.0320	0.0002	0.13728	0.000096	0.0000	0.0040	0.00408868	0.0074	0.6	3	1.24E-02	2.48E-03
Total Endrin													
	Max	0.0082	0	0.0082	0.0000246	0.0000	0.0002	0.0002624	0.0005	0.092	0.92	5.19E-03	5.19E-04
	Average	0.0021	0.0002	0.0021	0.0000063	0.0000	0.0001	0.00007876	0.0001	0.092	0.92	1.56E-03	1.56E-04
Total PCB													
	Max	0.6400	*0*	1.050	0.00192	0.0000	0.0304	0.0323584	0.0588	0.05	0.1	**1.18E+00**	5.88E-01
	Average	0.1014	0.0040	0.166	0.0003042	0.0002	0.0048	0.005357984	0.0097	0.05	0.1	1.95E-01	9.74E-02

Notes:
Sediment Exposure = Sediment Concentration * Sediment Ingestion Rate (mg/day)
Surface Water Exposure = Surface Water Concentration * Water Ingestion Rate (mg/day)
Prey Exposure = Tissue Concentration * Food Ingestion Rate (mg/day)
Total Exposure = Sediment Exposure + Surface Water Exposure + Prey Exposure (mg/day)

Daily Dose = Total Exposure / Body Weight (mg/kgBW/day)

NOAEL HQ = Daily Dose/NOAEL (mg/kgBW/day)
LOAEL HQ = Daily Dose/LOAEL (mg/kgBW/day)

a Guilday 1957.
b Based on Morrison 1957.
c Chew 1951.
d Estimated based on the results of Beyer et al. 1994.

Tissue data collected from Wetland 64

Table 11-4-3
Red Drum Exposure Model
OU 2 Phase II Data

	MeHg in Sediment (Cs) (ppm)	MeHg in Forage Fish (Cf) (ppm)A	MeHg in Crustaceans (Ccr) (ppm)	MeHg in Invertebrates (Cinv) (ppm)	MeHg in Red Drum Tissue (ppm)	NOAEL HQ	LOAEL HQ
OU 2 Maximum	1	1.2	0.28	0.1	2.57	**17.13**	**8.57**
OU2 Average	0.21	0.252	0.0588	0.021	0.54	**3.60**	**1.80**

Note:
A = Forage Fish tissue concentrations calculated BSAF of 1.2 from Evans and Engel 1994.

Table 11-4-4
OU 2 Wetlands FCM (Phase III)
Receptor: Green Heron (*Butorides virescens*)

Sediment Ingestion Rate[a] : 0.00023 kg/day
Surface Water Ingestion Rate[b]: 0.0227 L/day
Food Ingestion Rate[c]: 0.0115 kg/day

Body Weight[d]: 0.241 kg

Contaminant		Sediment Concentrations mg/kg	Surface Water Concentrations mg/L	Tissue Concentrations mg/kg	Sediment Exposure mg/day	Water Exposure mg/day	Prey Exposure mg/day	Total Exposure mg/day	Daily Dose mg/kgBW/day	NOAEL mg/kgBW/day	LOAEL mg/kgBW/day	NOAEL HQ	LOAEL HQ
Mercury													
	Max	0.2600	0.00006	0.096	0.00006	0.0000	0.0011	0.001165162	0.0048	0.44	0.86	1.10E-02	5.62E-03
	Average	0.1750	0.00004	0.0363	0.00004	0.0000	0.0004	0.000458608	0.0019	0.44	0.86	4.32E-03	2.21E-03
Total BHC													
	Max	0.0427	0	0.01365	0.00001	0.0000	0.0002	0.000166796	0.0007	0.563	2.25	1.23E-03	3.08E-04
	Average	0.0326	0.0001	0.009145	0.00001	0.0000	0.0001	0.000114936	0.0005	0.563	2.25	8.47E-04	2.12E-04
Total Chlordane													
	Max	0.0197	0	0.00755	0.00000	0.0000	0.0001	0.000091356	0.0004	2.14	10.7	1.77E-04	3.54E-05
	Average	0.0159	0.0001	0.00467	0.00000	0.0000	0.0001	0.000059632	0.0002	2.14	10.7	1.16E-04	2.31E-05
Dieldrin													
	Max	0.02	0	0.0007	0.00000	0.0000	0.0000	0.00001265	0.0001	0.044	0.44	1.19E-03	1.19E-04
	Average	0.16	0.00004	0.0085	0.00004	0.0000	0.0001	0.000135458	0.0006	0.044	0.44	1.28E-02	1.28E-03
Total DDT													
	Max	0.1960	0	0.072	0.00005	0.0000	0.0008	0.00087308	0.0036	0.051	0.512	7.10E-02	7.08E-03
	Average	0.1175	0.0002	0.03275	0.00003	0.0000	0.0004	0.00040819	0.0017	0.051	0.512	3.32E-02	3.31E-03
Total Endrin													
	Max	0.0119	0	0	0.00000	0.0000	0.0000	0.000002737	0.0000	0.1	0.01	1.14E-04	1.14E-03
	Average	0.0329	0.0002	0.1403	0.00001	0.0000	0.0016	0.001625557	0.0067	0.1	0.01	6.75E-02	6.75E-01
Total PCB													
	Max	2.1400	0	0.568	0.00049	0.0000	0.0065	0.00701845	0.0291	0.112	1.12	2.60E-01	2.60E-02
	Average	1.5062	0.004	0.457	0.00035	0.0001	0.0053	0.005692726	0.0236	0.112	1.12	2.11E-01	2.11E-02

Notes:
Sediment Exposure = Sediment Concentration * Sediment Ingestion Rate (mg/day)
Surface Water Exposure = Surface Water Concentration * Water Ingestion Rate (mg/day)
Prey Exposure = Tissue Concentration * Food Ingestion Rate (mg/day)
Total Exposure = Sediment Exposure + Surface Water Exposure + Prey Exposure (mg/day)

Daily Dose = Total Exposure / Body Weight (mg/kgBW/day)

NOAEL HQ = Daily Dose/NOAEL (mg/kgBW/day)
LOAEL HQ = Daily Dose/LOAEL (mg/kgBW/day)

a Estimated based on the results of Beyer et al 1994.
b Calder and Braun 1983.
c Kushlan 1978
d Niethammer and Kaiser 1983.

Tissue data collected from Wetland 64

Table 11-4-5
OU 2 Wetlands FCM (Phase III)
Receptor: Mink *(Mustella vison)*

Sediment Ingestion Rate[a] : 0.003 kg/day
Surface Water Ingestion Rate[b]: 0.0578 L/day
Food Ingestion Rate[c]: 0.029 kg/day

Body Weight[d]: 0.55 kg

Contaminant		Sediment Concentrations mg/kg	Surface Water Concentrations mg/L	Tissue Concentrations mg/kg	Sediment Exposure mg/day	Water Exposure mg/day	Prey Exposure mg/day	Total Exposure mg/day	Daily Dose mg/kgBW/day	NOAEL mg/kdBW/day	LOAEL mg/kdBW/day	NOAEL HQ	LOAEL HQ
Mercury													
	Max	0.2600	0.00006	0.096	0.00078	0.0000	0.0028	0.003567468	0.0065	0.032	0.16	2.03E-01	4.05E-02
	Average	0.1750	0.00004	0.0363	0.000525	0.0000	0.0011	0.001580012	0.0029	0.032	0.16	8.98E-02	1.80E-02
Total BHC													
	Max	0.0427	0	0.01365	0.0001281	0.0000	0.0004	0.00052395	0.0010	0.014	0.14	6.80E-02	6.80E-03
	Average	0.0326	0.0001	0.009145	0.0000978	0.0000	0.0003	0.000368785	0.0007	0.014	0.14	4.79E-02	4.79E-03
Total Chlordane													
	Max	0.0197	0	0.00755	0.0000591	0.0000	0.0002	0.00027805	0.0005	3.9	7.8	1.30E-04	6.48E-05
	Average	0.0159	0.0001	0.00467	0.0000477	0.0000	0.0001	0.00018891	0.0003	3.9	7.8	8.81E-05	4.40E-05
Dieldrin													
	Max	0.02	0	0.0007	0.00006	0.0000	0.0000	0.0000803	0.0001	0.015	0.15	9.73E-03	9.73E-04
	Average	0.0163	0.00004	0.0851	0.0000489	0.0000	0.0025	0.002519112	0.0046	0.015	0.15	3.05E-01	3.05E-02
Total DDT													
	Max	0.1960	0	0.072	0.000588	0.0000	0.0021	0.002676	0.0049	0.6	3	8.11E-03	1.62E-03
	Average	0.1175	0.0002	0.03275	0.0003525	0.0000	0.0009	0.00131381	0.0024	0.6	3	3.98E-03	7.96E-04
Total Endrin													
	Max	0.0119	0	0	0.0000357	0.0000	0.0000	0.0000357	0.0001	0.092	0.92	7.06E-04	7.06E-05
	Average	0.0329	0.0002	0.01403	0.0000987	0.0000	0.0004	0.00051713	0.0009	0.092	0.92	1.02E-02	1.02E-03
Total PCB													
	Max	2.1400	0	0.568	0.00642	0.0000	0.0165	0.0228775	0.0416	0.05	0.1	8.32E-01	4.16E-01
	Average	1.5062	0.004	0.457	0.0045186	0.0002	0.0133	0.0180028	0.0327	0.05	0.1	6.55E-01	3.27E-01

Notes:
Sediment Exposure = Sediment Concentration * Sediment Ingestion Rate (mg/day)
Surface Water Exposure = Surface Water Concentration * Water Ingestion Rate (mg/day)
Prey Exposure = Tissue Concentration * Food Ingestion Rate (mg/day)
Total Exposure = Sediment Exposure + Surface Water Exposure + Prey Exposure (mg/day)

Daily Dose = Total Exposure / Body Weight (mg/kgBW/day)

NOAEL HQ = Daily Dose/NOAEL (mg/kgBW/day)
LOAEL HQ = Daily Dose/LOAEL (mg/kgBW/day)

a Guilday 1957.
b Based on Morrison 1957.
c Chew 1951.
d Estimated based on the results of Beyer et al. 1994.

Table 11-4-6
Red Drum Exposure Model
OU 2 Phase IIB/III Data

	Me in Sediment (Cs) (ppm)	MeHg in Forage Fish (Cf) (ppm)A	MeHg in Crustaceans (Ccr) (ppm)	MeHg in Invertebrates (Cinv) (ppm)	MeHg in Red Drum Tissue (ppm)	NOAEL HQ	LOAEL HQ
OU 2 Maximum	0.46	0.096	0.1288	0.046	0.53	**3.54**	**1.77**
OU 2 Average	0.162	0.0363	0.04536	0.0162	0.19	**1.27**	0.64

Note:
A = Forage Fish tissue concentrations taken from site specific biota collected to support Site 41 RI.

FINAL REMEDIAL INVESTIGATION REPORT
SITE 41 — OPERABLE UNIT 16 — NAS PENSACOLA WETLANDS

NAVAL AIR STATION
PENSACOLA, FLORIDA

SOUTHNAVFACENGCOM
CONTRACT NUMBER: N62467-89-D-0318

CTO-036

VOLUME V OF XI
SECTION 12

Prepared for:

Comprehensive Long-Term
Environmental Action Navy
Naval Air Station
Pensacola, Florida

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August 17, 2005
Revised November 16, 2007

12.0 OU 10 — WETLANDS

OU 10 occupies approximately 26 acres on Magazine Point at NAS Pensacola (Figure 12-1 — figures are located at the end of each section). Magazine Point is currently used for both ordnance and munitions storage and is the site of the former IWTP (currently used to treat only domestic wastewater generated on base). From 1971 until 1996, IWTP treated both industrial and domestic wastewater from the base. OU 10 IR sites include three sites: the former Industrial Sludge Drying Beds (Site 32), Wastewater Treatment Plant Ponds (Site 33), and miscellaneous IWTP Solid Waste Management Units (Site 35). OU 10 is bounded on the east by Site 13, the Magazine Point Rubble Disposal Area. Site 30 (Buildings 649 and 755) lies to the southwest. West of OU 10 is Site 11 (North Chevalier Disposal Area). The area north of OU 10 is a wooded peninsula bounded on the east by Pensacola Bay and on the west by Wetland 64. Figure 12-2 presents the OU 10 area topography and Figure 12-3 presents the OU 10 area shallow potentiometric map. Figure 12-4 presents the soil and groundwater sample locations associated with the OU 10 investigation.

Site History

Wastewater has been treated at Magazine Point since 1941 at various treatment facilities. The current facility was constructed in 1948 to process primarily domestic wastewater and was upgraded in 1971 to treat both industrial and domestic wastewater separately. Site 32, the Industrial Sludge Drying Beds, operated from 1971 until 1984. The beds were closed under the RCRA in 1989. Site 32 is on the northern half of OU 10. Site 33, the IWTP Ponds, makes up the southern half of OU 10. It consists of the former Surge Pond, Phenol Stabilization Pond, and Polishing Pond, all of which operated from 1971 until 1988, when they were closed under RCRA. Both Site 32 and Site 33 are known sources of both soil and groundwater contamination at OU 10. Site 35 comprises all industrial treatment units within the OU 10 boundary.

Chronology of Events and Previous Investigations

The following is a chronology of events and previous investigations at OU 10.

1986 RCRA Corrective Action

A RCRA Corrective Action Program was implemented at the IWTP in 1986 to comply with conditions in the plant's temporary operating permit. A groundwater system for recovery of VOCs was installed in the most shallow portions of the underlying aquifer system. This system began operating in February 1987. Seven recovery wells were placed along the north-south axis of Magazine Point to create a composite cone of depression to capture constituents originating at the Surge Pond. Extracted groundwater was treated at the IWTP.

1993-1996 Remedial Investigation

The *Final RI Report, NAS Pensacola, OU 10 and Site 13* (E/A&H, 1995h) identified SVOC, pesticide, PCB, and metals constituents in site soil. Constituent concentrations were relatively low. This suggested constituent origins included routine pest and dust control applications, using pesticides and PCBs, and natural occurrence for metals. SVOC concentrations reflected ambient conditions related to air traffic over NAS Pensacola. Areas with higher concentrations of SVOCs and selected metals constituents appeared to be isolated soil "hot spots" adjacent to former IWTP units. The *Final RI Report, NAS Pensacola, OU 10 and Site 13* (E/A&H, 1995h) found the spatial distribution of constituents at OU 10 varies with media. Soil contamination was widely scattered, with the highest concentrations present in Site 32. Sites 33, 35, and 13 were characterized by isolated detections of COCs at concentrations one to two orders of magnitude less than Site 32 (E/A&H, 1995h).

The *Final RI Report, NAS Pensacola, OU 10 and Site 13* (E/A&H, 1995h) also identified VOC, SVOC, pesticide, and metals compounds in site groundwater. Of these, 11 constituents exceeding primary drinking water standards, three exceeded secondary standards, and four constituents exceeded Florida guidance concentrations for organoleptic contaminants and systemic toxicants. The *Final RI Report, NAS Pensacola, OU 10 and Site 13* (E/A&H, 1995h) indicated shallow and intermediate groundwater contamination exceeding drinking water criteria was concentrated in the east-central portion of OU 10, beneath Site 32. Little to no contamination was quantified in other areas or in the deep groundwater beneath the site (E/A&H, 1995h).

Based on the data collected during the OU 10 RI, the *Final ROD, OU 10* (E/A&H, 1997c) outlined the following RAOs for OU 10:

1. Contaminated groundwater (may impact drinking water supplies or nearby ecological receptors)

2. Contaminated soil (presents a continuing source of contamination to groundwater and a potential excess risk to a future child resident).

The following remedial actions were selected for the site:

1. Excavation and disposal of soil above residential soil preliminary remediation goals (Area A).

2. Leachability study on Areas B, C, and D to verify that contaminants remaining in soil are not leaching to groundwater.

3. Contingency remedial action of Areas B, C, and D to include excavation and disposal of soil that the leachability study verifies as a source of groundwater contamination.

4. Groundwater monitoring program to ensure the groundwater treatment system will be effective and that contaminants will not migrate.

5. Continued groundwater monitoring at sampling intervals to be determined during the remedial design for groundwater treatment developed in the corrective action plan for the RCRA permit modification. The groundwater monitoring program will continue until a five-year review concludes that the alternative has achieved the performance standards and remain protective of human health and the environment.

1992-1993 Contamination Assessment — Bilgewater Treatment Plant

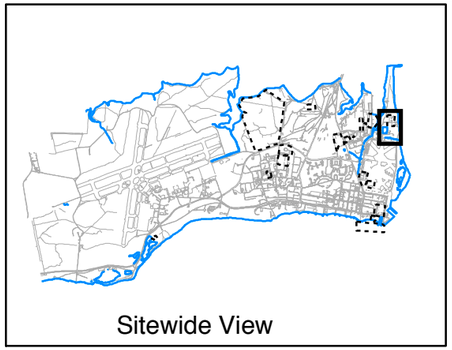
On March 11, 1992, a mechanical failure at the Bilgewater Treatment Plant, located at the south and of the OU 10 area between Wetlands 12 and 13, experienced an approximately 3,000-gallon waste oil release that spilled to the west into Wetland 12. An oily sheen and odors were present in the wetland for several months after the spill took place. Initial remedial action by the Navy recovered an undetermined amount of waste oil, and eight cubic yards of oil-contaminated soil were removed. Soil and groundwater in the spill area were investigated by Groundwater Technology Government Services beginning in December of 1992. The subsequent Contamination Assessment Report indicated low levels of contaminants have migrated to groundwater from the spill area. The report stated that the Navy's prompt initial action and natural attenuation in the impacted area have combined to minimize the long term impacts of the release (Groundwater Technology Government Services, 1993).

OU 10 Wetlands

The Site 41 wetlands associated with OU 10 include Wetlands 10, 12, and 13. As shown in Figure 12-1, these wetlands are located at the southern end of Magazine Point, directly north of Chevalier Field and the NATTC. Wetland 10 is a drainage ditch that is a part of the

NAS Pensacola storm water drainage system. Wetland 12 is an isolated wetland between Wetland 10 and the southern end of the former IWTP complex and receives runoff from the southern portion of the IWTP. Wetland 13 is a small, isolated wetland lying directly east of the former Bilgewater Plant.

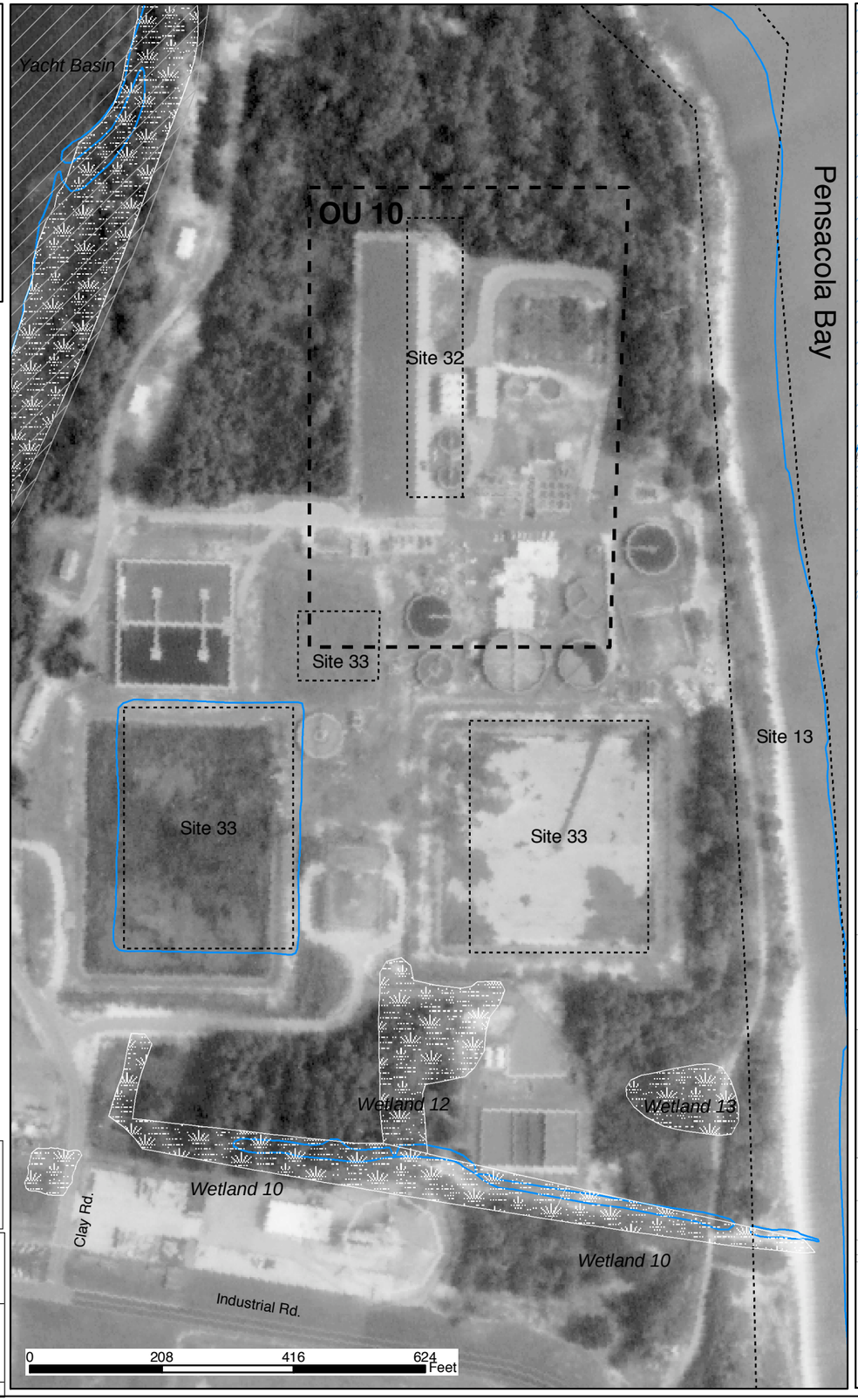
This section presents the nature and extent of contamination, ecological risk assessment, fate and transport analysis, and human health risk assessment by wetland. To assist in the data evaluation, Figure 12-5 presents OU 10 Total DDT for sediment, Figure 12-6 presents the Swartz TOC normalized PAHs, and Figure 12-7 presents the Mean ERM quotient categories. Figure 12-8 presents the chemistry and/or toxicity samples collected during Phases III and IV. To assess effects to selected measurement endpoints, such as the green heron, a food-chain model for all the wetlands associated with OU 10 is presented in Section 12.4.



Legend

- Site
- Wetland- Approximate
- Consolidated Wetland 64
- Operable Unit (OU)
- OU 10 Wetland- Approximate
- Building
- Shoreline
- Road
- Storm water Inlet
- Storm water Headwall
- Storm water Pipe

Note: Only the wetlands associated with OU 10 have labels.



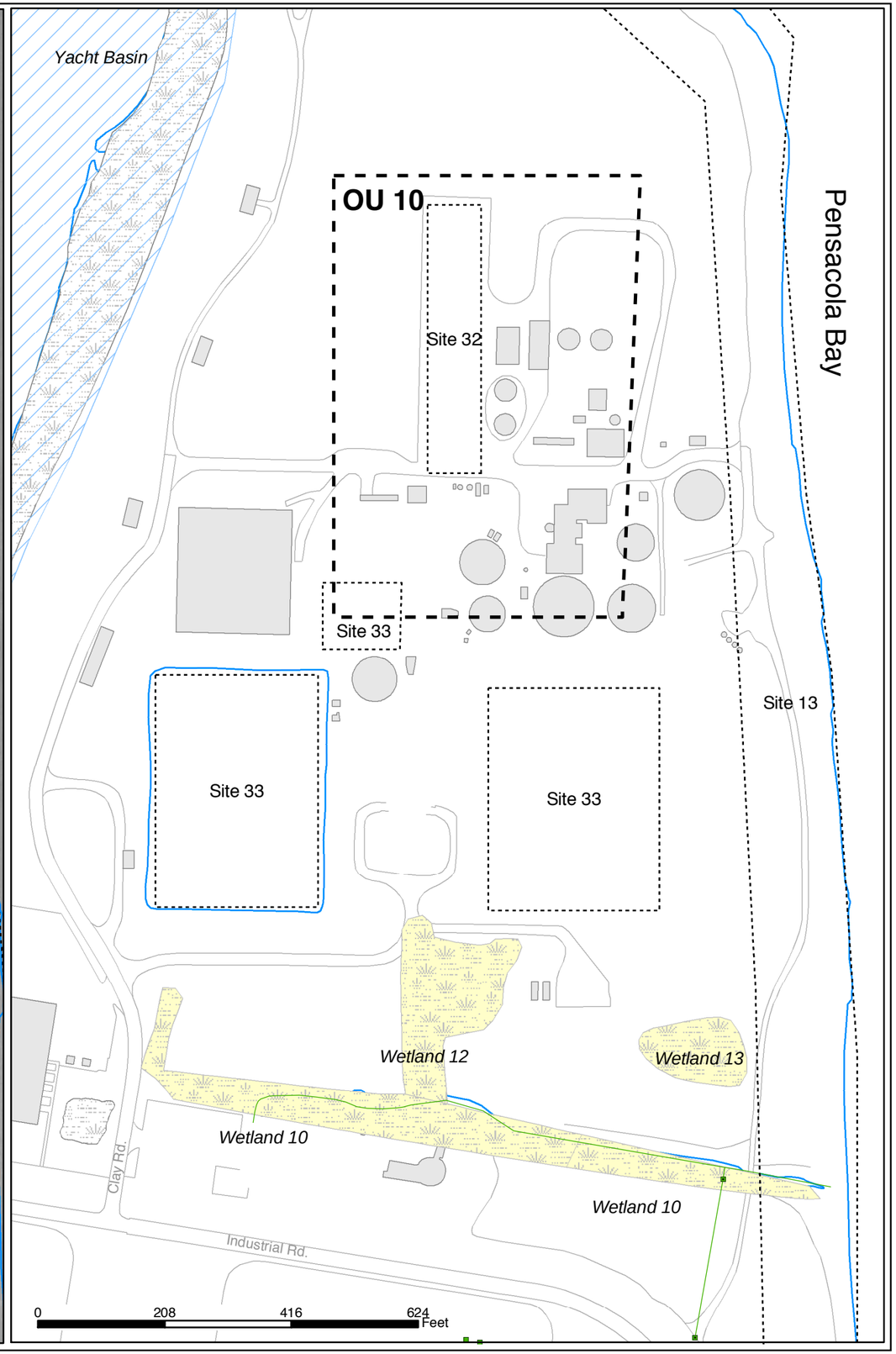


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FIGURE 12-1
Operable Unit 10
Wetlands and Nearby Sites

Final Remedial Investigation Report
Site 41
NAS Pensacola, FL

Date: 10/1/04 | Drwn by: CT | File: K:/GIS/Navy-Pensacola/CTO-036/Projects/Fig12-1.mxd

Yacht Basin

Pensacola Bay

OU 10

Site 32

Site 33

Site 33

Site 33

Site 13

Wetland 12

Wetland 13

Wetland 10

Wetland 10

Clay Rd.

Industrial Rd.

041M6408
041M6409
041M6405
041W6405
041M6406
041M6403
041M6404
041M6402
033GGI15
033GRW03
033GGM78
033SS210
033SS220
033GGI20
033GGS02
033SS040
032S0039
033SS450
033SS320
033SS030
033GGM09
033GGM69
033GGM68
033SS390
033GGM71
033SS560
032S0001
033GGS01
033SS010
033SS380
033SS370
033SS360
032S0036
032S0054
033SS540
032S0053
033SS530
033SS020
033SS050
033SS250
033GRW04
033SS330
033SS350
033SS340
033SS550
032S0055
032S0032
033GGS03
033GGI08
033GGI17
033GGM10
033GGS05
013SS005
033GGM70
032S0006
033SS060
033SS006
033SS190
032S0024
033SS240
033SS080
033GGM67
033GGM65
033GGM66
033GGM72
033GGM08
033GRW05
033GGM77
033GRW06
033GDG03
033GGI16
033SS070
036W0G16
033SS45D
033SS130
033SS500
033SS090
033SS460
033PCS02
033PCI02
033PCD02
033SS470
033SS520
033GGM76
033GGD18
033GGI13
033GGS04
033SS100
033SS110
033SS120
033GGM84
033SS140
011SRA07
011SLF07
033GGM62
033GGM63
033GRW07
033GGM11
033GGI09
011SRA08
011SLF08
013SS003
033SS230
030S0101
030GS101
033GGM14
011SI015
011GI015
030S0102
033GGI14
033SS150
033GGM13
013SS002
033GGM12
033GGI10
041M10A3
041M1201
041W1201
033SS160
041M10A1
041M1202
041W1301
041M1301
041M10A2
033M0001
033W0001
041M10A4
041M10A5
033M0002
033W0002
041M10A6
033M0004
033W0004
033M0003
033W0003

N
W
E
S

0 152 304 456 Feet

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FIGURE 12-2
Operable Unit 10
Study Area Topography

Final Remedial Investigation Report
Site 41
NAS Pensacola, FL

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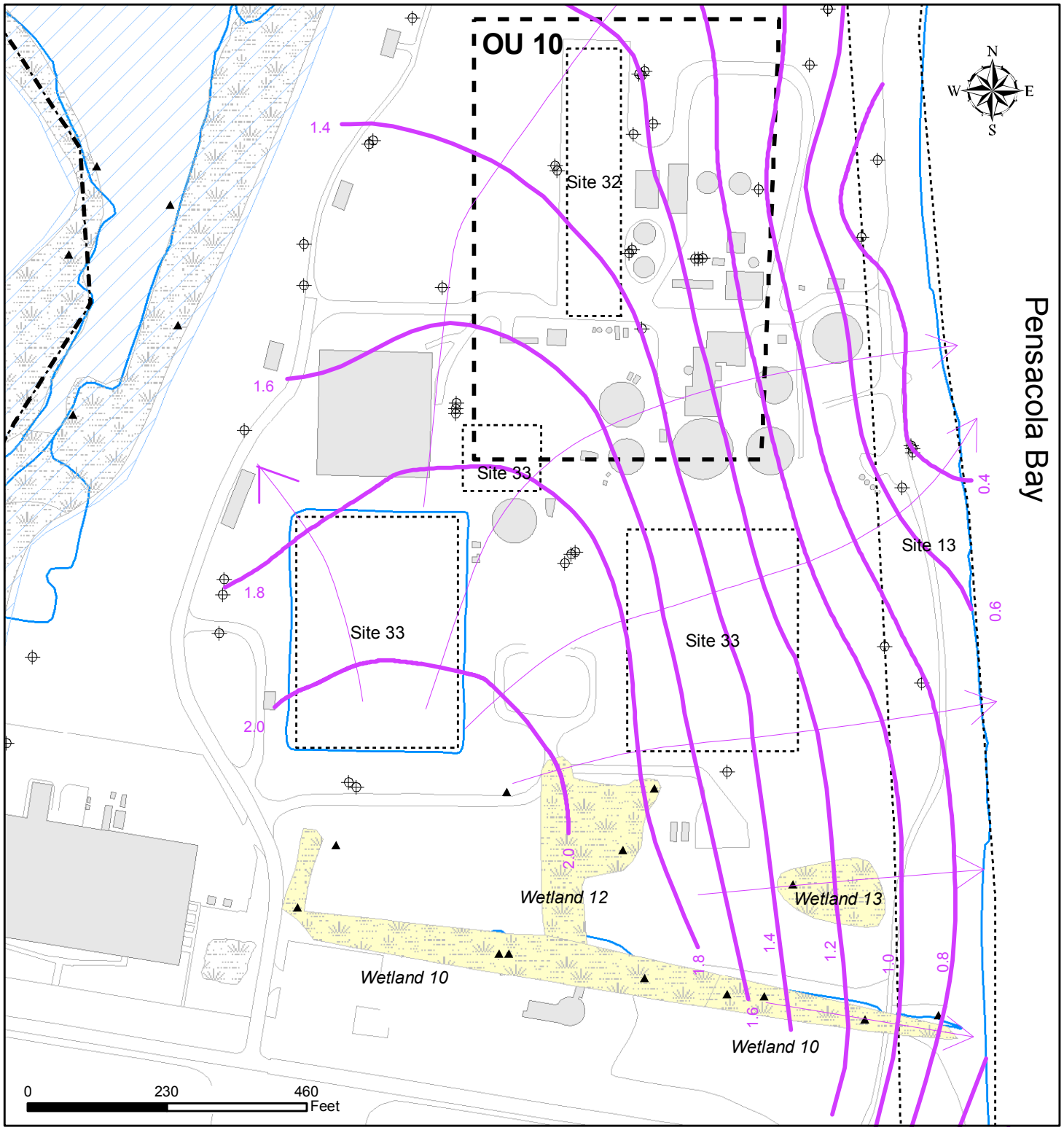
Legend

Sitewide Sample Locations

- Soil
- Site 41 RI Sediment
- Site 41 RI Surface Water
- Groundwater
- Operable Unit (OU)
- Site
- Wetland- Approximate
- Consolidated Wetland 64
- OU 10 Wetland- Approximate
- Building
- Shoreline
- Road
- Topographic Contour (ft)
- Storm water Inlet
- Storm water Headwall
- Storm water Pipe

Note: Only the wetlands associated with OU10 have labels.



Legend

Shallow Potentiometric Surface

- Contour (0.2 ft interval)
- Groundwater Flow Direction

Sitewide Sample Location

- Sediment Sample
- Groundwater Well
- OU 10 Wetland-Approximate
- Wetland- Approximate
- Consolidated Wetland 64

- Operable Unit (OU)
- Site
- Building
- Shoreline
- Road

Note:
Groundwater potentiometric contours are from the OU 10 RI Report, 1994.
Only the wetlands associated with OU10 have labels.

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FIGURE 12-3
Operable Unit 10 Wetlands
Shallow Potentiometric Surface

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Site 41
NAS Pensacola, FL

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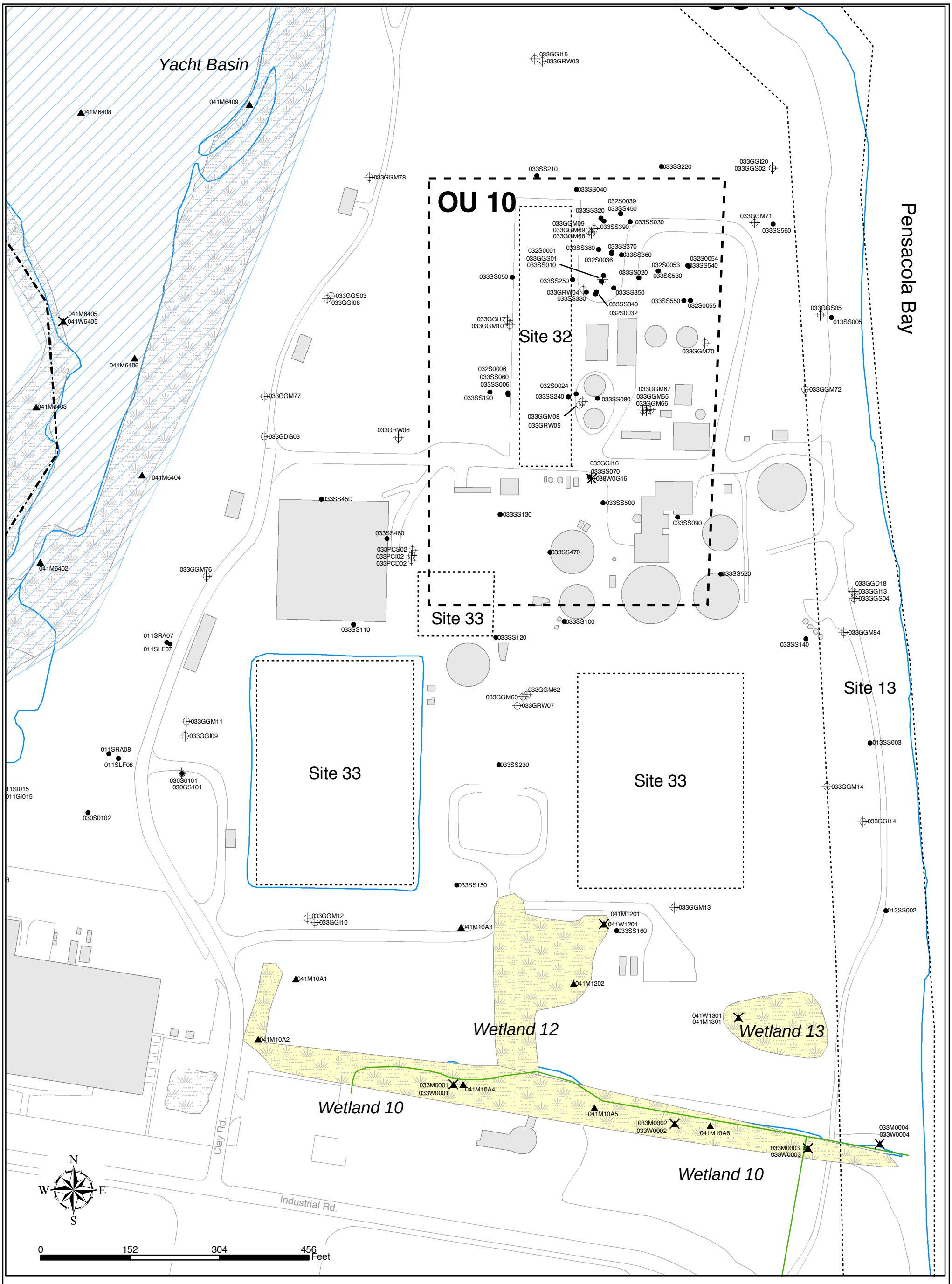

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FIGURE 12-4
Operable Unit 10 Wetlands, Nearby Sites, and Adjacent Soil Borings and Monitoring Wells

Final Remedial Investigation Report
Site 41
NAS Pensacola, FL

Date: 10/1/04 | Drwn by: CT | File: K:/GIS/Navy-Pensacola/CTO-036/Projects/Fig12-4.mxd

Legend

Sitewide Sample Locations

- Soil
- Site 41 RI Sediment
- Site 41 RI Surface Water
- Groundwater
- Site
- Wetland- Approximate
- Consolidated Wetland 64
- OU 10 Wetland- Approximate
- Operable Unit (OU)
- Building
- Shoreline
- Road
- Storm water Inlet
- Storm water Headwall
- Storm water Pipe

Note: Only the wetlands associated with OU10 have labels.

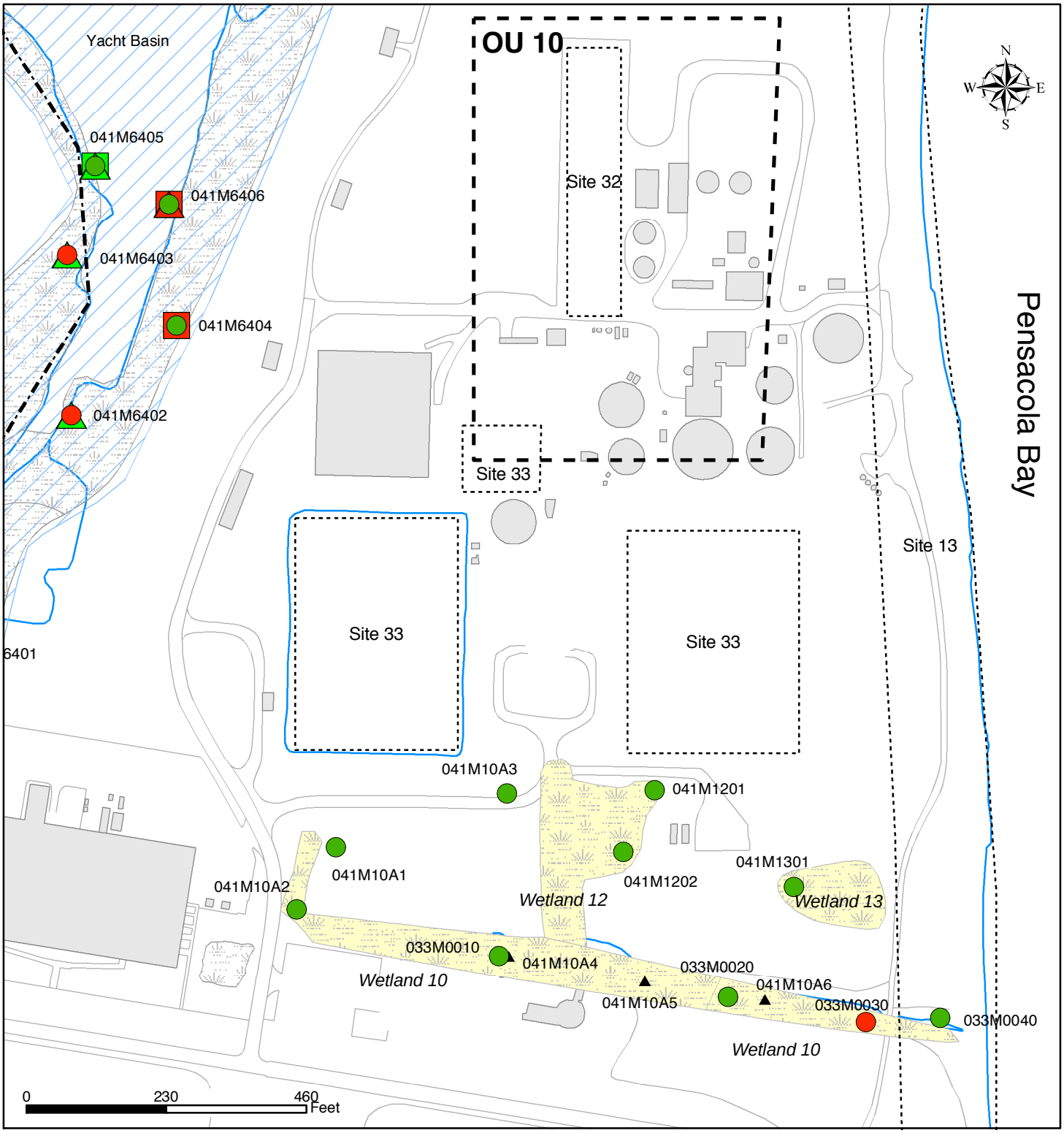

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FIGURE 12-5
Operable Unit 10 Wetlands
Sediment Total DDT

Final Remedial Investigation Report
Site 41
NAS Pensacola, FL

Date: 10/1/04 | Drwn by: CT | File: K:/GIS/Navy-Pensacola/CTO-036/Projects/Fig12-5.mxd

Legend

Site 41 RI Sediment Sample

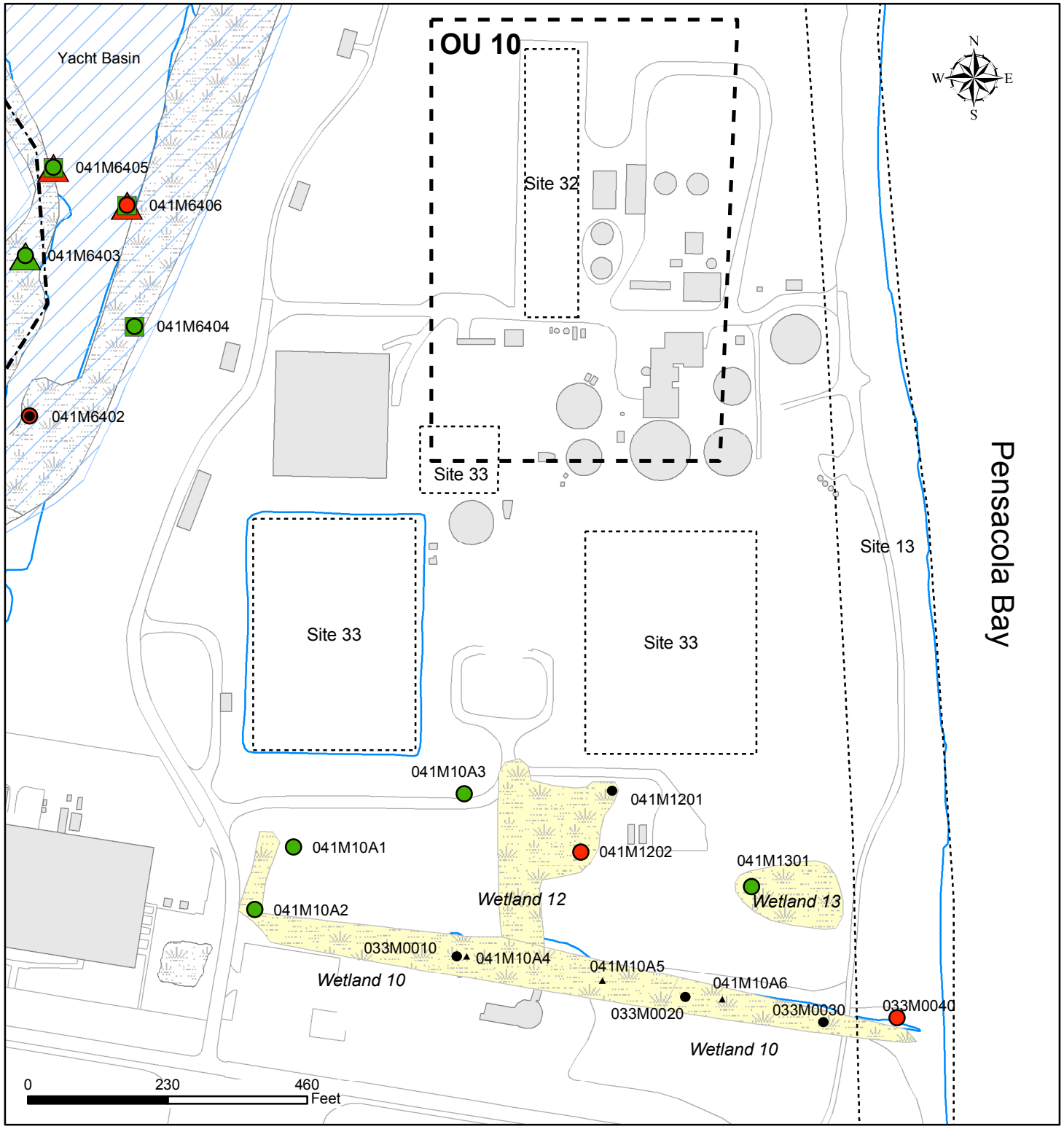
Phase II Total DDT
- 0.285 - 109.99
- 110.00(BL) - 3460.00

Phase III Total DDT
- 8.10 - 109.99
- 110.00(BL) - 196.00

Phase 2001 Total DDT
- 6.00 - 109.99
- 110.00(BL) - 195.00
- Sediment Sample without DDT analysis
- Operable Unit (OU)
- Site
- OU 10 Wetland- Approximate
- Wetland- Approximate
- Consolidated Wetland 64

- Building
- Shoreline
- Road

Note:
BL is the total DDT basewide level.
Result units are ug/kg.
Only the wetlands associated with OU10 have labels.



Legend

Site 41 RI Sediment Sample

Phase II TOC Normalized Total PAHs

- 1.94 - 289.99
- 290.00(TEC) - 1262.56

Phase III TOC Normalized Total PAHs

- 196.28 - 289.99
- 290.00(TEC) - 369.00

Phase 2001 TOC Normalized Total PAHs

- 144.61 - 289.99
- 290.00(TEC) - 651.71

- Nondetect TOC Normalized Total PAH
- Sediment Sample without TOC analysis
- Operable Unit (OU)
- Site
- OU 10 Wetland- Approximate
- Wetland- Approximate
- Consolidated Wetland 64
- Building
- Shoreline
- Road

Note:
Result units are mg/kg-oc.
Only the wetlands associated with OU10 have labels.

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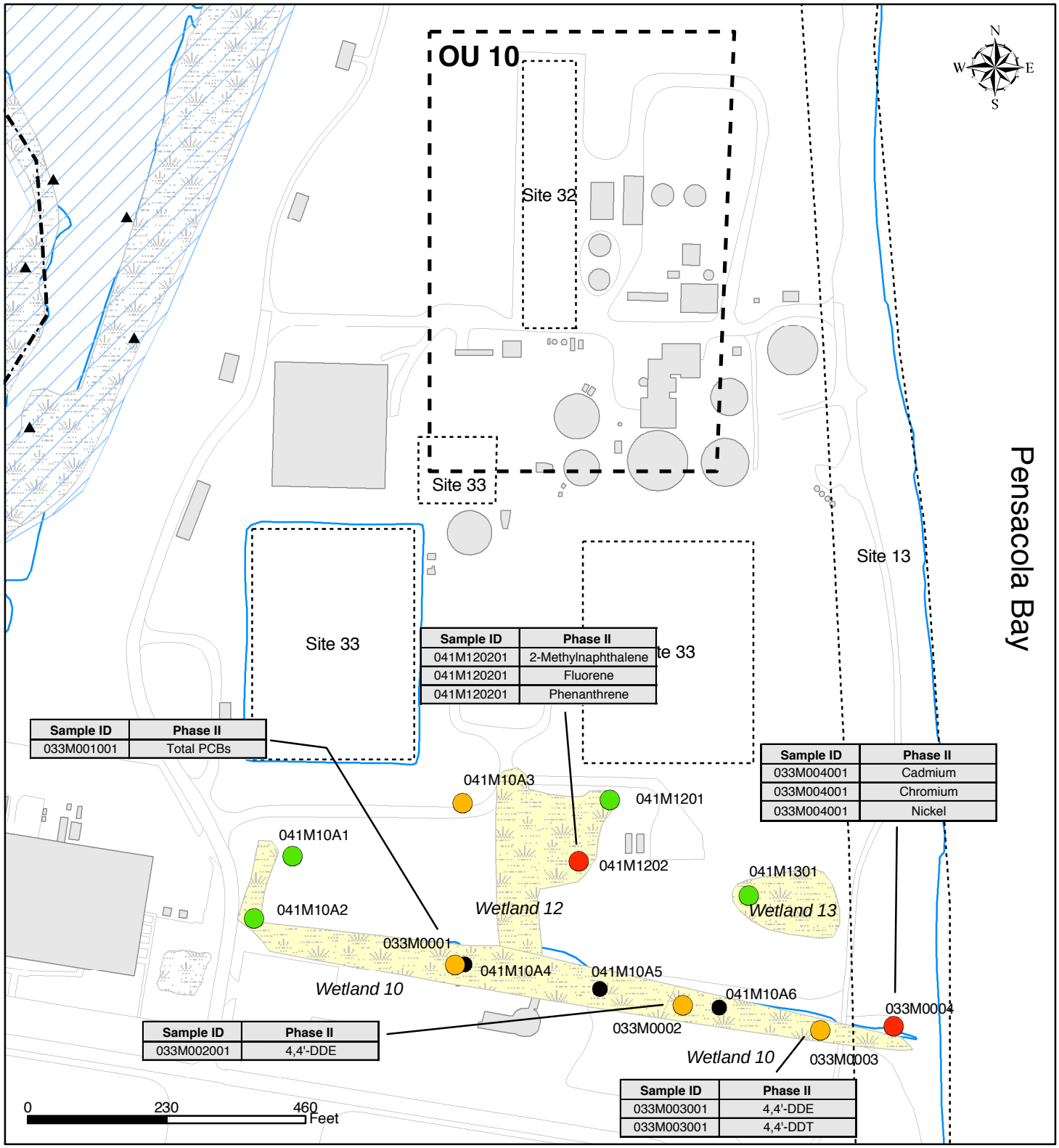
FIGURE 12-6
Operable Unit 10 Wetlands
Sediment Swartz Normalized Total PAHs

Final Remedial Investigation Report
Site 41
NAS Pensacola, FL

Date:3/9/05 | Drwn by: CT | File: K:/GIS/Navy-Pensacola/CTO-036/Projects/Fig12-6.mxd



Sample ID	Phase II
041M120201	2-Methylnaphthalene
041M120201	Fluorene
041M120201	Phenanthrene

Sample ID	Phase II
033M001001	Total PCBs

Sample ID	Phase II
033M004001	Cadmium
033M004001	Chromium
033M004001	Nickel

Sample ID	Phase II
033M002001	4,4'-DDE

Sample ID	Phase II
033M003001	4,4'-DDE
033M003001	4,4'-DDT

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FIGURE 12-7
Operable Unit 10 Sediment Sample ERM Quotient Categories and Parameters that Exceeded the ERM

Final Remedial Investigation Report
Site 41
NAS Pensacola, FL

Date: 10/1/04 | Drwn by: CT | File: K:/GIS/Navy-Pensacola/CTO-036/Projects/Fig12-7.mxd

Legend

OU 10 Sediment Sample with ERM Category

Phase II Mean ERM Quotient Category

- 1
- 2
- 3
- Site 41 RI Sediment associated to another OU
- Sediment Sample collected for grain size only
- Operable Unit (OU)

- Site
- OU 10 Wetland- Approximate
- Wetland- Approximate
- Consolidated Wetland 64
- Building
- Shoreline
- Road

Note:
Samples without a parameter table do not have parameters that exceeded the ERM value.
Only the wetlands associated with OU10 have labels.

Table indicates parameters that exceeded the ERM for each sample phase.				
Sample ID	Phase II	Phase III	Phase 2001	Phase 2004

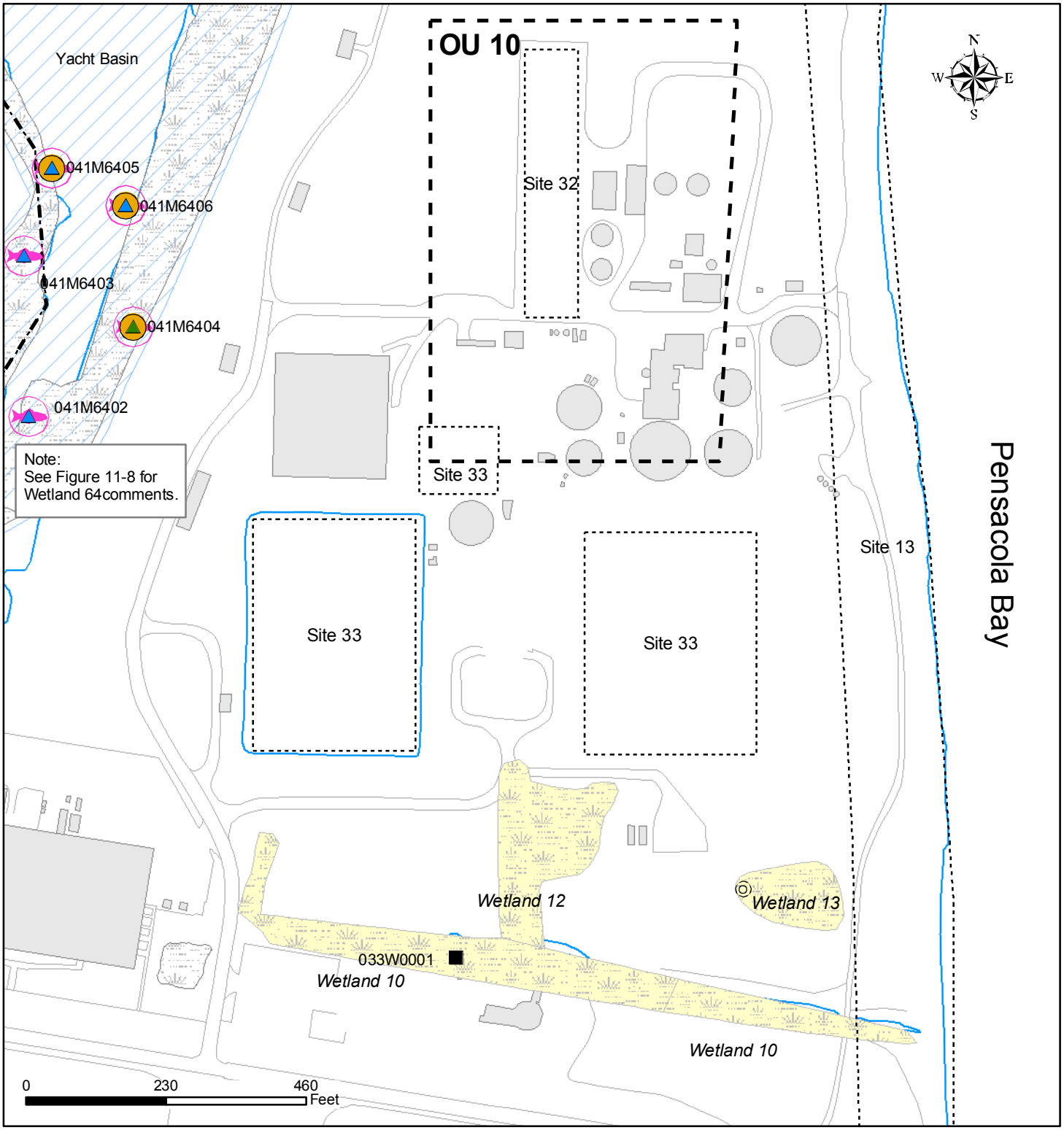

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FIGURE 12-8
Operable Unit 10
Chemistry and Toxicity Sample Locations

Final Remedial Investigation Report
Site 41
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Date: 6/8/05 | Drwn by: CT | File: K:/GIS/.../CTO-036/Projects/Fig12-8_rev.mxd

Legend

Sediment Sample
- Chemistry only
- Chemistry and Toxicity

Surface Water Sample
- Total and Dissolved Metals only
- Total and Dissolved Metals and VOCs
- Chemistry only
- Chemistry and Toxicity
- Proposed Surface Water Sample Not Collected
- Species Diversity Sample
- Fish Tissue Sample
- Site
- Operable Unit (OU)
- OU 10 Wetland- Approximate
- Wetland- Approximate
- Consolidated Wetland 64
- Building
- Shoreline
- Road

12.1 Wetland 10 — Screening Level Problem Formulation

12.1.1 Site Description and Habitats Present at Wetland 10

Wetland 10 is in the northeastern portion of NAS Pensacola, at the southern end of Magazine Point, south of OU 10 (Figure 12-1).

Parsons and Pruitt described Wetland 10 as a palustrine emergent system. The wetland is a man-made drainage ditch along the southern edge of OU 10 and receives storm water runoff from the former Chevalier Field area. The wetland is bound by maintained grass and a few scattered pine trees. The open water portion of Wetland 10 ranges from 1 to 5 feet in depth and 12 to 20 feet in width. The wetland appears stagnant, containing a monoculture of duckweed *(Lemna).* Wetland 10 is dissected by a service road with a culvert, which allows the wetland to drain by percolation to Pensacola Bay. A 4-foot man-made sand berm keeps this area from being tidally influenced. Storm water runoff from the northern part of the NATTC (former Chevalier Field area) flows into Wetland 10.

Photograph 1 Wetland 10 — Facing West from Pensacola Bay

IR sites potentially affecting Wetland 10 include Site 13, OU 10, and Site 36.

Site 13 (Magazine Point Rubble Disposal Site) extends along the eastern waterfront of the base, including Magazine Point and the waterfront on the eastern side of NATTC (Former Chevalier Field Area). This site was used for deposition of clean fill materials (building rubble, bricks, metal, and concrete), but there was no evidence that any hazardous materials were discarded in this area (E/A&H, 1995h).

Site 36 (Industrial Wastewater Treatment Plant Sewer Line) was investigated in conjunction with sites for OU 2. The wastewater treatment plant, originally built in 1948, was replaced in 1971 with a modern plant that could accept industrial wastes. Most facilities discharging to the sewer did so without any pretreatment or waste segregation. The waste stream has included paint strippers, heavy metals, pesticides, radioactive wastes, fuels, cyanide waste, and waste oil (NEESA, 1983). Beginning in 1973, the Naval Air Rework Facility operations discharged to the sewer, instead of to Pensacola Bay. The IWTP sewer line consisted of vitreous clay and cast-iron piping installed both before and after 1971. OU 2 investigated portions of the IWTP sewer line from the Building 649 complex to the wastewater treatment plant.

OU 10 is the former IWTP, located on approximately 26 acres on Magazine Point to the north of Chevalier Field, and contains three sites (Sites 32, 33, and 35), which may have an impact on Wetland 10. Site 32 includes the Industrial Sludge Drying Beds, Site 33 includes the IWTP Ponds (including the former surge pond, the stabilization pond, and the polishing pond), and Site 35 comprises all industrial treatment units within the OU 10 boundary.

Based on the data collected during the OU 10 RI, the *Final ROD* dated June 16, 1997, outlined the following RAOs for OU 10 sites (E/A&H, 1997c):

1. Contaminated groundwater (may impact drinking water supplies or nearby ecological receptors).

2. Contaminated soil (presents a continuing source of contamination to groundwater and a potential excess risk to a future child resident).

The following remedial actions were selected for the site:

1. Excavation and disposal of soil above residential soil preliminary remediation goals (Area A).

2. Leachability study on Areas B, C, and D to verify that contaminants remaining in soil are not leaching to groundwater.

3. Contingency remedial action of Areas B, C, and D to include excavation and disposal of soil that the leachability study verifies as a source of groundwater contamination.

4. Groundwater monitoring program to ensure the groundwater treatment system will be effective and that contaminants will not migrate.

5. Continued groundwater monitoring at sampling intervals to be determined during the remedial design for groundwater treatment developed in the Corrective Action Plan for the RCRA permit modification. The groundwater monitoring program will continue until a five-year review concludes that the alternative has achieved the performance standards and remain protective of human health and the environment.

A subsequent removal action was performed by Bechtel on the three areas, and the groundwater monitoring program was transferred to the RCRA program.

12.1.2 Wetland 10 — Sediment Sample Location Description

Phase II Sediment Sample Location Description

Seven sediment samples were collected and analyzed for Wetland 10 ERA (Figure 12-4). Wetland 10 sample locations 033M001001 through 033M004001 were collected in January 1993 and sample locations 041M10A101 through 041M10A601 were collected in November 1995. Samples 041M10A401 through 041M10A601 were analyzed for grain size only. Wetland 10 is comprised a long narrow, finger shaped wetland, which runs east to west. Two narrow extensions extend northward off the main wetland. The westernmost extension had two sample points, 041M10A101 and 041M10A201. The second extension had one sample point, 041M10A301, at the northern tip. Table 12-1-1 provides a physical description of the sediments collected at Wetland 10. Sediments at Wetland 10 were composed of light brown to brown poorly graded medium to fine sands and had TOC concentrations ranging from 0.203% (041M10A201) to 0.56% (041M10A301).

Phase II Surface Water Sample Location Description

Four surface water samples were collected at Wetland 10 during the Phase II investigation in 1994 (033W001002 through 033W004002). The samples were collocated with the sediment locations 033M001001 through 033M00401 (Figure 12-4). No physical descriptions of surface water were collected at Wetland 10.

Phase IV Surface Water Sample Location Description

One surface water sample was collected at location 033W001002 at Wetland 10 in the 2004 event. This location was co-located with the previously identified sediment location 033M001001 (Figure 12-4). No surface water quality parameters were collected at Wetland 10.

12.1.3 Wetland 10 — Nature and Extent of Contamination

Phase II Sediment

Figure 12-4 presents the Phase II sediment sampling locations for Wetland 10. Table 12-1-2 summarizes the analytical results of the seven Wetland 10 sediment samples.

Metals — Twenty-one metals were detected during Phase II sediment sampling at Wetland 10. Metals detections are generally well distributed across the wetland. The greatest number of detections was at location 041M10A301, where 19 metals were reported. Of these, only zinc exceeded the fresh water reference value. The lowest number of detections was at location 033M003001, where nine analytes were detected. None of the detected concentrations at location 033M003001 exceeded any reference values. The average number of detections by location was 13. Location 033M004001 had the greatest number of reference value exceedances with seven; barium, cadmium, chromium, copper, lead, nickel, and zinc. This location also represented the highest concentrations of these analytes detected at the wetland. Location 033M004001 is at the far eastern end of the wetland closest to Pensacola Bay.

Pesticides and PCBs — Fourteen pesticide compounds and aroclor-1260 were detected during sediment sampling at Wetland 10. Total DDT was calculated for each location by adding the concentrations of 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT. Likewise, a basewide total DDT reference concentration was calculated using the basewide concentrations for these same constituents.

The greatest number of pesticides detected in Wetland 10 sediment samples was at location 033M002001, which had 11 pesticide compounds present. Locations 033M001001 and 033M003001 each had nine pesticides detected, and sample location 033M004001 had 10 pesticide detections. The other locations had either three or a single low level detection(s). The

highest concentrations of pesticides detected and the only reference value exceedances were at location 033M003001, where the basewide reference concentrations for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and total DDT were exceeded. Aroclor-1260 was detected at locations 033M001001 and 033M002001, near the center of the wetland.

SVOCs — Sixteen SVOCs were detected in sediment samples collected at Wetland 10, during Phase II sediment sampling. These were limited to four locations. Location 041M10A101, located near the center of the wetland, had the greatest diversity of compounds, with 12 detections. These detections were also generally the highest concentrations detected in the wetland. Locations 041M10A201 and 041M10A301 each had 11 SVOCs detected. Sample location 033M004001 had a single SVOC detection, fluoranthene.

VOCs — No VOCs were detected during Phase II sediment sampling at Wetland 10.

The distribution of metals at Wetland 10 showed no distinct pattern. Pesticides and PCBs were more common and found at higher concentrations at locations 033M002001 and 033M003001, in the more down stream sections of the wetland. SVOCs were more common in the upper reaches of the wetland, adjacent to the closed stabilization ponds.

Phase II Surface Water

Figure 12-4 presents the surface water sampling locations for Wetland 10. Tables 12-1-3 summarize the analytical results of the four Wetland 10 surface water samples.

Metals — Eleven metals were detected in the Phase II surface water samples taken from Wetland 10. Location 033W001002 had the greatest diversity and number of concentrations exceeding the applicable freshwater reference values. Locations 033W002002, 033W003002, and 003W004002 had nine, eight, and eight detections, respectively. The metals barium, calcium, magnesium, manganese, and zinc were present at every sample location at concentrations exceeding their respective reference values. The number of reference value exceedances was greatest at location 033W001002 and decreased downstream towards the bay.

Pesticides and PCBs — Eight pesticide compounds were detected in surface water samples collected during Phase II at Wetland 10. All detections were present at relatively low concentrations. The greatest number of detections was at location 033W003002 where six compounds were reported. No PCB compounds were detected during surface water sampling at Wetland 10.

SVOCs — No SVOCs were detected during surface water sampling at Wetland 10.

VOCs — Toluene and xylene were the only VOCs detected in Wetland 10 surface water. Toluene was detected at location 033W002002, and xylene was detected at all locations, except 033W002002. Concentrations of both compounds were very low.

Phase IV Surface Water

Figure 12-4 presents the surface water sampling locations for Wetland 10. Table 12-1-4 summarize the analytical results of the one Wetland 10 Phase IV surface water sample.

Metals — Fifteen metals were detected in the Phase IV surface water sample collected from Wetland 10. Location 033W000102 was the only sample collected during this phase. Nine of the 15 detections exceeded the reference concentration. In general, inorganic constituents detected in surface water at Wetland 10 increased between Phase II and Phase IV sampling events.

Organics — Pesticides, PCBs, SVOCs, and VOCs were not analyzed during the Phase IV surface water investigation.

12.1.4 Ecological Risk Assessment

12.1.4.1 Phase II Investigation Summary — Wetland 10

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 12-1-5, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than one or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 12-1-6.

Baseline Problem Formulation — Wetland 10 Sediment COPC Refinement

During the COPC refinement, additional information was used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. This risk assessment presents a statement of potential risk for each of the COPCs.

The COPC refinement process included:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to basewide (reference) concentrations for total DDT

- Comparison of inorganic constituents to reference wetland values
- Interpretive tool for metals
- Di Toro EqP SQGs for VOCs
- Comparison to Swartz consensus values
- Mean ERM quotients
- Description of exceedances of RVs and their extent

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 12-1-7. Additionally, the tables compare: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 10concentrations to reference concentrations. COPCs retained after refinement are presented in Table 12-1-8.

For Wetland 10, barium, cadmium, chromium, cobalt, copper, lead, manganese, and nickel exceeded their Site 41 freshwater sediment reference concentrations and were retained as COPCs, expect for copper, which was below the reference value (Table 12-1-7). Concentrations of cadmium, chromium, copper, lead, and nickel appeared enriched, when normalized to aluminum and iron concentrations, using FDEP's interpretative tool (Appendix K). At Wetland 10, seven inorganic constituents (barium, cadmium, chromium, cobalt, lead, manganese, and nickel) were retained after the screening and refinement process. Many of the highest detections occurred at location 033M004001.

The major class of contaminants found at this wetland was pesticides. Total DDT was detected at location 033M003001 and had the highest HQ values for this wetland (Figure 12-5). Location 033M003001 is midway in the long narrow, finger shaped wetland and close to a nearby service road. Total DDT was also above the basewide level, indicating that 4,4'-DDT and its daughter products were detected in ranges above regular pesticide application levels. Other pesticides retained through the refinement process included aldrin, endosulfan I, heptachlor, heptachlor epoxide, total endrin, and total BHC. These pesticides were assessed in the OU-wide food chain models.

Total PCBs, specifically aroclor-1260, generated an RV HQ greater than the reference value and was therefore retained as a COPC.

No VOCs were detected in Wetland 10; however, six SVOCs were detected and retained due to lack of screening values. Those constituents included 1,2-dichlorbenzene, 1,4-dichlorobenzene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene. When normalized to detected TOC concentrations, PAHs did not appear to be a risk driver for Wetland 10 and were not retained. Total normalized PAHs are presented in Figure 12-6.

Table 12-1-9 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Figure 12-7 shows the Mean ERM category for each sediment sample location at Wetland 10. Based on this approach, two sample locations (041M10A101 and 041M10A201) were determined to be Category 1, indicating that sediments from these areas of the wetland were considered nontoxic. Five sample locations (033M001001 through 033M004001 and 041M10A301) were determined to be Category 2, which, according to tests evaluated in developing this methodology, had average survival rates of approximately 80% of control sediments; however, this Category also has the highest level of uncertainty.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 12-1-10, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 12-1-11.

Baseline Problem Formulation — Wetland 10 Surface Water COPC Refinement

During the surface water COPC refinement, additional information was used to evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs.

The COPC refinement process included:

- Comparison of maximum SV concentrations to average SV concentrations
- Comparison of inorganic constituents to reference wetland values
- Description of surface water exceedances and their extent

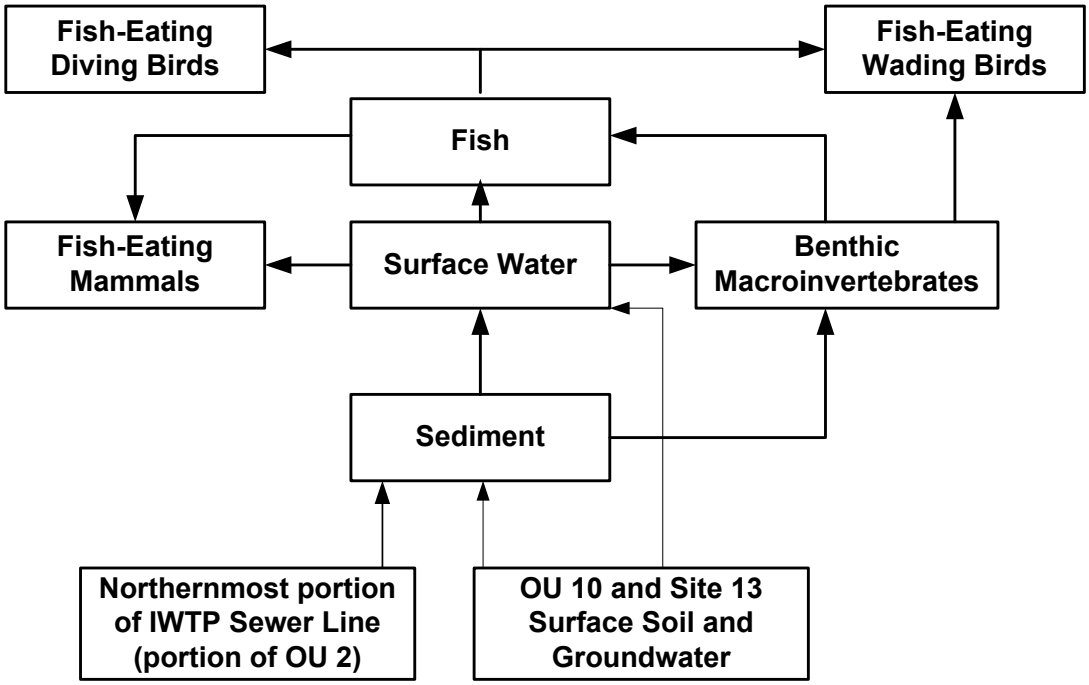
The methods used in the COPC refinement in the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 12-1-12. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland. COPCs retained after refinement are presented in Table 12-1-13.

For Wetland 10, aluminum, barium, cadmium, calcium, iron, and manganese exceeded their Site 41 freshwater reference surface water concentrations (Table 12-1-12) and were retained as COPCs. Several pesticides were also detected at Wetland 10, including total DDT and its daughter produces, total BHC, total chlordane, and heptachlor epoxide. Most of the concentrations were detected at sample location 033W003002. Xylene (total) was also detected in Wetland 10 surface water and retained as a COPC due to lack of screening values.

The following constituents were retained when following the ERA process in both sediment and surface water samples collected for Wetland 10 site investigation: barium, cadmium, manganese, 4,4'-DDD, 4,4'-DDT, heptachlor epoxide, alpha-chlordane, gamma-chlordane, total chlordane, and total-BHC.

The conceptual site model below symbolizes which environmental habitats may be impacted by Wetland 10 Phase II constituents retained during the ERA process.

Wetland 10
Conceptual Site Model



12.1.4.2 Phase IV Investigation Summary (2004) — Wetland 10

An additional surface water sample was collected and analyzed for TAL metals in 2004 to confirm the inorganic exceedances at 033W001002.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 12-1-14, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 12-1-15.

Baseline Problem Formulation — Wetland 10 Surface Water COPC Refinement

The same approach used to evaluate Phase II surface water samples (Section 12.1.4.1) was applied to Phase IV surface water (EnSafe, 2004b).

The methods used in the COPC refinement in the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 12-1-16. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland. A list of COPCs retained after refinement are presented in Table 12-1-17.

For Wetland 10, barium, calcium, manganese, and selenium exceeded their Site 41 freshwater reference surface water concentrations (Table 12-1-16) and were retained as COPCs.

Based on the Phase IV surface water sample, cadmium was no longer a concern for surface water at Wetland 10.

12.1.4.3 Comparison of Phase II and IV Surface Water Results

Both the Phase II and IV results indicated inorganic constituents were of greatest concern for Wetland 10 surface water. Concentrations increased among constituents common between the two phases. The exception was barium and selenium, which decreased during that same period.

The differences between the Phase II and Phase IV (EnSafe, 2004b) sampling efforts are presented below.

Surface Water

Constituent	Concentration Detected in Phase II	Concentration Detected in Phase IV	Difference
Metals mg/L			
Barium	16.1	15	-1.1 drop
Calcium	14,500	46,000	+31,500 increase
Manganese	280	290	+10 increase

Note:
mg/L = Micrograms per Liter

Additional surface water samples were collected in the Phase IV site investigation of Wetland 10 to verify the cadmium concentrations detected in the Phase II sampling efforts.

During the Phase II surface water sampling, the maximum cadmium concentrations was detected at 033W001002 with a concentration of 5.2 µg/L, which generated an average SV HQ of 4.81 and exceeded the fresh surface water reference concentration of 3 µg/L. Cadmium was detected in 2004 with a concentration of 0.82 µg/L at sample location 033W000102. The concentration generated an average SV HQ of 1.24; however, the detection was below the fresh surface water reference concentration.

As summarized in the approved *Final RI/FS SAP Addendum* (E/A&H, 1997d), Wetland 10 was identified as an Red-Coded Wetland based on the Phase II results, indicating contamination that was possibly related to nearby IR sites, but with limited contaminants exceeding sediment criteria and reference concentrations.

Contaminants detected in these wetlands were also considered to be possible sources of ecological risk. Wetland 10 was also classified as a Group D wetland. Based on similar contaminants and physical characteristics, the other Group D wetlands included 6, 5B, 1B, and W1. As stated in the approved SAP, Group D wetlands were not identified for further sampling.

12.1.5 Wetland 10 — Human Health Risk Assessment

Wetland 10 is described in Section 12.1.1, and the HHRA is summarized below.

12.1.5.1 Site Data

Sediment data were collected at Wetland 10 during Phase II, and surface water was collected during Phase II and Phase IV of the RI. Section 12.1.3 summarizes the nature and extent of

contamination for this wetland. Surface water and sediment data are summarized in Tables 12 1-2 through 12-1-4.

12.1.5.2 Conceptual Site Model

As described in Section 12.1.1, Wetland 10 is a drainage ditch located at the southern end of Magazine Point. It collects storm water from the southern end of OU 10, the northern portion of the NATTC, and conveys this runoff to Pensacola Bay. Homeland security restrictions at Wetland 10 prevent trespassing and fishing. However, Navy maintenance personnel could access this wetland.

Dermal contact with surface water could be a significant exposure pathway and was included in this HHRA. Sediment locations are inundated all year at some locations, preventing significant sediment exposure. However, sediment dries at other locations, where exposure could be similar to soil exposure. Contact with sediment was assessed for all sediment locations using soil exposure models. Based on the species present, depth of surface water, and available habitat, fishing would not likely occur. Therefore, fish ingestion was excluded. Wading during maintenance activities would be the most likely exposure scenario.

The following scenario and exposure pathways were evaluated for Wetland 10:

Scenario	Medium	Ingestion	Dermal
Maintenance	Sediment	√	√
	Surface water	√	√

12.1.5.3 Risk Characterization

The adult maintenance worker scenario was assessed for this wetland as described in Section 9.

Maintenance Worker

Wetland 10 Phase II

As shown in Tables 12-1-18 through 12-1-23, sediment and surface water risk estimates for Wetland 10 were below FDEP's risk threshold. Sediment hazard indices were below 1.0.

The hazard index for surface water was above 1.0 primarily due to silver, with a dermal hazard quotient of 0.9. 4,4'-DDT contributed 0.2 to the total hazard index, and no other chemical contributed more than 0.1.

Silver and 4,4'-DDT target different organs. As documented in USEPA's IRIS database, silver targets the skin, while 4,4'-DDT targets the liver. Therefore, hazard indices for silver and 4,4'-DDT should be considered separately. Neither exceeds 1.0. Therefore, neither silver or 4,4'-DDT were identified as COPCs.

Summary of Wetland 10 Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	3.55E-02	5.59E-07
	Surface water	1.13E+00	1.80E-06

Based on Phase II sediment and surface water data, no COCs were identified for Wetland 10.

Wetland 10 Phase IV/2004 Data

As shown in Tables 12-1-24 through 12-1-26, surface water risk estimates were below FDEP's risk threshold, and hazard indices were below 1.0.

Summary of Wetland 10 Phase IV Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Surface water	1.0E-02	N/A

Based on these data, no COCs were identified for the Wetland 10 Phase IV data.

Wetland 10 HHRA COC Summary

No COCs were identified in the HHRA for Wetland 10.

12.1.6 Wetland 10 — Fate and Transport Analysis

This wetland is located on the northern boundary of the Chevalier Field area and is intersected by Wetland 12 at its approximate middle. Because of its upgradient position to OU10, there are no borings or wells proximal to this wetland; therefore, only the sediment/surface water transport pathways were completed. It was noteworthy that a now-closed UST site was located near the southern boundary of this wetland.

Ten sediment and four surface water samples were collected (four sediment and one surface water collected prior to the confluence with Wetland 12) from this wetland and were used to evaluate the

transport pathways. The wetland flows from the west to the east and discharges into Pensacola Bay.

Surface Water/Sediment Transport within the Wetlands:

Surface Water — Evaluation of the surface water transport pathway compared upgradient location 033W0001 (prior to the confluence with Wetland 12) with downgradient locations 033W0002 (post Wetland 12 confluence), and 033W0004 (immediately prior to discharge to Pensacola Bay).

Evaluation of upgradient 033W0001 with downgradient 033W0002 did not indicate much change in the number of detected parameters (10 metals and four organics in the upgradient versus nine metals and three organics in the downgradient). For the metals, from upgradient to downgradient, four parameters decreased in concentration, four increased, and one parameter was present downgradient that was not detected upgradient. For the organics, two compounds were present downgradient that were not detected upgradient, and one organic exhibited an increase in concentration. The organics detected at both locations consisted of pesticides and very low concentration of VOCs. The pesticides were application residuals, and the VOCs are likely to be associated with the former UST site on the southern edge of the wetland.

Evaluation of upgradient location 033W0002 with downgradient 033W0004 indicated only slight changes in detections (nine metals and three metals in the upgradient location versus eight metals and five organics in the downgradient location). For the metals, all eight metals detected in the downgradient location exhibited only slight decreases in concentration. For the organics, four compounds were present in the downgradient locations that were not present in the upgradient. The only organic detected in both locations exhibited a slight decrease. Organics detected were pesticides and a VOC. The pesticides were likely application residuals, and the VOC may be related to influence from the now-closed UST site on the southern boundary of the wetland.

Sediment — To evaluate this pathway, upgradient sample location 033M0001 (prior to Wetland 12 confluence) was compared to downgradient locations 033M0002 (post Wetland 12 confluence) and 033M0004 (immediately prior to discharge to Pensacola Bay).

Evaluation of upgradient 033M0001 with downgradient 033M0002 indicated a decrease in inorganic detections and an increase in organics (11 metals and 10 organics in the upgradient versus 13 metals and 12 organics in the downgradient location). All changes in concentrations

were slight. For the metals, two parameters were present in the downgradient locations that were not detected in the upgradient location, four exhibited an increase, and seven constituents exhibited a decrease. For the organics, two compounds were present in the downgradient that were not detected in the upgradient samples, four exhibited an increase, and six compounds exhibited a decrease. The organics detected were primarily pesticides. Overall, there were no trends in concentration changes.

Evaluation of upgradient location 033M0002 with downgradient 033M0004 indicated 13 metals and 12 organics in the upgradient versus 13 metals and 11 organics in the downgradient. For the metals, only one constituent was present in the downgradient location that was not detected in the upgradient samples, one exhibited a downgradient decrease, and 11 parameters exhibited an increase. The increase in metals and decrease in organics may be due to influences from Pensacola Bay. Sandy sediments in this system can be high in metallic oxides, and tidal currents may hydraulically eliminate TOC material.

Table 12-1-1
Wetland 10 Phase II
Sediment Physical Parameters

Parameter		033M001001	033M002001	033M003001	033M004001	041M10A101	041M10A201	041M10A301	041M10A401	041M10A501	041M10A601
TOC (%)		No Data	No Data	No Data	No Data	0.369	0.203	0.564	No Data	No Data	No Data
Percent Solids (%)		No Data	No Data	No Data	No Data	61.9	83.4	82.6	No Data	No Data	No Data
Grain Size Analysis (percent of composition[1])											
	Coarse Sand	No Data	No Data	No Data	No Data	1	1	2	2	1	0
	Medium Sand	No Data	No Data	No Data	No Data	16	26	28	28	29	35
	Fine Sand	No Data	No Data	No Data	No Data	78	68	67	67	67	64
	Silt and Clay	No Data	No Data	No Data	No Data	5	5	3	3	3	1
	Description	N/A	N/A	N/A	N/A	Light Brown Poorly Graded Sand, Medium to Fine, with Silt	Light Brown Poorly Graded Sand, Medium to Fine, with Silt	Brown Poorly Graded Sand, Medium to Fine, with Silt	Brown Poorly Graded Sand, Medium to Fine, with Trace of Silt	Brown Poorly Graded Sand, Medium to Fine, with Trace of Silt	Light Brown Poorly Graded Sand, Medium

Notes:
[1] = Derived from sieve analyses.
Contains data collected as part of OU 10 (January 1993) and Site 41 (November 1995)

Table 12-1-2
Wetland 10 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	13,610.000	0	7	7	1,100.0	8,910.0	3,710.0	041M10A201
Antimony	4.430	4	1	7	0.190	0.190	4.330	041M10A301
Arsenic	6.620	0	6	7	0.820	6.20	2.190	033M004001
Barium	14.000	1	7	7	1.60	15.10	6.290	033M004001
Cadmium	1.800	2	4	7	0.270	34.60	5.830	033M004001
Calcium	10,756.670	0	7	7	155.0	3,880.0	1,400.0	041M10A301
Chromium	39.370	2	7	7	4.90	1,180.0	188.0	033M004001
Cobalt	2.800	1	1	7	3.90	3.90	1.490	041M10A201
Copper	19.500	1	5	7	2.40	45.10	10.80	033M004001
Iron	11,911.670	0	7	7	710.0	7,420.0	2,270.0	041M10A201
Lead	82.470	1	7	7	5.30	161.0	35.0	033M004001
Magnesium	7,513.330	0	5	7	46.20	242.0	110.0	033M002001
Manganese	37.970	1	7	7	4.10	135.0	30.90	041M10A201
Nickel	9.280	1	4	7	1.0	52.10	10.20	033M004001
Potassium	1,628.670	0	3	7	19.50	38.10	307.0	041M10A101
Selenium	3.450	0	1	7	0.20	0.20	0.360	041M10A301
Silver	2.100	0	1	7	0.320	0.320	0.945	041M10A201
Sodium	18,993.330	0	5	7	35.20	482.0	134.0	033M002001
Thallium	1.570	0	1	7	1.50	1.50	0.450	041M10A301
Vanadium	28.670	0	3	7	4.60	16.40	5.110	041M10A201
Zinc	36.730	3	7	7	6.70	115.0	34.0	033M004001
PAHs (g/kg)								
Acenaphthylene	N/A	0	2	7	32.0	33.0	133.0	041M10A101
Anthracene	N/A	0	1	7	22.0	22.0	130.0	041M10A101
Benzo(a)anthracene	N/A	0	3	7	27.0	87.0	147.0	041M10A101
Benzo(a)pyrene	N/A	0	3	7	27.0	110.0	153.0	041M10A101
Chrysene	N/A	0	3	7	30.0	97.0	150.0	041M10A101
Fluoranthene	N/A	0	4	7	43.0	140.0	141.0	041M10A101
Phenanthrene	N/A	0	2	7	22.0	23.0	130.0	041M10A301
Pyrene	N/A	0	3	7	39.0	110.0	155.0	041M10A101
Total PAHs	N/A	0	4	7	327.0	2,563.0	1,780.0	033M004001
Pesticides and PCBs (g/kg)								
Aroclor-1260	N/A	0	2	7	12.0	49.0	15.20	033M001001
Total PCBs	N/A	0	2	7	163.0	203.50	105.0	033M001001
Aldrin	N/A	0	2	7	0.078	0.120	0.371	033M002001
Dieldrin	N/A	0	1	7	0.390	0.390	1.020	033M004001
Endosulfan I	N/A	0	3	7	0.130	0.210	0.279	033M002001
Heptachlor	N/A	0	4	7	0.099	0.230	0.101	033M003001
Heptachlor epoxide	N/A	0	3	7	0.10	0.840	0.473	033M001001
alpha-Chlordane	N/A	0	6	7	0.130	0.960	0.279	033M001001
gamma-Chlordane	N/A	0	3	7	0.270	0.820	0.401	033M001001
Total Chlordane	N/A	0	6	7	0.20	1.780	0.680	033M001001
Endrin	N/A	0	2	7	0.410	2.30	1.050	033M003001
Endrin aldehyde	N/A	0	1	7	0.530	0.530	1.040	033M004001
Total Endrin	N/A	0	2	7	3.090	6.50	3.370	033M003001
delta-BHC	N/A	0	3	7	0.380	0.880	0.419	033M001001
gamma-BHC (Lindane)	N/A	0	2	7	0.074	0.120	0.356	033M002001
Total BHC	N/A	0	3	7	2.740	3.530	2.070	033M003001
4,4'-DDD	50.000	1	4	7	25.0	120.0	31.20	033M003001
4,4'-DDE	40.000	2	6	7	0.250	96.0	27.40	033M003001
4,4'-DDT	20.000	1	6	7	0.250	48.0	10.20	033M003001
Total DDT	110.000	1	6	7	0.885	264.0	68.80	033M003001
SVOCs (g/kg)								
1,2-Dichlorobenzene	N/A	0	1	7	28.0	28.0	183.0	041M10A301
1,4-Dichlorobenzene	N/A	0	1	7	31.0	31.0	183.0	041M10A301
Benzo(b)fluoranthene	N/A	0	2	7	150.0	190.0	172.0	041M10A101
Benzo(g,h,i)perylene	N/A	0	3	7	26.0	72.0	145.0	041M10A201
Benzo(k)fluoranthene	N/A	0	2	7	63.0	74.0	143.0	041M10A101
bis(2-Ethylhexyl)phthalate (BEH	N/A	0	1	7	52.0	52.0	140.0	041M10A301
Butylbenzylphthalate	N/A	0	1	7	35.0	35.0	112.0	041M10A201
Indeno(1,2,3-cd)pyrene	N/A	0	3	7	24.0	72.0	144.0	041M10A101

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 12-1-3
Wetland 10 Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (g/L)								
Aluminum	1,090.25	1	4	4	696.0	1,280.0	917.0	033W001002
Barium	3.7	4	4	4	11.9	16.1	13.4	033W001002
Cadmium	3.0	1	1	4	5.2	5.2	5.2	033W001002
Calcium	7,675.0	4	4	4	12,900.0	14,500.0	13,600.0	033W002002
Chromium	8.0	1	1	4	10.8	10.8	10.8	033W002002
Iron	2,360.0	1	4	4	808.0	5,110.0	1,950.0	033W001002
Lead	3.2	0	1	4	2.4	2.4	2.4	033W001002
Magnesium	20,260.0	0	4	4	2,950.0	5,470.0	4,600.0	033W002002
Manganese	13.2	3	4	4	11.3	280.0	87.3	033W001002
Sodium	182,200.0	0	4	4	5,050.0	24,500.0	17,900.0	033W002002
Zinc	5.53	4	4	4	29.0	39.2	36.0	033W002002
Pesticides (g/L)								
Heptachlor	N/A	0	1	4	0.0014	0.0014	0.0014	033W001002
Heptachlor epoxide	N/A	0	1	4	0.0013	0.0013	0.0013	033W003002
alpha-Chlordane	N/A	0	1	4	0.0013	0.0013	0.0013	033W003002
gamma-Chlordane	N/A	0	2	4	0.003	0.0034	0.0032	033W001002
Total Chlordane	N/A	0	3	4	0.0263	0.0284	0.0276	033W004002
alpha-BHC	N/A	0	2	4	0.0027	0.0043	0.0035	033W002002
Total BHC	N/A	0	2	4	0.0777	0.0793	0.0785	033W003002
4,4'-DDD	N/A	0	2	4	0.041	0.11	0.0755	033W003002
4,4'-DDE	N/A	0	4	4	0.0021	0.045	0.018	033W003002
4,4'-DDT	N/A	0	2	4	0.008	0.047	0.0275	033W003002
Total DDT	N/A	0	4	4	0.06	0.202	0.12	033W004002
VOCs (g/L)								
Toluene	N/A	0	1	4	2.0	2.0	2.0	033W002002
Xylene (Total)	N/A	0	3	4	1.0	2.0	1.67	033W004002

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 12-1-4
Wetland 10 Phase IV
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (g/L)								
Aluminum	1,090.25	0	1	1	480.0	480.0	480.0	033W000102
Barium	3.68	1	1	1	15.0	15.0	15.0	033W000102
Beryllium	1.0	0	1	1	0.5	0.5	0.5	033W000102
Cadmium	3.0	0	1	1	0.82	0.82	0.82	033W000102
Calcium	7,675.0	1	1	1	46,000.0	46,000.0	46,000.0	033W000102
Copper	4.0	0	1	1	1.6	1.6	1.6	033W000102
Iron	2,360.0	0	1	1	900.0	900.0	900.0	033W000102
Magnesium	20,260.0	0	1	1	6,900.0	6,900.0	6,900.0	033W000102
Manganese	13.2	1	1	1	290.0	290.0	290.0	033W000102
Nickel	12.0	0	1	1	2.7	2.7	2.7	033W000102
Potassium	6,995.0	0	1	1	4,000.0	4,000.0	4,000.0	033W000102
Selenium	3.0	1	1	1	8.9	8.9	8.9	033W000102
Sodium	182,200.0	0	1	1	33,000.0	33,000.0	33,000.0	033W000102
Vanadium	4.7	0	1	1	3.3	3.3	3.3	033W000102
Zinc	5.53	0	1	1	2.0	2.0	2.0	033W000102

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 12-1-5
Wetland 10 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detect	Maximum Detect	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	7	7			1,100	8,910	041M10A201	8,910			N/A		Yes	No SV
Antimony	1	7	0.095	7.6	0.19	0.19	041M10A301	0.19	J	12	2	0.02	No	Max Detect < SV
Arsenic	6	7	0.5	0.5	0.82	6.2	033M004001	6.2		7.24	1, 2	0.86	No	Max Detect < SV
Barium	7	7			1.6	15.1	033M004001	15.1	J		N/A		Yes	No SV
Beryllium	0	7	0.03	0.4			ND	0.4	U		N/A		Yes	No SV
Cadmium	**4**	**7**	**0.13**	**0.65**	**0.27**	**34.6**	**033M004001**	**34.6**		**0.676**	**1**	**51.2**	**Yes**	**Max Detect > SV**
Calcium	7	7			155	3,880	041M10A301	3,880	J		N/A		Yes	No SV
Chromium	**7**	**7**			**4.9**	**1,180**	**033M004001**	**1,180**		**52.3**	**1, 2**	**22.6**	**Yes**	**Max Detect > SV**
Cobalt	1	7	0.095	1.6	3.9	3.9	041M10A201	3.9			N/A		Yes	No SV
Copper	**5**	**7**	**3.2**	**3.3**	**2.4**	**45.1**	**033M004001**	**45.1**		**18.7**	**1, 2**	**2.41**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	7	0.295	0.4			ND	0.4	U		N/A		Yes	No SV
Iron	7	7			710	7,420	041M10A201	7,420			N/A		Yes	No SV
Lead	**7**	**7**			**5.3**	**161**	**033M004001**	**161**		**30.2**	**1, 2**	**5.33**	**Yes**	**Max Detect > SV**
Magnesium	5	7	70	71.5	46.2	242	033M002001	242	J		N/A		Yes	No SV
Manganese	7	7			4.1	135	041M10A201	135			N/A		Yes	No SV
Mercury	0	7	0.025	0.065			ND	0.065	U	0.13	1, 2	0.5	No	Max SQL< SV
Nickel	**4**	**7**	**4.85**	**5.05**	**1**	**52.1**	**033M004001**	**52.1**		**15.9**	**1, 2**	**3.28**	**Yes**	**Max Detect > SV**
Potassium	3	7	505	525	19.5	38.1	041M10A101	38.1	J		N/A		Yes	No SV
Selenium	1	7	0.09	0.55	0.2	0.2	041M10A301	0.2	J		N/A		Yes	No SV
Silver	1	7	0.125	1.8	0.32	0.32	041M10A201	0.32	J	0.733	1	0.44	No	Max Detect < SV
Sodium	5	7	1.2	1.65	35.2	482	033M002001	482	J		N/A		Yes	No SV
Thallium	1	7	0.09	0.395	1.5	1.5	041M10A301	1.5	J		N/A		Yes	No SV
Vanadium	3	7	1.9	2	4.6	16.4	041M10A201	16.4			N/A		Yes	No SV
Zinc	7	7			6.7	115	033M004001	115		124	1, 2	0.93	No	Max Detect < SV
PAHs (g/kg)														
2-Methylnaphthalene	0	7	20	215			ND	215	U	20.2	1	10.6	Yes	Max SQL > SV
Acenaphthene	0	7	9.5	215			ND	215	U	6.71	1	32	Yes	Max SQL > SV
Acenaphthylene	**2**	**7**	**20**	**215**	**32**	**33**	**041M10A101**	**33**	**J**	**5.87**	**1**	**5.62**	**Yes**	**Max Detect > SV**
Anthracene	1	7	20	215	22	22	041M10A101	22	J	46.9	1	0.47	No	Max Detect < SV
Benzo(a)anthracene	**3**	**7**	**205**	**215**	**27**	**87**	**041M10A101**	**87**		**74.8**	**1**	**1.16**	**Yes**	**Max Detect > SV**
Benzo(a)pyrene	**3**	**7**	**205**	**215**	**27**	**110**	**041M10A101**	**110**		**88.8**	**1**	**1.24**	**Yes**	**Max Detect > SV**
Chrysene	3	7	205	215	30	97	041M10A101	97		108	1	0.90	No	Max Detect < SV
Dibenz(a,h)anthracene	0	7	20	215			ND	215	U	6.22	1	34.6	Yes	Max SQL > SV
Fluoranthene	**4**	**7**	**205**	**215**	**43**	**140**	**041M10A101**	**140**		**113**	**1**	**1.24**	**Yes**	**Max Detect > SV**
Fluorene	0	7	9.5	215			ND	215	U	21.2	1	10.1	Yes	Max SQL > SV
Naphthalene	0	7	20	215			ND	215	U	34.6	1	6.21	Yes	Max SQL > SV
Phenanthrene	2	7	20	215	22	23	041M10A301	23	J	86.7	1	0.27	No	Max Detect < SV
Pyrene	3	7	205	215	39	110	041M10A101	110		153	1	0.72	No	Max Detect < SV
Total PAHs	**4**	**7**	**2,670**	**2,800**	**327**	**2,560**	**033M004001**	**2,560**		**1,684**	**1, 2**	**1.52**	**Yes**	**Max Detect > SV**
TOC Normalized PAHs	**4**	**7**	**####**	**####**	**57.98**	**1,262.56**	**033M004001**	**####**		**290**	**3**	**4.35**	**Yes**	**Max Detect > SV**
PCBs (g/kg)														
Aroclor-1016	0	7	1.05	22			ND	22	U	21.6	N/A	1.02	Yes	Max SQL > SV
Aroclor-1221	0	7	2	44.5			ND	44.5	U	67	2	0.66	No	Max SQL< SV
Aroclor-1232	0	7	1.05	22			ND	22	U	21.6	N/A	1.02	Yes	Max SQL > SV
Aroclor-1242	0	7	1.05	22			ND	22	U	21.6	N/A	1.02	Yes	Max SQL > SV
Aroclor-1248	0	7	1.05	22			ND	22	U	21.6	N/A	1.02	Yes	Max SQL > SV
Aroclor-1254	0	7	1.05	22			ND	22	U	21.6	N/A	1.02	Yes	Max SQL > SV
Aroclor-1260	**2**	**7**	**1.05**	**21.5**	**12**	**49**	**033M002001**	**49**	**J**	**21.6**	**N/A**	**2.27**	**Yes**	**Max Detect > SV**
Total PCBs	**2**	**7**	**8.3**	**172**	**163**	**204**	**033M002001**	**204**		**21.6**	**1**	**9.42**	**Yes**	**Max Detect > SV**
Pesticides (g/kg)														
Aldrin	2	7	0.05	1.15	0.078	0.12	033M002001	0.12	J		N/A		Yes	No SV
Dieldrin	1	7	0.105	2.2	0.39	0.39	033M004001	0.39	J	0.716	1	0.55	No	Max Detect < SV
Endosulfan I	3	7	0.105	1.15	0.13	0.21	033M002001	0.21	J		N/A		Yes	No SV
Endosulfan II	0	7	0.105	2.2			ND	2.2	U		N/A		Yes	No SV
Endosulfan sulfate	0	7	0.105	2.2			ND	2.2	U		N/A		Yes	No SV
Heptachlor	4	7	0.05	0.05	0.099	0.23	033M003001	0.23	J		N/A		Yes	No SV
Heptachlor epoxide	3	7	0.05	1.1	0.1	0.84	033M001001	0.84	J		N/A		Yes	No SV
Methoxychlor	0	7	0.5	11.5			ND	11.5	U		N/A		Yes	No SV
Toxaphene	0	7	5	115			ND	115	U		N/A		Yes	No SV
alpha-Chlordane	6	7	0.05	0.05	0.13	0.96	033M001001	0.96	J	1.7	1	0.57	No	Max Detect < SV
gamma-Chlordane	3	7	0.05	1.05	0.27	0.82	033M001001	0.82	J	1.7	1	0.48	No	Max Detect < SV
Total Chlordane	**6**	**7**	**0.1**	**0.1**	**0.2**	**1.78**	**033M001001**	**1.78**		**1.7**	**1**	**1.05**	**Yes**	**Max Detect > SV**
Endrin	2	7	0.105	2.2	0.41	2.3	033M003001	2.3	J	3.3	2	0.70	No	Max Detect < SV
Endrin aldehyde	1	7	0.105	2.2	0.53	0.53	033M004001	0.53	J	3.3	2	0.16	No	Max Detect < SV
Endrin ketone	0	7	0.105	2.2			ND	2.2	U	3.3	2	0.67	No	Max SQL< SV
Total Endrin	**2**	**7**	**0.315**	**6.6**	**3.09**	**6.5**	**033M003001**	**6.5**		**3.3**	**2**	**1.97**	**Yes**	**Max Detect > SV**
alpha-BHC	0	7	0.05	1.15			ND	1.15	U		N/A		Yes	No SV
beta-BHC	0	7	0.05	1.15			ND	1.15	U	0.32	N/A	3.59	Yes	Max SQL > SV
delta-BHC	**3**	**7**	**0.05**	**1.1**	**0.38**	**0.88**	**033M003001**	**0.88**	**J**	**0.32**	**N/A**	**2.75**	**Yes**	**Max Detect > SV**
gamma-BHC (Lindane)	2	7	0.05	1.1	0.074	0.12	033M002001	0.12	J	0.32	1	0.38	No	Max Detect < SV
Total BHC	**3**	**7**	**0.2**	**4.4**	**2.74**	**3.53**	**033M003001**	**3.53**		**0.32**	**2**	**11**	**Yes**	**Max Detect > SV**
4,4'-DDD	**4**	**7**	**0.105**	**0.105**	**25**	**120**	**033M003001**	**120**	**J**	**1.22**	**1**	**98.4**	**Yes**	**Max Detect > SV**
4,4'-DDE	**6**	**7**	**0.105**	**0.105**	**0.25**	**96**	**033M003001**	**96**	**J**	**2.07**	**1**	**46.4**	**Yes**	**Max Detect > SV**
4,4'-DDT	**6**	**7**	**0.105**	**0.105**	**0.25**	**48**	**033M003001**	**48**	**J**	**1.19**	**1**	**40.3**	**Yes**	**Max Detect > SV**
Total DDT	**6**	**7**	**0.315**	**0.315**	**0.885**	**264**	**033M003001**	**264**		**3.3**	**2**	**80**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	7	200	215			ND	215	U		N/A		Yes	No SV
1,2-Dichlorobenzene	1	7	200	215	28	28	041M10A301	28	J		N/A		Yes	No SV
1,3-Dichlorobenzene	0	7	200	215			ND	215	U		N/A		Yes	No SV
1,4-Dichlorobenzene	1	7	200	215	31	31	041M10A301	31	J		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	7	200	215			ND	215	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	7	480	500			ND	500	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	7	200	215			ND	215	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	7	200	215			ND	215	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	7	200	215			ND	215	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	7	480	500			ND	500	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	7	200	215			ND	215	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	7	200	215			ND	215	U		N/A		Yes	No SV
2-Chloronaphthalene	0	7	200	215			ND	215	U		N/A		Yes	No SV
2-Chlorophenol	0	7	200	215			ND	215	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	7	480	500			ND	500	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	7	200	215			ND	215	U		N/A		Yes	No SV
2-Nitroaniline	0	7	200	500			ND	500	U		N/A		Yes	No SV
2-Nitrophenol	0	7	200	215			ND	215	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	7	200	215			ND	215	U		N/A		Yes	No SV
3-Nitroaniline	0	5	485	500			ND	500	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	7	200	215			ND	215	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	7	200	215			ND	215	U		N/A		Yes	No SV
4-Chloroaniline	0	7	200	215			ND	215	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	7	200	215			ND	215	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	0	7	200	215			ND	215	U		N/A		Yes	No SV
4-Nitroaniline	0	7	480	500			ND	500	U		N/A		Yes	No SV
4-Nitrophenol	0	7	480	500			ND	500	U		N/A		Yes	No SV
Benzo(b)fluoranthene	2	7	20	215	150	190	041M10A101	190			N/A		Yes	No SV
Benzo(g,h,i)perylene	3	7	205	215	26	72	041M10A201	72			N/A		Yes	No SV
Benzo(k)fluoranthene	2	7	20	215	63	74	041M10A101	74			N/A		Yes	No SV
bis(2-Chloroethoxy)methane	0	7	200	215			ND	215	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	7	20	215			ND	215	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	1	7	29.5	210	52	52	041M10A301	52	J	182	1, 2	0.29	No	Max Detect < SV
Butylbenzylphthalate	1	7	70	205	35	35	041M10A201	35	J	182	1, 2	0.19	No	Max Detect < SV
Carbazole	0	7	200	215			ND	215	U		N/A		Yes	No SV

Table 12-1-5
Wetland 10 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detect	Maximum Detect	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
Dibenzofuran	0	7	200	215			ND	215	U		N/A		Yes	No SV
Diethylphthalate	0	7	200	215			ND	215	U	182	1, 2	1.18	Yes	Max SQL > SV
Dimethylphthalate	0	7	200	215			ND	215	U	182	1, 2	1.18	Yes	Max SQL > SV
Di-n-butylphthalate	0	7	200	215			ND	215	U	182	1, 2	1.18	Yes	Max SQL > SV
Di-n-octylphthalate	0	7	200	215			ND	215	U	182	1, 2	1.18	Yes	Max SQL > SV
Hexachlorobenzene	0	7	200	215			ND	215	U		N/A		Yes	No SV
Hexachlorobutadiene	0	7	200	215			ND	215	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	7	200	215			ND	215	U		N/A		Yes	No SV
Hexachloroethane	0	7	200	215			ND	215	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	3	7	205	215	24	72	041M10A101	72			N/A		Yes	No SV
Isophorone	0	7	200	215			ND	215	U		N/A		Yes	No SV
Nitrobenzene	0	7	200	215			ND	215	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	7	20	215			ND	215	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	7	200	215			ND	215	U		N/A		Yes	No SV
Pentachlorophenol	0	7	480	500			ND	500	U		N/A		Yes	No SV
Phenol	0	7	200	215			ND	215	U		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,1-Dichloroethane	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,1-Dichloroethene	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,2-Dichloroethane	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
1,2-Dichloropropane	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
2-Butanone (MEK)	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
2-Hexanone	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Acetone	0	7	6	24			ND	24	U		N/A		Yes	No SV
Benzene	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Bromodichloromethane	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Bromoform	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Bromomethane	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Carbon disulfide	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Carbon tetrachloride	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Chlorobenzene	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Chloroethane	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Chloroform	0	7	1	6.5			ND	6.5	U		N/A		Yes	No SV
Chloromethane	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Dibromochloromethane	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Ethylbenzene	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Methylene chloride	0	7	5	10.5			ND	10.5	U		N/A		Yes	No SV
Styrene	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Tetrachloroethene	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Toluene	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Trichloroethene	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV
Vinyl chloride	0	7	2	6.5			ND	6.5	U		N/A		Yes	No SV
Xylene (Total)	0	7	6	6.5			ND	6.5	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 12-1-6
Wetland 10 Phase II
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Aluminum	4,4'-DDD	1,2-Dichlorobenzene	None
Barium	4,4'-DDE	1,4-Dichlorobenzene	
Cadmium	4,4'-DDT	Acenaphthylene	
Calcium	Aldrin	Benzo(a)anthracene	
Chromium	delta-BHC	Benzo(a)pyrene	
Cobalt	Endosulfan I	Benzo(b)fluoranthene	
Copper	Heptachlor	Benzo(g,h,i)perylene	
Iron	Heptachlor epoxide	Benzo(k)fluoranthene	
Lead	Total BHC	Fluoranthene	
Magnesium	Total Chlordane	Indeno(1,2,3-cd)pyrene	
Manganese	Total DDT	Total PAHs	
Nickel	Total Endrin	TOC Normalized PAHs	
Potassium	Aroclor-1260		
Selenium	Total PCBs		
Sodium			
Thallium			
Vanadium			
Not Detected Parameters			
Beryllium	alpha-BHC	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Cyanide (CN)	beta-BHC	1,3-Dichlorobenzene	1,1,2,2-Tetrachloroethane
	Endosulfan II	2,2'-oxybis(1-Chloropropane)/bis(2-chlor	1,1,2-Trichloroethane
	Endosulfan sulfate	2,4,5-Trichlorophenol	1,1-Dichloroethane
	Methoxychlor	2,4,6-Trichlorophenol	1,1-Dichloroethene
	Toxaphene	2,4-Dichlorophenol	1,2-Dichloroethane
	Aroclor-1016	2,4-Dimethylphenol	1,2-Dichloroethene (total)
	Aroclor-1232	2,4-Dinitrophenol	1,2-Dichloropropane
	Aroclor-1242	2,4-Dinitrotoluene	2-Butanone (MEK)
	Aroclor-1248	2,6-Dinitrotoluene	2-Hexanone
	Aroclor-1254	2-Chloronaphthalene	4-Methyl-2-Pentanone (MIBK)
		2-Chlorophenol	Acetone
		2-Methyl-4,6-Dinitrophenol	Benzene
		2-methylnaphthalene	Bromodichloromethane
		2-Methylphenol (o-Cresol)	Bromoform
		2-Nitroaniline	Bromomethane
		2-Nitrophenol	Carbon disulfide
		3,3'-Dichlorobenzidine	Carbon tetrachloride
		3-Nitroaniline	Chlorobenzene
		4-Bromophenyl-phenylether	Chloroethane
		4-Chloro-3-methylphenol	Chloroform
		4-Chloroaniline	Chloromethane
		4-Chlorophenylphenyl ether	cis-1,3-Dichloropropene
		4-Methylphenol (p-Cresol)	Dibromochloromethane
		4-Nitroaniline	Ethylbenzene
		4-Nitrophenol	Methylene chloride
		Acenaphthene	Styrene
		bis(2-Chloroethoxy)methane	Tetrachloroethene
		bis(2-Chloroethyl)ether	Toluene
		Carbazole	trans-1,3-Dichloropropene
		Dibenz(a,h)anthracene	Trichloroethene
		Dibenzofuran	Vinyl chloride
		Diethylphthalate	Xylene (Total)
		Dimethylphthalate	
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		Fluorene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Isophorone	
		Naphthalene	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 12-1-7
Wetland 10 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	7	7				3,710	1,100	8,910	8,910		041M10A201			NA					0	13,610	0	No	EPC < RC
Barium	7	7				6.29	1.6	15.1	15.1	J	033M004001			NA					0	14	1	Yes	EPC > RC and no RV
Beryllium	0	7	0.239	0.03	0.4	0.239			0.4	U	ND			NA					0	0.84	0	No	EPC < RC
Cadmium	**4**	**7**	**0.477**	**0.13**	**0.65**	**5.83**	**0.27**	**34.6**	**34.6**		**033M004001**	**0.68**	**4.21**	**PEL**	**51.2**	**8.62**	**8.22**	**1.38**	**1**	**1.8**	**2**	**Yes**	**EPC > RV and RC**
Calcium	7	7				1,400	155	3,880	3,880	J	041M10A301			NA					0	10,756.67	0	No	EPC < RC
Chromium	**7**	**7**				**188**	**4.9**	**1,180**	**1,180**		**033M004001**	**52.3**	**160**	**PEL**	**22.6**	**3.59**	**7.38**	**1.17**	**1**	**39.37**	**2**	**Yes**	**EPC > RV and RC**
Cobalt	1	7	1.09	0.095	1.6	1.49	3.9	3.9	3.9		041M10A201			NA					0	2.8	1	Yes	EPC > RC and no RV
Copper	5	7	3.25	3.2	3.3	10.8	2.4	45.1	45.1		033M004001	18.7	108	PEL	2.41	0.58	0.418	0.1	0	19.5	1	No	EPC > RC, but < RV
Cyanide (CN)	0	7	0.329	0.295	0.4	0.329			0.4	U	ND			NA					0	5.22	0	No	EPC < RC
Iron	7	7				2,270	710	7,420	7,420		041M10A201			NA					0	11,911.67	0	No	EPC < RC
Lead	**7**	**7**				**35**	**5.3**	**161**	**161**		**033M004001**	**30.2**	**112**	**PEL**	**5.33**	**1.16**	**1.44**	**0.313**	**1**	**82.47**	**1**	**Yes**	**EPC > RV and RC**
Magnesium	5	7	70.8	70	71.5	110	46.2	242	242	J	033M002001			NA					0	7,513.33	0	No	EPC < RC
Manganese	7	7				30.9	4.1	135	135		041M10A201			NA					0	37.97	1	Yes	EPC > RC and no RV
Nickel	**4**	**7**	**4.98**	**4.85**	**5.05**	**10.2**	**1**	**52.1**	**52.1**		**033M004001**	**15.9**	**42.8**	**PEL**	**3.28**	**0.639**	**1.22**	**0.237**	**1**	**9.28**	**1**	**Yes**	**EPC > RV and RC**
Potassium	3	7	518	505	525	307	19.5	38.1	38.1	J	041M10A101			NA					0	1,628.67	0	No	EPC < RC
Selenium	1	7	0.387	0.09	0.55	0.36	0.2	0.2	0.2	J	041M10A301			NA					0	3.45	0	No	EPC < RC
Sodium	5	7	1.43	1.2	1.65	134	35.2	482	482	J	033M002001			NA					0	18,993.33	0	No	EPC < RC
Thallium	1	7	0.275	0.09	0.395	0.45	1.5	1.5	1.5	J	041M10A301			NA					0	1.57	0	No	EPC < RC
Vanadium	3	7	1.96	1.9	2	5.11	4.6	16.4	16.4		041M10A201			NA					0	28.67	0	No	EPC < RC
PAHs (g/kg)																							
2-Methylnaphthalene	0	7	129	20	215	129			215	U	ND	20.2	201	PEL	10.6	6.4	1.07	0.64	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthene	0	7	125	9.5	215	125			215	U	ND	6.71	88.9	PEL	32	18.6	2.42	1.4	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthylene	2	7	173	20	215	133	32	33	33	J	041M10A101	5.87	128	PEL	5.62	22.6	0.26	1.04	0		0	No	RV HQ <1 and no RC
Anthracene	1	7	148	20	215	130	22	22	22	J	041M10A101	46.9	245	PEL	0.47	2.76	0.09	0.53	0		0	No	RV HQ <1 and no RC
Benzo(a)anthracene	3	7	211	205	215	147	27	87	87		041M10A101	74.8	693	PEL	1.16	1.97	0.13	0.21	0		0	No	RV HQ <1 and no RC
Benzo(a)pyrene	3	7	211	205	215	153	27	110	110		041M10A101	88.8	763	PEL	1.24	1.72	0.14	0.2	0		0	No	RV HQ <1 and no RC
Chrysene	3	7	211	205	215	150	30	97	97		041M10A101	108	846	PEL	0.90	1.39	0.12	0.18	0		0	No	RV HQ <1 and no RC
Dibenz(a,h)anthracene	0	7	129	20	215	129			215	U	ND	6.22	135	PEL	34.6	20.8	1.59	0.96	0		0	No	Parameter Not Detected; Max SQL > RV
Fluoranthene	4	7	212	205	215	141	43	140	140		041M10A101	113	1,494	PEL	1.24	1.25	0.09	0.09	0		0	No	RV HQ <1 and no RC
Fluorene	0	7	125	9.5	215	125			215	U	ND	21.2	144	PEL	10.1	5.89	1.49	0.87	0		0	No	Parameter Not Detected; Max SQL > RV
Naphthalene	0	7	129	20	215	129			215	U	ND	34.6	391	PEL	6.21	3.74	0.55	0.33	0		0	No	Parameter Not Detected
Phenanthrene	2	7	173	20	215	130	22	23	23	J	041M10A301	86.7	544	PEL	0.27	1.5	0.04	0.24	0		0	No	RV HQ <1 and no RC
Pyrene	3	7	211	205	215	155	39	110	110		041M10A101	153	1,398	PEL	0.72	1.01	0.08	0.11	0		0	No	RV HQ <1 and no RC
Total PAHs	4	7	2,750	2,670	2,800	1,780	327	2,560	2,560		033M004001	1,684	16,770	PEL	1.52	1.05	0.15	0.11	0		0	No	RV HQ <1 and no RC
TOC Normalized PAHs	4	7	1,355.50	1,312.81	1,376.85	838.15	57.98	1,262.56	1,262.56		033M004001	290	1,800	MEC	4.35	2.89	0.70	0.47	0		0	No	RV HQ <1 and no RC
PCBs (g/kg)																							
Aroclor-1016	0	7	12.7	1.05	22	12.7			22	U	ND	21.6	189	PEL	1.02	0.59	0.116	0.07	0		0	No	Parameter Not Detected
Aroclor-1221	0	7	25.7	2	44.5	25.7			44.5	U	ND	67	189	PEL	0.66	0.38	0.24	0.14	0		0	No	Parameter Not Detected
Aroclor-1232	0	7	12.7	1.05	22	12.7			22	U	ND	21.6	189	PEL	1.02	0.59	0.116	0.07	0		0	No	Parameter Not Detected
Aroclor-1242	0	7	12.7	1.05	22	12.7			22	U	ND	21.6	189	PEL	1.02	0.59	0.116	0.07	0		0	No	Parameter Not Detected
Aroclor-1248	0	7	12.7	1.05	22	12.7			22	U	ND	21.6	189	PEL	1.02	0.59	0.116	0.07	0		0	No	Parameter Not Detected
Aroclor-1254	0	7	12.7	1.05	22	12.7			22	U	ND	21.6	189	PEL	1.02	0.59	0.116	0.07	0		0	No	Parameter Not Detected
Aroclor-1260	2	7	9.13	1.05	21.5	15.2	12	49	49	J	033M002001	21.6	189	PEL	2.27	0.71	0.26	0.08	0		0	No	RV HQ <1 and no RC
Total PCBs	**2**	**7**	**73.1**	**8.3**	**172**	**105**	**163**	**204**	**204**		**033M002001**	**21.6**	**189**	**PEL**	**9.42**	**4.84**	**1.08**	**0.55**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
Pesticides (g/kg)																							
Aldrin	2	7	0.48	0.05	1.15	0.371	0.078	0.12	0.12	J	033M002001			NA					0		0	Yes	No SV, no RV, and no RC
Endosulfan I	3	7	0.366	0.105	1.15	0.279	0.13	0.21	0.21	J	033M002001			NA					0		0	Yes	No SV, no RV, and no RC
Endosulfan II	0	7	1.27	0.105	2.2	1.27			2.2	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Endosulfan sulfate	0	7	1.27	0.105	2.2	1.27			2.2	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Heptachlor	4	7	0.05	0.05	0.05	0.101	0.099	0.23	0.23	J	033M003001			NA					0		0	Yes	No SV, no RV, and no RC
Heptachlor epoxide	3	7	0.563	0.05	1.1	0.473	0.1	0.84	0.84	J	033M001001			NA					0		0	Yes	No SV, no RV, and no RC
Methoxychlor	0	7	6.5	0.5	11.5	6.5			11.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Toxaphene	0	7	65	5	115	65			115	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
alpha-Chlordane	6	7	0.05	0.05	0.05	0.279	0.13	0.96	0.96	J	033M001001	1.7	4.79	PEL	0.57	0.16	0.2	0.06	0		0	No	RV HQ <1 and no RC
gamma-Chlordane	3	7	0.3	0.05	1.05	0.401	0.27	0.82	0.82	J	033M001001	1.7	4.79	PEL	0.48	0.24	0.17	0.08	0		0	No	RV HQ <1 and no RC
Total Chlordane	6	7	0.1	0.1	0.1	0.68	0.2	1.78	1.78		033M001001	1.7	4.79	PEL	1.05	0.4	0.37	0.14	0		0	No	RV HQ <1 and no RC
Endrin	2	7	0.933	0.105	2.2	1.05	0.41	2.3	2.3	J	033M003001	3.3		NA	0.70	0.32			0		0	Yes	No RV or RC and EPC > SV
Endrin aldehyde	1	7	1.13	0.105	2.2	1.04	0.53	0.53	0.53	J	033M004001	3.3		NA	0.16	0.32			0		0	Yes	No RV or RC and EPC > SV
Endrin ketone	0	7	1.27	0.105	2.2	1.27			2.2	U	ND	3.3		NA	0.67	0.39			0		0	No	Parameter Not Detected; Max SQL > RV
Total Endrin	2	7	2.8	0.315	6.6	3.37	3.09	6.5	6.5		033M003001	3.3		NA	1.97	1.02			0		0	Yes	No RV or RC and EPC > SV
alpha-BHC	0	7	0.65	0.05	1.15	0.65			1.15	U	ND		0.99	PEL			1.16	0.66	0		0	No	Parameter Not Detected; Max SQL > RV
beta-BHC	0	7	0.65	0.05	1.15	0.65			1.15	U	ND	0.32	0.99	PEL	3.59	2.03	1.16	0.66	0		0	No	Parameter Not Detected; Max SQL > RV
delta-BHC	3	7	0.313	0.05	1.1	0.419	0.38	0.88	0.88	J	033M003001	0.32	0.99	PEL	2.75	1.31	0.89	0.42	0		0	No	RV HQ <1 and no RC
gamma-BHC (Lindane)	2	7	0.46	0.05	1.1	0.356	0.074	0.12	0.12	J	033M002001	0.32	0.99	PEL	0.38	1.11	0.12	0.36	0		0	No	RV HQ <1 and no RC
Total BHC	**3**	**7**	**1.25**	**0.2**	**4.4**	**2.07**	**2.74**	**3.53**	**3.53**		**033M003001**	**0.32**	**0.99**	**PEL**	**11**	**6.48**	**3.57**	**2.1**	**3**		**0**	**Yes**	**RV HQ > 1 and no RC**
4,4'-DDD	**4**	**7**	**0.105**	**0.105**	**0.105**	**31.2**	**25**	**120**	**120**	**J**	**033M003001**	**1.22**	**7.81**	**PEL**	**98.4**	**25.6**	**15.4**	**3.99**	**4**	**50**	**1**	**Yes**	**EPC > RV and RC**
4,4'-DDE	6	7	0.105	0.105	0.105	27.4	0.25	96	96	J	033M003001	2.07	374	PEL	46.4	13.2	0.26	0.07	0	40	2	No	EPC > RC, but < RV
4,4'-DDT	**6**	**7**	**0.105**	**0.105**	**0.105**	**10.2**	**0.25**	**48**	**48**	**J**	**033M003001**	**1.19**	**4.77**	**PEL**	**40.3**	**8.61**	**10.1**	**2.15**	**4**	**20**	**1**	**Yes**	**EPC > RV and RC**
Total DDT	**6**	**7**	**0.315**	**0.315**	**0.315**	**68.8**	**0.885**	**264**	**264**		**033M003001**	**3.3**	**51.7**	**PEL**	**80**	**20.9**	**5.11**	**1.33**	**3**	**110**	**1**	**Yes**	**EPC > RV and RC**
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
1,2-Dichlorobenzene	1	7	208	200	215	183	28	28	28	J	041M10A301			NA					0		0	Yes	No SV, no RV, and no RC
1,3-Dichlorobenzene	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
1,4-Dichlorobenzene	1	7	208	200	215	183	31	31	31	J	041M10A301			NA					0		0	Yes	No SV, no RV, and no RC
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2,4,5-Trichlorophenol	0	7	494	480	500	494			500	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2,4,6-Trichlorophenol	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2,4-Dichlorophenol	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2,4-Dimethylphenol	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2,4-Dinitrophenol	0	7	494	480	500	494			500	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV

Table 12-1-7
Wetland 10 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
2,4-Dinitrotoluene	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2,6-Dinitrotoluene	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2-Chloronaphthalene	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2-Chlorophenol	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2-Methyl-4,6-Dinitrophenol	0	7	494	480	500	494			500	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2-Methylphenol (o-Cresol)	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2-Nitroaniline	0	7	372	200	500	372			500	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2-Nitrophenol	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
3,3'-Dichlorobenzidine	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
3-Nitroaniline	0	5	497	485	500	497			500	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
4-Bromophenyl-phenylether	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
4-Chloro-3-methylphenol	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
4-Chloroaniline	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
4-Chlorophenylphenyl ether	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
4-Methylphenol (p-Cresol)	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
4-Nitroaniline	0	7	494	480	500	494			500	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
4-Nitrophenol	0	7	494	480	500	494			500	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Benzo(b)fluoranthene	2	7	173	20	215	172	150	190	190		041M10A101			NA					0		0	No	TOC normalized PAHs<MEC
Benzo(g,h,i)perylene	3	7	211	205	215	145	26	72	72		041M10A201			NA					0		0	No	TOC normalized PAHs<MEC
Benzo(k)fluoranthene	2	7	173	20	215	143	63	74	74		041M10A101			NA					0		0	No	TOC normalized PAHs<MEC
bis(2-Chloroethoxy)methane	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
bis(2-Chloroethyl)ether	0	7	129	20	215	129			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Carbazole	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Dibenzofuran	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Diethylphthalate	0	7	207	200	215	207			215	U	ND	182	2,647	PEL	1.18	1.14	0.08	0.08	0		0	No	Parameter Not Detected
Dimethylphthalate	0	7	207	200	215	207			215	U	ND	182	2,647	PEL	1.18	1.14	0.08	0.08	0		0	No	Parameter Not Detected
Di-n-butylphthalate	0	7	207	200	215	207			215	U	ND	182	2,647	PEL	1.18	1.14	0.08	0.08	0		0	No	Parameter Not Detected
Di-n-octylphthalate	0	7	207	200	215	207			215	U	ND	182	2,647	PEL	1.18	1.14	0.08	0.08	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Hexachlorobutadiene	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Hexachlorocyclopentadiene	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Hexachloroethane	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Indeno(1,2,3-cd)pyrene	3	7	211	205	215	144	24	72	72		041M10A101			NA					0		0	No	TOC normalized PAHs<MEC
Isophorone	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Nitrobenzene	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
N-Nitroso-di-n-propylamine	0	7	129	20	215	129			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
N-Nitrosodiphenylamine	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Pentachlorophenol	0	7	494	480	500	494			500	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Phenol	0	7	207	200	215	207			215	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
1,1,2,2-Tetrachloroethane	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
1,1,2-Trichloroethane	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
1,1-Dichloroethane	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
1,1-Dichloroethene	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
1,2-Dichloroethane	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
1,2-Dichloroethene (total)	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
1,2-Dichloropropane	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2-Butanone (MEK)	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
2-Hexanone	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
4-Methyl-2-Pentanone (MIBK)	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Acetone	0	7	16.4	6	24	16.4			24	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Benzene	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Bromodichloromethane	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Bromoform	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Bromomethane	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Carbon disulfide	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Carbon tetrachloride	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Chlorobenzene	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Chloroethane	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Chloroform	0	7	5.64	1	6.5	5.64			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Chloromethane	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
cis-1,3-Dichloropropene	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Dibromochloromethane	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Ethylbenzene	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Methylene chloride	0	7	7.36	5	10.5	7.36			10.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Styrene	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Tetrachloroethene	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Toluene	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
trans-1,3-Dichloropropene	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Trichloroethene	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Vinyl chloride	0	7	5.21	2	6.5	5.21			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV
Xylene (Total)	0	7	6.43	6	6.5	6.43			6.5	U	ND			NA					0		0	No	Parameter Not Detected; Max SQL > RV

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 12-1-8
Wetland 10 Phase II
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Barium	Aldrin	1,2-Dichlorobenzene	None
Cadmium	Endosulfan I	1,4-Dichlorobenzene	
Chromium	Heptachlor		
Cobalt	Heptachlor epoxide		
Lead	Endrin		
Manganese	Endrin aldehyde		
Nickel	Total Endrin		
	Total BHC		
	4,4'-DDD		
	4,4'-DDT		
	Total DDT		
	Total PCBs		

Table 12-1-9
Wetland 10 Phase II
ERM Quotients

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
033M001001	1/19/1993	mg/kg	1.3	J	Arsenic	8.2	70	0.02
033M001001	1/19/1993	mg/kg	0.65	U	Cadmium	1.2	9.6	0.07
033M001001	1/19/1993	mg/kg	18.5		Chromium	81	370	0.05
033M001001	1/19/1993	mg/kg	3.3	U	Copper	34	270	0.01
033M001001	1/19/1993	mg/kg	6.5		Lead	46.7	218	0.03
033M001001	1/19/1993	mg/kg	0.065	U	Mercury	0.15	0.71	0.09
033M001001	1/19/1993	mg/kg	5.05	U	Nickel	20.9	51.6	0.10
033M001001	1/19/1993	mg/kg	1.35	U	Silver	1	3.7	0.36
033M001001	1/19/1993	mg/kg	38.2		Zinc	150	410	0.09
033M001001	1/19/1993	g/kg	21	J	4,4'-DDE	2.2	27	0.78
033M001001	1/19/1993	g/kg	6.2	J	4,4'-DDT	1.58	46.1	0.13
033M001001	**1/19/1993**	**g/kg**	**203.5**		**Total PCBs**	**22.7**	**180**	**1.13**
033M001001	1/19/1993	g/kg	215	U	2-Methylnaphthalene	70	670	0.32
033M001001	1/19/1993	g/kg	215	U	Acenaphthene	16	500	0.43
033M001001	1/19/1993	g/kg	215	U	Acenaphthylene	44	640	0.34
033M001001	1/19/1993	g/kg	215	U	Anthracene	85.3	1,100	0.20
033M001001	1/19/1993	g/kg	215	U	Benzo(a)anthracene	261	1,600	0.13
033M001001	1/19/1993	g/kg	215	U	Benzo(a)pyrene	430	1,600	0.13
033M001001	1/19/1993	g/kg	215	U	Chrysene	384	2,800	0.08
033M001001	1/19/1993	g/kg	215	U	Dibenz(a,h)anthracene	63.4	260	0.83
033M001001	1/19/1993	g/kg	215	U	Fluoranthene	600	5,100	0.04
033M001001	1/19/1993	g/kg	215	U	Fluorene	19	540	0.40
033M001001	1/19/1993	g/kg	215	U	Naphthalene	160	2,100	0.10
033M001001	1/19/1993	g/kg	215	U	Phenanthrene	240	1,500	0.14
033M001001	1/19/1993	g/kg	215	U	Pyrene	665	2,600	0.08
033M001001	1/19/1993				ERM Quotient Sum			6.09
033M001001	1/19/1993				Mean ERM Quotient			0.24
033M001001	1/19/1993				Mean ERM Quotient without ND			0.09
033M001001	1/19/1993				Mean ERM Quotient Category			2
033M002001	1/19/1993	mg/kg	0.82	J	Arsenic	8.2	70	0.01
033M002001	1/19/1993	mg/kg	2.8		Cadmium	1.2	9.6	0.29
033M002001	1/19/1993	mg/kg	79		Chromium	81	370	0.21
033M002001	1/19/1993	mg/kg	9.3		Copper	34	270	0.03
033M002001	1/19/1993	mg/kg	5.3		Lead	46.7	218	0.02
033M002001	1/19/1993	mg/kg	0.065	U	Mercury	0.15	0.71	0.09
033M002001	1/19/1993	mg/kg	5.05	U	Nickel	20.9	51.6	0.10
033M002001	1/19/1993	mg/kg	1.5	U	Silver	1	3.7	0.41
033M002001	1/19/1993	mg/kg	22.3		Zinc	150	410	0.05
033M002001	**1/19/1993**	**g/kg**	**54**	**J**	**4,4'-DDE**	**2.2**	**27**	**2.00**
033M002001	1/19/1993	g/kg	8.8	J	4,4'-DDT	1.58	46.1	0.19
033M002001	1/19/1993	g/kg	163		Total PCBs	22.7	180	0.91
033M002001	1/19/1993	g/kg	215	U	2-Methylnaphthalene	70	670	0.32
033M002001	1/19/1993	g/kg	215	U	Acenaphthene	16	500	0.43
033M002001	1/19/1993	g/kg	215	U	Acenaphthylene	44	640	0.34
033M002001	1/19/1993	g/kg	215	U	Anthracene	85.3	1,100	0.20
033M002001	1/19/1993	g/kg	215	U	Benzo(a)anthracene	261	1,600	0.13
033M002001	1/19/1993	g/kg	215	U	Benzo(a)pyrene	430	1,600	0.13
033M002001	1/19/1993	g/kg	215	U	Chrysene	384	2,800	0.08
033M002001	1/19/1993	g/kg	215	U	Dibenz(a,h)anthracene	63.4	260	0.83
033M002001	1/19/1993	g/kg	215	U	Fluoranthene	600	5,100	0.04
033M002001	1/19/1993	g/kg	215	U	Fluorene	19	540	0.40
033M002001	1/19/1993	g/kg	215	U	Naphthalene	160	2,100	0.10
033M002001	1/19/1993	g/kg	215	U	Phenanthrene	240	1,500	0.14
033M002001	1/19/1993	g/kg	215	U	Pyrene	665	2,600	0.08
033M002001	1/19/1993				ERM Quotient Sum			7.54
033M002001	1/19/1993				Mean ERM Quotient			0.30
033M002001	1/19/1993				Mean ERM Quotient without ND			0.15
033M002001	1/19/1993				Mean ERM Quotient Category			2
033M003001	1/19/1993	mg/kg	0.5	U	Arsenic	8.2	70	0.01
033M003001	1/19/1993	mg/kg	0.65	U	Cadmium	1.2	9.6	0.07
033M003001	1/19/1993	mg/kg	9.3		Chromium	81	370	0.03
033M003001	1/19/1993	mg/kg	3.2	U	Copper	34	270	0.01
033M003001	1/19/1993	mg/kg	5.7		Lead	46.7	218	0.03
033M003001	1/19/1993	mg/kg	0.065	U	Mercury	0.15	0.71	0.09
033M003001	1/19/1993	mg/kg	4.85	U	Nickel	20.9	51.6	0.09
033M003001	1/19/1993	mg/kg	1.35	U	Silver	1	3.7	0.36
033M003001	1/19/1993	mg/kg	8		Zinc	150	410	0.02
033M003001	**1/19/1993**	**g/kg**	**96**	**J**	**4,4'-DDE**	**2.2**	**27**	**3.56**
033M003001	**1/19/1993**	**g/kg**	**48**	**J**	**4,4'-DDT**	**1.58**	**46.1**	**1.04**
033M003001	1/19/1993	g/kg	168.5	U	Total PCBs	22.7	180	0.94
033M003001	1/19/1993	g/kg	205	U	2-Methylnaphthalene	70	670	0.31
033M003001	1/19/1993	g/kg	205	U	Acenaphthene	16	500	0.41
033M003001	1/19/1993	g/kg	205	U	Acenaphthylene	44	640	0.32
033M003001	1/19/1993	g/kg	205	U	Anthracene	85.3	1,100	0.19
033M003001	1/19/1993	g/kg	205	U	Benzo(a)anthracene	261	1,600	0.13
033M003001	1/19/1993	g/kg	205	U	Benzo(a)pyrene	430	1,600	0.13
033M003001	1/19/1993	g/kg	205	U	Chrysene	384	2,800	0.07
033M003001	1/19/1993	g/kg	205	U	Dibenz(a,h)anthracene	63.4	260	0.79
033M003001	1/19/1993	g/kg	205	U	Fluoranthene	600	5,100	0.04
033M003001	1/19/1993	g/kg	205	U	Fluorene	19	540	0.38
033M003001	1/19/1993	g/kg	205	U	Naphthalene	160	2,100	0.10
033M003001	1/19/1993	g/kg	205	U	Phenanthrene	240	1,500	0.14
033M003001	1/19/1993	g/kg	205	U	Pyrene	665	2,600	0.08
033M003001	1/19/1993				ERM Quotient Sum			9.31
033M003001	1/19/1993				Mean ERM Quotient			0.37
033M003001	1/19/1993				Mean ERM Quotient without ND			0.19
033M003001	1/19/1993				Mean ERM Quotient Category			2.00
033M004001	1/19/1993	mg/kg	6.2		Arsenic	8.2	70	0.09
033M004001	**1/19/1993**	**mg/kg**	**34.6**		**Cadmium**	**1.2**	**9.6**	**3.60**
033M004001	**1/19/1993**	**mg/kg**	**1180**		**Chromium**	**81**	**370**	**3.19**
033M004001	1/19/1993	mg/kg	45.1		Copper	34	270	0.17
033M004001	1/19/1993	mg/kg	161		Lead	46.7	218	0.74
033M004001	1/19/1993	mg/kg	0.065	U	Mercury	0.15	0.71	0.09
033M004001	**1/19/1993**	**mg/kg**	**52.1**		**Nickel**	**20.9**	**51.6**	**1.01**
033M004001	1/19/1993	mg/kg	1.8	U	Silver	1	3.7	0.49
033M004001	1/19/1993	mg/kg	115		Zinc	150	410	0.28

Table 12-1-9
Wetland 10 Phase II
ERM Quotients

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
033M004001	1/19/1993	g/kg	18	J	4,4'-DDE	2.2	27	0.67
033M004001	1/19/1993	g/kg	7.8		4,4'-DDT	1.58	46.1	0.17
033M004001	1/19/1993	g/kg	172	U	Total PCBs	22.7	180	0.96
033M004001	1/19/1993	g/kg	210	U	2-Methylnaphthalene	70	670	0.31
033M004001	1/19/1993	g/kg	210	U	Acenaphthene	16	500	0.42
033M004001	1/19/1993	g/kg	210	U	Acenaphthylene	44	640	0.33
033M004001	1/19/1993	g/kg	210	U	Anthracene	85.3	1,100	0.19
033M004001	1/19/1993	g/kg	210	U	Benzo(a)anthracene	261	1,600	0.13
033M004001	1/19/1993	g/kg	210	U	Benzo(a)pyrene	430	1,600	0.13
033M004001	1/19/1993	g/kg	210	U	Chrysene	384	2,800	0.08
033M004001	1/19/1993	g/kg	210	U	Dibenz(a,h)anthracene	63.4	260	0.81
033M004001	1/19/1993	g/kg	43	J	Fluoranthene	600	5,100	0.01
033M004001	1/19/1993	g/kg	210	U	Fluorene	19	540	0.39
033M004001	1/19/1993	g/kg	210	U	Naphthalene	160	2,100	0.10
033M004001	1/19/1993	g/kg	210	U	Phenanthrene	240	1,500	0.14
033M004001	1/19/1993	g/kg	210	U	Pyrene	665	2,600	0.08
033M004001	1/19/1993				ERM Quotient Sum			14.56
033M004001	1/19/1993				Mean ERM Quotient			0.58
033M004001	1/19/1993				Mean ERM Quotient without ND			0.40
033M004001	1/19/1993				Mean ERM Quotient Category			2
041M10A101	11/28/1995	mg/kg	1.2		Arsenic	8.2	70	0.02
041M10A101	11/28/1995	mg/kg	0.13	U	Cadmium	1.2	9.6	0.01
041M10A101	11/28/1995	mg/kg	4.9		Chromium	81	370	0.01
041M10A101	11/28/1995	mg/kg	2.4		Copper	34	270	0.01
041M10A101	11/28/1995	mg/kg	8.2		Lead	46.7	218	0.04
041M10A101	11/28/1995	mg/kg	0.035	U	Mercury	0.15	0.71	0.05
041M10A101	11/28/1995	mg/kg	1.6	J	Nickel	20.9	51.6	0.03
041M10A101	11/28/1995	mg/kg	0.17	UJ	Silver	1	3.7	0.05
041M10A101	11/28/1995	mg/kg	6.7		Zinc	150	410	0.02
041M10A101	11/28/1995	g/kg	0.105	U	4,4'-DDE	2.2	27	0.00
041M10A101	11/28/1995	g/kg	0.105	UJ	4,4'-DDT	1.58	46.1	0.00
041M10A101	11/28/1995	g/kg	8.35	U	Total PCBs	22.7	180	0.05
041M10A101	11/28/1995	g/kg	20.5	U	2-Methylnaphthalene	70	670	0.03
041M10A101	11/28/1995	g/kg	10	U	Acenaphthene	16	500	0.02
041M10A101	11/28/1995	g/kg	33	J	Acenaphthylene	44	640	0.05
041M10A101	11/28/1995	g/kg	22	J	Anthracene	85.3	1,100	0.02
041M10A101	11/28/1995	g/kg	87		Benzo(a)anthracene	261	1,600	0.05
041M10A101	11/28/1995	g/kg	110		Benzo(a)pyrene	430	1,600	0.07
041M10A101	11/28/1995	g/kg	97		Chrysene	384	2,800	0.03
041M10A101	11/28/1995	g/kg	20.5	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M10A101	11/28/1995	g/kg	140		Fluoranthene	600	5,100	0.03
041M10A101	11/28/1995	g/kg	10	U	Fluorene	19	540	0.02
041M10A101	11/28/1995	g/kg	20.5	U	Naphthalene	160	2,100	0.01
041M10A101	11/28/1995	g/kg	22	J	Phenanthrene	240	1,500	0.01
041M10A101	11/28/1995	g/kg	110		Pyrene	665	2,600	0.04
041M10A101	11/28/1995				ERM Quotient Sum			0.76
041M10A101	11/28/1995				Mean ERM Quotient			0.03
041M10A101	11/28/1995				Mean ERM Quotient without ND			0.02
041M10A101	11/28/1995				Mean ERM Quotient Category			1
041M10A201	11/28/1995	mg/kg	3.6		Arsenic	8.2	70	0.05
041M10A201	11/28/1995	mg/kg	0.27	J	Cadmium	1.2	9.6	0.03
041M10A201	11/28/1995	mg/kg	10.1		Chromium	81	370	0.03
041M10A201	11/28/1995	mg/kg	5.2		Copper	34	270	0.02
041M10A201	11/28/1995	mg/kg	8.5		Lead	46.7	218	0.04
041M10A201	11/28/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M10A201	11/28/1995	mg/kg	1	J	Nickel	20.9	51.6	0.02
041M10A201	11/28/1995	mg/kg	0.32	J	Silver	1	3.7	0.09
041M10A201	11/28/1995	mg/kg	8		Zinc	150	410	0.02
041M10A201	11/28/1995	g/kg	0.25	J	4,4'-DDE	2.2	27	0.01
041M10A201	11/28/1995	g/kg	0.53	J	4,4'-DDT	1.58	46.1	0.01
041M10A201	11/28/1995	g/kg	8.3	U	Total PCBs	22.7	180	0.05
041M10A201	11/28/1995	g/kg	20	U	2-Methylnaphthalene	70	670	0.03
041M10A201	11/28/1995	g/kg	9.5	U	Acenaphthene	16	500	0.02
041M10A201	11/28/1995	g/kg	32	J	Acenaphthylene	44	640	0.05
041M10A201	11/28/1995	g/kg	20	U	Anthracene	85.3	1,100	0.02
041M10A201	11/28/1995	g/kg	71		Benzo(a)anthracene	261	1,600	0.04
041M10A201	11/28/1995	g/kg	88		Benzo(a)pyrene	430	1,600	0.06
041M10A201	11/28/1995	g/kg	79		Chrysene	384	2,800	0.03
041M10A201	11/28/1995	g/kg	20	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M10A201	11/28/1995	g/kg	110		Fluoranthene	600	5,100	0.02
041M10A201	11/28/1995	g/kg	9.5	U	Fluorene	19	540	0.02
041M10A201	11/28/1995	g/kg	20	U	Naphthalene	160	2,100	0.01
041M10A201	11/28/1995	g/kg	20	U	Phenanthrene	240	1,500	0.01
041M10A201	11/28/1995	g/kg	89		Pyrene	665	2,600	0.03
041M10A201	11/28/1995				ERM Quotient Sum			0.81
041M10A201	11/28/1995				Mean ERM Quotient			0.03
041M10A201	11/28/1995				Mean ERM Quotient without ND			0.02
041M10A201	11/28/1995				Mean ERM Quotient Category			1
041M10A301	11/27/1995	mg/kg	1.7		Arsenic	8.2	70	0.02
041M10A301	11/27/1995	mg/kg	1.7		Cadmium	1.2	9.6	0.18
041M10A301	11/27/1995	mg/kg	11.6		Chromium	81	370	0.03
041M10A301	11/27/1995	mg/kg	7.4		Copper	34	270	0.03
041M10A301	11/27/1995	mg/kg	49.9	J	Lead	46.7	218	0.23
041M10A301	11/27/1995	mg/kg	0.025	U	Mercury	0.15	0.71	0.04
041M10A301	11/27/1995	mg/kg	1.5	J	Nickel	20.9	51.6	0.03
041M10A301	11/27/1995	mg/kg	0.125	UJ	Silver	1	3.7	0.03
041M10A301	11/27/1995	mg/kg	39.6		Zinc	150	410	0.10
041M10A301	11/27/1995	g/kg	2.3		4,4'-DDE	2.2	27	0.09
041M10A301	11/27/1995	g/kg	0.25	J	4,4'-DDT	1.58	46.1	0.01
041M10A301	11/27/1995	g/kg	8.3	U	Total PCBs	22.7	180	0.05
041M10A301	11/27/1995	g/kg	20	U	2-Methylnaphthalene	70	670	0.03
041M10A301	11/27/1995	g/kg	9.5	U	Acenaphthene	16	500	0.02
041M10A301	11/27/1995	g/kg	20	U	Acenaphthylene	44	640	0.03
041M10A301	11/27/1995	g/kg	20	U	Anthracene	85.3	1,100	0.02
041M10A301	11/27/1995	g/kg	27	J	Benzo(a)anthracene	261	1,600	0.02
041M10A301	11/27/1995	g/kg	27	J	Benzo(a)pyrene	430	1,600	0.02

Table 12-1-9
Wetland 10 Phase II
ERM Quotients

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M10A301	11/27/1995	g/kg	30	J	Chrysene	384	2,800	0.01
041M10A301	11/27/1995	g/kg	20	U	Dibenz(a,h)anthracene	63.4	260	0.08
041M10A301	11/27/1995	g/kg	62		Fluoranthene	600	5,100	0.01
041M10A301	11/27/1995	g/kg	9.5	U	Fluorene	19	540	0.02
041M10A301	11/27/1995	g/kg	20	U	Naphthalene	160	2,100	0.01
041M10A301	11/27/1995	g/kg	23	J	Phenanthrene	240	1,500	0.02
041M10A301	11/27/1995	g/kg	39	J	Pyrene	665	2,600	0.02
041M10A301	11/27/1995				ERM Quotient Sum			1.11
041M10A301	11/27/1995				Mean ERM Quotient			0.04
041M10A301	11/27/1995				Mean ERM Quotient without ND			0.03
041M10A301	11/27/1995				Mean ERM Quotient Category			2

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 12-1-10
Wetland 10 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	**4**	**4**				**917**	**696**	**1,280**	**033W001002**	**1,280**		**13**	**FDEP**	**98.5**	**Yes**	**Max Detect > SV**
Antimony	0	4	28.5	28.5	28.5	28.5			ND	28.5	U	160	EPA	0.18	No	Max SQL< SV
Arsenic	0	4	1.5	1.5	1.5	1.5			ND	1.5	U	50	FDEP	0.03	No	Max SQL< SV
Barium	4	4				13.4	11.9	16.1	033W001002	16.1	J		NA		Yes	No SV
Beryllium	0	4	1.5	1.5	1.5	1.5			ND	1.5	U	0.13	FDEP	11.5	Yes	Max SQL > SV
Cadmium	**1**	**4**	**2.5**	**2.5**	**2.5**	**3.17**	**5.2**	**5.2**	**033W001002**	**5.2**		**0.66**	**EPA**	**7.88**	**Yes**	**Max Detect > SV**
Calcium	4	4				13,600	12,900	14,500	033W002002	14,500			NA		Yes	No SV
Chromium	1	4	5	5	5	6.45	10.8	10.8	033W002002	10.8		11	EPA	0.98	No	Max Detect < SV
Cobalt	0	4	6	6	6	6			ND	6	U		NA		Yes	No SV
Copper	0	4	12.5	12.5	12.5	12.5			ND	12.5	U	6.54	EPA	1.91	Yes	Max SQL > SV
Cyanide (CN)	0	4	5	5	5	5			ND	5	U	5.2	EPA	0.96	No	Max SQL< SV
Iron	4	4				1,950	808	5,110	033W001002	5,110			NA		Yes	No SV
Lead	**1**	**4**	**1**	**1**	**1**	**1.35**	**2.4**	**2.4**	**033W001002**	**2.4**	**J**	**1.32**	**EPA**	**1.82**	**Yes**	**Max Detect > SV**
Magnesium	4	4				4,600	2,950	5,470	033W002002	5,470			NA		Yes	No SV
Manganese	4	4				87.3	11.3	280	033W001002	280			NA		Yes	No SV
Mercury	0	4	0.1	0.1	0.1	0.1			ND	0.1	U	0.012	EPA	8.33	Yes	Max SQL > SV
Nickel	0	4	19	19	19	19			ND	19	U	87.71	EPA	0.22	No	Max SQL< SV
Potassium	0	4	1,980	1,975	1,975	1,980			ND	1,975	U		NA		Yes	No SV
Selenium	0	4	1.5	1.5	1.5	1.5			ND	1.5	U	5	EPA	0.3	No	Max SQL< SV
Silver	0	4	5	5	5	5			ND	5	U	0.012	EPA	417	Yes	Max SQL > SV
Sodium	4	4				17,900	5,050	24,500	033W002002	24,500			NA		Yes	No SV
Thallium	0	4	1.5	1.5	1.5	1.5			ND	1.5	U	4	EPA	0.38	No	Max SQL< SV
Vanadium	0	4	7.5	7.5	7.5	7.5			ND	7.5	U		NA		Yes	No SV
Zinc	4	4				36	29	39.2	033W002002	39.2		58.91	EPA	0.67	No	Max Detect < SV
Pesticides (g/L)																
Aldrin	0	4	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	4	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	4	0.025	0.025	0.025	0.025			ND	0.025	U	0.056	EPA	0.45	No	Max SQL< SV
Endosulfan II	0	4	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	4	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	1	4	0.025	0.025	0.025	0.0191	0.0014	0.0014	033W001002	0.0014	J	0.0038	EPA	0.37	No	Max Detect < SV
Heptachlor epoxide	**1**	**4**	**0.025**	**0.025**	**0.025**	**0.0191**	**0.0013**	**0.0013**	**033W003002**	**0.0013**	**J**	**0.00004**	**FDEP**	**32.5**	**Yes**	**Max Detect > SV**
Methoxychlor	0	4	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	4	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	1	4	0.025	0.025	0.025	0.0191	0.0013	0.0013	033W003002	0.0013	J		NA		Yes	No SV
gamma-Chlordane	2	4	0.025	0.025	0.025	0.0141	0.003	0.0034	033W001002	0.0034	J		NA		Yes	No SV
Total Chlordane	**3**	**4**	**0.05**	**0.05**	**0.05**	**0.0332**	**0.0263**	**0.0284**	**033W004002**	**0.0284**		**0.0043**	**EPA**	**6.6**	**Yes**	**Max Detect > SV**
Endrin	0	4	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	4	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	4	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	4	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	2	4	0.025	0.025	0.025	0.0143	0.0027	0.0043	033W002002	0.0043	J		NA		Yes	No SV
beta-BHC	0	4	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	4	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	4	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	No	Max SQL< SV
Total BHC	2	4	0.1	0.1	0.1	0.0892	0.0777	0.0793	033W003002	0.0793			NA		Yes	No SV
4,4'-DDD	**2**	**4**	**0.05**	**0.05**	**0.05**	**0.0628**	**0.041**	**0.11**	**033W003002**	**0.11**	**J**	**0.0003**	**FDEP**	**367**	**Yes**	**Max Detect > SV**
4,4'-DDE	**4**	**4**				**0.018**	**0.0021**	**0.045**	**033W003002**	**0.045**	**J**	**0.0002**	**FDEP**	**225**	**Yes**	**Max Detect > SV**
4,4'-DDT	**2**	**4**	**0.05**	**0.05**	**0.05**	**0.0388**	**0.008**	**0.047**	**033W003002**	**0.047**	**J**	**0.00059**	**FDEP**	**79.7**	**Yes**	**Max Detect > SV**
Total DDT	4	4				0.12	0.06	0.202	033W004002	0.202			NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	4	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1260	0	4	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	35.7	Yes	Max SQL > SV
Total PCB	0	4	4	4	4	4			ND	4	U		NA		Yes	No SV

Table 12-1-10
Wetland 10 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L)																
1,2-Dichlorobenzene	0	4	5	5	5	5			ND	5	U	15.8	EPA	0.32	No	Max SQL< SV
1,3-Dichlorobenzene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	4	5	5	5	5			ND	5	U	3	FDEP	1.67	Yes	Max SQL > SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlo	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Chloronaphthalene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Chlorophenol	0	4	5	5	5	5			ND	5	U	43.8	EPA	0.11	No	Max SQL< SV
2-Methyl-4,6-Dinitrophenol	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Nitroaniline	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
2-Nitrophenol	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
3-Nitroaniline	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Chloroaniline	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Nitroaniline	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
4-Nitrophenol	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	4	2.5	0.5	3.5	2.5			ND	3.5	U	0.3	EPA	11.7	Yes	Max SQL > SV
Butylbenzylphthalate	0	4	2	2	2	2			ND	2	U		NA		Yes	No SV
Carbazole	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Dibenzofuran	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Diethylphthalate	0	4	2.75	0.5	5	2.75			ND	5	U		NA		Yes	No SV
Dimethylphthalate	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Di-n-butylphthalate	0	4	5	5	5	5			ND	5	U	9.4	EPA	0.53	No	Max SQL< SV
Di-n-octylphthalate	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Hexachlorobenzene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Hexachlorobutadiene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Hexachloroethane	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Isophorone	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Nitrobenzene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Pentachlorophenol	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA		Yes	No SV
Phenol	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Acenaphthene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Acenaphthylene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Anthracene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Benzo(a)anthracene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Benzo(a)pyrene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Chrysene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Fluoranthene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Fluorene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV

Table 12-1-10
Wetland 10 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
PAHs (g/L) - cont.																
Naphthalene	0	4	5	5	5	5			ND	5	U	26	FDEP	0.19	No	Max SQL< SV
Phenanthrene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Pyrene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Total PAH	0	4	65	65	65	65			ND	65	U		NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	0	4	5	5	5	5			ND	5	U	270	FDEP	0.02	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
1,1-Dichloroethane	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
1,1-Dichloroethene	0	4	5	5	5	5			ND	5	U	3.2	FDEP	1.56	Yes	Max SQL > SV
1,2-Dichloroethane	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
1,2-Dichloroethene (total)	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
1,2-Dichloropropane	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
2-Butanone (MEK)	0	4	12.4	5	34.5	12.4			ND	34.5	U		NA		Yes	No SV
2-Hexanone	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Acetone	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Benzene	0	4	5	5	5	5			ND	5	U	53	EPA	0.09	No	Max SQL< SV
Bromodichloromethane	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Bromoform	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Bromomethane	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Carbon disulfide	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Carbon tetrachloride	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Chlorobenzene	0	4	5	5	5	5			ND	5	U	17	FDEP	0.29	No	Max SQL< SV
Chloroethane	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Chloroform	0	4	5	5	5	5			ND	5	U	289	EPA	0.02	No	Max SQL< SV
Chloromethane	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Dibromochloromethane	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Ethylbenzene	0	4	5	5	5	5			ND	5	U	453	EPA	0.01	No	Max SQL< SV
Methylene chloride	0	4	5.63	1.5	8.5	5.63			ND	8.5	U	1580	FDEP	0.01	No	Max SQL< SV
Styrene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Tetrachloroethene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Toluene	1	4	5	5	5	4.25	2	2	033W002002	2	J	175	EPA	0.01	No	Max Detect < SV
trans-1,3-Dichloropropene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Trichloroethene	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Vinyl chloride	0	4	5	5	5	5			ND	5	U		NA		Yes	No SV
Xylene (Total)	3	4	5	5	5	2.5	1	2	033W004002	2	J		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value

Table 12-1-11
Wetland 10 Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Aluminum	Heptachlor epoxide	None	Xylene (Total)
Barium	alpha-Chlordane		
Cadmium	gamma-Chlordane		
Calcium	Total Chlordane		
Iron	4,4'-DDD		
Lead	4,4'-DDE		
Magnesium	4,4'-DDT		
Manganese	Total DDT		
Sodium	alpha-BHC		
	Total BHC		
Not Detected Parameters			
Beryllium	Aldrin	1,2,4-trichlorobenzene	1,1,2,2-Tetrachloroethane
Cobalt	Dieldrin	1,3-Dichlorobenzene	1,1,2-Trichloroethane
Copper	Endosulfan II	1,4-Dichlorobenzene	1,1-Dichloroethane
Mercury	Endosulfan sulfate	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
Potassium	Methoxychlor	2,4,5-Trichlorophenol	1,2-Dichloroethane
Silver	Toxaphene	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
Vanadium	Endrin	2,4-Dichlorophenol	1,2-Dichloropropane
	Endrin aldehyde	2,4-Dimethylphenol	2-Butanone (MEK)
	Endrin ketone	2,4-Dinitrophenol	2-Hexanone
	Total Endrin	2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
	beta-BHC	2,6-Dinitrotoluene	Acetone
	delta-BHC	2-Chloronaphthalene	Bromodichloromethane
	Aroclor-1016	2-Methyl-4,6-Dinitrophenol	Bromoform
	Aroclor-1221	2-Methylphenol (o-Cresol)	Bromomethane
	Aroclor-1232	2-Nitroaniline	Carbon disulfide
	Aroclor-1242	2-Nitrophenol	Carbon tetrachloride
	Aroclor-1248	3,3'-Dichlorobenzidine	Chloroethane
	Aroclor-1254	3-Nitroaniline	Chloromethane
	Aroclor-1260	4-Bromophenyl-phenylether	cis-1,3-Dichloropropene
	Total PCBs	4-Chloro-3-methylphenol	Dibromochloromethane
		4-Chloroaniline	Styrene
		4-Chlorophenylphenyl ether	Tetrachloroethene
		4-Methylphenol (p-Cresol)	trans-1,3-Dichloropropene
		4-Nitroaniline	Trichloroethene
		4-Nitrophenol	Vinyl chloride
		Benzo(b)fluoranthene	
		Benzo(g,h,i)perylene	
		Benzo(k)fluoranthene	
		bis(2-Chloroethoxy)methane	
		bis(2-Chloroethyl)ether	
		bis(2-Ethylhexyl)phthalate (BEHP)	
		Butylbenzylphthalate	
		Carbazole	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 12-1-12
Wetland 10 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Metals (g/L)																			
Aluminum	**4**	**4**				**917**	**696**	**1,280**	**033W001002**	**1,280**		**13**	**FDEP**	**70.5**	**98.46**	**1,090.30**	**1**	**Yes**	**Max Result > Ref. Conc.**
Barium	4	4				13.4	11.9	16.1	033W001002	16.1	J		NA			3.68	4	Yes	Max Result > Ref. Conc.
Beryllium	0	4	1.5	1.5	1.5	1.5			ND	1.5	U	0.13	FDEP	11.5	11.54	1	0	No	Parameter Not Detected
Cadmium	**1**	**4**	**2.5**	**2.5**	**2.5**	**3.17**	**5.2**	**5.2**	**033W001002**	**5.2**		**0.66**	**EPA**	**4.81**	**7.88**	**3**	**1**	**Yes**	**Max Result > Ref. Conc.**
Calcium	**4**	**4**				**13,600**	**12,900**	**14,500**	**033W002002**	**14,500**			**NA**			**7,675**	**4**	**No**	**Essential Nutrient**
Cobalt	0	4	6	6	6	6			ND	6	U		NA			3	0	No	Parameter Not Detected
Copper	0	4	12.5	12.5	12.5	12.5			ND	12.5	U	6.54	EPA	1.91	1.91	4	0	No	Parameter Not Detected
Iron	**4**	**4**				**1,950**	**808**	**5,110**	**033W001002**	**5,110**			**NA**			**2,360**	**1**	**Yes**	**Max Result > Ref. Conc.**
Lead	**1**	**4**	**1**	**1**	**1**	**1.35**	**2.4**	**2.4**	**033W001002**	**2.4**	**J**	**1.32**	**EPA**	**1.02**	**1.82**	**3.2**	**0**	**No**	**Max Result < Ref. Conc.**
Magnesium	4	4				4,600	2,950	5,470	033W002002	5,470			NA			20,260	0	No	Max Result < Ref. Conc.
Manganese	**4**	**4**				**87.3**	**11.3**	**280**	**033W001002**	**280**			**NA**			**13.2**	**3**	**Yes**	**Max Result > Ref. Conc.**
Mercury	0	4	0.1	0.1	0.1	0.1			ND	0.1	U	0.012	EPA	8.33	8.33	0.13	0	No	Parameter Not Detected
Potassium	0	4	1,980	1,975	1,975	1,980			ND	1,975	U		NA			6,995	0	No	Parameter Not Detected
Silver	0	4	5	5	5	5			ND	5	U	0.012	EPA	417	416.67	4	0	No	Parameter Not Detected
Sodium	4	4				17,900	5,050	24,500	033W002002	24,500			NA			182,200	0	No	Max Result < Ref. Conc.
Vanadium	0	4	7.5	7.5	7.5	7.5			ND	7.5	U		NA			4.7	0	No	Parameter Not Detected
Pesticides (µg/L)																			
Aldrin	0	4	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Dieldrin	0	4	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan II	0	4	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan sulfate	0	4	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Heptachlor epoxide	**1**	**4**	**0.025**	**0.025**	**0.025**	**0.0191**	**0.0013**	**0.0013**	**033W003002**	**0.0013**	**J**	**0.00004**	**FDEP**	**477**	**32.5**		**0**	**Yes**	**Max Detect > SV; no RV**
Methoxychlor	0	4	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	No	Parameter Not Detected
Toxaphene	0	4	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
alpha-Chlordane	1	4	0.025	0.025	0.025	0.0191	0.0013	0.0013	033W003002	0.0013	J		NA				0	Yes	Max Detect > SV; no RV
gamma-Chlordane	2	4	0.025	0.025	0.025	0.0141	0.003	0.0034	033W001002	0.0034	J		NA				0	Yes	Max Detect > SV; no RV
Total Chlordane	**3**	**4**	**0.05**	**0.05**	**0.05**	**0.0332**	**0.0263**	**0.0284**	**033W004002**	**0.0284**		**0.0043**	**EPA**	**7.72**	**6.60**		**0**	**Yes**	**Max Detect > SV; no RV**
Endrin	0	4	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin aldehyde	0	4	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin ketone	0	4	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	21.74		0	No	Parameter Not Detected
Total Endrin	0	4	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
alpha-BHC	2	4	0.025	0.025	0.025	0.0143	0.0027	0.0043	033W002002	0.0043	J		NA				0	Yes	Max Detect > SV; no RV
beta-BHC	0	4	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
delta-BHC	0	4	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Total BHC	2	4	0.1	0.1	0.1	0.0892	0.0777	0.0793	033W003002	0.0793			NA				0	Yes	Max Detect > SV; no RV
4,4'-DDD	**2**	**4**	**0.05**	**0.05**	**0.05**	**0.0628**	**0.041**	**0.11**	**033W003002**	**0.11**	**J**	**0.0003**	**FDEP**	**209**	**366.67**		**0**	**Yes**	**Max Detect > SV; no RV**
4,4'-DDE	**4**	**4**				**0.018**	**0.0021**	**0.045**	**033W003002**	**0.045**	**J**	**0.0002**	**FDEP**	**90.1**	**225**		**0**	**Yes**	**Max Detect > SV; no RV**
4,4'-DDT	**2**	**4**	**0.05**	**0.05**	**0.05**	**0.0388**	**0.008**	**0.047**	**033W003002**	**0.047**	**J**	**0.00059**	**FDEP**	**65.7**	**79.66**		**0**	**Yes**	**Max Detect > SV; no RV**
Total DDT	**4**	**4**				**0.12**	**0.06**	**0.202**	**033W004002**	**0.202**		**0.0002**	**FDEP**	**1,010**			**0**	**Yes**	**Max Detect > SV; no RV**
PCBs (µg/L)																			
Aroclor-1016	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1221	0	4	1	1	1	1			ND	1	U		NA				0	No	Parameter Not Detected
Aroclor-1232	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1242	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1248	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1254	0	4	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1260	0	4	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	35.7	35.71		0	No	Parameter Not Detected
Total PCB	0	4	4	4	4	4			ND	4	U		NA				0	No	Parameter Not Detected
SVOCs (µg/L)																			
1,2,4-Trichlorobenzene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	4	5	5	5	5			ND	5	U	3	FDEP	1.67	1.67		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-ch	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
2,4-Dichlorophenol	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
2,4-Dimethylphenol	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
2,4-Dinitrophenol	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
2-Chloronaphthalene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
2-Nitroaniline	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	No	Parameter Not Detected
2-Nitrophenol	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
3-Nitroaniline	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	No	Parameter Not Detected

Table 12-1-12
Wetland 10 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
SVOCs (µg/L) - cont.																			
4-Bromophenyl-phenylether	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
4-Chloroaniline	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
4-Nitroaniline	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	No	Parameter Not Detected
4-Nitrophenol	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	4	2.5	0.5	3.5	2.5			ND	3.5	U	0.3	EPA	8.33	11.67		0	No	Parameter Not Detected
Butylbenzylphthalate	0	4	2	2	2	2			ND	2	U		NA				0	No	Parameter Not Detected
Carbazole	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Dibenzofuran	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Diethylphthalate	0	4	2.75	0.5	5	2.75			ND	5	U		NA				0	No	Parameter Not Detected
Dimethylphthalate	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Di-n-octylphthalate	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Hexachlorobenzene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Hexachlorobutadiene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Hexachloroethane	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Isophorone	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Nitrobenzene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Pentachlorophenol	0	4	12.5	12.5	12.5	12.5			ND	12.5	U		NA				0	No	Parameter Not Detected
Phenol	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
PAHs (µg/L)																			
2-Methylnaphthalene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Acenaphthene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Acenaphthylene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Anthracene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Benzo(a)anthracene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Benzo(a)pyrene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Chrysene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Fluoranthene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Fluorene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Naphthalene	0	4	5	5	5	5			ND	5	U	26	FDEP	0.19	0.19		0	No	Parameter Not Detected
Phenanthrene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Pyrene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Total PAH	0	4	65	65	65	65			ND	65	U		NA				0	No	Parameter Not Detected
VOCs (µg/L)																			
1,1,2,2-Tetrachloroethane	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
1,1-Dichloroethane	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
1,1-Dichloroethene	0	4	5	5	5	5			ND	5	U	3.2	FDEP	1.56	1.56		0	No	Parameter Not Detected
1,2-Dichloroethane	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
1,2-Dichloropropane	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
2-Butanone (MEK)	0	4	12.4	5	34.5	12.4			ND	34.5	U		NA				0	No	Parameter Not Detected
2-Hexanone	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Acetone	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Bromodichloromethane	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Bromoform	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Bromomethane	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Carbon disulfide	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Carbon tetrachloride	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Chloroethane	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Chloromethane	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Dibromochloromethane	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Styrene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected

Table 12-1-12
Wetland 10 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
VOCs (µg/L) - cont.																			
Tetrachloroethene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Trichloroethene	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Vinyl chloride	0	4	5	5	5	5			ND	5	U		NA				0	No	Parameter Not Detected
Xylene (Total)	3	4	5	5	5	2.5	1	2	033W004002	2	J		NA				0	Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s

Table 12-1-13
Wetland 10 Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Aluminum	4,4'-DDD	None	Xylene (Total)
Barium	4,4'-DDE		
Cadmium	4,4'-DDT		
Iron	alpha-BHC		
Manganese	alpha-Chlordane		
	gamma-Chlordane		
	Heptachlor epoxide		
	Total BHC		
	Total Chlordane		
	Total DDT		

Table 12-1-14
Wetland 10 Phase IV
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	**1**	**1**				**480**	**480**	**480**	**033W000102**	**480**		**13**	**FDEP**	**36.9**	**Yes**	**Max Detect > SV**
Antimony	0	1	1.95	1.95	1.95	1.95			ND	1.95	U	160	EPA	0.01	No	Max SQL< SV
Arsenic	0	1	1.65	1.65	1.65	1.65			ND	1.65	U	50	FDEP	0.03	No	Max SQL< SV
Barium	1	1				15	15	15	033W000102	15			NA		Yes	No SV
Beryllium	**1**	**1**				**0.5**	**0.5**	**0.5**	**033W000102**	**0.5**	**I**	**0.13**	**FDEP**	**3.85**	**Yes**	**Max Detect > SV**
Cadmium	**1**	**1**				**0.82**	**0.82**	**0.82**	**033W000102**	**0.82**	**I**	**0.66**	**EPA**	**1.24**	**Yes**	**Max Detect > SV**
Calcium	1	1				46,000	46,000	46,000	033W000102	####			NA		Yes	No SV
Chromium	0	1	0.7	0.7	0.7	0.7			ND	0.7	U	11	EPA	0.06	No	Max SQL< SV
Cobalt	0	1	0.6	0.6	0.6	0.6			ND	0.6	U		NA		Yes	No SV
Copper	1	1				1.6	1.6	1.6	033W000102	1.6	I	6.54	EPA	0.25	No	Max Detect < SV
Iron	1	1				900	900	900	033W000102	900			NA		Yes	No SV
Lead	0	1	0.95	0.95	0.95	0.95			ND	0.95	U	1.32	EPA	0.72	No	Max SQL< SV
Magnesium	1	1				6,900	6,900	6,900	033W000102	6,900			NA		Yes	No SV
Manganese	1	1				290	290	290	033W000102	290			NA		Yes	No SV
Mercury	0	1	0.039	0.039	0.039	0.039			ND	0.039	U	0.012	EPA	3.25	Yes	Max SQL > SV
Nickel	1	1				2.7	2.7	2.7	033W000102	2.7	I	87.71	EPA	0.03	No	Max Detect < SV
Potassium	1	1				4,000	4,000	4,000	033W000102	4,000			NA		Yes	No SV
Selenium	**1**	**1**				**8.9**	**8.9**	**8.9**	**033W000102**	**8.9**	**I**	**5**	**EPA**	**1.78**	**Yes**	**Max Detect > SV**
Silver	0	1	0.55	0.55	0.55	0.55			ND	0.55	U	0.012	EPA	45.8	Yes	Max SQL > SV
Sodium	1	1				33,000	33,000	33,000	033W000102	####			NA		Yes	No SV
Thallium	0	1	3.8	3.8	3.8	3.8			ND	3.8	U	4	EPA	0.95	No	Max SQL< SV
Vanadium	1	1				3.3	3.3	3.3	033W000102	3.3	I		NA		Yes	No SV
Zinc	1	1				2	2	2	033W000102	2	I	58.91	EPA	0.03	No	Max Detect < SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteri

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQ
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limit for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 12-1-15
Wetland 10 Phase IV
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Aluminum	Not Analyzed	Not Analyzed	Not Analyzed
Barium			
Beryllium			
Cadmium			
Calcium			
Iron			
Magnesium			
Manganese			
Potassium			
Selenium			
Sodium			
Vanadium			
Not Detected Parameters			
Cobalt	Not Analyzed	Not Analyzed	Not Analyzed
Mercury			
Silver			

Table 12-1-16
Wetland 10 Phase IV
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Metals (g/L)																			
Aluminum	1	1				480	480	480	033W000102	480		13	FDEP	36.92	36.9	1,090.25	0	No	Max Result < Ref. Conc.
Barium	**1**	**1**				**15**	**15**	**15**	**033W000102**	**15**			**NA**			**3.68**	**1**	**Yes**	**Max Result > Ref. Conc.**
Beryllium	1	1				0.5	0.5	0.5	033W000102	0.5	I	0.13	FDEP	3.85	3.85	1	0	No	Max Result < Ref. Conc.
Cadmium	1	1				0.82	0.82	0.82	033W000102	0.82	I	0.66	EPA	1.24	1.24	3	0	No	Max Result < Ref. Conc.
Calcium	1	1				46,000	46,000	46,000	033W000102	46,000			NA			7,675	1	No	Essential Nutrient
Cobalt	0	1	0.6	0.6	0.6	0.6			ND	0.6	U		NA			3	0	No	Parameter Not Detected
Iron	1	1				900	900	900	033W000102	900			NA			2,360	0	No	Max Result < Ref. Conc.
Magnesium	1	1				6,900	6,900	6,900	033W000102	6,900			NA			20,260	0	No	Max Result < Ref. Conc.
Manganese	**1**	**1**				**290**	**290**	**290**	**033W000102**	**290**			**NA**			**13.2**	**1**	**Yes**	**Max Result > Ref. Conc.**
Mercury	0	1	0.039	0.039	0.039	0.039			ND	0.039	U	0.012	EPA	3.25	3.25	0.13	0	No	Parameter Not Detected
Potassium	1	1				4,000	4,000	4,000	033W000102	4,000			NA			6,995	0	No	Max Result < Ref. Conc.
Selenium	**1**	**1**				**8.9**	**8.9**	**8.9**	**033W000102**	**8.9**	**I**	**5**	**EPA**		**1.78**	**3**	**1**	**Yes**	**Max Result > Ref. Conc.**
Silver	0	1	0.55	0.55	0.55	0.55			ND	0.55	U	0.012	EPA	45.83	45.8	4	0	No	Parameter Not Detected
Sodium	1	1				33,000	33,000	33,000	033W000102	33,000			NA			182,200	0	No	Max Result < Ref. Conc.
Vanadium	1	1				3.3	3.3	3.3	033W000102	3.3	I		NA			4.7	0	No	Max Result < Ref. Conc.

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8)
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections.
Parameters in bold were detected and exceeded Ref. Conc.s

Table 12-1-17
Wetland 10 Phase IV
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Barium Manganese Selenium	Not Analyzed	Not Analyzed	Not Analyzed

Table 12-1-18
Wetland 10 Phase II
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
Aluminum	N	1.1E+03	=	8.9E+03	=	MG/KG	041M10A201	7 / 7	NAV	1.0E-03	3	N/A	8.91E-07	N/A	1.89E-05
Barium	N	1.6E+00	J	1.5E+01	J	MG/KG	033M004001	7 / 7	NAV	1.0E-03	3	N/A	1.51E-09	N/A	3.20E-08
Cadmium	N	2.7E-01	J	3.5E+01	=	MG/KG	033M004001	4 / 7	2.6E-01 / 1.3E+00	1.0E-03	3	N/A	3.46E-09	N/A	7.32E-08
Chromium	N	4.9E+00	=	1.2E+03	=	MG/KG	033M004001	7 / 7	NAV	1.0E-03	3	N/A	1.18E-07	N/A	2.50E-06
Cobalt	C	N/A	N/A	3.9E+00	=	MG/KG	041M10A201	1 / 7	1.9E-01 / 3.2E+00	1.0E-03	3	N/A	3.90E-10	N/A	2.95E-09
Copper	N	2.4E+00	=	4.5E+01	=	MG/KG	033M004001	5 / 7	6.4E+00 / 6.6E+00	1.0E-03	3	N/A	4.51E-09	N/A	9.55E-08
Iron	N	7.1E+02	=	7.4E+03	=	MG/KG	041M10A201	7 / 7	NAV	1.0E-03	3	N/A	7.42E-07	N/A	1.57E-05
Lead	N	5.3E+00	=	1.6E+02	=	MG/KG	033M004001	7 / 7	NAV	1.0E-03	3	N/A	1.61E-08	N/A	3.41E-07
Manganese	N	4.1E+00	=	1.4E+02	=	MG/KG	041M10A201	7 / 7	NAV	1.0E-03	3	N/A	1.35E-08	N/A	2.86E-07
Nickel	N	1.0E+00	J	5.2E+01	=	MG/KG	033M004001	4 / 7	9.7E+00 / 1.0E+01	1.0E-03	3	N/A	5.21E-09	N/A	1.10E-07
Selenium	N	N/A	N/A	2.0E-01	J	MG/KG	041M10A301	1 / 7	1.8E-01 / 1.1E+00	1.0E-03	3	N/A	2.00E-11	N/A	4.23E-10
Thallium	N	N/A	N/A	1.5E+00	J	MG/KG	041M10A301	1 / 7	1.8E-01 / 7.9E-01	1.0E-03	3	N/A	1.50E-10	N/A	3.17E-09
Vanadium	N	4.6E+00	=	1.6E+01	=	MG/KG	041M10A201	3 / 7	3.8E+00 / 4.0E+00	1.0E-03	3	N/A	1.64E-09	N/A	3.47E-08
4,4'-DDD	C	2.5E-02	J	1.2E-01	J	MG/KG	033M003001	4 / 7	2.1E-04 / 2.1E-04	3.0E-02	1	N/A	3.60E-10	N/A	2.72E-09
4,4'-DDE	C	2.5E-04	J	9.6E-02	J	MG/KG	033M003001	6 / 7	N/A / 2.1E-04	3.0E-02	1	N/A	2.88E-10	N/A	2.18E-09
4,4'-DDT	C	2.5E-04	J	4.8E-02	J	MG/KG	033M003001	6 / 7	N/A / 2.1E-04	3.0E-02	1	N/A	1.44E-10	N/A	1.09E-09
Aldrin	C	7.8E-05	J	1.2E-04	J	MG/KG	033M002001	2 / 7	1.0E-04 / 2.3E-03	1.0E-01	2	N/A	1.20E-12	N/A	9.07E-12
alpha-Chlordane	C	1.3E-04	J	9.6E-04	J	MG/KG	033M001001	6 / 7	N/A / 1.0E-04	4.0E-02	2	N/A	3.84E-12	N/A	2.90E-11
Aroclor-1260	C	1.2E-02	J	4.9E-02	J	MG/KG	033M001001	2 / 7	2.1E-03 / 4.3E-02	1.4E-02	3	N/A	6.76E-11	N/A	5.11E-10
delta-BHC	C	3.8E-04	J	8.8E-04	J	MG/KG	033M001001	3 / 7	1.0E-04 / 2.2E-03	4.0E-02	2	N/A	3.52E-12	N/A	2.66E-11
Dieldrin	C	N/A	N/A	3.9E-04	J	MG/KG	033M004001	1 / 7	2.1E-04 / 4.4E-03	1.0E-01	2	N/A	3.90E-12	N/A	2.95E-11
Endosulfan I	N	1.3E-04	J	2.1E-04	J	MG/KG	033M002001	3 / 7	2.1E-04 / 2.3E-03	1.0E-01	2	N/A	2.10E-12	N/A	4.44E-11
Endrin	N	4.1E-04	J	2.3E-03	J	MG/KG	033M003001	2 / 7	2.1E-04 / 4.4E-03	1.0E-01	2	N/A	2.30E-11	N/A	4.87E-10
Endrin aldehyde	N	N/A	N/A	5.3E-04	J	MG/KG	033M004001	1 / 7	2.1E-04 / 4.4E-03	1.0E-01	2	N/A	5.30E-12	N/A	1.12E-10
gamma-BHC (Lindane)	C	7.4E-05	J	1.2E-04	J	MG/KG	033M002001	2 / 7	1.0E-04 / 2.2E-03	4.0E-02	2	N/A	4.80E-13	N/A	3.63E-12
gamma-Chlordane	C	2.7E-04	J	8.2E-04	J	MG/KG	033M001001	3 / 7	1.0E-04 / 2.1E-03	4.0E-02	2	N/A	3.28E-12	N/A	2.48E-11
Heptachlor	C	9.9E-05	J	2.3E-04	J	MG/KG	033M003001	4 / 7	1.0E-04 / 1.0E-04	1.0E-01	2	N/A	2.30E-12	N/A	1.74E-11
Heptachlor epoxide	C	1.0E-04	J	8.4E-04	J	MG/KG	033M001001	3 / 7	1.0E-04 / 2.2E-03	1.0E-01	2	N/A	8.40E-12	N/A	6.35E-11
1,2-Dichlorobenzene	C	N/A	N/A	2.8E-02	J	MG/KG	041M10A301	1 / 7	4.0E-01 / 4.3E-01	1.0E-02	3	N/A	2.80E-11	N/A	2.12E-10
1,4-Dichlorobenzene	C	N/A	N/A	3.1E-02	J	MG/KG	041M10A301	1 / 7	4.0E-01 / 4.3E-01	1.0E-02	3	N/A	3.10E-11	N/A	2.34E-10
Anthracene	N	N/A	N/A	2.2E-02	J	MG/KG	041M10A101	1 / 7	4.0E-02 / 4.3E-01	1.0E-02	3	N/A	2.20E-11	N/A	4.66E-10
Benzo(a)anthracene	C	2.7E-02	J	8.7E-02	=	MG/KG	041M10A101	3 / 7	4.1E-01 / 4.3E-01	1.3E-01	2	N/A	1.13E-09	N/A	8.55E-09
Benzo(a)pyrene	C	2.7E-02	J	1.1E-01	=	MG/KG	041M10A101	3 / 7	4.1E-01 / 4.3E-01	1.3E-01	2	N/A	1.43E-09	N/A	1.08E-08
Benzo(b)fluoranthene	C	1.5E-01	=	1.9E-01	=	MG/KG	041M10A101	2 / 7	4.0E-02 / 4.3E-01	1.3E-01	2	N/A	2.47E-09	N/A	1.87E-08
Benzo(g,h,i)perylene	C	2.6E-02	J	7.2E-02	=	MG/KG	041M10A201	3 / 7	4.1E-01 / 4.3E-01	1.3E-01	2	N/A	9.36E-10	N/A	7.08E-09
Benzo(k)fluoranthene	C	6.3E-02	=	7.4E-02	=	MG/KG	041M10A101	2 / 7	4.0E-02 / 4.3E-01	1.3E-01	2	N/A	9.62E-10	N/A	7.27E-09
Ethylhexyl)phthalate	C	N/A	N/A	5.2E-02	J	MG/KG	041M10A301	1 / 7	5.9E-02 / 4.2E-01	1.0E-01	1	N/A	5.20E-10	N/A	3.93E-09
Butylbenzylphthalate	N	N/A	N/A	3.5E-02	J	MG/KG	041M10A201	1 / 7	1.4E-01 / 4.1E-01	1.0E-01	2	N/A	3.50E-10	N/A	7.41E-09
Chrysene	C	3.0E-02	J	9.7E-02	=	MG/KG	041M10A101	3 / 7	4.1E-01 / 4.3E-01	1.3E-01	2	N/A	1.26E-09	N/A	9.53E-09
Fluoranthene	N	4.3E-02	J	1.4E-01	=	MG/KG	041M10A101	4 / 7	4.1E-01 / 4.3E-01	1.3E-01	2	N/A	1.82E-09	N/A	3.85E-08
Indeno(1,2,3-cd)pyrene	C	2.4E-02	J	7.2E-02	=	MG/KG	041M10A101	3 / 7	4.1E-01 / 4.3E-01	1.3E-01	2	N/A	9.36E-10	N/A	7.08E-09
Phenanthrene	N	2.2E-02	J	2.3E-02	J	MG/KG	041M10A301	2 / 7	4.0E-02 / 4.3E-01	1.0E-02	3	N/A	2.30E-11	N/A	4.87E-10
Pyrene	N	3.9E-02	J	1.1E-01	=	MG/KG	041M10A101	3 / 7	4.1E-01 / 4.3E-01	1.0E-02	3	N/A	1.10E-10	N/A	2.33E-09

Notes:
Equation for sediment risk:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DADsd = Dermal Absorbed Dose-soil contact (mg/kg-day).
DAevent = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).

SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

= Chemical concentration in sediment (mg/kg).
= Conversion factor (10^{-6} kg/mg).
= Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
= Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Table 12-1-19
Wetland 10 Phase II
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

										Child Trespasser		Maintenance Worker	
Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABSGI	ABSGI Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
Sediment Dermal Risk	Aluminum	N	8.9E+03	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	N/A	N/A	1.9E-04	N/A
	Barium	N	1.5E+01	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	N/A	N/A	6.5E-06	N/A
	Cadmium	N	3.5E+01	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	N/A	N/A	5.9E-03	N/A
	Chromium	N	1.2E+03	N/A	N/A	2.5E-02	1	N/A	N/A	N/A	N/A	N/A	N/A
	Cobalt	C	3.9E+00	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	N/A	N/A	1.8E-07	N/A
	Copper	N	4.5E+01	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	N/A	N/A	8.0E-06	N/A
	Iron	N	7.4E+03	3.0E-01	N/A	1.5E-01	3	4.5E-02	N/A	N/A	N/A	3.5E-04	N/A
	Lead	N	1.6E+02	1.0E-07	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.4E+02	2.4E-02	N/A	4.0E-02	1, 3	9.6E-04	N/A	N/A	N/A	3.0E-04	N/A
	Nickel	N	5.2E+01	2.0E-02	N/A	2.7E-01	3	5.4E-03	N/A	N/A	N/A	2.0E-05	N/A
	Selenium	N	2.0E-01	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	N/A	N/A	1.5E-07	N/A
	Thallium	N	1.5E+00	6.6E-05	N/A	1.5E-01	3	9.9E-06	N/A	N/A	N/A	3.2E-04	N/A
	Vanadium	N	1.6E+01	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	N/A	N/A	1.9E-04	N/A
	4,4'-DDD	C	1.2E-01	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	N/A	N/A	2.2E-08
	4,4'-DDE	C	9.6E-02	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	N/A	N/A	2.5E-08
	4,4'-DDT	C	4.8E-02	5.0E-04	3.4E-01	3.0E-02	2	1.5E-05	1.1E+01	N/A	N/A	7.3E-05	1.2E-08
	Aldrin	C	1.2E-04	3.0E-05	1.7E+01	1.3E-02	3	4.0E-07	1.3E+03	N/A	N/A	2.3E-05	1.2E-08
	alpha-Chlordane	C	9.6E-04	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	N/A	N/A	7.3E-08	1.3E-11
	Aroclor-1260	C	4.9E-02	N/A	2.0E+00	1.4E-01	2	N/A	1.4E+01	N/A	N/A	N/A	7.3E-09
	delta-BHC	C	8.8E-04	5.0E-04	6.3E+00	1.4E-02	3	7.1E-06	4.4E+02	N/A	N/A	3.7E-06	1.2E-08
	Dieldrin	C	3.9E-04	5.0E-05	1.6E+01	5.0E-01	3	2.5E-05	3.2E+01	N/A	N/A	1.2E-06	9.4E-10
	Endosulfan I	N	2.1E-04	6.0E-03	N/A	5.0E-01	3	3.0E-03	N/A	N/A	N/A	1.5E-08	N/A
	Endrin	N	2.3E-03	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	N/A	N/A	1.3E-04	N/A
	Endrin aldehyde	N	5.3E-04	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	N/A	N/A	3.0E-05	N/A
	gamma-BHC (Lindane)	C	1.2E-04	3.0E-04	1.3E+00	9.7E-01	3	2.9E-04	1.3E+00	N/A	N/A	1.2E-08	4.9E-12
	gamma-Chlordane	C	8.2E-04	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	N/A	N/A	6.2E-08	1.1E-11
	Heptachlor	C	2.3E-04	5.0E-04	4.5E+00	1.1E-02	3	5.6E-06	4.0E+02	N/A	N/A	3.1E-06	7.0E-09
	Heptachlor epoxide	C	8.4E-04	5.0E-04	4.5E+00	1.1E-02	3	5.6E-06	4.0E+02	N/A	N/A	1.1E-05	2.6E-08
	1,2-Dichlorobenzene	C	2.8E-02	9.0E-02	N/A	8.0E-01	3	7.2E-02	N/A	N/A	N/A	2.9E-09	N/A
	1,4-Dichlorobenzene	C	3.1E-02	3.0E-02	2.4E-02	9.0E-01	3	2.7E-02	2.7E-02	N/A	N/A	8.7E-09	6.2E-12
	Anthracene	N	2.2E-02	3.0E-01	N/A	7.6E-01	3	2.3E-01	N/A	N/A	N/A	2.0E-09	N/A
	Benzo(a)anthracene	C	8.7E-02	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	N/A	N/A	2.0E-08
	Benzo(a)pyrene	C	1.1E-01	N/A	7.3E+00	3.1E-01	3	N/A	2.4E+01	N/A	N/A	N/A	2.5E-07
	Benzo(b)fluoranthene	C	1.9E-01	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	N/A	N/A	4.4E-08
	Benzo(g,h,i)perylene	C	7.2E-02	N/A	7.3E-01	3.1E-01	3	N/A	2.4E+00	N/A	N/A	N/A	1.7E-08
	Benzo(k)fluoranthene	C	7.4E-02	N/A	7.3E-02	3.1E-01	3	N/A	2.4E-01	N/A	N/A	N/A	1.7E-09
	bis(2-Ethylhexyl)phthalate (BEHP)	C	5.2E-02	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	N/A	N/A	2.0E-06	5.5E-10
	Butylbenzylphthalate	N	3.5E-02	2.0E-01	N/A	1.7E-02	3	3.5E-03	N/A	N/A	N/A	2.1E-06	N/A
	Chrysene	C	9.7E-02	7.3E-03	N/A	3.1E-01	3	2.3E-03	N/A	N/A	N/A	4.2E-06	N/A
	Fluoranthene	N	1.4E-01	N/A	4.0E-02	3.1E-01	3	N/A	1.3E-01	N/A	N/A	N/A	5.0E-09
	Indeno(1,2,3-cd)pyrene	C	7.2E-02	7.3E-01	N/A	3.1E-01	3	2.3E-01	N/A	N/A	N/A	3.1E-08	N/A
	Phenanthrene	N	2.3E-02	N/A	3.0E-02	7.3E-01	3	N/A	4.1E-02	N/A	N/A	N/A	2.0E-11
	Pyrene	N	1.1E-01	N/A	3.0E-02	3.1E-01	3	N/A	9.7E-02	N/A	N/A	N/A	2.3E-10

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfDdermal = Dermal reference dose.
RFDoral = Oral reference dose.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 12-1-20
Wetland 10 Phase II
Sediment Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser Ingestion Hazard Quotient	Child Trespasser Ingestion Cancer Risk	Maintenance Worker Ingestion Hazard Quotient	Maintenance Worker Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	8.9E+03	1.0E+00	N/A	N/A	N/A	1.81E-03	N/A
	Barium	N	1.5E+01	7.0E-02	N/A	N/A	N/A	4.39E-05	N/A
	Cadmium	N	3.5E+01	5.0E-04	N/A	N/A	N/A	1.41E-02	N/A
	Chromium	N	1.2E+03	N/A	N/A	N/A	N/A	N/A	N/A
	Cobalt	C	3.9E+00	2.0E-02	N/A	N/A	N/A	1.42E-05	N/A
	Copper	N	4.5E+01	4.0E-02	N/A	N/A	N/A	2.29E-04	N/A
	Iron	N	7.4E+03	3.0E-01	N/A	N/A	N/A	5.03E-03	N/A
	Lead	N	1.6E+02	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.4E+02	2.4E-02	N/A	N/A	N/A	1.14E-03	N/A
	Nickel	N	5.2E+01	2.0E-02	N/A	N/A	N/A	5.30E-04	N/A
	Selenium	N	2.0E-01	5.0E-03	N/A	N/A	N/A	8.14E-06	N/A
	Thallium	N	1.5E+00	6.6E-05	N/A	N/A	N/A	4.63E-03	N/A
	Vanadium	N	1.6E+01	7.0E-03	N/A	N/A	N/A	4.77E-04	N/A
	4,4'-DDD	C	1.2E-01	N/A	2.4E-01	N/A	N/A	N/A	2.09E-09
	4,4'-DDE	C	9.6E-02	N/A	3.4E-01	N/A	N/A	N/A	2.37E-09
	4,4'-DDT	C	4.8E-02	5.0E-04	3.4E-01	N/A	N/A	6.98E-06	1.19E-09
	Aldrin	C	1.2E-04	3.0E-05	1.7E+01	N/A	N/A	2.91E-07	1.48E-10
	alpha-Chlordane	C	9.6E-04	5.0E-04	3.5E-01	N/A	N/A	1.40E-07	2.44E-11
	Aroclor-1260	C	4.9E-02	N/A	2.0E+00	N/A	N/A	N/A	7.12E-09
	delta-BHC	C	8.8E-04	5.0E-04	6.3E+00	N/A	N/A	1.28E-07	4.03E-10
	Dieldrin	C	3.9E-04	5.0E-05	1.6E+01	N/A	N/A	5.67E-07	4.54E-10
	Endosulfan I	N	2.1E-04	6.0E-03	N/A	N/A	N/A	7.12E-09	N/A
	Endrin	N	2.3E-03	3.0E-04	N/A	N/A	N/A	1.56E-06	N/A
	Endrin aldehyde	N	5.3E-04	3.0E-04	N/A	N/A	N/A	3.60E-07	N/A
	gamma-BHC (Lindane)	C	1.2E-04	3.0E-04	1.3E+00	N/A	N/A	2.91E-08	1.13E-11
	gamma-Chlordane	C	8.2E-04	5.0E-04	3.5E-01	N/A	N/A	1.19E-07	2.09E-11
	Heptachlor	C	2.3E-04	5.0E-04	4.5E+00	N/A	N/A	3.34E-08	7.52E-11
	Heptachlor epoxide	C	8.4E-04	5.0E-04	4.5E+00	N/A	N/A	1.22E-07	2.75E-10
	1,2-Dichlorobenzene	C	2.8E-02	9.0E-02	N/A	N/A	N/A	2.26E-08	N/A
	1,4-Dichlorobenzene	C	3.1E-02	3.0E-02	2.4E-02	N/A	N/A	7.51E-08	5.41E-11
	Anthracene	N	2.2E-02	3.0E-01	N/A	N/A	N/A	1.49E-08	N/A
	Benzo(a)anthracene	C	8.7E-02	N/A	7.3E-01	N/A	N/A	N/A	4.62E-09
	Benzo(a)pyrene	C	1.1E-01	N/A	7.3E+00	N/A	N/A	N/A	5.84E-08
	Benzo(b)fluoranthene	C	1.9E-01	N/A	7.3E-01	N/A	N/A	N/A	1.01E-08
	Benzo(g,h,i)perylene	C	7.2E-02	N/A	7.3E-01	N/A	N/A	N/A	3.82E-09
	Benzo(k)fluoranthene	C	7.4E-02	N/A	7.3E-02	N/A	N/A	N/A	3.93E-10
	bis(2-Ethylhexyl)phthalate (BEHP)	C	5.2E-02	2.0E-02	1.4E-02	N/A	N/A	1.89E-07	5.29E-11
	Butylbenzylphthalate	N	3.5E-02	2.0E-01	N/A	N/A	N/A	3.56E-08	N/A
	Chrysene	C	9.7E-02	7.3E-03	N/A	N/A	N/A	9.66E-07	N/A
	Fluoranthene	N	1.4E-01	N/A	4.0E-02	N/A	N/A	N/A	1.14E-09
	Indeno(1,2,3-cd)pyrene	C	7.2E-02	7.3E-01	N/A	N/A	N/A	7.17E-09	N/A
	Phenanthrene	N	2.3E-02	N/A	3.0E-02	N/A	N/A	N/A	1.40E-10
	Pyrene	N	1.1E-01	N/A	3.0E-02	N/A	N/A	N/A	6.72E-10

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = chronic daily intake (mg/kg-day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
IRsd = 100 mg/day for age groups greater than 6-years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Table 12-1-21
Wetland 10 Phase II
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max. Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	7.0E+02	=	1.3E+03	=	UG/L	033W001002	4 / 4	NAV	9.2E+02	1.3E-03	1.0E-03	3.33E-06	N/A	7.04E-05
7440393	Barium	N	1.2E+01	J	1.6E+01	J	UG/L	033W001002	4 / 4	NAV	1.3E+01	1.6E-05	1.0E-03	4.19E-08	N/A	8.86E-07
7440439	Cadmium	N	N/A	N/A	5.2E+00	=	UG/L	033W001002	1 / 4	5.0E+00 / 5.0E+00	3.2E+00	5.2E-06	1.0E-03	1.35E-08	N/A	2.86E-07
7439896	Iron	N	8.1E+02	=	5.1E+03	=	UG/L	033W001002	4 / 4	NAV	2.0E+03	5.1E-03	2.5E-04	3.32E-06	N/A	7.03E-05
7439921	Lead	N	N/A	N/A	2.4E+00	J	UG/L	033W001002	1 / 4	2.0E+00 / 2.0E+00	1.4E+00	2.4E-06	3.4E-04	2.12E-09	N/A	4.49E-08
7439965	Manganese	N	1.1E+01	J	2.8E+02	=	UG/L	033W001002	4 / 4	NAV	8.7E+01	2.8E-04	1.0E-03	7.28E-07	N/A	1.54E-05
7440224	Silver	N	N/A	N/A	2.5E+04	=	UG/L	033W002002	1 / 4	1.0E+01 / 1.0E+01	6.1E+03	2.5E-02	6.0E-04	3.82E-05	N/A	8.09E-04
72548	4,4'-DDD	C	4.1E-02	J	1.1E-01	J	UG/L	033W003002	2 / 4	1.0E-01 / 1.0E-01	6.3E-02	1.1E-07	1.8E-01	4.07E-07	N/A	3.08E-06
72559	4,4'-DDE	C	2.1E-03	J	4.5E-02	J	UG/L	033W003002	4 / 4	NAV	1.8E-02	4.5E-08	1.6E-01	1.41E-07	N/A	1.07E-06
50293	4,4'-DDT	C	8.0E-03	J	4.7E-02	J	UG/L	033W003002	2 / 4	1.0E-01 / 1.0E-01	3.9E-02	4.7E-08	2.7E-01	3.95E-07	N/A	2.99E-06
319846	alpha-BHC	C	2.7E-03	J	4.3E-03	J	UG/L	033W002002	2 / 4	5.0E-02 / 5.0E-02	1.4E-02	4.3E-09	2.8E-02	6.02E-10	N/A	4.55E-09
5103719	alpha-Chlordane	C	N/A	N/A	1.3E-03	J	UG/L	033W003002	1 / 4	5.0E-02 / 5.0E-02	1.9E-02	1.3E-09	3.4E-02	1.75E-09	N/A	1.32E-08
5103742	gamma-Chlordane	C	3.0E-03	J	3.4E-03	J	UG/L	033W001002	2 / 4	5.0E-02 / 5.0E-02	1.4E-02	3.4E-09	3.4E-02	4.58E-09	N/A	3.46E-08
76448	Heptachlor	C	N/A	N/A	1.4E-03	J	UG/L	033W001002	1 / 4	5.0E-02 / 5.0E-02	1.9E-02	1.4E-09	8.6E-03	3.04E-10	N/A	2.30E-09
1024573	Heptachlor epoxide	C	N/A	N/A	1.3E-03	J	UG/L	033W003002	1 / 4	5.0E-02 / 5.0E-02	1.9E-02	1.3E-09	8.6E-03	2.82E-10	N/A	2.13E-09
108883	Toluene	N	N/A	N/A	2.0E+00	J	UG/L	033W002002	1 / 4	1.0E+01 / 1.0E+01	4.3E+00	2.0E-06	3.1E-02	1.94E-07	N/A	4.11E-06
1330207	Xylene (Total)	N	1.0E+00	J	2.0E+00	J	UG/L	033W004002	3 / 4	N/A / 1.0E+01	2.5E+00	2.0E-06	5.3E-02	3.36E-07	N/A	7.11E-06

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 12-1-22
Wetland 10 Phase II
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	1.3E-03	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	N/A	N/A	7.0E-04	N/A
	Barium	N	1.6E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	N/A	N/A	1.8E-04	N/A
	Cadmium	N	5.2E-06	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	N/A	N/A	2.3E-02	N/A
	Iron	N	5.1E-03	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	2.4E-06	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.8E-04	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	N/A	N/A	2.8E-03	N/A
	Silver	N	2.5E-02	5.0E-03	N/A	1.8E-01	3	9.0E-04	N/A	N/A	N/A	9.0E-01	N/A
	4,4'-DDD	C	1.1E-07	N/A	2.4E-01	3.0E-02	2	N/A	8.0E+00	N/A	N/A	N/A	N/A
	4,4'-DDE	C	4.5E-08	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	N/A	N/A	N/A
	4,4'-DDT	C	4.7E-08	5.0E-04	3.4E-01	3.0E-02	2	1.5E-05	1.1E+01	N/A	N/A	2.0E-01	N/A
	alpha-BHC	C	4.3E-09	5.0E-04	6.3E+00	1.4E-02	3	7.1E-06	4.4E+02	N/A	N/A	6.4E-04	N/A
	alpha-Chlordane	C	1.3E-09	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	N/A	N/A	3.3E-05	5.8E-09
	gamma-Chlordane	C	3.4E-09	5.0E-04	3.5E-01	8.0E-01	1	4.0E-04	4.4E-01	N/A	N/A	8.7E-05	1.5E-08
	Heptachlor	C	1.4E-09	5.0E-04	4.5E+00	1.1E-02	3	5.6E-06	4.0E+02	N/A	N/A	4.1E-04	9.2E-07
	Heptachlor epoxide	C	1.3E-09	5.0E-04	4.5E+00	1.1E-02	3	5.6E-06	4.0E+02	N/A	N/A	3.8E-04	8.6E-07
	Toluene	N	2.0E-06	2.0E-01	N/A	3.1E-01	3	6.2E-02	N/A	N/A	N/A	6.6E-05	N/A
	Xylene (Total)	N	2.0E-06	7.0E-01	N/A	1.0E-01	2	7.0E-02	N/A	N/A	N/A	1.0E-04	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 12-1-23
Wetland 10 Phase II
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	1.3E-03	1.0E+00	N/A	N/A	N/A	2.6E-08	N/A
	Barium	N	1.6E-05	7.0E-02	N/A	N/A	N/A	4.7E-09	N/A
	Cadmium	N	5.2E-06	5.0E-04	N/A	N/A	N/A	2.1E-07	N/A
	Iron	N	5.1E-03	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	2.4E-06	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	2.8E-04	1.4E-01	N/A	N/A	N/A	4.1E-08	N/A
	Silver	N	2.5E-02	5.0E-03	N/A	N/A	N/A	1.0E-04	N/A
	4,4'-DDD	C	1.1E-07	N/A	2.4E-01	N/A	N/A	N/A	1.9E-13
	4,4'-DDE	C	4.5E-08	N/A	3.4E-01	N/A	N/A	N/A	1.1E-13
	4,4'-DDT	C	4.7E-08	5.0E-04	3.4E-01	N/A	N/A	6.8E-10	1.2E-13
	alpha-BHC	C	4.3E-09	5.0E-04	6.3E+00	N/A	N/A	6.3E-11	2.0E-13
	alpha-Chlordane	C	1.3E-09	5.0E-04	3.5E-01	N/A	N/A	1.9E-11	3.3E-15
	gamma-Chlordane	C	3.4E-09	5.0E-04	3.5E-01	N/A	N/A	4.9E-11	8.6E-15
	Heptachlor	C	1.4E-09	5.0E-04	4.5E+00	N/A	N/A	2.0E-11	4.6E-14
	Heptachlor epoxide	C	1.3E-09	5.0E-04	4.5E+00	N/A	N/A	1.9E-11	4.3E-14
	Toluene	N	2.0E-06	2.0E-01	N/A	N/A	N/A	2.0E-10	N/A
	Xylene (Total)	N	2.0E-06	7.0E-01	N/A	N/A	N/A	5.8E-11	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Table 12-1-24
Wetland 10 Phase IV
2004 Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	N/A	N/A	4.8E+02	=	UG/L	033W000102	1 / 1	NAV	4.8E+02	4.8E-04	1.0E-03	1.25E-06	N/A	2.64E-05
7440393	Barium	N	N/A	N/A	1.5E+01	=	UG/L	033W000102	1 / 1	NAV	1.5E+01	1.5E-05	1.0E-03	3.90E-08	N/A	8.25E-07
7440417	Beryllium	N	N/A	N/A	5.0E-01	I	UG/L	033W000102	1 / 1	NAV	5.0E-01	5.0E-07	1.0E-03	1.30E-09	N/A	2.75E-08
7440439	Cadmium	N	N/A	N/A	8.2E-01	I	UG/L	033W000102	1 / 1	NAV	8.2E-01	8.2E-07	1.0E-03	2.13E-09	N/A	4.51E-08
7439965	Manganese	N	N/A	N/A	2.9E+02	=	UG/L	033W000102	1 / 1	NAV	2.9E+02	2.9E-04	1.0E-03	7.54E-07	N/A	1.60E-05
7782492	Selenium	N	N/A	N/A	8.9E+00	I	UG/L	033W000102	1 / 1	NAV	8.9E+00	8.9E-06	1.0E-03	2.31E-08	N/A	4.90E-07
7440622	Vanadium	N	N/A	N/A	3.3E+00	I	UG/L	033W000102	1 / 1	NAV	3.3E+00	3.3E-06	1.0E-03	8.58E-09	N/A	1.82E-07

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).

EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound,
calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 12-1-25
Wetland 10 Phase IV
2004 Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	4.8E-04	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	N/A	N/A	2.6E-04	N/A
	Barium	N	1.5E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	N/A	N/A	1.7E-04	N/A
	Beryllium	N	5.0E-07	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	N/A	N/A	2.0E-03	N/A
	Cadmium	N	8.2E-07	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	N/A	N/A	3.6E-03	N/A
	Manganese	N	2.9E-04	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	N/A	N/A	2.8E-03	N/A
	Selenium	N	8.9E-06	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	N/A	N/A	1.8E-04	N/A
	Vanadium	N	3.3E-06	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	N/A	N/A	1.0E-03	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 12-1-26
Wetland 10 Phase IV
2004 Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	4.8E-04	1.0E+00	N/A	N/A	N/A	9.8E-09	N/A
	Barium	N	1.5E-05	7.0E-02	N/A	N/A	N/A	4.4E-09	N/A
	Beryllium	N	5.0E-07	2.0E-03	N/A	N/A	N/A	5.1E-09	N/A
	Cadmium	N	8.2E-07	5.0E-04	N/A	N/A	N/A	3.3E-08	N/A
	Manganese	N	2.9E-04	1.4E-01	N/A	N/A	N/A	4.2E-08	N/A
	Selenium	N	8.9E-06	5.0E-03	N/A	N/A	N/A	3.6E-08	N/A
	Vanadium	N	3.3E-06	7.0E-03	N/A	N/A	N/A	9.6E-09	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

12.2 Wetland 12 — Screening Level Problem Formulation

12.2.1 Site Description and Habitats Present at Wetland 12

Wetland 12 is in the northeastern portion of NAS Pensacola, at the southern end of Magazine Point, south of OU 10 (Figure 12-1). Wetland 12 appears as a depression area fed primarily by rainfall and surface runoff from the surrounding area. The open water portion of Wetland 12 ranges from one to three feet deep and is inundated with cattails *(Typha, sp.)*. The transition from open water to upland is very gradual and depends heavily on recent precipitation.

IR sites potentially affecting Wetland 12 include Site 36 and OU 10. Site 36 (Industrial Wastewater Treatment Plant Sewer Line) was investigated in conjunction with sites for OU 2. The wastewater treatment plant, originally built in 1948, was replaced in 1971 with a modern plant that could accept industrial wastes. Most facilities discharging to the sewer did so without any pretreatment or waste segregation. The waste stream has included paint strippers, heavy metals, pesticides, radioactive wastes, fuels, cyanide waste, and waste oil (NEESA, 1983). Beginning in 1973, the Naval Air Rework Facility operations discharged to the sewer instead of to Pensacola Bay. The IWTP sewer line consisted of vitreous clay and cast-iron piping installed both before and after 1971. OU 2 investigated portions of the IWTP sewer line from the Building 649 complex to the wastewater treatment plant.

OU 10 is the former IWTP, located on approximately 26 acres on Magazine Point to the north of NATTC (the former Chevalier Field area), and contains three sites (Sites 32, 33, and 35) which may possibly impact Wetland 12. Site 32 includes the Industrial Sludge Drying Beds, Site 33 includes the IWTP Ponds (including the former surge pond, the stabilization pond, and the polishing pond), and Site 35 comprises all industrial treatment units within the OU 10 boundary.

Wetland 12 is a freshwater-forested wetland, which drains into Wetland 10. It received a spill of oily water from the Bilge Water Plant in 1992, and the effects were still visible in 1994 and 1995. Storm water runoff from the southern part of OU 10 flows into Wetland 12.

A bilge water spill reportedly occurred at this site. Approximately 3,000 gallons of waste oil was reportedly released into the surrounding soil and wetlands as a result of this spill. Most heavily affected was an approximately 100' x 100' area north and west of the Bilge Water Treatment Plant. This spill, suspected to have occurred in the area of Wetland 12, was investigated by Groundwater Technology Government Services, Inc. under the Petroleum Program (Groundwater Technology Government Services, 1993).

Photograph 1 Wetland 12 — Facing Southwest

Based on the data collected during the OU 10 RI, the *Final ROD* dated June 16, 1997, outlined the following RAOs for OU 10 sites (EA&H, 1997c):

1. Contaminated groundwater (may impact drinking water supplies or nearby ecological receptors).

2. Contaminated soil (presents a continuing source of contamination to groundwater and a potential excess risk to a future child resident).

The following remedial actions were selected for the site:

1. Excavation and disposal of soil above residential soil preliminary remediation goals (Area A).

2. Leachability study on Areas B, C, and D to verify that contaminants remaining in soil are not leaching to groundwater.

3. Contingency remedial action of Areas B, C, and D to include excavation and disposal of soil that the leachability study verifies as a source of groundwater contamination;

4. Groundwater monitoring program to ensure the groundwater treatment system will be effective and that contaminants will not migrate.

5. Continued groundwater monitoring at sampling intervals to be determined during the remedial design for groundwater treatment developed in the Corrective Action Plan for the RCRA permit modification. The groundwater monitoring program will continue until a five-year review concludes that the alternative has achieved the performance standards and remain protective of human health and the environment.

12.2.2 Wetland 12 — Sample Location Description

Phase II Sediment Sample Location Description

Two sediment samples were collected and analyzed for the Wetland 12 ERA (Figure 12-4). Wetland 12 sample stations 041M120101 and 041M120201 were collected in November 1995. Table 12-2-1 provides a physical description of the sediments collected. Sediments at Wetland 12 were composed of dark brown poorly graded medium grained sand, with a trace of silt (041M120101) to dark brown silty fine sand with organics (041M120201). TOC concentrations ranged from 0.724% at 041M120101 to 4.1% at 041M120201.

Phase II Surface Water Sample Location Description

One surface water sample was collected at Wetland 12 during the Phase II investigation in 1995. The sample was collocated with the sediment station 041M120101 (Figure 12-4). Table 12-2-2 summarizes the physical parameters for the surface water sample collected at location 041W120101 during the Phase II investigation in 1995.

12.2.3 Wetland 12 — Nature and Extent of Contamination

Figure 12-4 presents the Phase II sediment and surface water sampling locations for Wetland 12.

Phase II Sediment

Table 12-2-3 summarize the analytical results of the two Wetland 12 sediment samples.

Metals — Sixteen metals were detected during Phase II sediment sampling at Wetland 12. The location with the greatest diversity of analytes and the highest concentrations of each analyte was 041M120201. This location had all 16 metals detected; however, none of the detections

exceeded any applicable freshwater reference value. Location 041M120101 had 13 metals detected, and none of these exceeded their reference value.

The sample collected from the southern portion of the wetland had the greatest diversity and highest concentrations of metals detected at Wetland 12.

Pesticides and PCBs — Eight pesticide compounds were detected during Phase II sediment sampling at Wetland 12. Total DDT was calculated for each location by adding the concentrations of 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT. Likewise, a basewide total DDT reference concentration was calculated using the basewide concentrations for these same constituents. None of the pesticides detected exceeded the available basewide reference values.

Location 041M120201 had five pesticides detected at relatively low concentrations. Location 041M120101 had four pesticides detected, also at low concentrations. No PCBs were detected in sediment samples collected during Phase II sampling.

SVOCs — Four SVOCs (i.e., PAHs) were detected in the sediment samples collected at Wetland 12. All SVOCs detected were at location 041M120201, which is on the southern end of the wetland.

VOCs — Methylene chloride was the only VOC detected during Phase II sediment sampling at Wetland 12. This VOC was detected at a relatively high concentration at sample location 041M120201.

Metals, SVOCs, and VOCs were more common and detected at higher concentrations at location 041M12020,1 near the southern end of the wetland. Pesticides, although wide-spread in the wetland, were all detected at very low concentrations.

Phase II Surface Water

Figure 12-4 presents the surface water sampling locations for Wetland 12. Table 12-2-4 summarizes the analytical results of the single Wetland 12 surface water sample.

Metals — Ten metals were detected in the Phase II surface water sample collected from Wetland 12. Of these 10 detections, eight were present at concentrations exceeding their respective fresh water reference values. These included calcium, chromium, magnesium, manganese, potassium, sodium, thallium, and zinc.

Pesticides and PCBs — No pesticides compounds or PCBs were detected in this surface water sample.

SVOCs — A single SVOC, di-n-butylphthalate, was detected in the surface water sample at a very low concentration.

VOCs — No VOCs were detected in the Phase II surface water sample collected from Wetland 12.

12.2.4 Ecological Risk Assessment

Phase II Investigation Summary — Wetland 12

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 12-2-5, the sediment samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than one or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 12-2-6.

Baseline Problem Formulation — Wetland 12 Sediment COPC Refinement

During the COPC refinement, additional information was used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs. This risk assessment presents a statement of potential risk for each of the COPCs.

The COPC refinement process included:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to basewide (reference) concentrations for total DDT
- Comparison of inorganic constituents to reference wetland values
- Interpretive tool for metals
- Di Toro EqP SQGs for VOCs
- Comparison to Swartz consensus values
- Mean ERM quotients
- Description of exceedances of RVs and their extent

The methods used in the COPC refinement for the Site 41 ERA Process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 12-2-7. Additionally, the tables compare: 1) average concentrations to screening and

refinement values to assess potential exposure across the entire wetland, and 2) Wetland 12 concentrations to reference concentrations. COPCs retained after refinement are presented in Table 12-2-8.

No inorganic constituents exceeded their respective risk screening numbers or their reference concentrations. Therefore, none of the inorganic constituents were included as COPCs.

At Wetland 12, total DDT was below the basewide levels and was retained as a COPC (Figure 12-5). Other pesticides detected and retained as COPCs included endosulfan I, endosulfan sulfate, total endrin, and total BHC. These pesticides were evaluated in the OU-wide food chain models.

The PAHs detected during the Phase II investigation at Wetland 12 were likely remnants from the bilge water spill the wetland experienced in 1992. However, the one location with PAHs detections did not exceed the Swartz MEC, and PAHs have not been included as COPCs (Figure 12-6). One VOC, methylene chloride, was detected in Wetland 12, and no DiToro EqP SQGs was available, so the compound was retained as a COPC.

Table 12-2-9 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Figure 12-7 shows the Mean ERM category for each sediment sample location at Wetland 12. Based on this approach, one sample location, 041M120101 was determined to be Category 1, indicating that sediments from this area of the wetland were considered nontoxic. The other location, sample location 041M120201, fell into Category 3, which is the category that includes the studies where about 50% of samples were found to be toxic and average survival was about 60-70%.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 12-2-10, the surface water samples were compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 12-2-11.

Baseline Problem Formulation — Wetland 12 Surface Water COPC Refinement

During the surface water COPC refinement, additional information will be used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as preliminary COPCs.

The COPC refinement process included:

- Comparison of maximum SV concentrations to average SV concentrations
- Comparison of inorganic constituents to reference wetland values
- Description of surface water exceedances and their extent

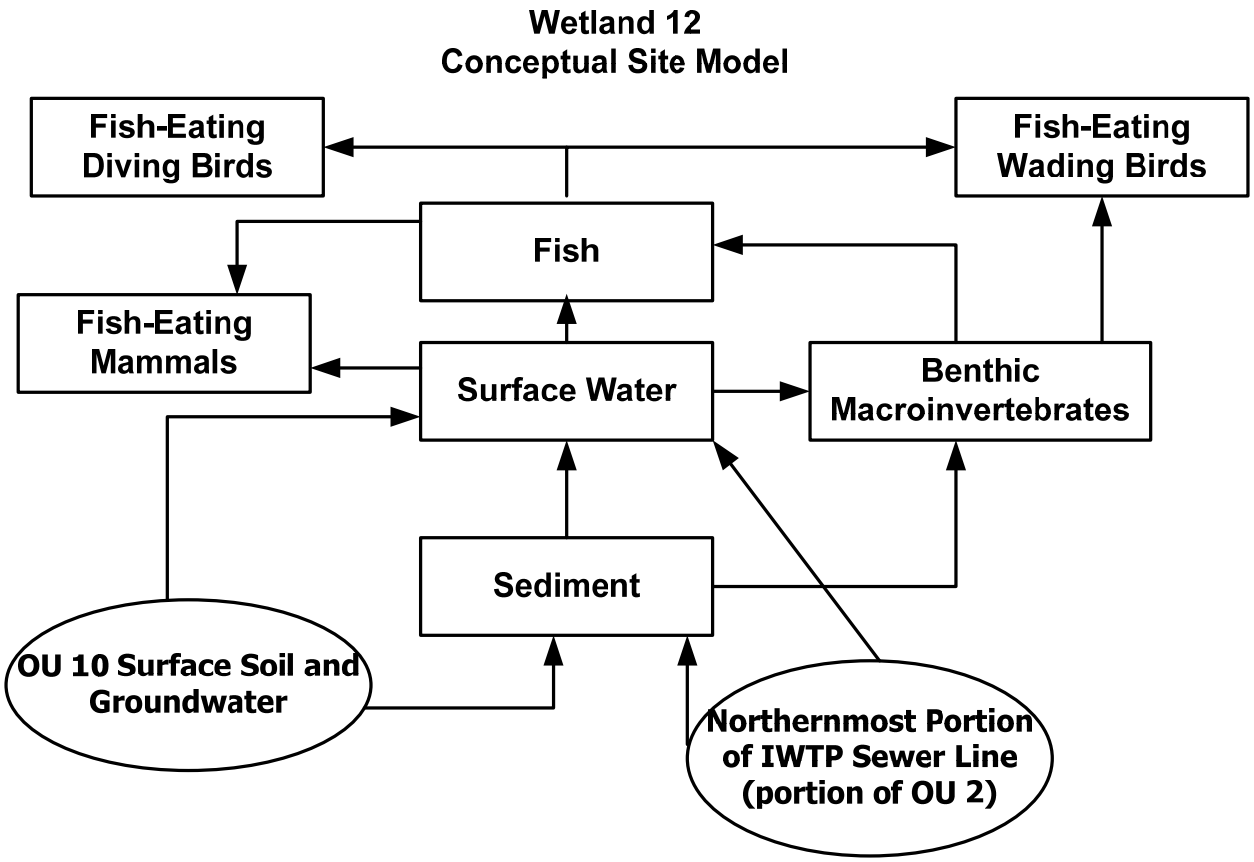
The methods used in the COPC refinement in the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 12-2-12. COPCs retained after refinement are presented in Table 12-2-13. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland. By comparing Wetland 12 inorganic surface water data to the fresh water reference values, inorganic contamination above natural background conditions can be determined.

For Wetland 12, manganese and thallium exceeded their Site 41 freshwater reference surface water concentrations (Table 12-2-12). Calcium, magnesium, potassium, and sodium also exceeded their reference concentrations, but are considered essential nutrients. The essential nutrients are not carried forward in the ERA process.

None of the same constituents was retained as COPCs for both sediment and surface water at Wetland 12.

Based on the COPCs retained during the ERA process, pesticides detected in sediments have most likely entered the wetland through runoff from OU 10. This portion of the base has ideal conditions for many biting insects and has several service roads adjacent to it, which may have been treated with pesticides over the years. PAHs were likely introduced during the 1992 bilge water spill.

The conceptual model below symbolizes which environmental habitats may be impacted by Wetland 12 Phase II constituents retained during the ERA process.



As summarized in the approved *Final RI/FS SAP Addendum* (E/A&H, 1997d), Wetland 12 was identified as an Red-Coded Wetland based on the Phase II results, indicating contamination that was possibly related to nearby IR sites, but with limited contaminants exceeding sediment criteria and reference concentrations. Contaminants detected in these wetlands were also considered to be possible sources of ecological risk.

12.2.5 Wetland 12 — Human Health Risk Assessment

Wetland 12 is described in Section 12.2.2, and the HHRA is summarized below.

12.2.5.1 Site Data

Sediment and surface water data were collected at Wetland 12 during Phase II of the RI. Section 12.2.3 summarizes the nature and extent of contamination for this wetland. Sediment and surface water data are summarized in Tables 12-2-3 and 12-2-4.

12.2.5.2 Conceptual Site Model

As described in Section 12.2.1, Wetland 12 is located at the southern end of Magazine Point. It collects storm water from the southern end of OU 10 and conveys this runoff to Wetland 10, which discharges to Pensacola Bay. Trespasser access to Wetland 12 is limited by homeland security restrictions. However, Navy maintenance personnel could obtain access to this wetland.

Dermal contact with surface water could be a significant exposure pathway and was included in this HHRA. Sediment locations are inundated all year at some locations, preventing significant sediment exposure. However, sediment dries at other locations, where exposure could be similar to soil exposure. Contact with sediment was assessed for all sediment locations using soil exposure models. Based on the species present, depth of surface water, and available habitat, fishing would not likely occur. Therefore, fish ingestion was excluded. Wading during maintenance activities would be the most likely exposure scenario.

The following scenarios and exposure pathways were evaluated for Wetland 12:

Scenario	Medium	Ingestion	Dermal
Maintenance	Sediment	√	√
	Surface water	√	√

12.2.5.3 Risk Characterization

The adult maintenance worker scenario was assessed for this wetland as described in Section 9.

Maintenance Worker

Wetland 12 Phase II

As shown in Tables 12-2-14 through 12-2-19, risk estimates for dermal contact and incidental ingestion of Wetland 12 sediment and surface water were below FDEP's risk threshold. Hazard indices were below 1.0.

Summary of Wetland 12 Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	2.29E-03	3.90E-08
	Surface water	5.15E-02	N/A

Based on these data, no COCs were identified for Wetland 12 Phase II.

Wetland 12 HHRA COC Summary

No COCs were identified in the HHRA for Wetland 12.

12.2.6 Wetland 12 — Fate and Transport Analysis

This wetland is located on the northern end of Chevalier Field and the southern end of OU 10. Two sediment samples and one surface water sample were collected from this wetland and used to evaluate the transport pathways. Flow within the wetland is to the south, where it intersects Wetland 10 at its approximate mid-point; flow from this wetland eventually empties into Pensacola Bay (see Figure 12-1).

Because of its upgradient position to OU 10, there are no wells proximal to this wetland conducive to evaluating the groundwater pathways. There are two soil borings associated with OU 10 that are proximal to this wetland and could potentially contribute surface soil to the system via runoff. The sediment COPCs retained after refinement for this wetland are summarized in Table 12-2-8. Provided below are the associated soil borings used for comparing data for the fate and transport analysis.

Associated Borings: 033SS150, 033SS160

Surface Water/Sediment Transport into the Wetlands:

Surface Water — There were no directly comparable storm water data from the area proximal to this wetland complex. Because of the lack of data, no definitive statement can be made regarding the validation of the pathway via storm water runoff into the wetland complex. The vast majority of surface water drainage to this wetland is runoff from the northern portion of the former Chevalier Field. OU 10 lies north and upgradient of it and is not expected to impact it.

Sediment — Based on the data from surface soil in associated borings, this pathway was validated only for the pesticide endosulfan I.

Surface Water/Sediment Transport within the Wetlands:

Surface Water— Because only one surface water sample was collected, this pathway was not evaluated.

Sediment — To evaluate this pathway, upgradient location 041M1201 was compared to 041M1202. Evaluation of these locations indicated an increase in detected parameters (13 metals and four organics in the upgradient location versus 16 metals and 10 metals in the downgradient location). TOC exhibited a marked increase in concentration. For the metals, three parameters were present in the downgradient locations that were not detected in the upgradient locations, and 13 constituents exhibited an increase. For the organics, nine compounds were present in the downgradient locations that were not detected in the upgradient location, and the one organic detected in both locations exhibited a decrease. Overall, there was a marked increase in organic detections, likely associated with Chevalier Field runoff, and possible influence from a former UST site, located on the northern boundary of Chevalier Field and the southern boundary of Wetland 10. The higher TOC concentrations in the downgradient location provided a ready substrate for parameter adsorption.

Table 12-2-1
Wetland 12 Phase II
Sediment Physical Parameters

Parameter		041M120101	041M120201
TOC (%)		0.724	4.1
Percent Solids (%)		63.8	50.2
Grain Size Analysis (percent of composition[1])			
	Fine Gravel	0	0
	Coarse Sand	1	0
	Medium Sand	25	23
	Fine Sand	72	66
	Silt and Clay	2	11
	Description	Dark Brown Poorly Graded Sand, Medium to Fine, with Trace of Silt	Dark Brown Silty Sand with Organics

Note:
[1] = Derived from sieve analyses.

Table 12-2-2
Wetland 12 Phase II
Surface Water Physical Parameters

Parameter	041W120101
Hardness as CaCO3 (mg/L)	216
pH	6.21
Specific Conductivity (mS/cm)	3.95
Turbidity (NTU)	1
Salinity (%)	0.2

Notes:

mg/L = Milligrams per liter
MS/cm = Millisiemens per centimeter
NTU = Nephelometric turbidity units
% = Percent

Table 12-2-3
Wetland 12 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	13,610.0	0	2	2	593.0	3,070.0	1,830.0	041M120201
Arsenic	6.620	0	1	2	0.240	0.240	0.163	041M120201
Barium	14.0	0	2	2	0.860	3.10	1.980	041M120201
Beryllium	0.840	0	1	2	0.120	0.120	0.080	041M120201
Calcium	10,756.670	0	2	2	1,290.0	1,950.0	1,620.0	041M120201
Chromium	39.370	0	2	2	2.10	4.80	3.450	041M120201
Copper	19.50	0	2	2	0.670	2.90	1.780	041M120201
Iron	11,911.670	0	2	2	367.0	484.0	426.0	041M120201
Lead	82.470	0	2	2	5.10	27.10	16.10	041M120201
Magnesium	7,513.330	0	2	2	103.0	468.0	286.0	041M120201
Manganese	37.970	0	2	2	2.90	7.60	5.250	041M120201
Potassium	1,628.670	0	2	2	26.20	138.0	82.10	041M120201
Selenium	3.450	0	1	2	0.430	0.430	0.277	041M120201
Sodium	18,993.330	0	2	2	229.0	1,840.0	1,030.0	041M120201
Vanadium	28.670	0	2	2	1.30	6.60	3.950	041M120201
Zinc	36.730	0	2	2	2.30	3.0	2.650	041M120201
PAHs (g/kg)								
2-Methylnaphthalene	N/A	0	1	2	7,100.0	7,100.0	4,580.0	041M120201
Fluorene	N/A	0	1	2	1,300.0	1,300.0	1,150.0	041M120201
Naphthalene	N/A	0	1	2	1,300.0	1,300.0	1,680.0	041M120201
Phenanthrene	N/A	0	1	2	2,500.0	2,500.0	2,280.0	041M120201
Total PAHs	N/A	0	1	2	17,300.0	17,300.0	20,900.0	041M120201
Pesticides and PCBs (g/kg)								
Dieldrin	N/A	0	1	2	0.310	0.310	0.207	041M120201
Endosulfan I	N/A	0	2	2	0.40	1.20	0.80	041M120101
Endosulfan sulfate	N/A	0	1	2	3.20	3.20	1.650	041M120201
Endrin aldehyde	N/A	0	1	2	0.280	0.280	0.193	041M120201
Endrin ketone	N/A	0	1	2	13.0	13.0	6.580	041M120101
Total Endrin	N/A	0	2	2	0.60	13.210	6.910	041M120101
beta-BHC	N/A	0	1	2	0.890	0.890	0.485	041M120101
delta-BHC	N/A	0	1	2	1.10	1.10	0.590	041M120101
Total BHC	N/A	0	1	2	2.090	2.090	1.20	041M120101
4,4'-DDE	40.0	0	1	2	0.970	0.970	0.537	041M120201
Total DDT	110.0	0	1	2	1.290	1.290	0.802	041M120201
VOCs (g/kg)								
Methylene chloride	N/A	0	1	2	1,300.0	1,300.0	1,130.0	041M120201

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 12-2-4
Wetland 12 Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (g/L)								
Calcium	7,675.0	1	1	1	23,000.0	23,000.0	23,000.0	041W120101
Chromium	8.0	1	1	1	8.1	8.1	8.1	041W120101
Iron	2,360.0	0	1	1	1,150.0	1,150.0	1,150.0	041W120101
Lead	3.2	0	1	1	1.2	1.2	1.2	041W120101
Magnesium	20,260.0	1	1	1	38,400.0	38,400.0	38,400.0	041W120101
Manganese	13.2	1	1	1	47.9	47.9	47.9	041W120101
Potassium	6,995.0	1	1	1	24,100.0	24,100.0	24,100.0	041W120101
Sodium	182,200.0	1	1	1	541,000.0	541,000.0	541,000.0	041W120101
Thallium	4.2	1	1	1	12.2	12.2	12.2	041W120101
Zinc	5.53	1	1	1	7.8	7.8	7.8	041W120101
SVOCs (g/L)								
Di-n-butylphthalate	N/A	0	1	1	1.0	1.0	1.0	041W120101

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 12-2-5
Wetland 12 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	2	2			593	3,070	041M120201	3,070			N/A		Yes	No SV
Antimony	0	1	0.415	0.415			ND	0.415	UJ	12	2	0.03	No	Max SQL< SV
Arsenic	1	2	0.085	0.085	0.24	0.24	041M120201	0.24	J	7.24	1, 2	0.03	No	Max Detect < SV
Barium	2	2			0.86	3.1	041M120201	3.1	J		N/A		Yes	No SV
Beryllium	1	2	0.04	0.04	0.12	0.12	041M120201	0.12	J		N/A		Yes	No SV
Cadmium	0	2	0.125	0.15			ND	0.15	U	0.68	1	0.22	No	Max SQL< SV
Calcium	2	2			1,290	1,950	041M120201	1,950			N/A		Yes	No SV
Chromium	2	2			2.1	4.8	041M120201	4.8	J	52.3	1, 2	0.09	No	Max Detect < SV
Cobalt	0	2	0.125	0.15			ND	0.15	U		N/A		Yes	No SV
Copper	2	2			0.67	2.9	041M120201	2.9		18.7	1, 2	0.16	No	Max Detect < SV
Cyanide (CN)	0	2	0.38	0.495			ND	0.495	U		N/A		Yes	No SV
Iron	2	2			367	484	041M120201	484			N/A		Yes	No SV
Lead	2	2			5.1	27.1	041M120201	27.1		30.2	1, 2	0.90	No	Max Detect < SV
Magnesium	2	2			103	468	041M120201	468	J		N/A		Yes	No SV
Manganese	2	2			2.9	7.6	041M120201	7.6			N/A		Yes	No SV
Mercury	0	2	0.03	0.05			ND	0.05	U	0.13	1, 2	0.39	No	Max SQL< SV
Nickel	0	2	0.5	0.6			ND	0.6	U	15.9	1, 2	0.04	No	Max SQL< SV
Potassium	2	2			26.2	138	041M120201	138	J		N/A		Yes	No SV
Selenium	1	2	0.125	0.125	0.43	0.43	041M120201	0.43	J		N/A		Yes	No SV
Silver	0	2	0.165	0.205			ND	0.205	U	0.73	1	0.28	No	Max SQL< SV
Sodium	2	2			229	1,840	041M120201	1,840			N/A		Yes	No SV
Thallium	0	2	0.125	0.15			ND	0.15	UJ		N/A		Yes	No SV
Vanadium	2	2			1.3	6.6	041M120201	6.6			N/A		Yes	No SV
Zinc	2	2			2.3	3	041M120201	3		124	1, 2	0.02	No	Max Detect < SV
PAHs (g/kg)														
2-Methylnaphthalene	**1**	**2**	**2,050**	**2,050**	**7,100**	**7,100**	**041M120201**	**7,100**		**20.2**	**1**	**351**	**Yes**	**Max Detect > SV**
Acenaphthene	0	2	300	1,000			ND	1,000	U	6.71	1	149	Yes	Max SQL > SV
Acenaphthylene	0	2	600	2,050			ND	2,050	U	5.87	1	349	Yes	Max SQL > SV
Anthracene	0	2	600	2,050			ND	2,050	U	46.9	1	43.7	Yes	Max SQL > SV
Benzo(a)anthracene	0	2	600	2,050			ND	2,050	U	74.8	1	27.4	Yes	Max SQL > SV
Benzo(a)pyrene	0	2	600	2,050			ND	2,050	U	88.8	1	23.1	Yes	Max SQL > SV
Chrysene	0	2	600	2,050			ND	2,050	U	108	1	19	Yes	Max SQL > SV
Dibenz(a,h)anthracene	0	2	600	2,050			ND	2,050	U	6.22	1	330	Yes	Max SQL > SV
Fluoranthene	0	2	600	2,050			ND	2,050	U	113	1	18.1	Yes	Max SQL > SV
Fluorene	**1**	**2**	**1,000**	**1,000**	**1,300**	**1,300**	**041M120201**	**1,300**		**21.2**	**1**	**61.3**	**Yes**	**Max Detect > SV**
Naphthalene	**1**	**2**	**2,050**	**2,050**	**1,300**	**1,300**	**041M120201**	**1,300**		**34.6**	**1**	**37.6**	**Yes**	**Max Detect > SV**
Phenanthrene	**1**	**2**	**2,050**	**2,050**	**2,500**	**2,500**	**041M120201**	**2,500**		**86.7**	**1**	**28.8**	**Yes**	**Max Detect > SV**
Pyrene	0	2	600	2,050			ND	2,050	U	153	1	13.4	Yes	Max SQL > SV
Total PAHs	**1**	**2**	**24,600**	**###**	**17,300**	**17,300**	**041M120201**	**17,300**		**1684**	**1, 2**	**10.3**	**Yes**	**Max Detect > SV**
TOC Normalized PAHs	**1**	**2**	**3,391**	**3,391**	**421.95**	**421.95**	**041M120201**	**421.95**		**290**	**3**	**1.46**	**Yes**	**Max Detect > SV**
PCBs (g/kg)														
Aroclor-1016	0	2	1.05	1.6			ND	1.6	U	21.6	N/A	0.07	No	Max SQL< SV
Aroclor-1221	0	2	2.05	3.1			ND	3.1	U	67	2	0.05	No	Max SQL< SV
Aroclor-1232	0	2	1.05	1.6			ND	1.6	U	21.6	N/A	0.07	No	Max SQL< SV
Aroclor-1242	0	2	1.05	1.6			ND	1.6	U	21.6	N/A	0.07	No	Max SQL< SV
Aroclor-1248	0	2	1.05	1.6			ND	1.6	U	21.6	N/A	0.07	No	Max SQL< SV
Aroclor-1254	0	2	1.05	1.6			ND	1.6	U	21.6	N/A	0.07	No	Max SQL< SV
Aroclor-1260	0	2	1.05	1.6			ND	1.6	U	21.6	N/A	0.07	No	Max SQL< SV
Total PCBs	0	2	8.35	12.7			ND	12.7	U	21.6	1	0.59	No	Max SQL< SV
Pesticides (g/kg)														
Aldrin	0	2	0.05	0.08			ND	0.08	U		N/A		Yes	No SV
Dieldrin	1	2	0.105	0.105	0.31	0.31	041M120201	0.31	J	0.72	1	0.43	No	Max Detect < SV
Endosulfan I	2	2			0.4	1.2	041M120101	1.2	J		N/A		Yes	No SV
Endosulfan II	0	2	0.105	0.16			ND	0.16	U		N/A		Yes	No SV
Endosulfan sulfate	1	2	0.105	0.105	3.2	3.2	041M120201	3.2	J		N/A		Yes	No SV
Heptachlor	0	2	0.05	0.08			ND	0.08	U		N/A		Yes	No SV
Heptachlor epoxide	0	2	0.05	0.08			ND	0.08	U		N/A		Yes	No SV
Methoxychlor	0	2	0.5	0.8			ND	0.8	UJ		N/A		Yes	No SV
Toxaphene	0	2	5	8			ND	8	U		N/A		Yes	No SV
alpha-Chlordane	0	2	0.05	0.08			ND	0.08	U	1.7	1	0.05	No	Max SQL< SV
gamma-Chlordane	0	2	0.05	0.08			ND	0.08	U	1.7	1	0.05	No	Max SQL< SV
Total Chlordane	0	2	0.1	0.16			ND	0.16	U	1.7	1	0.09	No	Max SQL< SV
Endrin	0	2	0.105	0.16			ND	0.16	U	3.3	2	0.05	No	Max SQL< SV
Endrin aldehyde	1	2	0.105	0.105	0.28	0.28	041M120201	0.28	J	3.3	2	0.08	No	Max Detect < SV
Endrin ketone	**1**	**2**	**0.16**	**0.16**	**13**	**13**	**041M120101**	**13**	**DJ**	**3.3**	**2**	**3.94**	**Yes**	**Max Detect > SV**
Total Endrin	**2**	**2**			**0.6**	**13.2**	**041M120101**	**13.2**		**3.3**	**2**	**4**	**Yes**	**Max Detect > SV**
alpha-BHC	0	2	0.05	0.08			ND	0.08	U		N/A		Yes	No SV
beta-BHC	**1**	**2**	**0.08**	**0.08**	**0.89**	**0.89**	**041M120101**	**0.89**	**J**	**0.32**	**2**	**2.78**	**Yes**	**Max Detect > SV**
delta-BHC	**1**	**2**	**0.08**	**0.08**	**1.1**	**1.1**	**041M120101**	**1.1**	**J**	**0.32**	**2**	**3.44**	**Yes**	**Max Detect > SV**
gamma-BHC (Lindane)	0	2	0.05	0.08			ND	0.08	U	0.32	2	0.25	No	Max SQL< SV
Total BHC	**1**	**2**	**0.32**	**0.32**	**2.09**	**2.09**	**041M120101**	**2.09**		**0.32**	**2**	**6.53**	**Yes**	**Max Detect > SV**
4,4'-DDD	0	2	0.105	0.16			ND	0.16	U	1.22	1	0.13	No	Max SQL< SV
4,4'-DDE	1	2	0.105	0.105	0.97	0.97	041M120201	0.97		2.07	1	0.47	No	Max Detect < SV
4,4'-DDT	0	2	0.105	0.16			ND	0.16	UJ	1.19	1	0.13	No	Max SQL< SV
Total DDT	1	2	0.315	0.315	1.29	1.29	041M120201	1.29		3.3	2	0.39	No	Max Detect < SV
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	6,000	6,000			ND	6,000	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	2	15,000	50,000			ND	50,000	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	2	15,000	50,000			ND	50,000	UJ		N/A		Yes	No SV
2,4-Dinitrotoluene	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
2-Chloronaphthalene	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
2-Chlorophenol	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	2	15,000	50,000			ND	50,000	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
2-Nitroaniline	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
2-Nitrophenol	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	2	6,000	20,500			ND	20,500	UJ		N/A		Yes	No SV
3-Nitroaniline	0	1	15,000	15,000			ND	15,000	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
4-Chloroaniline	0	1	20,500	20,500			ND	20,500	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
4-Nitroaniline	0	2	15,000	50,000			ND	50,000	UJ		N/A		Yes	No SV
4-Nitrophenol	0	2	15,000	50,000			ND	50,000	U		N/A		Yes	No SV
Benzo(b)fluoranthene	0	2	600	2,050			ND	2,050	U		N/A		Yes	No SV
Benzo(g,h,i)perylene	0	2	600	2,050			ND	2,050	U		N/A		Yes	No SV
Benzo(k)fluoranthene	0	2	600	2,050			ND	2,050	U		N/A		Yes	No SV
bis(2-Chloroethoxy)methane	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	2	600	2,050			ND	2,050	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	2	6,000	20,500			ND	20,500	U	182	1, 2	113	Yes	Max SQL > SV
Butylbenzylphthalate	0	2	6,000	20,500			ND	20,500	U	182	1, 2	113	Yes	Max SQL > SV
Carbazole	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
Dibenzofuran	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
Diethylphthalate	0	2	6,000	20,500			ND	20,500	U	182	1, 2	113	Yes	Max SQL > SV

Table 12-2-5
Wetland 12 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
Dimethylphthalate	0	2	6,000	20,500			ND	20,500	U	182	1, 2	113	Yes	Max SQL > SV
Di-n-butylphthalate	0	2	6,000	20,500			ND	20,500	U	182	1, 2	113	Yes	Max SQL > SV
Di-n-octylphthalate	0	2	6,000	20,500			ND	20,500	U	182	1, 2	113	Yes	Max SQL > SV
Hexachlorobenzene	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
Hexachlorobutadiene	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	2	6,000	20,500			ND	20,500	UJ		N/A		Yes	No SV
Hexachloroethane	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	2	600	2,050			ND	2,050	U		N/A		Yes	No SV
Isophorone	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
Nitrobenzene	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
N-Nitroso-di-n-propylamine	0	2	600	2,050			ND	2,050	U		N/A		Yes	No SV
N-Nitrosodiphenylamine	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
Pentachlorophenol	0	2	15,000	50,000			ND	50,000	U		N/A		Yes	No SV
Phenol	0	2	6,000	20,500			ND	20,500	U		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
1,1-Dichloroethane	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
1,1-Dichloroethene	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
1,2-Dichloroethane	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
1,2-Dichloropropane	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
2-Butanone (MEK)	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
2-Hexanone	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Acetone	0	2	950	1,300			ND	1,300	UJ		N/A		Yes	No SV
Benzene	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Bromodichloromethane	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Bromoform	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Bromomethane	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Carbon disulfide	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Carbon tetrachloride	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Chlorobenzene	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Chloroethane	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Chloroform	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Chloromethane	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Dibromochloromethane	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Ethylbenzene	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Methylene chloride	1	2	950	950	1,300	1,300	041M120201	1,300	J		N/A		Yes	No SV
Styrene	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Tetrachloroethene	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Toluene	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Trichloroethene	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV
Vinyl chloride	0	2	285	385			ND	385	U		N/A		Yes	No SV
Xylene (Total)	0	2	950	1,300			ND	1,300	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 12-2-6
Wetland 12 Phase II
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Aluminum	Endosulfan I	2-Methylnaphthalene	Methylene chloride
Barium	Endosulfan sulfate	Fluorene	
Beryllium	Endrin ketone	Naphthalene	
Calcium	Total Endrin	Phenanthrene	
Iron	beta-BHC	Total PAHs	
Magnesium	delta-BHC	TOC Normalized PAHs	
Manganese	Total BHC		
Potassium			
Selenium			
Sodium			
Vanadium			
Not Detected Parameters			
Cobalt	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Cyanide (CN)	alpha-BHC	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
Thallium	Endosulfan II	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Heptachlor	1,4-Dichlorobenzene	1,1-Dichloroethane
	Heptachlor epoxide	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1-Dichloroethene
	Methoxychlor	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Toxaphene	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
		2,4-Dichlorophenol	1,2-Dichloropropane
		2,4-Dimethylphenol	2-Butanone (MEK)
		2,4-Dinitrophenol	2-Hexanone
		2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
		2,6-Dinitrotoluene	Acetone
		2-Chloronaphthalene	Benzene
		2-Chlorophenol	Bromodichloromethane
		2-Methyl-4,6-Dinitrophenol	Bromoform
		2-Methylphenol (o-Cresol)	Bromomethane
		2-Nitroaniline	Carbon disulfide
		2-Nitrophenol	Carbon tetrachloride
		3,3'-Dichlorobenzidine	Chlorobenzene
		3-Nitroaniline	Chloroethane
		4-Bromophenyl-phenylether	Chloroform
		4-Chloro-3-methylphenol	Chloromethane
		4-Chloroaniline	cis-1,3-Dichloropropene
		4-Chlorophenylphenyl ether	Dibromochloromethane
		4-Methylphenol (p-Cresol)	Ethylbenzene
		4-Nitroaniline	Styrene
		4-Nitrophenol	Tetrachloroethene
		Acenaphthene	Toluene
		Acenaphthylene	trans-1,3-Dichloropropene
		Anthracene	Trichloroethene
		Benzo(a)anthracene	Vinyl chloride
		Benzo(a)pyrene	Xylene (Total)
		Benzo(b)fluoranthene	
		Benzo(g,h,i)perylene	
		Benzo(k)fluoranthene	
		bis(2-Chloroethoxy)methane	
		bis(2-Chloroethyl)ether	
		bis(2-Ethylhexyl)phthalate (BEHP)	
		Butylbenzylphthalate	
		Carbazole	
		Chrysene	
		Dibenz(a,h)anthracene	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-butylphthalate	
		Di-n-octylphthalate	
		Fluoranthene	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		Pyrene	

Table 12-2-7
Wetland 12 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																							
Aluminum	2	2				1,830	593	3,070	3,070		041M120201			NA					0	13,610	0	No	EPC < RC
Barium	2	2				1.98	0.86	3.1	3.1	J	041M120201			NA					0	14	0	No	EPC < RC
Beryllium	1	2	0.04	0.04	0.04	0.08	0.12	0.12	0.12	J	041M120201			NA					0	0.84	0	No	EPC < RC
Calcium	2	2				1,620	1,290	1,950	1,950		041M120201			NA					0	10,756.67	0	No	EPC < RC
Cobalt	0	2	0.138	0.125	0.15	0.138			0.15	U	ND			NA					0	2.8	0	No	Parameter Not Detected
Cyanide (CN)	0	2	0.438	0.38	0.495	0.438			0.495	U	ND			NA					0	5.22	0	No	Parameter Not Detected
Iron	2	2				426	367	484	484		041M120201			NA					0	11,911.67	0	No	EPC < RC
Magnesium	2	2				286	103	468	468	J	041M120201			NA					0	7,513.33	0	No	EPC < RC
Manganese	2	2				5.25	2.9	7.6	7.6		041M120201			NA					0	37.97	0	No	EPC < RC
Potassium	2	2				82.1	26.2	138	138	J	041M120201			NA					0	1,628.67	0	No	EPC < RC
Selenium	1	2	0.125	0.125	0.125	0.277	0.43	0.43	0.43	J	041M120201			NA					0	3.45	0	No	EPC < RC
Sodium	2	2				1,030	229	1,840	1,840		041M120201			NA					0	18,993.33	0	No	EPC < RC
Thallium	0	2	0.138	0.125	0.15	0.138			0.15	UJ	ND			NA					0	1.57	0	No	Parameter Not Detected
Vanadium	2	2				3.95	1.3	6.6	6.6		041M120201			NA					0	28.67	0	No	EPC < RC
PAHs (g/kg)																							
2-Methylnaphthalene	1	2	2,050	2,050	2,050	4,580	7,100	7,100	7,100		041M120201	20.2	201	PEL	351	226	35.3	22.8	1		0	No	TOC normalized PAHs<MEC
Acenaphthene	0	2	650	300	1,000	650			1,000	U	ND	6.71	88.9	PEL	149	96.9	11.2	7.31	0		0	No	Parameter Not Detected; Max SQL > RV
Acenaphthylene	0	2	1,330	600	2,050	1,330			2,050	U	ND	5.87	128	PEL	349	226	16	10.4	0		0	No	Parameter Not Detected; Max SQL > RV
Anthracene	0	2	1,330	600	2,050	1,330			2,050	U	ND	46.9	245	PEL	43.7	28.3	8.37	5.41	0		0	No	Parameter Not Detected; Max SQL > RV
Benzo(a)anthracene	0	2	1,330	600	2,050	1,330			2,050	U	ND	74.8	693	PEL	27.4	17.7	2.96	1.91	0		0	No	Parameter Not Detected; Max SQL > RV
Benzo(a)pyrene	0	2	1,330	600	2,050	1,330			2,050	U	ND	88.8	763	PEL	23.1	14.9	2.69	1.74	0		0	No	Parameter Not Detected; Max SQL > RV
Chrysene	0	2	1,330	600	2,050	1,330			2,050	U	ND	108	846	PEL	19	12.3	2.42	1.57	0		0	No	Parameter Not Detected; Max SQL > RV
Dibenz(a,h)anthracene	0	2	1,330	600	2,050	1,330			2,050	U	ND	6.22	135	PEL	330	213	15.2	9.81	0		0	No	Parameter Not Detected; Max SQL > RV
Fluoranthene	0	2	1,330	600	2,050	1,330			2,050	U	ND	113	1,494	PEL	18.1	11.7	1.37	0.89	0		0	No	Parameter Not Detected; Max SQL > RV
Fluorene	1	2	1,000	1,000	1,000	1,150	1,300	1,300	1,300		041M120201	21.2	144	PEL	61.3	54.2	9.03	7.99	1		0	No	TOC normalized PAHs<MEC
Naphthalene	1	2	2,050	2,050	2,050	1,680	1,300	1,300	1,300		041M120201	34.6	391	PEL	37.6	48.4	3.32	4.28	1		0	No	TOC normalized PAHs<MEC
Phenanthrene	1	2	2,050	2,050	2,050	2,280	2,500	2,500	2,500		041M120201	86.7	544	PEL	28.8	26.2	4.6	4.18	1		0	No	TOC normalized PAHs<MEC
Pyrene	0	2	1,330	600	2,050	1,330			2,050	U	ND	153	1,398	PEL	13.4	8.66	1.47	0.95	0		0	No	Parameter Not Detected; Max SQL > RV
Total PAHs	1	2	24,600	24,600	24,600	20,900	17,300	17,300	17,300		041M120201	1,684	16,770	PEL	10.3	12.4	1.03	1.25	1		0	No	TOC normalized PAHs<MEC
TOC Normalized PAHs	1	2	3390.88	3,390.88	3,390.88	1,906.42	421.95	421.95	421.95		041M120201	290	1,800	MEC	1.46	6.57	0.23	1.06	0		0	No	RV HQ <1 and no RC
PCBs (g/kg)																							
Aroclor-1016	0	2	1.33	1.05	1.6	1.33			1.6	U	ND	21.6	189	PEL	0.07	0.06	0.01	0.01	0		0	No	Parameter Not Detected
Aroclor-1221	0	2	2.58	2.05	3.1	2.58			3.1	U	ND	67	189	PEL	0.05	0.04	0.02	0.01	0		0	No	Parameter Not Detected
Aroclor-1232	0	2	1.33	1.05	1.6	1.33			1.6	U	ND	21.6	189	PEL	0.07	0.06	0.01	0.01	0		0	No	Parameter Not Detected
Aroclor-1242	0	2	1.33	1.05	1.6	1.33			1.6	U	ND	21.6	189	PEL	0.07	0.06	0.01	0.01	0		0	No	Parameter Not Detected
Aroclor-1248	0	2	1.33	1.05	1.6	1.33			1.6	U	ND	21.6	189	PEL	0.07	0.06	0.01	0.01	0		0	No	Parameter Not Detected
Aroclor-1254	0	2	1.33	1.05	1.6	1.33			1.6	U	ND	21.6	189	PEL	0.07	0.06	0.01	0.01	0		0	No	Parameter Not Detected
Aroclor-1260	0	2	1.33	1.05	1.6	1.33			1.6	U	ND	21.6	189	PEL	0.07	0.06	0.01	0.01	0		0	No	Parameter Not Detected
Total PCBs	0	2	10.5	8.35	12.7	10.5			12.7	U	ND	21.6	189	PEL	0.59	0.49	0.07	0.06	0		0	No	Parameter Not Detected
Pesticides (g/kg)																							
Aldrin	0	2	0.065	0.05	0.08	0.065			0.08	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan I	2	2				0.8	0.4	1.2	1.2	J	041M120101			NA					0		0	Yes	No SV, no RV, and no RC
Endosulfan II	0	2	0.133	0.105	0.16	0.133			0.16	U	ND			NA					0		0	No	Parameter Not Detected
Endosulfan sulfate	1	2	0.105	0.105	0.105	1.65	3.2	3.2	3.2	J	041M120201			NA					0		0	Yes	No SV, no RV, and no RC
Heptachlor	0	2	0.065	0.05	0.08	0.065			0.08	U	ND			NA					0		0	No	Parameter Not Detected
Heptachlor epoxide	0	2	0.065	0.05	0.08	0.065			0.08	U	ND			NA					0		0	No	Parameter Not Detected
Methoxychlor	0	2	0.65	0.5	0.8	0.65			0.8	UJ	ND			NA					0		0	No	Parameter Not Detected
Toxaphene	0	2	6.5	5	8	6.5			8	U	ND			NA					0		0	No	Parameter Not Detected
Endrin	0	2	0.133	0.105	0.16	0.133			0.16	U	ND	3.3		NA	0.05	0.04			0		0	No	Parameter Not Detected
Endrin aldehyde	1	2	0.105	0.105	0.105	0.193	0.28	0.28	0.28	J	041M120201	3.3		NA	0.08	0.06			0		0	Yes	No RV or RC and EPC > SV
Endrin ketone	1	2	0.16	0.16	0.16	6.58	13	13	13	DJ	041M120101	3.3		NA	3.94	1.99			0		0	Yes	No RV or RC and EPC > SV
Total Endrin	2	2				6.91	0.6	13.2	13.2		041M120101	3.3		NA	4	2.09			0		0	Yes	No RV or RC and EPC > SV
alpha-BHC	0	2	0.065	0.05	0.08	0.065			0.08	U	ND		0.99	PEL			0.08	0.07	0		0	No	Parameter Not Detected
beta-BHC	1	2	0.08	0.08	0.08	0.485	0.89	0.89	0.89	J	041M120101	0.32	0.99	PEL	2.78	1.52	0.899	0.49	0		0	No	RV HQ <1 and no RC
delta-BHC	**1**	**2**	**0.08**	**0.08**	**0.08**	**0.59**	**1.1**	**1.1**	**1.1**	**J**	**041M120101**	**0.32**	**0.99**	**PEL**	**3.44**	**1.84**	**1.11**	**0.60**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
gamma-BHC (Lindane)	0	2	0.065	0.05	0.08	0.065			0.08	U	ND	0.32	0.99	PEL	0.25	0.20	0.08	0.07	0		0	No	Parameter Not Detected
Total BHC	**1**	**2**	**0.32**	**0.32**	**0.32**	**1.2**	**2.09**	**2.09**	**2.09**		**041M120101**	**0.32**	**0.99**	**PEL**	**6.53**	**3.77**	**2.11**	**1.22**	**1**		**0**	**Yes**	**RV HQ > 1 and no RC**
SVOCs (g/kg)																							
1,2,4-Trichlorobenzene	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	1	6,000	6,000	6,000	6,000			6,000	U	ND			NA					0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	2	32,500	15,000	50,000	32,500			50,000	U	ND			NA					0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	2	32,500	15,000	50,000	32,500			50,000	UJ	ND			NA					0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Chlorophenol	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	2	32,500	15,000	50,000	32,500			50,000	U	ND			NA					0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitroaniline	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
2-Nitrophenol	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	2	13,300	6,000	20,500	13,300			20,500	UJ	ND			NA					0		0	No	Parameter Not Detected
3-Nitroaniline	0	1	15,000	15,000	15,000	15,000			15,000	U	ND			NA					0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Chloroaniline	0	1	20,500	20,500	20,500	20,500			20,500	U	ND			NA					0		0	No	Parameter Not Detected

Table 12-2-7
Wetland 12 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result SV HQ	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
SVOCs (g/kg) - cont.																							
4-Chlorophenylphenyl ether	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
4-Nitroaniline	0	2	32,500	15,000	50,000	32,500			50,000	UJ	ND			NA					0		0	No	Parameter Not Detected
4-Nitrophenol	0	2	32,500	15,000	50,000	32,500			50,000	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	2	1,330	600	2,050	1,330			2,050	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	2	1,330	600	2,050	1,330			2,050	U	ND			NA					0		0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	2	1,330	600	2,050	1,330			2,050	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	2	1,330	600	2,050	1,330			2,050	U	ND			NA					0		0	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	2	13,300	6,000	20,500	13,300			20,500	U	ND	182	2,647	PEL	113	72.8	7.74	5.01	0		0	No	Parameter Not Detected; Max SQL > RV
Butylbenzylphthalate	0	2	13,300	6,000	20,500	13,300			20,500	U	ND	182	2,647	PEL	113	72.8	7.74	5.01	0		0	No	Parameter Not Detected; Max SQL > RV
Carbazole	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
Dibenzofuran	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
Diethylphthalate	0	2	13,300	6,000	20,500	13,300			20,500	U	ND	182	2,647	PEL	113	72.8	7.74	5.01	0		0	No	Parameter Not Detected; Max SQL > RV
Dimethylphthalate	0	2	13,300	6,000	20,500	13,300			20,500	U	ND	182	2,647	PEL	113	72.8	7.74	5.01	0		0	No	Parameter Not Detected; Max SQL > RV
Di-n-butylphthalate	0	2	13,300	6,000	20,500	13,300			20,500	U	ND	182	2,647	PEL	113	72.8	7.74	5.01	0		0	No	Parameter Not Detected; Max SQL > RV
Di-n-octylphthalate	0	2	13,300	6,000	20,500	13,300			20,500	U	ND	182	2,647	PEL	113	72.8	7.74	5.01	0		0	No	Parameter Not Detected; Max SQL > RV
Hexachlorobenzene	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	2	13,300	6,000	20,500	13,300			20,500	UJ	ND			NA					0		0	No	Parameter Not Detected
Hexachloroethane	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	2	1,330	600	2,050	1,330			2,050	U	ND			NA					0		0	No	Parameter Not Detected
Isophorone	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
Nitrobenzene	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	2	1,330	600	2,050	1,330			2,050	U	ND			NA					0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
Pentachlorophenol	0	2	32,500	15,000	50,000	32,500			50,000	U	ND			NA					0		0	No	Parameter Not Detected
Phenol	0	2	13,300	6,000	20,500	13,300			20,500	U	ND			NA					0		0	No	Parameter Not Detected
VOCs (g/kg)																							
1,1,1-Trichloroethane	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
2-Hexanone	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Acetone	0	2	1,130	950	1,300	1,130			1,300	UJ	ND			NA					0		0	No	Parameter Not Detected
Benzene	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Bromodichloromethane	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Bromoform	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Bromomethane	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Carbon disulfide	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Carbon tetrachloride	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Chlorobenzene	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Chloroethane	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Chloroform	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Chloromethane	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Dibromochloromethane	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Ethylbenzene	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Methylene chloride	1	2	950	950	950	1130	1,300	1,300	1,300	J	041M120201			NA					0		0	Yes	No SV, no RV, and no RC
Styrene	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Tetrachloroethene	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Toluene	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Trichloroethene	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected
Vinyl chloride	0	2	335	285	385	335			385	U	ND			NA					0		0	No	Parameter Not Detected
Xylene (Total)	0	2	1,130	950	1,300	1,130			1,300	U	ND			NA					0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 12-2-8
Wetland 12 Phase II
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
None	Endosulfan I Endosulfan sulfate Endrin aldehyde Endrin ketone Total Endrin delta-BHC Total BHC	None	None

Table 12-2-9
Wetland 12 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M120101	11/28/1995	mg/kg	0.085	U	Arsenic	8.2	70	0.00
041M120101	11/28/1995	mg/kg	0.125	U	Cadmium	1.2	9.6	0.01
041M120101	11/28/1995	mg/kg	2.1		Chromium	81	370	0.01
041M120101	11/28/1995	mg/kg	0.67	J	Copper	34	270	0.00
041M120101	11/28/1995	mg/kg	5.1		Lead	46.7	218	0.02
041M120101	11/28/1995	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M120101	11/28/1995	mg/kg	0.5	U	Nickel	20.9	51.6	0.01
041M120101	11/28/1995	mg/kg	0.165	UJ	Silver	1	3.7	0.04
041M120101	11/28/1995	mg/kg	2.3	J	Zinc	150	410	0.01
041M120101	11/28/1995	g/kg	0.105	U	4,4'-DDE	2.2	27	0.00
041M120101	11/28/1995	g/kg	0.105	UJ	4,4'-DDT	1.58	46.1	0.00
041M120101	11/28/1995	g/kg	8.35	U	Total PCBs	22.7	180	0.05
041M120101	11/28/1995	g/kg	2,050	U	2-Methylnaphthalene	70	670	3.06
041M120101	11/28/1995	g/kg	1,000	U	Acenaphthene	16	500	2.00
041M120101	11/28/1995	g/kg	2,050	U	Acenaphthylene	44	640	3.20
041M120101	11/28/1995	g/kg	2,050	U	Anthracene	85.3	1,100	1.86
041M120101	11/28/1995	g/kg	2,050	U	Benzo(a)anthracene	261	1,600	1.28
041M120101	11/28/1995	g/kg	2,050	U	Benzo(a)pyrene	430	1,600	1.28
041M120101	11/28/1995	g/kg	2,050	U	Chrysene	384	2,800	0.73
041M120101	11/28/1995	g/kg	2,050	U	Dibenz(a,h)anthracene	63.4	260	7.88
041M120101	11/28/1995	g/kg	2,050	U	Fluoranthene	600	5,100	0.40
041M120101	11/28/1995	g/kg	1,000	U	Fluorene	19	540	1.85
041M120101	11/28/1995	g/kg	2,050	U	Naphthalene	160	2,100	0.98
041M120101	11/28/1995	g/kg	2,050	U	Phenanthrene	240	1,500	1.37
041M120101	11/28/1995	g/kg	2,050	U	Pyrene	665	2,600	0.79
041M120101	11/28/1995				ERM Quotient Sum			26.89
041M120101	11/28/1995				Mean ERM Quotient			1.08
041M120101	11/28/1995				Mean ERM Quotient without ND			0.00
041M120101	11/28/1995				Mean ERM Quotient Category			1
041M120201	11/29/1995	mg/kg	0.24	J	Arsenic	8.2	70	0.00
041M120201	11/29/1995	mg/kg	0.15	U	Cadmium	1.2	9.6	0.02
041M120201	11/29/1995	mg/kg	4.8	J	Chromium	81	370	0.01
041M120201	11/29/1995	mg/kg	2.9		Copper	34	270	0.01
041M120201	11/29/1995	mg/kg	27.1		Lead	46.7	218	0.12
041M120201	11/29/1995	mg/kg	0.05	U	Mercury	0.15	0.71	0.07
041M120201	11/29/1995	mg/kg	0.6	U	Nickel	20.9	51.6	0.01
041M120201	11/29/1995	mg/kg	0.205	U	Silver	1	3.7	0.06
041M120201	11/29/1995	mg/kg	3		Zinc	150	410	0.01
041M120201	11/29/1995	g/kg	0.97		4,4'-DDE	2.2	27	0.04
041M120201	11/29/1995	g/kg	0.16	UJ	4,4'-DDT	1.58	46.1	0.00
041M120201	11/29/1995	g/kg	12.7	U	Total PCBs	22.7	180	0.07
041M120201	**11/29/1995**	**g/kg**	**7,100**		**2-Methylnaphthalene**	**70**	**670**	**10.60**
041M120201	11/29/1995	g/kg	300	U	Acenaphthene	16	500	0.60
041M120201	11/29/1995	g/kg	600	U	Acenaphthylene	44	640	0.94
041M120201	11/29/1995	g/kg	600	U	Anthracene	85.3	1,100	0.55
041M120201	11/29/1995	g/kg	600	U	Benzo(a)anthracene	261	1,600	0.38
041M120201	11/29/1995	g/kg	600	U	Benzo(a)pyrene	430	1,600	0.38
041M120201	11/29/1995	g/kg	600	U	Chrysene	384	2,800	0.21
041M120201	11/29/1995	g/kg	600	U	Dibenz(a,h)anthracene	63.4	260	2.31
041M120201	11/29/1995	g/kg	600	U	Fluoranthene	600	5,100	0.12
041M120201	**11/29/1995**	**g/kg**	**1,300**		**Fluorene**	**19**	**540**	**2.41**
041M120201	11/29/1995	g/kg	1,300		Naphthalene	160	2,100	0.62
041M120201	**11/29/1995**	**g/kg**	**2,500**		**Phenanthrene**	**240**	**1,500**	**1.67**
041M120201	11/29/1995	g/kg	600	U	Pyrene	665	2,600	0.23
041M120201	11/29/1995				ERM Quotient Sum			21.42
041M120201	11/29/1995				Mean ERM Quotient			0.86
041M120201	11/29/1995				Mean ERM Quotient without ND			0.62
041M120201	11/29/1995				Mean ERM Quotient Category			3

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 12-2-10
Wetland 12 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement ?	Rationale
Metals (g/L)																
Aluminum	0	1	89.5	89.5	89.5	89.5			ND	89.5	U	13	FDEP	6.88	Yes	Max SQL > SV
Antimony	0	1	1	1	1	1			ND	1	U	160	EPA	0.01	No	Max SQL< SV
Arsenic	0	1	1	1	1	1			ND	1	U	50	FDEP	0.02	No	Max SQL< SV
Barium	0	1	4	4	4	4			ND	4	UJ		NA		Yes	No SV
Beryllium	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.13	FDEP	3.85	Yes	Max SQL > SV
Cadmium	0	1	1.5	1.5	1.5	1.5			ND	1.5	U	0.66	EPA	2.27	Yes	Max SQL > SV
Calcium	1	1				23,000	23,000	23,000	041W120101	23,000			NA		Yes	No SV
Chromium	1	1				8.1	8.1	8.1	041W120101	8.1	J	11	EPA	0.74	No	Max Detect < SV
Cobalt	0	1	1.5	1.5	1.5	1.5			ND	1.5	U		NA		Yes	No SV
Copper	0	1	2	2	2	2			ND	2	UJ	6.54	EPA	0.31	No	Max SQL< SV
Cyanide (CN)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	5.2	EPA	0.48	No	Max SQL< SV
Iron	1	1				1,150	1,150	1,150	041W120101	1,150			NA		Yes	No SV
Lead	1	1				1.2	1.2	1.2	041W120101	1.2	J	1.32	EPA	0.91	No	Max Detect < SV
Magnesium	1	1				38,400	38,400	38,400	041W120101	38,400			NA		Yes	No SV
Manganese	1	1				47.9	47.9	47.9	041W120101	47.9			NA		Yes	No SV
Mercury	0	1	0.065	0.065	0.065	0.065			ND	0.065	U	0.012	EPA	5.42	Yes	Max SQL > SV
Nickel	0	1	6	6	6	6			ND	6	U	87.71	EPA	0.07	No	Max SQL< SV
Potassium	1	1				24,100	24,100	24,100	041W120101	24,100			NA		Yes	No SV
Selenium	0	1	1.5	1.5	1.5	1.5			ND	1.5	U	5	EPA	0.3	No	Max SQL< SV
Silver	0	1	2	2	2	2			ND	2	U	0.012	EPA	167	Yes	Max SQL > SV
Sodium	1	1				541,000	541,000	541,000	041W120101	541,000			NA		Yes	No SV
Thallium	**1**	**1**				**12.2**	**12.2**	**12.2**	**041W120101**	**12.2**		**4**	**EPA**	**3.05**	**Yes**	**Max Detect > SV**
Vanadium	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Zinc	1	1				7.8	7.8	7.8	041W120101	7.8	J	58.91	EPA	0.13	No	Max Detect < SV
Pesticides (g/L)																
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan I	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.056	EPA	0.45	No	Max SQL< SV
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	6.58	Yes	Max SQL > SV
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	Yes	Max SQL > SV
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA		Yes	No SV
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	11.6	Yes	Max SQL > SV
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA		Yes	No SV
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	21.7	Yes	Max SQL > SV
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA		Yes	No SV
gamma-BHC (Lindane)	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	No	Max SQL< SV
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA		Yes	No SV
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	Yes	Max SQL > SV
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	Yes	Max SQL > SV
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	UJ	0.00059	FDEP	84.7	Yes	Max SQL > SV
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA		Yes	No SV
PCBs (g/L)																
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA		Yes	No SV
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Table 12-2-10
Wetland 12 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement ?	Rationale
PCBs (g/L) - cont.																
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA	35.7	Yes	Max SQL > SV
Total PCB	0	1	4	4	4	4			ND	4	U		NA		Yes	No SV
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Chlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	43.8	EPA	0.06	No	Max SQL< SV
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
3-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloro-3-methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
4-Nitrophenol	0	1	10	10	10	10			ND	10	U		NA		Yes	No SV
Benzo(b)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(g,h,i)perylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(k)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	0.3	EPA	8.33	Yes	Max SQL > SV
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Di-n-butylphthalate	1	1				1	1	1	041W120101	1	J	9.4	EPA	0.11	No	Max Detect < SV
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Pentachlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Acenaphthylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Benzo(a)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Table 12-2-10
Wetland 12 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
PAHs (g/L) - cont.																
Chrysene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibenz(a,h)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Fluorene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Naphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	26	FDEP	0.02	No	Max SQL< SV
Phenanthrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Total PAH	0	1	6.5	6.5	6.5	6.5			ND	6.5	U		NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	270	FDEP	0.00185	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.156	No	Max SQL< SV
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	15.8	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	3	FDEP	0.167	No	Max SQL< SV
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	53	EPA	0.01	No	Max SQL< SV
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	17	FDEP	0.03	No	Max SQL< SV
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	289	EPA	0.00	No	Max SQL< SV
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	453	EPA	0.00	No	Max SQL< SV
Methylene chloride	0	1	3.5	3.5	3.5	3.5			ND	3.5	U	1,580	FDEP	0.00	No	Max SQL< SV
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	175	EPA	0.00	No	Max SQL< SV
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Vinyl chloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 12-2-11
Wetland 12 Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Calcium			
Iron			
Magnesium			
Manganese			
Potassium			
Sodium			
Thallium			
Not Detected Parameters			
Aluminum	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Antimony	Dieldrin	2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1,2,2-Tetrachloroethane
Arsenic	Endosulfan I	2,4,5-Trichlorophenol	1,1,2-Trichloroethane
Barium	Endosulfan II	2,4,6-Trichlorophenol	1,1-Dichloroethane
Beryllium	Endosulfan sulfate	2,4-Dichlorophenol	1,1-Dichloroethene
Cadmium	Heptachlor	2,4-Dimethylphenol	1,2-Dibromo-3-Chloropropane
Cobalt	Heptachlor epoxide	2,4-Dinitrophenol	1,2-Dibromoethane
Copper	Methoxychlor	2,4-Dinitrotoluene	1,2-Dichlorobenzene
Cyanide (CN)	Toxaphene	2,6-Dinitrotoluene	1,2-Dichloroethane
Mercury	alpha-Chlordane	2-Chloronaphthalene	1,2-Dichloropropane
Nickel	gamma-Chlordane	2-Chlorophenol	1,3-Dichlorobenzene
Selenium	Total Chlordane	2-Methyl-4,6-Dinitrophenol	1,4-Dichlorobenzene
Silver	Endrin	2-Methylphenol (o-Cresol)	2-Hexanone
Vanadium	Endrin aldehyde	2-Nitroaniline	4-Methyl-2-Pentanone (MIBK)
	Endrin ketone	2-Nitrophenol	Benzene
	Total Endrin	3,3'-Dichlorobenzidine	Bromochloromethane
	alpha-BHC	3-Nitroaniline	Bromodichloromethane
	beta-BHC	4-Bromophenyl-phenylether	Bromoform
	delta-BHC	4-Chloro-3-methylphenol	Bromomethane
	gamma-BHC (Lindane)	4-Chloroaniline	Carbon disulfide
	Total BHC	4-Chlorophenylphenyl ether	Carbon tetrachloride
	4,4'-DDD	4-Methylphenol (p-Cresol)	Chlorobenzene
	4,4'-DDE	4-Nitroaniline	Chloroethane
	4,4'-DDT	4-Nitrophenol	Chloroform
	Total DDT	Benzo(b)fluoranthene	Chloromethane
	Aroclor-1016	Benzo(g,h,i)perylene	cis-1,2-Dichloroethene
	Aroclor-1221	Benzo(k)fluoranthene	cis-1,3-Dichloropropene
	Aroclor-1232	bis(2-Chloroethoxy)methane	Dibromochloromethane
	Aroclor-1242	bis(2-Chloroethyl)ether	Ethylbenzene
	Aroclor-1248	bis(2-Ethylhexyl)phthalate (BEHP)	Methylene chloride
	Aroclor-1254	Butylbenzylphthalate	Styrene
	Aroclor-1260	Dibenzofuran	Tetrachloroethene
	Total PCBs	Diethylphthalate	Toluene
		Dimethylphthalate	trans-1,2-Dichloroethene
		Di-n-octylphthalate	trans-1,3-Dichloropropene
		Hexachlorobenzene	Trichloroethene
		Hexachlorobutadiene	Vinyl chloride
		Hexachlorocyclopentadiene	Xylene (Total)
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Naphthalene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 12-2-12
Wetland 12 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
Metals (g/L)																			
Aluminum	0	1	89.5	89.5	89.5	89.5			ND	89.5	U	13	FDEP	7	6.88	1,090.25	0	No	Parameter Not Detected
Barium	0	1	4	4	4	4			ND	4	UJ		NA			3.68	0	No	Parameter Not Detected
Beryllium	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.13	FDEP	4	3.85	1	0	No	Parameter Not Detected
Calcium	1	1				23,000	23,000	23,000	041W120101	23,000			NA			7,675	1	No	Essential Nutrient
Cobalt	0	1	1.5	1.5	1.5	1.5			ND	1.5	U		NA			3	0	No	Parameter Not Detected
Iron	1	1				1,150	1,150	1,150	041W120101	1,150			NA			2,360	0	No	Max Result < Ref. Conc.
Magnesium	1	1				38,400	38,400	38,400	041W120101	38,400			NA			20,260	1	No	Essential Nutrient
Manganese	1	1				47.9	47.9	47.9	041W120101	47.9			NA			13.2	1	Yes	Max Result > Ref. Conc.
Mercury	0	1	0.065	0.065	0.065	0.065			ND	0.065	U	0.012	EPA	5.42	5.42	0.13	0	No	Parameter Not Detected
Potassium	1	1				24,100	24,100	24,100	041W120101	24,100			NA			6,995	1	No	Essential Nutrient
Silver	0	1	2	2	2	2			ND	2	U	0.012	EPA	167	167	4	0	No	Parameter Not Detected
Sodium	1	1				541,000	541,000	541,000	041W120101	541,000			NA			182,200	1	No	Essential Nutrient
Thallium	**1**	**1**				**12.2**	**12.2**	**12.2**	**041W120101**	**12.2**		**4**	**EPA**	**3.05**	**3.05**	**4.2**	**1**	**Yes**	**Max Result > Ref. Conc.**
Vanadium	0	1	1	1	1	1			ND	1	U		NA			4.7	0	No	Parameter Not Detected
Pesticides (g/L)																			
Aldrin	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Dieldrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan II	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endosulfan sulfate	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Heptachlor	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.0038	EPA	7	6.58		0	No	Parameter Not Detected
Heptachlor epoxide	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.00004	FDEP	625	625		0	No	Parameter Not Detected
Methoxychlor	0	1	0.25	0.25	0.25	0.25			ND	0.25	U		NA				0	No	Parameter Not Detected
Toxaphene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
alpha-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
gamma-Chlordane	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
Total Chlordane	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0043	EPA	12	11.6		0	No	Parameter Not Detected
Endrin	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin aldehyde	0	1	0.05	0.05	0.05	0.05			ND	0.05	U		NA				0	No	Parameter Not Detected
Endrin ketone	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0023	EPA	22	21.7		0	No	Parameter Not Detected
Total Endrin	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
alpha-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
beta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
delta-BHC	0	1	0.025	0.025	0.025	0.025			ND	0.025	U		NA				0	No	Parameter Not Detected
gamma-BHC (Lindane)	0	1	0.025	0.025	0.025	0.025			ND	0.025	U	0.08	EPA	0.31	0.31		0	No	Parameter Not Detected
Total BHC	0	1	0.1	0.1	0.1	0.1			ND	0.1	U		NA				0	No	Parameter Not Detected
4,4'-DDD	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0003	FDEP	167	167		0	No	Parameter Not Detected
4,4'-DDE	0	1	0.05	0.05	0.05	0.05			ND	0.05	U	0.0002	FDEP	250	250		0	No	Parameter Not Detected
4,4'-DDT	0	1	0.05	0.05	0.05	0.05			ND	0.05	UJ	0.00059	FDEP	85	84.7		0	No	Parameter Not Detected
Total DDT	0	1	0.15	0.15	0.15	0.15			ND	0.15	U		NA				0	No	Parameter Not Detected
PCBs (g/L)																			
Aroclor-1016	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1221	0	1	1	1	1	1			ND	1	U		NA				0	No	Parameter Not Detected
Aroclor-1232	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1242	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1248	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1254	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Aroclor-1260	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	0.014	EPA		35.7		0	No	Parameter Not Detected
Total PCB	0	1	4	4	4	4			ND	4	U		NA				0	No	Parameter Not Detected
SVOCs (g/L)																			
1,2,4-Trichlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-ch	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Nitroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
3-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Nitroaniline	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
4-Nitrophenol	0	1	10	10	10	10			ND	10	U		NA				0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected

Table 12-2-12
Wetland 12 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Retained for Refinement?	Rationale
SVOCs (g/L) - cont.																			
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	0.3	EPA	8.33	8.33		0	No	Parameter Not Detected
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Pentachlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
PAHs (g/L)																			
2-Methylnaphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Acenaphthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Acenaphthylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(a)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Benzo(a)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chrysene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Fluorene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Naphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	26	FDEP	0.02	0.02		0	No	Parameter Not Detected
Phenanthrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Total PAH	0	1	6.5	6.5	6.5	6.5			ND	6.5	U		NA				0	No	Parameter Not Detected
VOCs (g/L)																			
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,1-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	No	Parameter Not Detected
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
cis-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Trichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Vinyl chloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected
Xylene (Total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL

UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.

N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 12-2-13
Wetland 12 Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Manganese Thallium	None	None	None

Table 12-2-14
Wetland 12 Phase II
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	5.9E+02	=	3.1E+03	=	MG/KG	041M120201	2 / 2	NAV	1.8E+03	1.0E-03	3	N/A	3.07E-07	N/A	6.50E-06
7440393	Barium	N	8.6E-01	J	3.1E+00	J	MG/KG	041M120201	2 / 2	NAV	2.0E+00	1.0E-03	3	N/A	3.10E-10	N/A	6.56E-09
7440417	Beryllium	N	N/A	N/A	1.2E-01	J	MG/KG	041M120201	1 / 2	N/A / 8.0E-02	8.0E-02	1.0E-03	3	N/A	1.20E-11	N/A	2.54E-10
7439896	Iron	N	3.7E+02	=	4.8E+02	=	MG/KG	041M120201	2 / 2	NAV	4.3E+02	1.0E-03	3	N/A	4.84E-08	N/A	1.02E-06
7439965	Manganese	N	2.9E+00	=	7.6E+00	=	MG/KG	041M120201	2 / 2	NAV	5.3E+00	1.0E-03	3	N/A	7.60E-10	N/A	1.61E-08
7782492	Selenium	N	N/A	N/A	4.3E-01	J	MG/KG	041M120201	1 / 2	N/A / 2.5E-01	2.8E-01	1.0E-03	3	N/A	4.30E-11	N/A	9.10E-10
7440622	Vanadium	N	1.3E+00	J	6.6E+00	=	MG/KG	041M120201	2 / 2	NAV	4.0E+00	1.0E-03	3	N/A	6.60E-10	N/A	1.40E-08
72559	4,4'-DDE	C	N/A	N/A	9.7E-04	=	MG/KG	041M120201	1 / 2	N/A / 2.1E-04	5.4E-04	3.0E-02	1	N/A	2.91E-12	N/A	2.20E-11
319857	beta-BHC	C	N/A	N/A	8.9E-04	J	MG/KG	041M120101	1 / 2	N/A / 1.6E-04	4.9E-04	4.0E-02	2	N/A	3.56E-12	N/A	2.69E-11
319868	delta-BHC	C	N/A	N/A	1.1E-03	J	MG/KG	041M120101	1 / 2	N/A / 1.6E-04	5.9E-04	4.0E-02	2	N/A	4.40E-12	N/A	3.33E-11
60571	Dieldrin	C	N/A	N/A	3.1E-04	J	MG/KG	041M120201	1 / 2	N/A / 2.1E-04	2.1E-04	1.0E-01	2	N/A	3.10E-12	N/A	2.34E-11
115297	Endosulfan I	N	4.0E-04	J	1.2E-03	J	MG/KG	041M120101	2 / 2	NAV	8.0E-04	1.0E-01	2	N/A	1.20E-11	N/A	2.54E-10
1031078	Endosulfan sulfate	N	N/A	N/A	3.2E-03	J	MG/KG	041M120201	1 / 2	N/A / 2.1E-04	1.7E-03	1.0E-01	2	N/A	3.20E-11	N/A	6.77E-10
7421934	Endrin aldehyde	N	N/A	N/A	2.8E-04	J	MG/KG	041M120201	1 / 2	N/A / 2.1E-04	1.9E-04	1.0E-01	2	N/A	2.80E-12	N/A	5.93E-11
53494705	Endrin ketone	N	N/A	N/A	1.3E-02	DJ	MG/KG	041M120101	1 / 2	N/A / 3.2E-04	6.6E-03	1.0E-01	2	N/A	1.30E-10	N/A	2.75E-09
91576	2-Methylnaphthalene	N	N/A	N/A	7.1E+00	=	MG/KG	041M120201	1 / 2	N/A / 4.1E+00	4.6E+00	1.0E-02	3	N/A	7.10E-09	N/A	1.50E-07
86737	Fluorene	N	N/A	N/A	1.3E+00	=	MG/KG	041M120201	1 / 2	N/A / 2.0E+00	1.2E+00	1.0E-02	3	N/A	1.30E-09	N/A	2.75E-08
91203	Naphthalene	N	N/A	N/A	1.3E+00	=	MG/KG	041M120201	1 / 2	N/A / 4.1E+00	1.7E+00	1.0E-02	3	N/A	1.30E-09	N/A	2.75E-08
85018	Phenanthrene	N	N/A	N/A	2.5E+00	=	MG/KG	041M120201	1 / 2	N/A / 4.1E+00	2.3E+00	1.0E-02	3	N/A	2.50E-09	N/A	5.29E-08
75092	Methylene chloride	C	N/A	N/A	1.3E+00	J	MG/KG	041M120201	1 / 2	N/A / 1.9E+00	1.1E+00	1.0E-02	3	N/A	1.30E-09	N/A	9.83E-09

Equation for sediment risk:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer - 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer - 25,550 days (child trespasser/adult maintenance worker).

Equation for DA_{event} for sediment contact:

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

Where:

C_{sd} = Chemical concentration in sediment (mg/kg).
CF = Conversion factor (10^{-6} kg/mg).
AF = Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1;
(2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Table 12-2-15
Wetland 12 Phase II
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABSGI	ABSGI Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
Sediment Dermal Risk	Aluminum	N	3.1E+03	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	N/A	N/A	6.5E-05	N/A
	Barium	N	3.1E+00	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	N/A	N/A	1.3E-06	N/A
	Beryllium	N	1.2E-01	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	N/A	N/A	1.8E-05	N/A
	Iron	N	4.8E+02	3.0E-01	N/A	1.5E-01	3	4.5E-02	N/A	N/A	N/A	2.3E-05	N/A
	Manganese	N	7.6E+00	2.4E-02	N/A	4.0E-02	1, 3	9.6E-04	N/A	N/A	N/A	1.7E-05	N/A
	Selenium	N	4.3E-01	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	N/A	N/A	3.3E-07	N/A
	Vanadium	N	6.6E+00	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	N/A	N/A	7.7E-05	N/A
	4,4'-DDE	C	9.7E-04	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	N/A	N/A	2.5E-10
	beta-BHC	C	8.9E-04	2.0E-04	1.8E+00	1.4E-02	3	2.8E-06	1.3E+02	N/A	N/A	9.5E-06	3.4E-09
	delta-BHC	C	1.1E-03	5.0E-04	6.3E+00	1.4E-02	3	7.1E-06	4.4E+02	N/A	N/A	4.7E-06	1.5E-08
	Dieldrin	C	3.1E-04	5.0E-05	1.6E+01	5.0E-01	3	2.5E-05	3.2E+01	N/A	N/A	9.4E-07	7.5E-10
	Endosulfan I	N	1.2E-03	6.0E-03	N/A	5.0E-01	3	3.0E-03	N/A	N/A	N/A	8.5E-08	N/A
	Endosulfan sulfate	N	3.2E-03	6.0E-03	N/A	5.0E-01	3	3.0E-03	N/A	N/A	N/A	2.3E-07	N/A
	Endrin aldehyde	N	2.8E-04	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	N/A	N/A	1.6E-05	N/A
	Endrin ketone	N	1.3E-02	3.0E-04	N/A	1.3E-02	3	3.8E-06	N/A	N/A	N/A	7.3E-04	N/A
	2-Methylnaphthalene	N	7.1E+00	8.0E-02	N/A	5.0E-01	3	4.0E-02	N/A	N/A	N/A	3.8E-06	N/A
	Fluorene	N	1.3E+00	4.0E-02	N/A	3.1E-01	3	1.2E-02	N/A	N/A	N/A	2.2E-06	N/A
	Naphthalene	N	1.3E+00	2.0E-02	N/A	5.9E-02	3	1.2E-03	N/A	N/A	N/A	2.3E-05	N/A
	Phenanthrene	N	2.5E+00	N/A	3.0E-02	7.3E-01	3	N/A	4.1E-02	N/A	N/A	N/A	2.2E-09
	Methylene chloride	C	1.3E+00	6.0E-02	7.5E-03	1.0E-01	3	6.1E-03	7.4E-02	N/A	N/A	1.6E-06	7.3E-10

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfDdermal = Dermal reference dose.
RFDoral =Oral reference dose.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 12-2-16
Wetland 12 Phase II
Sediment Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	3.1E+03	1.0E+00	N/A	N/A	N/A	6.25E-04	N/A
	Barium	N	3.1E+00	7.0E-02	N/A	N/A	N/A	9.01E-06	N/A
	Beryllium	N	1.2E-01	2.0E-03	N/A	N/A	N/A	1.22E-05	N/A
	Iron	N	4.8E+02	3.0E-01	N/A	N/A	N/A	3.28E-04	N/A
	Manganese	N	7.6E+00	2.4E-02	N/A	N/A	N/A	6.44E-05	N/A
	Selenium	N	4.3E-01	5.0E-03	N/A	N/A	N/A	1.75E-05	N/A
	Vanadium	N	6.6E+00	7.0E-03	N/A	N/A	N/A	1.92E-04	N/A
	4,4'-DDE	C	9.7E-04	N/A	3.4E-01	N/A	N/A	N/A	2.40E-11
	beta-BHC	C	8.9E-04	2.0E-04	1.8E+00	N/A	N/A	3.23E-07	1.16E-10
	delta-BHC	C	1.1E-03	5.0E-04	6.3E+00	N/A	N/A	1.60E-07	5.04E-10
	Dieldrin	C	3.1E-04	5.0E-05	1.6E+01	N/A	N/A	4.51E-07	3.61E-10
	Endosulfan I	N	1.2E-03	6.0E-03	N/A	N/A	N/A	4.07E-08	N/A
	Endosulfan sulfate	N	3.2E-03	6.0E-03	N/A	N/A	N/A	1.09E-07	N/A
	Endrin aldehyde	N	2.8E-04	3.0E-04	N/A	N/A	N/A	1.90E-07	N/A
	Endrin ketone	N	1.3E-02	3.0E-04	N/A	N/A	N/A	8.82E-06	N/A
	2-Methylnaphthalene	N	7.1E+00	8.0E-02	N/A	N/A	N/A	1.81E-05	N/A
	Fluorene	N	1.3E+00	4.0E-02	N/A	N/A	N/A	6.61E-06	N/A
	Naphthalene	N	1.3E+00	2.0E-02	N/A	N/A	N/A	1.32E-05	N/A
	Phenanthrene	N	2.5E+00	N/A	3.0E-02	N/A	N/A	N/A	1.53E-08
	Methylene chloride	C	1.3E+00	6.0E-02	7.5E-03	N/A	N/A	1.57E-06	7.09E-10

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = chronic daily intake (mg/kg-day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
IRsd = 100 mg/day for age groups greater than 6-years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 12-2-17
Wetland 12 Phase II
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7439896	Iron	N	N/A	N/A	1.2E+03	=	UG/L	041W120101	1 / 1	NAV	1.2E+03	1.2E-03	2.5E-04	7.48E-07	N/A	1.58E-05
7439965	Manganese	N	N/A	N/A	4.8E+01	=	UG/L	041W120101	1 / 1	NAV	4.8E+01	4.8E-05	1.0E-03	1.25E-07	N/A	2.64E-06
7440280	Thallium	N	N/A	N/A	1.2E+01	=	UG/L	041W120101	1 / 1	NAV	1.2E+01	1.2E-05	1.0E-03	3.17E-08	N/A	6.71E-07
84742	Di-n-butylphthalate	N	N/A	N/A	1.0E+00	J	UG/L	041W120101	1 / 1	NAV	1.0E+00	1.0E-06	2.4E-02	2.46E-07	N/A	5.21E-06

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr). Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr). Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr). Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker). Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker). Cancer — 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 12-2-18
Wetland 12 Phase II
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
										Dermal Hazard Quotient	Dermal Cancer Risk	Dermal Hazard Quotient	Dermal Cancer Risk
SW Dermal Risk	Iron	N	1.2E-03	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	4.8E-05	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	N/A	N/A	4.7E-04	N/A
	Thallium	N	1.2E-05	6.6E-05	N/A	2.0E-01	3, 4	1.3E-05	N/A	N/A	N/A	5.1E-02	N/A
	Di-n-butylphthalate	N	1.0E-06	1.0E-01	N/A	3.1E-01	3	3.1E-02	N/A	N/A	N/A	1.7E-04	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 12-2-19
Wetland 12 Phase II
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
SW Incidental Ingestion	Iron	N	1.2E-03	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	4.8E-05	1.4E-01	N/A	N/A	N/A	7.0E-09	N/A
	Thallium	N	1.2E-05	6.6E-05	N/A	N/A	N/A	3.8E-06	N/A
	Di-n-butylphthalate	N	1.0E-06	1.0E-01	N/A	N/A	N/A	2.0E-10	N/A

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

Where:
CDI = Chronic daily intake (mg/kg-day).
EPC_{sw} = Exposure point concentration in surface water (mg/L).
IR_{sw} = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:
Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

12.3 Wetland 13 — Screening Level Problem Formulation

12.3.1 Site Description and Habitats Present at Wetland 13

Wetland 13 is in the northeastern portion of NAS Pensacola, at the southeast end of Magazine Point, south of OU 10. The wetland is also near the southern part of Site 13, which runs along the eastern shore from the northern most tip of Magazine Point south to Wetland 63B. Wetland 13 is directly east of the IWTP Bilge Water Plant (Figure 12-1). Wetland 13 is very small wetland, roughly 200 feet by 130 feet. Wetland 13 ranges from being seasonally dry to containing standing water, which may be 8 inches deep.

Wetland 13 is a palustrine-forested site with emergent vegetation. This wetland is seasonally dry, dependent upon rainfall in the immediate area. Although near the bay, there is no connection to the bay from the wetland.

Photograph 1 Wetland 13 — Frogs on Sawgrass

IR sites potentially affecting Wetland 13 include Site 36 and OU 10. Site 36 (Industrial Wastewater Treatment Plant Sewer Line) was investigated in conjunction with sites for OU 2. The wastewater treatment plant, originally built in 1948, was replaced in 1971 with a modern plant that could accept industrial wastes. Most facilities discharging to the sewer did so without any pretreatment or waste segregation. The waste stream has included paint strippers, heavy metals, pesticides, radioactive wastes, fuels, cyanide waste, and waste oil (NEESA, 1983). Beginning in 1973, the Naval Air Rework Facility operations discharged to the sewer instead of to Pensacola Bay. The IWTP sewer line consisted of vitreous clay and cast-iron piping installed both before and after 1971. OU 2 investigated portions of the IWTP sewer line from the Building 649 complex to the wastewater treatment plant.

OU 10 is the former IWTP, located on approximately 26 acres on Magazine Point to the north of Chevalier Field, and contains three sites (Sites 32, 33, and 35) which may have an impact on Wetland 13. Site 32 includes the Industrial Sludge Drying Beds, Site 33 includes the IWTP Ponds (including the former surge pond, the stabilization pond, and the polishing pond), and Site 35 comprises all industrial treatment units within the OU 10 boundary.

Based on the data collected during the OU 10 RI, the *Final ROD* dated June 16, 1997, outlined the following RAOs for OU 10 sites (E/A&H, 1997c):

1. Contaminated groundwater (may impact drinking water supplies or nearby ecological receptors)

2. Contaminated soil (presents a continuing source of contamination to groundwater and a potential excess risk to a future child resident)

The following remedial actions were selected for the site:

1. Excavation and disposal of soil above residential soil preliminary remediation goals in one area.

2. Leachability study on three areas to verify that contaminants remaining in soil are not leaching to groundwater.

3. Contingency remedial action of three areas to include excavation and disposal of soil that the leachability study verifies as a source of groundwater contamination.

4. Groundwater monitoring program to ensure the groundwater treatment system will be effective and that contaminants will not migrate.

5. Continued groundwater monitoring at sampling intervals to be determined during the remedial design for groundwater treatment developed in the Corrective Action Plan for the RCRA permit modification. The groundwater monitoring program will continue until a five-year review concludes that the alternative has achieved the performance standards and remain protective of human health and the environment.

12.3.2 Wetland 13 — Sample Location Description

Phase II Sediment Sample Location Description

One sample, 041M130101, was collected in 1995 during the Phase II investigation to represent this wetland (Figure 12-4). Table 12-3-1 (tables are located at the end of each section) provides a physical description of the sediments collected at Wetland 13. The sample at Wetland 13 was mostly composed of dark brown silty sand and had a TOC concentration of 1.38%.

Phase II Surface Water Sample Location Description

One surface water sample was collected at Wetland 13 during the Phase II investigation in 1995. The sample was collocated with the sediment station 041M130101 (Figure 12-4). Table 12-3-2 summarizes the physical description of the surface water collected at Wetland 13. The sample was significantly turbid with a reading of greater than 1,000 NTUs.

12.3.3 Wetland 13 — Nature and Extent of Contamination

Phase II Sediment

Figure 12-4 presents the sediment sampling location for Wetland 13. Table 12-3-3 summarizes the analytical results for the Wetland 13 sediment sample.

Metals — Seventeen metals were detected during Phase II sediment sampling at Wetland 13. Although location 041M130101 exhibited detections of 17 metals, none of these were reported at concentrations exceeding their respective freshwater reference values.

Pesticides and PCBs — Three pesticide compounds were detected during Phase II sediment sampling at Wetland 13. Total DDT was calculated for each location by adding the concentrations of 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT. Likewise, a basewide total DDT reference concentration was calculated using the basewide concentrations for these same constituents. None of the pesticides detected exceeded the available basewide reference values.

Location 041M130101 had three pesticides detected at relatively low concentrations. These included 4,4′-DDE, 4,4′-DDT, and dieldrin. No PCBs were detected in the sediment sample collected during Phase II sampling.

SVOCs — Three SVOCs were detected in the sediment sample collected at Wetland 13. These include bis(2-ethylhexyl)phthalate, di-n-butylphthalate, and fluoranthene. All were reported at relatively low concentrations.

VOCs — No VOCs were detected during sediment sampling at Wetland 13.

Phase II Surface Water

Figure 12-4 presents the surface water sampling location for Wetland 13. Table 12-3-4 summarizes the analytical results for the Wetland 13 surface water sample.

Metals — Twenty-one metals were detected in the Phase II surface water sample collected from Wetland 13. Of these 21 detections, 20 parameters were present at concentrations exceeding their respective fresh water reference values. These included aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, vanadium, and zinc.

Organics — There were no organic constituents detected in surface water collected during the Phase II investigation of Wetland 13.

12.3.4 Ecological Risk Assessment

Phase II Investigation Summary — Wetland 13

Sediment Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 12-3-5, the sediment sample was compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or with no screening value were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 12-3-6.

Baseline Problem Formulation — Wetland 13 Sediment COPC Refinement

During the COPC refinement, additional information was used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as COPCs. This risk assessment presents a statement of potential risk for each of the COPCs.

The COPC refinement process included:

- Comparison of maximum concentrations to RVs
- Comparison of average concentrations to SVs and RVs
- Comparison to basewide (reference) concentrations for total DDT
- Comparison of inorganic constituents to reference wetland values
- Interpretive tool for metals
- Di Toro EqP SQGs for VOCs
- Comparison to Swartz consensus values
- Mean ERM quotients
- Description of exceedances of RVs and their extent

The methods used in the COPC refinement for the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 12-3-7. A list of COPCs retained after refinement are presented in Table 12-3-8. Additionally, the tables compare: 1) average concentrations to screening and refinement values to assess potential exposure across the entire wetland, and 2) Wetland 13 concentrations to reference concentrations.

For Wetland 13, all inorganic detections were below reference wetland concentration and were removed as COPCs (Table 12-3-7). Since all the inorganic detections were below freshwater sediment reference concentrations, the constituents were not evaluated using the FDEP's interpretative tool. The three pesticides, 4,4'-DDE, 4,4'-DDT, and total DDT, were detected; however, the concentrations were below basewide levels and were not retained as COPC as shown on Figure 12-5. PAHs and VOCs were not detected in Wetland 13.

Table 12-3-9 presents the Mean ERL and ERM values, the Mean ERM Quotients, and the Mean ERM Quotient Category by individual sample location. Figure 12-7 shows the Mean ERM category for each sediment sample location at Wetland 13. Based on this approach, sample location 041M130101 was determined to be Category 1, indicating that sediments from this wetland were considered non-toxic.

Surface Water Screening — Level Risk-Exposure Estimation and Risk Calculation

As presented in Table 12-3-10, the surface water sample was compared with screening values in accordance with the procedures described in Section 8. All parameters with HQs greater than 1 or

with no screening values were carried forward to COPC refinement. A list of all COPCs after screening is included in Table 12-3-11.

Baseline Problem Formulation — Wetland 13 Surface Water COPC Refinement

During the surface water COPC refinement, additional information was used to help evaluate the potential for risk at Site 41 based on exposure to the constituents included as COPCs.

The COPC refinement process included:

- Comparison of maximum SV concentrations to average SV concentrations
- Comparison of inorganic constituents to reference wetland values
- Description of surface water exceedances and their extent

The methods used in the COPC refinement in the Site 41 ERA process are detailed in Section 8. Comparison of maximum detected concentrations with refinement values is presented in Table 12-3-12. Additionally, the tables compare average concentrations to screening and refinement values to assess potential exposure across the entire wetland. COPCs retained after refinement are presented in Table 12-3-13.

For Wetland 13, aluminum, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, selenium, vanadium, and zinc exceeded their Site 41 freshwater reference surface water concentrations (Table 12-3-12) and were retained as COPCs.

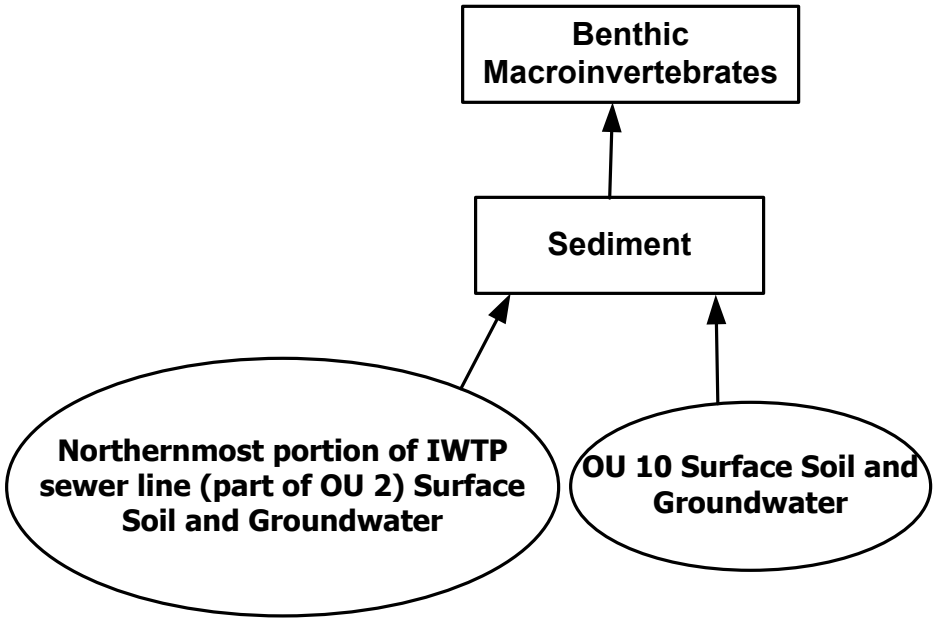
No sediment COPCs were retained from sediments collected at Wetland 13. All inorganic constituents were retained for surface water COPCs.

The surface water sample was collected from a shallow hole that was dug before sampling. The water in this depression was very turbid (>1,000 NTUs) and attributed to the high level of inorganic exceedances (Table 12-3-12).

In April 2004, EnSafe personnel revisited the Wetland 13 area, after a rain event, to collect another surface water sample, using quiescent techniques, but found the wetland to be dry.

The conceptual model below symbolizes which environmental habitats that may be impacted by Wetland 13 Phase II constituents during the ERA process.

Wetland 13
Conceptual Site Model



As summarized in the approved *Final RI/FS SAP Addendum* (E/A&H, 1997d), Wetland 13 was identified as an Blue-Coded Wetland based on the Phase II results, indicating contamination that was possibly not related to nearby IR sites. Contaminants detected in these wetlands were in most cases below benchmark values. Blue-Coded Wetlands were not assessed further in Phase III.

12.3.5 Wetland 13 — Human Health Risk Assessment

Wetland 13 is described in Section 12.3.2, and the HHRA is summarized below.

12.3.5.1 Site Data

Sediment and surface water data were collected at Wetland 13 during Phase II of the RI. Section 12.3.3 summarizes the nature and extent of contamination for this wetland. Surface water and sediment data are summarized in Tables 12-3-3 and 12-3-4.

12.3.5.2 Conceptual Site Model

As described in Section 12.3.1, Wetland 13 is at the southern end of Magazine Point, on the east side of the former Bilge Water Plant. Trespasser exposure would be limited at Wetland 13 based on the homeland security restrictions. However, Navy maintenance personnel could obtain access to this wetland.

Dermal contact with surface water could be a significant exposure pathway and was included in this HHRA. Sediment dries at some locations, where exposure could be similar to soil exposure, so contact with sediment was assessed for all sediment locations using soil exposure models. Because surface water is only seasonally present at Wetland 13, there is no fish habitat at this wetland. Therefore, fish ingestion was excluded. Wading during maintenance activities would be the most likely exposure scenario.

The following scenarios and exposure pathways were evaluated for Wetland 13:

Scenario	Medium	Ingestion	Dermal
Maintenance	Sediment	√	√
	Surface water	√	√

12.3.5.3 Risk Characterization

The adult maintenance worker scenario was assessed for this wetland as described in Section 9.

Maintenance Worker

Wetland 13 Phase II

As shown in Tables 12-3-14 through 12-3-19, sediment and surface water risk estimates for Wetland 13 were below FDEP's risk threshold. Hazard indices were below 1.0.

Summary of Wetland 13 Phase II Risk Estimates

Scenario	Medium	Hazard Index	Risk
Maintenance	Sediment	8.91E-04	3.63E-09
	Surface water	4.10E-01	N/A

Based on these data, no COCs were identified for Wetland 13 Phase II.

Wetland 13 HHRA COC Summary

No COCs were identified in the HHRA for Wetland 13.

12.3.6 Wetland 13 — Fate and Transport Analysis

This wetland is located to the northeast of former Chevalier Field and the southeast of the Wastewater Treatment Plant (WTP). It is not connected with any other wetlands; one surface water and one sediment sample were collected from this wetland. It is located upgradient of soil and groundwater data associated with the WTP, and there are no borings or wells associated with this wetland. Due to its isolation from other wetlands, its lack of associated soil and groundwater data, and the limited number of samples collected within it, no fate and transport pathway evaluations can be made.

Table 12-3-1
Wetland 13 Phase II
Sediment Physical Parameters

Parameter		041M130101
TOC (%)		1.38
Percent Solids (%)		73.8
Grain Size Analysis		
(percent of composition[1])		
	Medium Sand	23
	Fine Sand	65
	Silt and Clay	12
	Description	Dark Brown Silty Sand

Note:
[1] = Derived from sieve analyses.

Table 12-3-2
Wetland 13 Phase II
Surface Water Physical Parameters

Parameter	041W130101
Hardness as CaCO3 (mg/L)	271
pH	6.13
Specific Conductivity (mS/cm)	0.31
Turbidity (NTU)	>1,000
Salinity (%)	0.06

Notes:

mg/L = Milligrams per liter
MS/cm = Millisiemens per centimeter
NTU = Nephelometric turbidity units
% = Percent

Table 12-3-3
Wetland 13 Phase II
Sediment Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (mg/kg)								
Aluminum	13,610.0	0	1	1	1,590.0	1,590.0	1,590.0	041M130101
Antimony	4.430	0	1	1	0.150	0.150	0.150	041M130101
Arsenic	6.620	0	1	1	0.140	0.140	0.140	041M130101
Barium	14.0	0	1	1	0.880	0.880	0.880	041M130101
Beryllium	0.840	0	1	1	0.110	0.110	0.110	041M130101
Calcium	10,756.670	0	1	1	327.0	327.0	327.0	041M130101
Chromium	39.370	0	1	1	4.0	4.0	4.0	041M130101
Copper	19.50	0	1	1	1.20	1.20	1.20	041M130101
Iron	11,911.670	0	1	1	229.0	229.0	229.0	041M130101
Lead	82.470	0	1	1	9.20	9.20	9.20	041M130101
Magnesium	7,513.330	0	1	1	187.0	187.0	187.0	041M130101
Manganese	37.970	0	1	1	0.850	0.850	0.850	041M130101
Potassium	1,628.670	0	1	1	50.60	50.60	50.60	041M130101
Selenium	3.450	0	1	1	0.410	0.410	0.410	041M130101
Sodium	18,993.330	0	1	1	290.0	290.0	290.0	041M130101
Vanadium	28.670	0	1	1	7.50	7.50	7.50	041M130101
Zinc	36.730	0	1	1	1.70	1.70	1.70	041M130101
PAHs (g/kg)								
Fluoranthene	N/A	0	1	1	29.0	29.0	29.0	041M130101
Total PAHs	N/A	0	1	1	303.0	303.0	303.0	041M130101
Pesticides and PCBs (g/kg)								
Dieldrin	N/A	0	1	1	0.30	0.30	0.30	041M130101
4,4'-DDE	40.0	0	1	1	1.90	1.90	1.90	041M130101
4,4'-DDT	20.0	0	1	1	1.40	1.40	1.40	041M130101
Total DDT	110.0	0	1	1	3.430	3.430	3.430	041M130101
SVOCs (g/kg)								
bis(2-Ethylhexyl)phthalate (BEHP)	N/A	0	1	1	31.0	31.0	31.0	041M130101
Di-n-butylphthalate	N/A	0	1	1	26.0	26.0	26.0	041M130101

Notes:
g/kg = micrograms per kilogram
mg/kg = milligram per kilogram
N/A = Not Applicable

Table 12-3-4
Wetland 13 Phase II
Surface Water Analytical Results

Parameter	Reference Concentration (if applicable)	Number Greater Than Reference Concentration	Frequency of Detections: Number Detected	Frequency of Detections: Number Analyzed	Range of Detections: Minimum Detection	Range of Detections: Maximum Detection	Average Detection	Maximum Detection Location
Metals (g/L)								
Aluminum	1,090.25	1	1	1	145,000.0	145,000.0	145,000.0	041W130101
Antimony	4.0	0	1	1	2.8	2.8	2.8	041W130101
Arsenic	2.7	1	1	1	26.6	26.6	26.6	041W130101
Barium	3.68	1	1	1	95.4	95.4	95.4	041W130101
Beryllium	1.0	1	1	1	4.4	4.4	4.4	041W130101
Cadmium	3.0	1	1	1	9.8	9.8	9.8	041W130101
Calcium	7,675.0	1	1	1	47,500.0	47,500.0	47,500.0	041W130101
Chromium	8.0	1	1	1	225.0	225.0	225.0	041W130101
Cobalt	3.0	1	1	1	7.8	7.8	7.8	041W130101
Copper	4.0	1	1	1	142.0	142.0	142.0	041W130101
Iron	2,360.0	1	1	1	36,200.0	36,200.0	36,200.0	041W130101
Lead	3.2	1	1	1	1,220.0	1,220.0	1,220.0	041W130101
Magnesium	20,260.0	1	1	1	37,100.0	37,100.0	37,100.0	041W130101
Manganese	13.2	1	1	1	150.0	150.0	150.0	041W130101
Mercury	0.1	1	1	1	1.3	1.3	1.3	041W130101
Nickel	12.0	1	1	1	47.2	47.2	47.2	041W130101
Potassium	6,995.0	1	1	1	16,600.0	16,600.0	16,600.0	041W130101
Selenium	3.0	1	1	1	13.6	13.6	13.6	041W130101
Sodium	182,200.0	1	1	1	199,000.0	199,000.0	199,000.0	041W130101
Vanadium	4.7	1	1	1	324.0	324.0	324.0	041W130101
Zinc	5.53	1	1	1	536.0	536.0	536.0	041W130101

Notes:
g/L = micrograms per liter
N/A = Not Applicable

Table 12-3-5
Wetland 13 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Min SQL	Max SQL	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
Metals (mg/kg)														
Aluminum	1	1			1,590	1,590	041M130101	1,590			N/A		Yes	No SV
Antimony	1	1			0.15	0.15	041M130101	0.15	J	12	2	0.01	No	Max Detect < SV
Arsenic	1	1			0.14	0.14	041M130101	0.14	J	7.24	1, 2	0.02	No	Max Detect < SV
Barium	1	1			0.88	0.88	041M130101	0.88	J		N/A		Yes	No SV
Beryllium	1	1			0.11	0.11	041M130101	0.11	J		N/A		Yes	No SV
Cadmium	0	1	0.1	0.1			ND	0.1	U	0.676	1	0.15	No	Max SQL< SV
Calcium	1	1			327	327	041M130101	327	J		N/A		Yes	No SV
Chromium	1	1			4	4	041M130101	4		52.3	1, 2	0.08	No	Max Detect < SV
Cobalt	0	1	0.1	0.1			ND	0.1	U		N/A		Yes	No SV
Copper	1	1			1.2	1.2	041M130101	1.2	J	18.7	1, 2	0.06	No	Max Detect < SV
Cyanide (CN)	0	1	0.33	0.33			ND	0.33	U		N/A		Yes	No SV
Iron	1	1			229	229	041M130101	229			N/A		Yes	No SV
Lead	1	1			9.2	9.2	041M130101	9.2	J	30.2	1, 2	0.31	No	Max Detect < SV
Magnesium	1	1			187	187	041M130101	187	J		N/A		Yes	No SV
Manganese	1	1			0.85	0.85	041M130101	0.85	J		N/A		Yes	No SV
Mercury	0	1	0.03	0.03			ND	0.03	U	0.13	1, 2	0.23	No	Max SQL< SV
Nickel	0	1	0.405	0.405			ND	0.405	U	15.9	1, 2	0.03	No	Max SQL< SV
Potassium	1	1			50.6	50.6	041M130101	50.6	J		N/A		Yes	No SV
Selenium	1	1			0.41	0.41	041M130101	0.41	J		N/A		Yes	No SV
Silver	0	1	0.135	0.135			ND	0.135	UJ	0.733	1	0.18	No	Max SQL< SV
Sodium	1	1			290	290	041M130101	290	J		N/A		Yes	No SV
Thallium	0	1	0.1	0.1			ND	0.1	UJ		N/A		Yes	No SV
Vanadium	1	1			7.5	7.5	041M130101	7.5			N/A		Yes	No SV
Zinc	1	1			1.7	1.7	041M130101	1.7		124	1, 2	0.01	No	Max Detect < SV
PAHs (g/kg)														
2-Methylnaphthalene	0	1	25	25			ND	25	U	20.2	1	1.24	No	TOC normalized PAHs<TEC
Acenaphthene	0	1	12	12			ND	12	U	6.71	1	1.79	No	TOC normalized PAHs<TEC
Acenaphthylene	0	1	25	25			ND	25	U	5.87	1	4.26	No	TOC normalized PAHs<TEC
Anthracene	0	1	25	25			ND	25	U	46.9	1	0.53	No	Max SQL< SV
Benzo(a)anthracene	0	1	25	25			ND	25	U	74.8	1	0.33	No	Max SQL< SV
Benzo(a)pyrene	0	1	25	25			ND	25	U	88.8	1	0.28	No	Max SQL< SV
Chrysene	0	1	25	25			ND	25	U	108	1	0.23	No	Max SQL< SV
Dibenz(a,h)anthracene	0	1	25	25			ND	25	U	6.22	1	4.02	No	TOC normalized PAHs<TEC
Fluoranthene	1	1			29	29	041M130101	29	J	113	1	0.26	No	Max Detect < SV
Fluorene	0	1	12	12			ND	12	U	21.2	1	0.57	No	Max SQL< SV
Naphthalene	0	1	25	25			ND	25	U	34.6	1	0.72	No	Max SQL< SV
Phenanthrene	0	1	25	25			ND	25	U	86.7	1	0.29	No	Max SQL< SV
Pyrene	0	1	25	25			ND	25	U	153	1	0.16	No	Max SQL< SV
Total PAHs	1	1			303	303	041M130101	303		1,684	1, 2	0.18	No	Max Detect < SV
TOC Normalized PAHs	1	1			21.96	21.96	041M130101	21.96		290	3	0.08	No	Max Detect < SV
PCBs (g/kg)														
Aroclor-1016	0	1	1.3	1.3			ND	1.3	UJ	21.6	1	0.06	No	Max SQL< SV
Aroclor-1221	0	1	2.5	2.5			ND	2.5	UJ	67	2	0.04	No	Max SQL< SV
Aroclor-1232	0	1	1.3	1.3			ND	1.3	UJ	21.6	1	0.06	No	Max SQL< SV
Aroclor-1242	0	1	1.3	1.3			ND	1.3	UJ	21.6	1	0.06	No	Max SQL< SV
Aroclor-1248	0	1	1.3	1.3			ND	1.3	UJ	21.6	1	0.06	No	Max SQL< SV
Aroclor-1254	0	1	1.3	1.3			ND	1.3	UJ	21.6	1	0.06	No	Max SQL< SV
Aroclor-1260	0	1	1.3	1.3			ND	1.3	UJ	21.6	1	0.06	No	Max SQL< SV
Total PCBs	0	1	10.3	10.3			ND	10.3	U	21.6	1	0.48	No	Max SQL< SV
Pesticides (g/kg)														
Aldrin	0	1	0.06	0.06			ND	0.06	UJ		N/A		Yes	No SV
Dieldrin	1	1			0.3	0.3	041M130101	0.3	J	0.716	1	0.42	No	Max Detect < SV
Endosulfan I	0	1	0.13	0.13			ND	0.13	UJ		N/A		Yes	No SV
Endosulfan II	0	1	0.13	0.13			ND	0.13	UJ		N/A		Yes	No SV
Endosulfan sulfate	0	1	0.13	0.13			ND	0.13	UJ		N/A		Yes	No SV
Heptachlor	0	1	0.06	0.06			ND	0.06	UJ		N/A		Yes	No SV
Heptachlor epoxide	0	1	0.06	0.06			ND	0.06	UJ		N/A		Yes	No SV
Methoxychlor	0	1	0.6	0.6			ND	0.6	UJ		N/A		Yes	No SV
Toxaphene	0	1	6	6			ND	6	UJ		N/A		Yes	No SV
alpha-Chlordane	0	1	0.06	0.06			ND	0.06	UJ	1.7	1	0.04	No	Max SQL< SV
gamma-Chlordane	0	1	0.06	0.06			ND	0.06	UJ	1.7	1	0.04	No	Max SQL< SV
Total Chlordane	0	1	0.12	0.12			ND	0.12	U	1.7	1	0.07	No	Max SQL< SV
Endrin	0	1	0.13	0.13			ND	0.13	UJ	3.3	2	0.04	No	Max SQL< SV
Endrin aldehyde	0	1	0.13	0.13			ND	0.13	UJ	3.3	2	0.04	No	Max SQL< SV
Endrin ketone	0	1	0.13	0.13			ND	0.13	UJ	3.3	2	0.04	No	Max SQL< SV
Total Endrin	0	1	0.39	0.39			ND	0.39	U	3.3	2	0.12	No	Max SQL< SV
alpha-BHC	0	1	0.06	0.06			ND	0.06	UJ		N/A		Yes	No SV
beta-BHC	0	1	0.06	0.06			ND	0.06	UJ	0.32	1	0.19	No	Max SQL< SV
delta-BHC	0	1	0.06	0.06			ND	0.06	UJ	0.32	1	0.19	No	Max SQL< SV
gamma-BHC (Lindane)	0	1	0.06	0.06			ND	0.06	UJ	0.32	1	0.19	No	Max SQL< SV
Total BHC	0	1	0.24	0.24			ND	0.24	U	0.32	2	0.75	No	Max SQL< SV
4,4'-DDD	0	1	0.13	0.13			ND	0.13	UJ	1.22	1	0.11	No	Max SQL< SV
4,4'-DDE	1	1			1.9	1.9	041M130101	1.9	J	2.07	1	0.92	No	Max Detect < SV
4,4'-DDT	**1**	**1**			**1.4**	**1.4**	**041M130101**	**1.4**	**J**	**1.19**	**1**	**1.18**	**Yes**	**Max Detect > SV**
Total DDT	**1**	**1**			**3.43**	**3.43**	**041M130101**	**3.43**		**3.3**	**2**	**1.04**	**Yes**	**Max Detect > SV**
SVOCs (g/kg)														
1,2,4-Trichlorobenzene	0	1	250	250			ND	250	U		N/A		Yes	No SV
1,2-Dichlorobenzene	0	1	250	250			ND	250	U		N/A		Yes	No SV
1,3-Dichlorobenzene	0	1	250	250			ND	250	U		N/A		Yes	No SV
1,4-Dichlorobenzene	0	1	250	250			ND	250	U		N/A		Yes	No SV
2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	0	1	250	250			ND	250	U		N/A		Yes	No SV
2,4,5-Trichlorophenol	0	1	600	600			ND	600	U		N/A		Yes	No SV
2,4,6-Trichlorophenol	0	1	250	250			ND	250	U		N/A		Yes	No SV
2,4-Dichlorophenol	0	1	250	250			ND	250	U		N/A		Yes	No SV
2,4-Dimethylphenol	0	1	250	250			ND	250	U		N/A		Yes	No SV
2,4-Dinitrophenol	0	1	600	600			ND	600	U		N/A		Yes	No SV
2,4-Dinitrotoluene	0	1	250	250			ND	250	U		N/A		Yes	No SV
2,6-Dinitrotoluene	0	1	250	250			ND	250	U		N/A		Yes	No SV
2-Chloronaphthalene	0	1	250	250			ND	250	U		N/A		Yes	No SV
2-Chlorophenol	0	1	250	250			ND	250	U		N/A		Yes	No SV
2-Methyl-4,6-Dinitrophenol	0	1	600	600			ND	600	U		N/A		Yes	No SV
2-Methylphenol (o-Cresol)	0	1	250	250			ND	250	U		N/A		Yes	No SV
2-Nitroaniline	0	1	250	250			ND	250	U		N/A		Yes	No SV
2-Nitrophenol	0	1	250	250			ND	250	U		N/A		Yes	No SV
3,3'-Dichlorobenzidine	0	1	250	250			ND	250	U		N/A		Yes	No SV
3-Nitroaniline	0	1	600	600			ND	600	U		N/A		Yes	No SV
4-Bromophenyl-phenylether	0	1	250	250			ND	250	U		N/A		Yes	No SV
4-Chloro-3-methylphenol	0	1	250	250			ND	250	U		N/A		Yes	No SV
4-Chloroaniline	0	1	250	250			ND	250	U		N/A		Yes	No SV
4-Chlorophenylphenyl ether	0	1	250	250			ND	250	U		N/A		Yes	No SV
4-Methylphenol (p-Cresol)	0	1	250	250			ND	250	U		N/A		Yes	No SV
4-Nitroaniline	0	1	600	600			ND	600	U		N/A		Yes	No SV
4-Nitrophenol	0	1	600	600			ND	600	U		N/A		Yes	No SV
Benzo(b)fluoranthene	0	1	25	25			ND	25	U		N/A		No	TOC normalized PAHs<TEC
Benzo(g,h,i)perylene	0	1	25	25			ND	25	U		N/A		No	TOC normalized PAHs<TEC
Benzo(k)fluoranthene	0	1	25	25			ND	25	U		N/A		No	TOC normalized PAHs<TEC
bis(2-Chloroethoxy)methane	0	1	250	250			ND	250	U		N/A		Yes	No SV
bis(2-Chloroethyl)ether	0	1	25	25			ND	25	U		N/A		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	1	1			31	31	041M130101	31	J	182	1, 2	0.17	No	Max Detect < SV
Butylbenzylphthalate	0	1	250	250			ND	250	U	182	1, 2	1.37	Yes	Max SQL > SV
Carbazole	0	1	250	250			ND	250	U		N/A		Yes	No SV
Dibenzofuran	0	1	250	250			ND	250	U		N/A		Yes	No SV
Diethylphthalate	0	1	250	250			ND	250	U	182	1, 2	1.37	Yes	Max SQL > SV
Dimethylphthalate	0	1	250	250			ND	250	U	182	1, 2	1.37	Yes	Max SQL > SV
Di-n-butylphthalate	1	1			26	26	041M130101	26	J	182	1, 2	0.14	No	Max Detect < SV
Di-n-octylphthalate	0	1	250	250			ND	250	UJ	182	1, 2	1.37	Yes	Max SQL > SV
Hexachlorobenzene	0	1	250	250			ND	250	U		N/A		Yes	No SV
Hexachlorobutadiene	0	1	250	250			ND	250	U		N/A		Yes	No SV
Hexachlorocyclopentadiene	0	1	250	250			ND	250	U		N/A		Yes	No SV
Hexachloroethane	0	1	250	250			ND	250	U		N/A		Yes	No SV

Table 12-3-5
Wetland 13 Phase II
Sediment Screening

Parameter	Number Detected	Number Analyzed	Max SQL	Max SQL	Maximum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	SV	Source	SHQ	Retained for Refinement	Rationale
SVOCs (g/kg) - cont.														
Indeno(1,2,3-cd)pyrene	0	1	25	25			ND	25	U		N/A		No	TOC normalized PAHs<TEC
Isophorone	0	1	250	250			ND	250	U		N/A		Yes	No SV
Nitrobenzene	0	1	250	250			ND	250	U		N/A		Yes	No SV
N-Nitroso-di-n-propylaMaxe	0	1	25	25			ND	25	U		N/A		Yes	No SV
N-NitrosodiphenylaMaxe	0	1	250	250			ND	250	U		N/A		Yes	No SV
Pentachlorophenol	0	1	600	600			ND	600	U		N/A		Yes	No SV
Phenol	0	1	250	250			ND	250	U		N/A		Yes	No SV
VOCs (g/kg)														
1,1,1-Trichloroethane	0	1	7	7			ND	7	U		N/A		Yes	No SV
1,1,2,2-Tetrachloroethane	0	1	7	7			ND	7	U		N/A		Yes	No SV
1,1,2-Trichloroethane	0	1	7	7			ND	7	U		N/A		Yes	No SV
1,1-Dichloroethane	0	1	7	7			ND	7	U		N/A		Yes	No SV
1,1-Dichloroethene	0	1	7	7			ND	7	U		N/A		Yes	No SV
1,2-Dichloroethane	0	1	7	7			ND	7	U		N/A		Yes	No SV
1,2-Dichloroethene (total)	0	1	7	7			ND	7	U		N/A		Yes	No SV
1,2-Dichloropropane	0	1	7	7			ND	7	U		N/A		Yes	No SV
2-Butanone (MEK)	0	1	7	7			ND	7	U		N/A		Yes	No SV
2-Hexanone	0	1	7	7			ND	7	U		N/A		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	7	7			ND	7	U		N/A		Yes	No SV
Acetone	0	1	11.5	11.5			ND	11.5	U		N/A		Yes	No SV
Benzene	0	1	7	7			ND	7	U		N/A		Yes	No SV
Bromodichloromethane	0	1	7	7			ND	7	U		N/A		Yes	No SV
Bromoform	0	1	7	7			ND	7	U		N/A		Yes	No SV
Bromomethane	0	1	7	7			ND	7	U		N/A		Yes	No SV
Carbon disulfide	0	1	7	7			ND	7	U		N/A		Yes	No SV
Carbon tetrachloride	0	1	7	7			ND	7	U		N/A		Yes	No SV
Chlorobenzene	0	1	7	7			ND	7	U		N/A		Yes	No SV
Chloroethane	0	1	7	7			ND	7	U		N/A		Yes	No SV
Chloroform	0	1	7	7			ND	7	U		N/A		Yes	No SV
Chloromethane	0	1	7	7			ND	7	U		N/A		Yes	No SV
cis-1,3-Dichloropropene	0	1	7	7			ND	7	U		N/A		Yes	No SV
Dibromochloromethane	0	1	7	7			ND	7	U		N/A		Yes	No SV
Ethylbenzene	0	1	7	7			ND	7	U		N/A		Yes	No SV
Methylene chloride	0	1	8	8			ND	8	U		N/A		Yes	No SV
Styrene	0	1	7	7			ND	7	U		N/A		Yes	No SV
Tetrachloroethene	0	1	7	7			ND	7	U		N/A		Yes	No SV
Toluene	0	1	7	7			ND	7	U		N/A		Yes	No SV
trans-1,3-Dichloropropene	0	1	7	7			ND	7	U		N/A		Yes	No SV
Trichloroethene	0	1	7	7			ND	7	U		N/A		Yes	No SV
Vinyl chloride	0	1	7	7			ND	7	U		N/A		Yes	No SV
Xylene (Total)	0	1	7	7			ND	7	U		N/A		Yes	No SV

Notes:

Sources for Screening Values:
SV = Screening Value
1 = USEPA Region 4 Screening Value. Detailed explanation for SVs provided in Section 8.0.
2 = FDEP Threshold effects level

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available.
U or ND = Not Detected at or above the SQL
J = Estimated value
SHQ = Screening Hazard Quotient

D = Diluted Result
mg/kg = milligrams per kilograms
g/kg = micrograms per kilograms
mg/kg oc = milligrams per kilograms - organic carbon
UJ = Not detected. SQL is estimated.
Parameters in bold were detected and exceeded screening values.

Table 12-3-6
Wetland 13 Phase II
Sediment COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
Aluminum	4,4'-DDT	None	None
Barium	Total DDT		
Beryllium			
Calcium			
Iron			
Magnesium			
Manganese			
Potassium			
Selenium			
Sodium			
Vanadium			
		Not Detected Parameters	
Cobalt	Aldrin	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane
Cyanide (CN)	alpha-BHC	1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
Thallium	Endosulfan I	1,3-Dichlorobenzene	1,1,2-Trichloroethane
	Endosulfan II	1,4-Dichlorobenzene	1,1-Dichloroethane
	Endosulfan sulfate	2,2'-oxybis(1-Chloropropane)/bis(2-chlo	1,1-Dichloroethene
	Heptachlor	2,4,5-Trichlorophenol	1,2-Dichloroethane
	Heptachlor epoxide	2,4,6-Trichlorophenol	1,2-Dichloroethene (total)
	Methoxychlor	2,4-Dichlorophenol	1,2-Dichloropropane
	Toxaphene	2,4-Dimethylphenol	2-Butanone (MEK)
		2,4-Dinitrophenol	2-Hexanone
		2,4-Dinitrotoluene	4-Methyl-2-Pentanone (MIBK)
		2,6-Dinitrotoluene	Acetone
		2-Chloronaphthalene	Benzene
		2-Chlorophenol	Bromodichloromethane
		2-Methyl-4,6-Dinitrophenol	Bromoform
		2-Methylnaphthalene	Bromomethane
		2-Methylphenol (o-Cresol)	Carbon disulfide
		2-Nitroaniline	Carbon tetrachloride
		2-Nitrophenol	Chlorobenzene
		3,3'-Dichlorobenzidine	Chloroethane
		3-Nitroaniline	Chloroform
		4-Bromophenyl-phenylether	Chloromethane
		4-Chloro-3-methylphenol	cis-1,3-Dichloropropene
		4-Chloroaniline	Dibromochloromethane
		4-Chlorophenylphenyl ether	Ethylbenzene
		4-Methylphenol (p-Cresol)	Methylene chloride
		4-Nitroaniline	Styrene
		4-Nitrophenol	Tetrachloroethene
		Acenaphthene	Toluene
		Acenaphthylene	trans-1,3-Dichloropropene
		Benzo(b)fluoranthene	Trichloroethene
		Benzo(g,h,i)perylene	Vinyl chloride
		Benzo(k)fluoranthene	Xylene (Total)
		bis(2-Chloroethoxy)methane	
		bis(2-Chloroethyl)ether	
		Butylbenzylphthalate	
		Carbazole	
		Dibenz(a,h)anthracene	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	

Table 12-3-7
Wetland 13 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result HQ	SV	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
Metals (mg/kg)																								
Aluminum	1	1				1,590	1,590	1,590	1,590		041M130101			NA						0	13,610	0	No	EPC < RC
Barium	1	1				0.88	0.88	0.88	0.88	J	041M130101			NA						0	14	0	No	EPC < RC
Beryllium	1	1				0.11	0.11	0.11	0.11	J	041M130101			NA						0	0.84	0	No	EPC < RC
Calcium	1	1				327	327	327	327	J	041M130101			NA						0	10,756.67	0	No	EPC < RC
Cobalt	0	1	0.1	0.1	0.1	0.1			0.1	U	ND			NA						0	2.8	0	No	Parameter Not Detected
Cyanide (CN)	0	1	0.33	0.33	0.33	0.33			0.33	U	ND			NA						0	5.22	0	No	Parameter Not Detected
Iron	1	1				229	229	229	229		041M130101			NA						0	11,911.67	0	No	EPC < RC
Magnesium	1	1				187	187	187	187	J	041M130101			NA						0	7,513.33	0	No	EPC < RC
Manganese	1	1				0.85	0.85	0.85	0.85	J	041M130101			NA						0	37.97	0	No	EPC < RC
Potassium	1	1				50.6	50.6	50.6	50.6	J	041M130101			NA						0	1,628.67	0	No	EPC < RC
Selenium	1	1				0.41	0.41	0.41	0.41	J	041M130101			NA						0	3.45	0	No	EPC < RC
Sodium	1	1				290	290	290	290	J	041M130101			NA						0	18,993.33	0	No	EPC < RC
Thallium	0	1	0.1	0.1	0.1	0.1			0.1	UJ	ND			NA						0	1.57	0	No	Parameter Not Detected
Vanadium	1	1				7.5	7.5	7.5	7.5		041M130101			NA						0	28.67	0	No	EPC < RC
Pesticides (g/kg)																								
Aldrin	0	1	0.06	0.06	0.06	0.06			0.06	UJ	ND			NA						0		0	No	Parameter Not Detected
Endosulfan I	0	1	0.13	0.13	0.13	0.13			0.13	UJ	ND			NA						0		0	No	Parameter Not Detected
Endosulfan II	0	1	0.13	0.13	0.13	0.13			0.13	UJ	ND			NA						0		0	No	Parameter Not Detected
Endosulfan sulfate	0	1	0.13	0.13	0.13	0.13			0.13	UJ	ND			NA						0		0	No	Parameter Not Detected
Heptachlor	0	1	0.06	0.06	0.06	0.06			0.06	UJ	ND			NA						0		0	No	Parameter Not Detected
Heptachlor epoxide	0	1	0.06	0.06	0.06	0.06			0.06	UJ	ND			NA						0		0	No	Parameter Not Detected
Methoxychlor	0	1	0.6	0.6	0.6	0.6			0.6	UJ	ND			NA						0		0	No	Parameter Not Detected
Toxaphene	0	1	6	6	6	6			6	UJ	ND			NA						0		0	No	Parameter Not Detected
alpha-BHC	0	1	0.06	0.06	0.06	0.06			0.06	UJ	ND		0.99	PEL				0.06	0.06	0		0	No	Parameter Not Detected
beta-BHC	0	1	0.06	0.06	0.06	0.06			0.06	UJ	ND	0.32	0.99	PEL	0.19		0.19	0.06	0.06	0		0	No	Parameter Not Detected
delta-BHC	0	1	0.06	0.06	0.06	0.06			0.06	UJ	ND	0.32	0.99	PEL	0.19		0.19	0.06	0.06	0		0	No	Parameter Not Detected
gamma-BHC (Lindane)	0	1	0.06	0.06	0.06	0.06			0.06	UJ	ND	0.32	0.99	PEL	0.19		0.19	0.06	0.06	0		0	No	Parameter Not Detected
Total BHC	0	1	0.24	0.24	0.24	0.24			0.24	U	ND	0.32	0.99	PEL	0.75		0.75	0.24	0.24	0		0	No	Parameter Not Detected
4,4'-DDD	0	1	0.13	0.13	0.13	0.13			0.13	UJ	ND	1.22	7.81	PEL	0.11		0.11	0.02	0.02	0	50	0	No	Parameter Not Detected
4,4'-DDE	1	1				1.9	1.9	1.9	1.9	J	041M130101	2.07	374	PEL	0.92		0.92	0.01	0.01	0	40	0	No	EPC < RC and RV
4,4'-DDT	1	1				1.4	1.4	1.4	1.4	J	041M130101	1.19	4.77	PEL	1.18		1.18	0.29	0.29	0	20	0	No	EPC < RC and RV
Total DDT	1	1				3.43	3.43	3.43	3.43		041M130101	3.3	51.7	PEL	1.04		1.04	0.07	0.07	0	110	0	No	EPC < RC and RV
SVOCs (g/kg)																								
1,2,4-Trichlorobenzene	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
1,2-Dichlorobenzene	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
1,4-Dichlorobenzene	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)/bis(2-chlor	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	1	600	600	600	600			600	U	ND			NA						0		0	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
2,4-Dichlorophenol	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
2,4-Dimethylphenol	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
2,4-Dinitrophenol	0	1	600	600	600	600			600	U	ND			NA						0		0	No	Parameter Not Detected
2,4-Dinitrotoluene	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
2,6-Dinitrotoluene	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
2-Chloronaphthalene	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
2-Chlorophenol	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	1	600	600	600	600			600	U	ND			NA						0		0	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
2-Nitroaniline	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
2-Nitrophenol	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
3-Nitroaniline	0	1	600	600	600	600			600	U	ND			NA						0		0	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
4-Chloroaniline	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
4-Nitroaniline	0	1	600	600	600	600			600	U	ND			NA						0		0	No	Parameter Not Detected
4-Nitrophenol	0	1	600	600	600	600			600	U	ND			NA						0		0	No	Parameter Not Detected
Benzo(b)fluoranthene	0	1	25	25	25	25			25	U	ND			NA						0		0	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	1	25	25	25	25			25	U	ND			NA						0		0	No	Parameter Not Detected
Benzo(k)fluoranthene	0	1	25	25	25	25			25	U	ND			NA						0		0	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	1	25	25	25	25			25	U	ND			NA						0		0	No	Parameter Not Detected
Butylbenzylphthalate	0	1	250	250	250	250			250	U	ND	182	2647	PEL	1.37		1.37	0.09	0.09	0		0	No	Parameter Not Detected
Carbazole	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
Dibenzofuran	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
Diethylphthalate	0	1	250	250	250	250			250	U	ND	182	2647	PEL	1.37		1.37	0.09	0.09	0		0	No	Parameter Not Detected
Dimethylphthalate	0	1	250	250	250	250			250	U	ND	182	2647	PEL	1.37		1.37	0.09	0.09	0		0	No	Parameter Not Detected
Di-n-octylphthalate	0	1	250	250	250	250			250	UJ	ND	182	2647	PEL	1.37		1.37	0.09	0.09	0		0	No	Parameter Not Detected
Hexachlorobenzene	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
Hexachlorobutadiene	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
Hexachloroethane	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	1	25	25	25	25			25	U	ND			NA						0		0	No	Parameter Not Detected
Isophorone	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
Nitrobenzene	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	1	25	25	25	25			25	U	ND			NA						0		0	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected
Pentachlorophenol	0	1	600	600	600	600			600	U	ND			NA						0		0	No	Parameter Not Detected
Phenol	0	1	250	250	250	250			250	U	ND			NA						0		0	No	Parameter Not Detected

Table 12-3-7
Wetland 13 Phase II
Sediment Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Min SQL	Max SQL	Average Result	Minimum Detected	Maximum Detected	EPC	Q	Maximum Detection Location	SV	Refinement Value	Refinement Value Source	Maximum Result HQ	SV	Average Result SV HQ	Maximum Result RV HQ	Average Result RV HQ	Number Detected > RV	Reference Concentration	Number Detected > Reference Concentration	COPC Retained (Y/N)	Rationale
VOCs (g/kg)																								
1,1,1-Trichloroethane	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
1,1,2,2-Tetrachloroethane	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
1,1-Dichloroethane	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
1,1-Dichloroethene	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
1,2-Dichloroethane	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
1,2-Dichloroethene (total)	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
1,2-Dichloropropane	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
2-Butanone (MEK)	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
2-Hexanone	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Acetone	0	1	11.5	11.5	11.5	11.5			11.5	U	ND			NA						0		0	No	Parameter Not Detected
Benzene	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Bromodichloromethane	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Bromoform	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Bromomethane	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Carbon disulfide	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Carbon tetrachloride	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Chlorobenzene	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Chloroethane	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Chloroform	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Chloromethane	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Dibromochloromethane	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Ethylbenzene	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Methylene chloride	0	1	8	8	8	8			8	U	ND			NA						0		0	No	Parameter Not Detected
Styrene	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Tetrachloroethene	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Toluene	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Trichloroethene	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Vinyl chloride	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected
Xylene (Total)	0	1	7	7	7	7			7	U	ND			NA						0		0	No	Parameter Not Detected

Notes:

Sources for Refinement Values (RVs):
PEL = FDEP Probable Effects Level
MEC = Swartz Midrange Effect Concentration

Supporting Information:
SQL = Sample Quantitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
Parameters in bold were detected and exceeded screening values.

Supporting Information:
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
PEL = Probable effects level.

N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters.
As a result, some average detections may exceed the maximum detections
NAS Pensacola basewide levels used as reference values for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE and total DDT.

Table 12-3-8
Wetland 13 Phase II
Sediment COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
		Detected Parameters	
None	None	None	None

Table 12-3-9
Wetland 13 Phase II
Mean ERM Quotient

Sample ID	Sample Date	Units	Result	VQUAL	Parameter	ERL	ERM	ERM Quotient
041M130101	11/27/1995	mg/kg	0.14	J	Arsenic	8.2	70	0.00
041M130101	11/27/1995	mg/kg	0.1	U	Cadmium	1.2	9.6	0.01
041M130101	11/27/1995	mg/kg	4		Chromium	81	370	0.01
041M130101	11/27/1995	mg/kg	1.2	J	Copper	34	270	0.00
041M130101	11/27/1995	mg/kg	9.2	J	Lead	46.7	218	0.04
041M130101	11/27/1995	mg/kg	0.03	U	Mercury	0.15	0.71	0.04
041M130101	11/27/1995	mg/kg	0.405	U	Nickel	20.9	51.6	0.01
041M130101	11/27/1995	mg/kg	0.135	UJ	Silver	1	3.7	0.04
041M130101	11/27/1995	mg/kg	1.7		Zinc	150	410	0.00
041M130101	11/27/1995	g/kg	1.9	J	4,4'-DDE	2.2	27	0.07
041M130101	11/27/1995	g/kg	1.4	J	4,4'-DDT	1.58	46.1	0.03
041M130101	11/27/1995	g/kg	10.3	U	Total PCBs	22.7	180	0.06
041M130101	11/27/1995	g/kg	25	U	2-Methylnaphthalene	70	670	0.04
041M130101	11/27/1995	g/kg	12	U	Acenaphthene	16	500	0.02
041M130101	11/27/1995	g/kg	25	U	Acenaphthylene	44	640	0.04
041M130101	11/27/1995	g/kg	25	U	Anthracene	85.3	1,100	0.02
041M130101	11/27/1995	g/kg	25	U	Benzo(a)anthracene	261	1,600	0.02
041M130101	11/27/1995	g/kg	25	U	Benzo(a)pyrene	430	1,600	0.02
041M130101	11/27/1995	g/kg	25	U	Chrysene	384	2,800	0.01
041M130101	11/27/1995	g/kg	25	U	Dibenz(a,h)anthracene	63.4	260	0.10
041M130101	11/27/1995	g/kg	29	J	Fluoranthene	600	5,100	0.01
041M130101	11/27/1995	g/kg	12	U	Fluorene	19	540	0.02
041M130101	11/27/1995	g/kg	25	U	Naphthalene	160	2,100	0.01
041M130101	11/27/1995	g/kg	25	U	Phenanthrene	240	1,500	0.02
041M130101	11/27/1995	g/kg	25	U	Pyrene	665	2,600	0.01
041M130101	11/27/1995				ERM Quotient Sum			0.64
041M130101	11/27/1995				Mean ERM Quotient			0.03
041M130101	11/27/1995				Mean ERM Quotient without ND			0.01
041M130101	11/27/1995				Mean ERM Quotient Category			1

Notes:
ERL = Effects Range Low
ERM = Effects Range Median
mg/kg = milligrams per kilogram
g/kg = micrograms per kilogram
U = not detected at or above the SQL (value in table is 1/2 reported value)
J = estimated value
Shaded cells indicate constituent exceeds ERL.
Shaded and bold cells indicate constituent exceeds ERM.

Table 12-3-10
Wetland 13 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
Metals (g/L)																
Aluminum	**1**	**1**				**145,000**	**145,000**	**145,000**	**041W130101**	**145,000**		**13**	**FDEP**	**11,200**	**Yes**	**Max Detect > SV**
Antimony	1	1				2.8	2.8	2.8	041W130101	2.8	J	160	EPA	0.02	No	Max Detect < SV
Arsenic	1	1				26.6	26.6	26.6	041W130101	26.6		50	FDEP	0.53	No	Max Detect < SV
Barium	1	1				95.4	95.4	95.4	041W130101	95.4	J		NA		Yes	No SV
Beryllium	**1**	**1**				**4.4**	**4.4**	**4.4**	**041W130101**	**4.4**	**J**	**0.13**	**FDEP**	**33.8**	**Yes**	**Max Detect > SV**
Cadmium	**1**	**1**				**9.8**	**9.8**	**9.8**	**041W130101**	**9.8**		**0.66**	**EPA**	**14.8**	**Yes**	**Max Detect > SV**
Calcium	1	1				47,500	47,500	47,500	041W130101	47,500			NA		Yes	No SV
Chromium	**1**	**1**				**225**	**225**	**225**	**041W130101**	**225**		**11**	**EPA**	**20.5**	**Yes**	**Max Detect > SV**
Cobalt	1	1				7.8	7.8	7.8	041W130101	7.8	J		NA		Yes	No SV
Copper	**1**	**1**				**142**	**142**	**142**	**041W130101**	**142**		**6.54**	**EPA**	**21.7**	**Yes**	**Max Detect > SV**
Cyanide (CN)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U	5.2	EPA	0.48	No	Max SQL< SV
Iron	1	1				36,200	36,200	36,200	041W130101	36,200			NA		Yes	No SV
Lead	**1**	**1**				**1,220**	**1,220**	**1,220**	**041W130101**	**1,220**		**1.32**	**EPA**	**924**	**Yes**	**Max Detect > SV**
Magnesium	1	1				37,100	37,100	37,100	041W130101	37,100			NA		Yes	No SV
Manganese	1	1				150	150	150	041W130101	150			NA		Yes	No SV
Mercury	**1**	**1**				**1.3**	**1.3**	**1.3**	**041W130101**	**1.3**		**0.012**	**EPA**	**108**	**Yes**	**Max Detect > SV**
Nickel	1	1				47.2	47.2	47.2	041W130101	47.2		87.71	EPA	0.54	No	Max Detect < SV
Potassium	1	1				16,600	16,600	16,600	041W130101	16,600			NA		Yes	No SV
Selenium	**1**	**1**				**13.6**	**13.6**	**13.6**	**041W130101**	**13.6**		**5**	**EPA**	**2.72**	**Yes**	**Max Detect > SV**
Silver	0	1	2	2	2	2			ND	2	U	0.012	EPA	167	Yes	Max SQL > SV
Sodium	1	1				199,000	199,000	199,000	041W130101	199,000			NA		Yes	No SV
Thallium	0	1	1.5	1.5	1.5	1.5			ND	1.5	U	4	EPA	0.38	No	Max SQL< SV
Vanadium	1	1				324	324	324	041W130101	324			NA		Yes	No SV
Zinc	**1**	**1**				**536**	**536**	**536**	**041W130101**	**536**		**58.91**	**EPA**	**9.1**	**Yes**	**Max Detect > SV**
SVOCs (g/L)																
1,2,4-Trichlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
2,2'-oxybis(1-Chloropropane)	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	UJ		NA		Yes	No SV
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	UJ		NA		Yes	No SV
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
2-Chlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ	43.8	EPA	0.06	No	Max SQL< SV
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	UJ		NA		Yes	No SV
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
2-Nitroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
3,3'-Dichlorobenzidine	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
3-Nitroaniline	0	1	10	10	10	10			ND	10	UJ		NA		Yes	No SV
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
4-Chloro-3-methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
4-Methylphenol (p-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
4-Nitroaniline	0	1	10	10	10	10			ND	10	UJ		NA		Yes	No SV
4-Nitrophenol	0	1	10	10	10	10			ND	10	UJ		NA		Yes	No SV
Benzo(b)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Benzo(g,h,i)perylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Benzo(k)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
bis(2-Chloroethyl)ether	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ	0.3	EPA	8.33	Yes	Max SQL > SV
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV

Table 12-3-10
Wetland 13 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
SVOCs (g/L) - cont.																
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
Di-n-butylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ	9.4	EPA	0.27	No	Max SQL< SV
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
Hexachlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
Indeno(1,2,3-cd)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
N-Nitroso-di-n-propylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
Pentachlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA		Yes	No SV
PAHs (g/L)																
2-Methylnaphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Acenaphthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Acenaphthylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Benzo(a)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Benzo(a)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Chrysene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Dibenz(a,h)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Fluorene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Naphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ	26	FDEP	0.02	No	Max SQL< SV
Phenanthrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA		Yes	No SV
Total PAH	0	1	6.5	6.5	6.5	6.5			ND	6.5	U		NA		Yes	No SV
VOCs (g/L)																
1,1,1-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	270	FDEP	0.00	No	Max SQL< SV
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,1-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	3.2	FDEP	0.16	No	Max SQL< SV
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	15.8	EPA	0.03	No	Max SQL< SV
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
1,4-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	3	FDEP	0.17	No	Max SQL< SV
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
4-Methyl-2-Pentanone (MIBK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA		Yes	No SV
Benzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	53	EPA	0.01	No	Max SQL< SV
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	17	FDEP	0.03	No	Max SQL< SV
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Chloroform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	289	EPA	0.00	No	Max SQL< SV
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
cis-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Table 12-3-10
Wetland 13 Phase II
Surface Water Screening

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Maximum SQL	Average Result	Minimum Detected	Maximum Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Screening HQ	Retained for Refinement?	Rationale
VOCs (g/L) - cont.																
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Ethylbenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	453	EPA	0.00	No	Max SQL< SV
Methylene chloride	0	1	7.5	7.5	7.5	7.5			ND	7.5	U	1,580	FDEP	0.00	No	Max SQL< SV
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Toluene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U	175	EPA	0.00	No	Max SQL< SV
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Trichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Vinyl chloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV
Xylene (Total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA		Yes	No SV

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
J = Estimated Value
UJ = Not detected. SQL is estimated.
D = Diluted Result

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
HQ = Hazard Quotient.
N/R = No refinement value available.
N/A = Not Applicable.

Average result calculations include summing detections and one half the detection limit for not detected parameters. As a result, some average detections may exceed the maximum detections.
Parameters in bold were detected and exceeded the screening value.

Table 12-3-11
Wetland 13 Phase II
Surface Water COPCs Retained After Screening

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Aluminum	None	None	None
Barium			
Beryllium			
Cadmium			
Calcium			
Chromium			
Cobalt			
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Mercury			
Potassium			
Selenium			
Sodium			
Vanadium			
Zinc			
Not Detected Parameters			
Silver	None	1,2,4-Trichlorobenzene	1,1,2,2-Tetrachloroethane
		2,2'-oxybis(1-Chloropropane)/bis(2-chlor)	1,1,2-Trichloroethane
		2,4,5-Trichlorophenol	1,1-Dichloroethane
		2,4,6-Trichlorophenol	1,2-Dibromo-3-Chloropropane
		2,4-Dichlorophenol	1,2-Dibromoethane
		2,4-Dimethylphenol	1,2-Dichloroethane
		2,4-Dinitrophenol	1,2-Dichloropropane
		2,4-Dinitrotoluene	1,3-Dichlorobenzene
		2,6-Dinitrotoluene	2-Hexanone
		2-Chloronaphthalene	4-Methyl-2-Pentanone (MIBK)
		2-Methyl-4,6-Dinitrophenol	Bromochloromethane
		2-Methylphenol (o-Cresol)	Bromodichloromethane
		2-Nitroaniline	Bromoform
		2-Nitrophenol	Bromomethane
		3,3'-Dichlorobenzidine	Carbon disulfide
		3-Nitroaniline	Carbon tetrachloride
		4-Bromophenyl-phenylether	Chloroethane
		4-Chloro-3-methylphenol	Chloromethane
		4-Chloroaniline	cis-1,2-Dichloroethene
		4-Chlorophenylphenyl ether	cis-1,3-Dichloropropene
		4-Methylphenol (p-Cresol)	Dibromochloromethane
		4-Nitroaniline	Styrene
		4-Nitrophenol	Tetrachloroethene
		Benzo(b)fluoranthene	trans-1,2-Dichloroethene
		Benzo(g,h,i)perylene	trans-1,3-Dichloropropene
		Benzo(k)fluoranthene	Trichloroethene
		bis(2-Chloroethoxy)methane	Vinyl chloride
		bis(2-Chloroethyl)ether	Xylene (Total)
		bis(2-Ethylhexyl)phthalate (BEHP)	
		Butylbenzylphthalate	
		Dibenzofuran	
		Diethylphthalate	
		Dimethylphthalate	
		Di-n-octylphthalate	
		Hexachlorobenzene	
		Hexachlorobutadiene	
		Hexachlorocyclopentadiene	
		Hexachloroethane	
		Indeno(1,2,3-cd)pyrene	
		Isophorone	
		Nitrobenzene	
		N-Nitroso-di-n-propylamine	
		N-Nitrosodiphenylamine	
		Pentachlorophenol	
		Phenol	
		2-Methylnaphthalene	
		Acenaphthene	
		Acenaphthylene	
		Anthracene	
		Benzo(a)anthracene	
		Benzo(a)pyrene	
		Chrysene	
		Dibenz(a,h)anthracene	
		Fluoranthene	
		Fluorene	
		Phenanthrene	
		Pyrene	
		Total PAHs	

Table 12-3-12
Wetland 13 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
Metals (g/L)																				
Aluminum	**1**	**1**				**145,000**	**145,000**	**145,000**	**041W130101**	**145,000**		**13**	**FDEP**	**11,154**	**11,200**	**1,090.25**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
Barium	1	1				95.4	95.4	95.4	041W130101	95.4	J		NA			3.68	1	1	Yes	Max Result > Ref. Conc.
Beryllium	**1**	**1**				**4.4**	**4.4**	**4.4**	**041W130101**	**4.4**	**J**	**0.13**	**FDEP**	**34**	**33.8**	**1**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
Cadmium	**1**	**1**				**9.8**	**9.8**	**9.8**	**041W130101**	**9.8**		**0.66**	**EPA**	**15**	**14.8**	**3**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
Calcium	1	1				47,500	47,500	47,500	041W130101	47,500			NA			7,675	1	1	No	Essential Nutrient
Chromium	**1**	**1**				**225**	**225**	**225**	**041W130101**	**225**		**11**	**EPA**	**20.45**	**20.5**	**8**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
Cobalt	1	1				7.8	7.8	7.8	041W130101	7.8	J		NA			3	1	1	Yes	Max Result > Ref. Conc.
Copper	**1**	**1**				**142**	**142**	**142**	**041W130101**	**142**		**6.54**	**EPA**	**22**	**21.7**	**4**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
Iron	1	1				36,200	36,200	36,200	041W130101	36,200			NA			2,360	1	1	Yes	Max Result > Ref. Conc.
Lead	**1**	**1**				**1,220**	**1,220**	**1,220**	**041W130101**	**1,220**		**1.32**	**EPA**	**924.24**	**924**	**3.2**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
Magnesium	1	1				37,100	37,100	37,100	041W130101	37,100			NA			20,260	1	1	No	Essential Nutrient
Manganese	1	1				150	150	150	041W130101	150			NA			13.2	1	1	Yes	Max Result > Ref. Conc.
Mercury	**1**	**1**				**1.3**	**1.3**	**1.3**	**041W130101**	**1.3**		**0.012**	**EPA**	**108.33**	**108**	**0.13**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
Potassium	1	1				16,600	16,600	16,600	041W130101	16,600			NA			6,995	1	1	No	Essential Nutrient
Selenium	**1**	**1**				**13.6**	**13.6**	**13.6**	**041W130101**	**13.6**		**5**	**EPA**	**3**	**2.72**	**3**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
Silver	0	1	2	2	2	2			ND	2	U	0.012	EPA	167	167	4	0	1	No	Max SQL < Ref. Conc.
Sodium	1	1				199,000	199,000	199,000	041W130101	199,000			NA			182,200	1	1	No	Essential Nutrient
Vanadium	1	1				324	324	324	041W130101	324			NA			4.7	1	1	Yes	Max Result > Ref. Conc.
Zinc	**1**	**1**				**536**	**536**	**536**	**041W130101**	**536**		**58.91**	**EPA**	**9.10**	**9.1**	**5.53**	**1**	**1**	**Yes**	**Max Result > Ref. Conc.**
SVOCs (g/L)																				
1,2,4-Trichlorobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
2,2'-oxybis(1-Chloropropane)	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
2,4,5-Trichlorophenol	0	1	10	10	10	10			ND	10	UJ		NA				0	1	No	Parameter Not Detected
2,4,6-Trichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
2,4-Dichlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
2,4-Dimethylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
2,4-Dinitrophenol	0	1	10	10	10	10			ND	10	UJ		NA				0	1	No	Parameter Not Detected
2,4-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
2,6-Dinitrotoluene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
2-Chloronaphthalene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
2-Methyl-4,6-Dinitrophenol	0	1	10	10	10	10			ND	10	UJ		NA				0	1	No	Parameter Not Detected
2-Methylphenol (o-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
2-Nitroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
2-Nitrophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
3,3'-Dichlorobenzidine	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
3-Nitroaniline	0	1	10	10	10	10			ND	10	UJ		NA				0	1	No	Parameter Not Detected
4-Bromophenyl-phenylether	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
4-Chloro-3-methylphenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
4-Chloroaniline	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
4-Chlorophenylphenyl ether	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
4-Methylphenol (p-Cresol)	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
4-Nitroaniline	0	1	10	10	10	10			ND	10	UJ		NA				0	1	No	Parameter Not Detected
4-Nitrophenol	0	1	10	10	10	10			ND	10	UJ		NA				0	1	No	Parameter Not Detected
Benzo(b)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Benzo(g,h,i)perylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Benzo(k)fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
bis(2-Chloroethoxy)methane	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
bis(2-Chloroethyl)ether	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
bis(2-Ethylhexyl)phthalate (BEHP)	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ	0.3	EPA	8.33	8.33		0	1	No	Parameter Not Detected
Butylbenzylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
Dibenzofuran	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
Diethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
Dimethylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
Di-n-octylphthalate	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
Hexachlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Hexachlorobutadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
Hexachlorocyclopentadiene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
Hexachloroethane	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
Indeno(1,2,3-cd)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Isophorone	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
Nitrobenzene	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
N-Nitroso-di-n-propylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
N-Nitrosodiphenylamine	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
Pentachlorophenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
Phenol	0	1	2.5	2.5	2.5	2.5			ND	2.5	UJ		NA				0	1	No	Parameter Not Detected
PAHs (g/L)																				
2-Methylnaphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Acenaphthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Acenaphthylene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Benzo(a)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Benzo(a)pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Chrysene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Dibenz(a,h)anthracene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Fluoranthene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Fluorene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Naphthalene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ	26	FDEP	0.02	0.02		0	1	No	Parameter Not Detected

Table 12-3-12
Wetland 13 Phase II
Surface Water Refinement

Parameter	Number Detected	Number Analyzed	Average SQL	Minimum SQL	Max SQL	Average Result	Minimum Detected	Max Detected	Maximum Detection Location	EPC	Q	Screening Value	Source	Max Screening HQ	Average Screening HQ	Ref. Conc.	Number Detected > Ref. Conc.	Number Analyzed	Retained for Refinement?	Rationale
PAHs (g/L) - cont.																				
Phenanthrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Pyrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	UJ		NA				0	1	No	Parameter Not Detected
Total PAH	0	1	6.5	6.5	6.5	6.5			ND	6.5	U		NA				0	1	No	Parameter Not Detected
VOCs (g/L)																				
1,1,2,2-Tetrachloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,1,2-Trichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,1-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dibromo-3-Chloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dibromoethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,2-Dichloropropane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
1,3-Dichlorobenzene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
2-Hexanone	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
4-Methyl-2-Pentanone (MIBK)	0	1	2.5	2.5	2.5	2.5			ND	2.5	U		NA				0	1	No	Parameter Not Detected
Bromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Bromodichloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Bromoform	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Bromomethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Carbon disulfide	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Carbon tetrachloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Chloroethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Chloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
cis-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
cis-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Dibromochloromethane	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Styrene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Tetrachloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
trans-1,2-Dichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
trans-1,3-Dichloropropene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Trichloroethene	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Vinyl chloride	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected
Xylene (Total)	0	1	0.5	0.5	0.5	0.5			ND	0.5	U		NA				0	1	No	Parameter Not Detected

Notes:

Sources for Screening Values (SVs):
EPA = Ambient Water Quality Criteria
FDEP = Surface Water Quality Criteria

Supporting Information:
SQL = Sample Quanitation Limit
HQ = Hazard Quotient
N/A = No screening value available
U or ND = Not Detected at or above the SQL
UJ = Not detected. SQL is estimated.
D = Diluted Result
J = Estimated Value

Supporting Information:
SV = Screening value (detailed explanation for SVs provided in Section 8).
RV = Refinement value (detailed explanation of RVs provided in Section 8).
PEL = Probable effects level.
N/R = No refinement value available.
N/A = Not Applicable.
Average result calculations include summing detections and one half the detection limits for not detected parameters. As a result, some average detections may exceed the Max detections
Parameters in bold were detected and exceeded Ref. Conc.s.

Table 12-3-13
Wetland 13 Phase II
Surface Water COPCs Retained After Refinement

Metals	Pesticides/PCBs	SVOCs/PAHs	VOCs
Detected Parameters			
Aluminum	None	None	None
Barium			
Beryllium			
Cadmium			
Chromium			
Cobalt			
Copper			
Iron			
Lead			
Manganese			
Mercury			
Selenium			
Vanadium			
Zinc			

Table 12-3-14
Wetland 13 Phase II
Sediment Dermal Exposure Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (mg/kg)	Min. Qual.	Maximum Concentration (mg/kg)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	ABS_{sd}	ABS_{sd} Source	DA_{event}: Child Trespasser	DA_{event}: Adult Maintenance Worker	DAD_{sd} (mg/kg-day): Child Trespasser	DAD_{sd} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	N/A	N/A	1.6E+03	=	MG/KG	041M130101	1 / 1	NAV	1.6E+03	1.0E-03	3	N/A	1.59E-07	N/A	3.37E-06
7440393	Barium	N	N/A	N/A	8.8E-01	J	MG/KG	041M130101	1 / 1	NAV	8.8E-01	1.0E-03	3	N/A	8.80E-11	N/A	1.86E-09
7440417	Beryllium	N	N/A	N/A	1.1E-01	J	MG/KG	041M130101	1 / 1	NAV	1.1E-01	1.0E-03	3	N/A	1.10E-11	N/A	2.33E-10
7439896	Iron	N	N/A	N/A	2.3E+02	=	MG/KG	041M130101	1 / 1	NAV	2.3E+02	1.0E-03	3	N/A	2.29E-08	N/A	4.85E-07
7439965	Manganese	N	N/A	N/A	8.5E-01	J	MG/KG	041M130101	1 / 1	NAV	8.5E-01	1.0E-03	3	N/A	8.50E-11	N/A	1.80E-09
7782492	Selenium	N	N/A	N/A	4.1E-01	J	MG/KG	041M130101	1 / 1	NAV	4.1E-01	1.0E-03	3	N/A	4.10E-11	N/A	8.68E-10
7440622	Vanadium	N	N/A	N/A	7.5E+00	=	MG/KG	041M130101	1 / 1	NAV	7.5E+00	1.0E-03	3	N/A	7.50E-10	N/A	1.59E-08
72559	4,4'-DDE	C	N/A	N/A	1.9E-03	J	MG/KG	041M130101	1 / 1	NAV	1.9E-03	3.0E-02	1	N/A	5.70E-12	N/A	4.31E-11
50293	4,4'-DDT	C	N/A	N/A	1.4E-03	J	MG/KG	041M130101	1 / 1	NAV	1.4E-03	3.0E-02	1	N/A	4.20E-12	N/A	3.17E-11
60571	Dieldrin	C	N/A	N/A	3.0E-04	J	MG/KG	041M130101	1 / 1	NAV	3.0E-04	1.0E-01	2	N/A	3.00E-12	N/A	2.27E-11
117817	bis(2-Ethylhexyl)phthalate (BEHP)	C	N/A	N/A	3.1E-02	J	MG/KG	041M130101	1 / 1	NAV	3.1E-02	1.0E-01	1	N/A	3.10E-10	N/A	2.34E-09
84742	Di-n-butylphthalate	N	N/A	N/A	2.6E-02	J	MG/KG	041M130101	1 / 1	NAV	2.6E-02	1.0E-01	2	N/A	2.60E-10	N/A	5.50E-09
206440	Fluoranthene	N	N/A	N/A	2.9E-02	J	MG/KG	041M130101	1 / 1	NAV	2.9E-02	1.3E-01	2	N/A	3.77E-10	N/A	7.98E-09

Notes:
Equation for sediment risk:

$$DAD_{sd} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:
DAD_{sd} = Dermal Absorbed Dose-soil contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event)
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:
EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Equation for DA_{event} for sediment contact:

$$DA_{event} = C_{sd} \times CF \times AF \times ABS_d$$

Where:
C_{sd} = Chemical concentration in sediment (mg/kg).
CF = Conversion factor (10^{-6} kg/mg).
AF = Adherence factor of sediment to soil (mg/cm2-event).
0.2 (children playing in wet soil) 0.1 (construction worker)
AB_{sd} = Dermal absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Table 12-3-15
Wetland 13 Phase II
Sediment Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABSGI	ABSGI Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
Sediment Dermal Risk	Aluminum	N	1.6E+03	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	N/A	N/A	3.4E-05	N/A
	Barium	N	8.8E-01	7.0E-02	N/A	7.0E-02	1, 3	4.9E-03	N/A	N/A	N/A	3.8E-07	N/A
	Beryllium	N	1.1E-01	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	N/A	N/A	1.7E-05	N/A
	Iron	N	2.3E+02	3.0E-01	N/A	1.5E-01	3	4.5E-02	N/A	N/A	N/A	1.1E-05	N/A
	Manganese	N	8.5E-01	2.4E-02	N/A	4.0E-02	1, 3	9.6E-04	N/A	N/A	N/A	1.9E-06	N/A
	Selenium	N	4.1E-01	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	N/A	N/A	3.2E-07	N/A
	Vanadium	N	7.5E+00	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	N/A	N/A	8.7E-05	N/A
	4,4'-DDE	C	1.9E-03	N/A	3.4E-01	3.0E-02	2	N/A	1.1E+01	N/A	N/A	N/A	4.9E-10
	4,4'-DDT	C	1.4E-03	5.0E-04	3.4E-01	3.0E-02	2	1.5E-05	1.1E+01	N/A	N/A	2.1E-06	3.6E-10
	Dieldrin	C	3.0E-04	5.0E-05	1.6E+01	5.0E-01	3	2.5E-05	3.2E+01	N/A	N/A	9.1E-07	7.3E-10
	bis(2-Ethylhexyl)phthalate (BEHP)	C	3.1E-02	2.0E-02	1.4E-02	1.0E-01	2	2.0E-03	1.4E-01	N/A	N/A	1.2E-06	3.3E-10
	Di-n-butylphthalate	N	2.6E-02	1.0E-01	N/A	3.1E-01	3	3.1E-02	N/A	N/A	N/A	1.8E-07	N/A
	Fluoranthene	N	2.9E-02	N/A	4.0E-02	3.1E-01	3	N/A	1.3E-01	N/A	N/A	N/A	1.0E-09

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose-sources: (1) RAIS value; (2) adjusted for ABSGI.
Dermal SF = Dermal slope factor-sources: (1) RAIS value; (2) adjusted for ABSGI.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfDdermal = Dermal reference dose.
RFDoral = Oral reference dose.
ABSGI = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 12-3-16
Wetland 13 Phase II
Sediment Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum Concentration (mg/kg)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
Sediment Incidental Ingestion	Aluminum	N	1.6E+03	1.0E+00	N/A	N/A	N/A	3.24E-04	N/A
	Barium	N	8.8E-01	7.0E-02	N/A	N/A	N/A	2.56E-06	N/A
	Beryllium	N	1.1E-01	2.0E-03	N/A	N/A	N/A	1.12E-05	N/A
	Iron	N	2.3E+02	3.0E-01	N/A	N/A	N/A	1.55E-04	N/A
	Manganese	N	8.5E-01	2.4E-02	N/A	N/A	N/A	7.21E-06	N/A
	Selenium	N	4.1E-01	5.0E-03	N/A	N/A	N/A	1.67E-05	N/A
	Vanadium	N	7.5E+00	7.0E-03	N/A	N/A	N/A	2.18E-04	N/A
	4,4'-DDE	C	1.9E-03	N/A	3.4E-01	N/A	N/A	N/A	4.70E-11
	4,4'-DDT	C	1.4E-03	5.0E-04	3.4E-01	N/A	N/A	2.04E-07	3.46E-11
	Dieldrin	C	3.0E-04	5.0E-05	1.6E+01	N/A	N/A	4.36E-07	3.49E-10
	bis(2-Ethylhexyl)phthalate (BEHP)	C	3.1E-02	2.0E-02	1.4E-02	N/A	N/A	1.13E-07	3.15E-11
	Di-n-butylphthalate	N	2.6E-02	1.0E-01	N/A	N/A	N/A	5.29E-08	N/A
	Fluoranthene	N	2.9E-02	N/A	4.0E-02	N/A	N/A	N/A	2.36E-10

Notes:
Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = chronic daily intake (mg/kg-day)

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, sediment risk:

$$CDI = \frac{EPC_{sd} \times IR_{sd} \times EF \times ED \times CF}{BW \times AT}$$

$$Hazard\ Quotient = \frac{CDI}{RfD_{oral}}$$

= Oral reference dose.
= Oral slope factor.

Where:
CDI = Chronic daily intake (mg/kg-day).
EPCsd = Exposure point concentration in sediment (mg/kg).
IRsd = Incidental ingestion rate for sediment (mg/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
CF = Conversion factor (1E-6 kg/mg).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

Exposure Parameters:
IRsd = 100 mg/day for age groups greater than 6-years old.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

Table 12-3-17
Wetland 13 Phase II
Surface Water Dermal Absorbed Dose-Child Trespasser and Adult Maintenance Worker

CAS Number	Chemical		Minimum Concentration (g/L)	Min. Qual.	Maximum Concentration (g/L)	Max. Qual.	Units	Location of Max.Conc.	Detection Frequency	Range of Detection Limits	Mean	Maximum concentration (mg/cm^3)	K_p	DA_{event}	DAD_{sw} (mg/kg-day): Child Trespasser	DAD_{sw} (mg/kg-day): Adult Maintenance Worker
7429905	Aluminum	N	N/A	N/A	1.5E+05	=	UG/L	041W130101	1 / 1	NAV	1.5E+05	1.5E-01	1.0E-03	3.77E-04	N/A	7.98E-03
7440393	Barium	N	N/A	N/A	9.5E+01	J	UG/L	041W130101	1 / 1	NAV	9.5E+01	9.5E-05	1.0E-03	2.48E-07	N/A	5.25E-06
7440417	Beryllium	N	N/A	N/A	4.4E+00	J	UG/L	041W130101	1 / 1	NAV	4.4E+00	4.4E-06	1.0E-03	1.14E-08	N/A	2.42E-07
7440439	Cadmium	N	N/A	N/A	9.8E+00	=	UG/L	041W130101	1 / 1	NAV	9.8E+00	9.8E-06	1.0E-03	2.55E-08	N/A	5.39E-07
7440473	Chromium	N	N/A	N/A	2.3E+02	=	UG/L	041W130101	1 / 1	NAV	2.3E+02	2.3E-04	1.0E-03	5.85E-07	N/A	1.24E-05
7440484	Cobalt	C	N/A	N/A	7.8E+00	J	UG/L	041W130101	1 / 1	NAV	7.8E+00	7.8E-06	1.2E-03	2.43E-08	N/A	1.84E-07
7440508	Copper	N	N/A	N/A	1.4E+02	=	UG/L	041W130101	1 / 1	NAV	1.4E+02	1.4E-04	1.0E-03	3.69E-07	N/A	7.81E-06
7439896	Iron	N	N/A	N/A	3.6E+04	=	UG/L	041W130101	1 / 1	NAV	3.6E+04	3.6E-02	2.5E-04	2.35E-05	N/A	4.98E-04
7439921	Lead	N	N/A	N/A	1.2E+03	=	UG/L	041W130101	1 / 1	NAV	1.2E+03	1.2E-03	3.4E-04	1.08E-06	N/A	2.28E-05
7439965	Manganese	N	N/A	N/A	1.5E+02	=	UG/L	041W130101	1 / 1	NAV	1.5E+02	1.5E-04	1.0E-03	3.90E-07	N/A	8.25E-06
7487947	Mercury	N	N/A	N/A	1.3E+00	=	UG/L	041W130101	1 / 1	NAV	1.3E+00	1.3E-06	1.0E-03	3.38E-09	N/A	7.15E-08
7782492	Selenium	N	N/A	N/A	1.4E+01	=	UG/L	041W130101	1 / 1	NAV	1.4E+01	1.4E-05	1.0E-03	3.54E-08	N/A	7.48E-07
7440622	Vanadium	N	N/A	N/A	3.2E+02	=	UG/L	041W130101	1 / 1	NAV	3.2E+02	3.2E-04	1.0E-03	8.42E-07	N/A	1.78E-05
7440666	Zinc	N	N/A	N/A	5.4E+02	=	UG/L	041W130101	1 / 1	NAV	5.4E+02	5.4E-04	6.0E-04	8.36E-07	N/A	1.77E-05

Notes:

Equation for Dermal Absorbed Dose, surface water risk:

$$DAD_{sw} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD_{sw} = Dermal absorbed dose-water contact (mg/kg-day).
DA_{event} = Dermal absorbed dose per event (mg/cm2-event).
SA = Skin surface area available for contact (cm2).
EV = Event frequency (events/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr
carcinogenic effects AT = 70 yr x 365 dy/yr.

Equation for DAevent for inorganics:

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: RAGS Part E, Exhibit B-3 or Exhibit B-4
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).

Equation for DAevent for organics:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1 + B} + 2\,\tau_{event} \left(\frac{1 + 3B + 3B^2}{(1 + B)^2} \right) \right]$$

Where:

FA = Fraction absorbed water (dimensionless). From RAGS Part E, Exhibit B-4.
Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E, Exhibit B-4.
Cw = Chemical concentration in water (mg/cm3).
t_{event} = Event duration (hr/event).
t_{event} = Lag time per event (hr/event). From RAGS Part E, Exhibit B-4.
B = Dimensionless ratio of the permeability coefficient of a compound, calculated using the equation below:

$$B = \frac{K_p \sqrt{MW}}{2.6}$$

Where:

Kp = Dermal permeability coefficient of compound in water (cm/hr).
Source: (1) RAGS Part E.
MW = Molecular weight

Exposure Parameters:

EV = 1 event per day (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
EF = 52 dys/yr (child trespasser/adult maintenance worker).
SA = 5,000 cm2(child trespasser); 10,400 cm2 (adult maintenance worker).
Source: Tables 6-6 and 6-8 Exposure Factors Handbook.
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).
t_{event} = 2.6 hrs/dy (child trespasser/adult maintenance worker).

Table 12-3-18
Wetland 13 Phase II
Surface Water Dermal Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)-1	ABS_{GI}	ABS_{GI} Source	Dermal RfD (mg/kg-day)	Dermal SF (mg/kg-day)-1	Child Trespasser: Dermal Hazard Quotient	Child Trespasser: Dermal Cancer Risk	Maintenance Worker: Dermal Hazard Quotient	Maintenance Worker: Dermal Cancer Risk
SW Dermal Risk	Aluminum	N	1.5E-01	1.0E+00	N/A	1.0E-01	2	1.0E-01	N/A	N/A	N/A	8.0E-02	N/A
	Barium	N	9.5E-05	7.0E-02	N/A	7.0E-02	1, 2	4.9E-03	N/A	N/A	N/A	1.1E-03	N/A
	Beryllium	N	4.4E-06	2.0E-03	N/A	7.0E-03	1	1.4E-05	N/A	N/A	N/A	1.7E-02	N/A
	Cadmium	N	9.8E-06	5.0E-04	N/A	2.5E-02	1	1.3E-05	N/A	N/A	N/A	4.3E-02	N/A
	Chromium	N	2.3E-04	3.0E-03	N/A	2.5E-02	1	7.5E-05	N/A	N/A	N/A	1.7E-01	N/A
	Cobalt	C	7.8E-06	2.0E-02	N/A	8.0E-01	3	1.6E-02	N/A	N/A	N/A	1.1E-05	N/A
	Copper	N	1.4E-04	4.0E-02	N/A	3.0E-01	3	1.2E-02	N/A	N/A	N/A	6.5E-04	N/A
	Iron	N	3.6E-02	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	1.2E-03	N/A	N/A	1.5E-01	3	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.5E-04	1.4E-01	N/A	4.0E-02	1	5.6E-03	N/A	N/A	N/A	1.5E-03	N/A
	Mercury	N	1.3E-06	3.0E-04	N/A	7.0E-02	1	2.1E-05	N/A	N/A	N/A	3.4E-03	N/A
	Selenium	N	1.4E-05	5.0E-03	N/A	5.5E-01	1	2.8E-03	N/A	N/A	N/A	2.7E-04	N/A
	Vanadium	N	3.2E-04	7.0E-03	N/A	2.6E-02	1	1.8E-04	N/A	N/A	N/A	9.8E-02	N/A
	Zinc	N	5.4E-04	3.0E-01	N/A	2.0E-01	2, 4	6.0E-02	N/A	N/A	N/A	2.9E-04	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.
Dermal RfD = Dermal reference dose adjusted for ABS_{GI}.
Dermal SF = Dermal slope factoradjusted for ABS_{GI}.

Equations for Dermal Reference Dose and Dermal Slope Factor, surface water risk:

$$RfD_{dermal} = RfD_{oral} \times ABS_{GI}$$

$$SF_{dermal} = \frac{RfD_{oral}}{ABS_{GI}}$$

Where:
RfD_{dermal} = Dermal reference dose.
RFD_{oral} = Oral reference dose.
SFdermal = Dermal slope factor.
ABS_{GI} = GI absorption fraction from following sources, in order of choice: (1) RAGS Part E, Exhibit 4-1; (2) 2002 USEPA Region 9 RBC Table; (3) RAIS; (4) USEPA Region 4 OTS supplemental values.

Risk calculation equation, cancer:

$$Risk = DAD_{sw} \times SF_{dermal}$$

Risk calculation equation, noncancer:

$$Hazard\ Quotient = \frac{DAD_{sw}}{RfD_{dermal}}$$

Table 12-3-19
Wetland 13 Phase II
Surface Water Incidental Ingestion Exposure Risk-Child Trespasser and Adult Maintenance Worker

Exposure Route	COPC		Maximum concentration (mg/cm^3)	Oral RfD (mg/kg·day)	Oral SF (mg/kg-day)-1	Child Trespasser		Maintenance Worker	
						Ingestion Hazard Quotient	Ingestion Cancer Risk	Ingestion Hazard Quotient	Ingestion Cancer Risk
SW Incidental Ingestion	Aluminum	N	1.5E-01	1.0E+00	N/A	N/A	N/A	3.0E-06	N/A
	Barium	N	9.5E-05	7.0E-02	N/A	N/A	N/A	2.8E-08	N/A
	Beryllium	N	4.4E-06	2.0E-03	N/A	N/A	N/A	4.5E-08	N/A
	Cadmium	N	9.8E-06	5.0E-04	N/A	N/A	N/A	4.0E-07	N/A
	Chromium	N	2.3E-04	3.0E-03	N/A	N/A	N/A	1.5E-06	N/A
	Cobalt	C	7.8E-06	2.0E-02	N/A	N/A	N/A	2.8E-09	N/A
	Copper	N	1.4E-04	4.0E-02	N/A	N/A	N/A	7.2E-08	N/A
	Iron	N	3.6E-02	N/A	N/A	N/A	N/A	N/A	N/A
	Lead	N	1.2E-03	N/A	N/A	N/A	N/A	N/A	N/A
	Manganese	N	1.5E-04	1.4E-01	N/A	N/A	N/A	2.2E-08	N/A
	Mercury	N	1.3E-06	3.0E-04	N/A	N/A	N/A	8.8E-08	N/A
	Selenium	N	1.4E-05	5.0E-03	N/A	N/A	N/A	5.5E-08	N/A
	Vanadium	N	3.2E-04	7.0E-03	N/A	N/A	N/A	9.4E-07	N/A
	Zinc	N	5.4E-04	3.0E-01	N/A	N/A	N/A	3.6E-08	N/A

Notes:

Oral RfD = Oral reference dose from: (1) IRIS; or (2) RAIS.
Oral SF = Oral Slope Factor from (1) IRIS; or (2) RAIS.
CDI = Chronic Daily Intake

$$Risk = CDI \times SF_{oral}$$

Equation for Chronic Daily Intake, surface water risk:

$$CDI = \frac{EPC_{sw} \times IR_{sw} \times EF \times ED}{BW \times AT}$$

$$\text{Hazard Quotient} = \frac{CDI}{RfD_{oral}}$$

Where:

CDI = Chronic daily intake (mg/kg-day).
EPCsw = Exposure point concentration in surface water (mg/L).
IRsw = Incidental ingestion rate for sediment (L/day).
EF = Exposure frequency (days/year).
ED = Exposure duration (years).
BW = Body weight (kg) 70 kg (adult) 45 kg (child).
AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 dy/yr.
carcinogenic effects AT = 70 yr x 365 dy/yr.

= Oral reference dose.
= Oral slope factor.

Exposure Parameters:

Irsw = 0.01 L/day exposure to surface water during wading for adolescents and adults.
EF = 52 dys/yr (child trespasser/adult maintenance worker).
ED = 10 yrs (child trespasser); 25 yrs (adult maintenance worker).
BW = 45 kg (child trespasser); 70 kg (adult maintenance worker).
AT = Noncancer — 3,650 days (child trespasser); 9,125 days (adult maintenance worker).
Cancer — 25,550 days (child trespasser/adult maintenance worker).

12.4 OU 10 — Wide Evaluation

The wetlands included in this evaluation (Wetlands 10, 12, and 13) were grouped together based on their association with the sites within OU 10 (Industrial Wastewater Treatment Plant). All the OU 10 wetlands were evaluated collectively to help determine where the highest probabilities of unacceptable risk may occur and whether that risk was likely to be related to releases from IR sites at NAS Pensacola. The evaluations in this section included:

- **Food-Chain Models:** Many of the upper level predators likely to be exposed within Site 41 wetlands would likely be exposed to constituents in more than one wetland. To evaluate this scenario, food-chain models were developed using constituent concentrations from Wetlands 10, 12, and 13.

- **Mean ERM Quotients:** This methodology is an effective way to pinpoint areas of potential risk from a mixture of constituents. It is also useful in identifying locations most likely to be impacted by direct toxicity. ERM Quotient Categories and the parameters exceeding ERMs are presented in Figure 12-7.

- **Basewide Total DDT-Level Comparison:** A basewide level was established for total DDT at NAS Pensacola. A comparison of site concentrations to the basewide levels is presented in Figure 12-5 and will be discussed on a basewide level in this section.

- **TOC-Normalized PAH Concentrations:** PAHs are widespread across NAS Pensacola and have been evaluated based on their potential for adverse effects when the TOC at each sample location is taken into account. This method has been summarized in Figure 12-6 to identify locations where PAHs may occur at levels most likely to cause adverse effects.

12.4.1 OU 10 Wetlands — Food-Chain Modeling

To evaluate the potential for risk to upper-trophic-level receptors that forage within the wetlands surrounding OU 10, food-chain models were conducted following the methodology presented in Section 8. No prey items were collected from the OU 10 wetlands during the RI investigation; therefore, all the tissue concentrations used in the food-chain models were estimated using literature-based BSAFs. According to USEPA guidance, constituents for which no BSAF could be located, a BSAF of 1 was assumed for accumulation purposes. The exposure concentrations for sediment and surface water utilized in the food-chain models are included in Appendix M.

Tables 12-4-1 through 12-4-3 (tables are located at the end of each section) show the results of the food-chain models for the following receptor groups:

- Piscivorous Birds (green heron used as representative species) (Table 12-4-1)
- Piscivorous Mammals (mink used as representative species) (Table 12-4-2)
- Predatory Fish (red drum used as representative species) (Table 12-4-3)

12.4.1.1 Food-Chain Modeling Results

The following assessment endpoints were proposed and approved in the *Final RI/FS SAP, Site 41* (E/A&H, 1995g).

Assessment Endpoint 1 — Health and Viability of Piscivorous Bird Communities that Forage throughout OU 10 Wetlands

Phase II Evaluation

Data from Phase II of the RI sampling were utilized in this food-chain modeling. The only constituent to generate an HQ greater than one (max NOAEL HQ=1.1) for piscivorous birds was the maximum concentration of total DDT. Total DDT was detected in sediments (Wetlands 10, 12, and 13) and in surface water (only Wetland 10). The tissue concentration used in the food-chain model was calculated using the literature-based BSAF for total DDT. The estimated tissue concentration, based on the maximum detected concentration in Wetland 10, was the largest portion of the total exposure for piscivorous birds. However, if the average concentration was evaluated across all wetlands the HQ drops to well below one. This indicates the potential for adverse effects only at the location of the maximum sediment concentration (Wetland 10 sample location 033M003001).

Assessment Endpoint 2 — Health and Viability of Piscivorous Mammal Communities that Forage throughout OU 10 Wetlands

Data from Phase II of the RI sampling were utilized in this food-chain modeling. The only constituent to generate HQs greater than one (max NOAEL HQ=4.3, average NOAEL HQ=1.1) for piscivorous mammals was mercury. Mercury was only detected above the SQL in one surface water sample (041W130101). This surface sample had a very high turbidity measurement as a result of sampling technique, and this wetland was targeted for resampling in 2004. When samplers returned to Wetland 13, there was no standing water found; therefore, no sample was collected. Since this was the only detection of mercury in either sediment or surface water above their respective SQLs, it was likely that the HQs presented in this

food-chain model were not representative of actual site conditions and should not be interpreted as representing potential for adverse effects.

Assessment Endpoint 3 — Health and Viability of Predatory Fish Communities that Forage in and around OU 10 Wetlands

Data from Phase II of the RI sampling were utilized in this food-chain modeling, and no HQs exceeded one.

12.4.2 Mean ERM Quotients

Figure 12-7 shows one Category 3 sediment sample location (041M1202) and five Category 2 locations within the OU 10 wetlands. The constituents exceeding their individual ERMs at the Category 3 location included PAHs (2-methylnaphthalene, fluorene, and phenanthrene). Of the five Category 2 locations, four samples were located in Wetland 10, and the location with the most ERM exceedances was location 033M0004. Cadmium, chromium, and nickel exceeded ERMs at location 033M0004. This figure also shows the potential for adverse effects in Wetlands 10 and 12 and likely adverse effects at location 041M1202 in Wetland 12.

12.4.3 Basewide Total DDT-Levels

The only OU 10-associated wetland sample location exceeding the basewide total DDT levels was location 033M003. However, the levels of total DDT present at this location, and throughout the OU 10 wetlands, did not present a potential for adverse effects to upper-trophic-level predators in the food-chain models.

12.4.4 TOC-Normalized Total PAHs Concentrations

Figure 12-6 shows a total of six sample locations and two of those locations exceed the Swartz TEC. The two locations that exceed the Swartz TEC are located in Wetland 10 (033M004) and Wetland 12 (041M1202). This analysis indicates the potential for adverse effects from exposure to PAHs at one location in Wetland 10 and Wetland 12.

12.5 Conclusions

Based on the potential for risk illustrated above within the wetlands associated with OU 10, a FS is proposed for Wetland 10. However, a pre-requisite for completing the FS should be based on confirming the levels and extent of contamination currently present. If constituents are still present at similar concentrations, the FS for Wetland 10 should be focused on addressing the potential risk presented by the elevated levels of inorganic constituents, and PAHs to benthic macroinvertebrates. While elevated levels of PAHs existed in Wetland 12, the source of these PAHs is known to be a bilge water spill. This spill is currently being investigated under the FDEP Petroleum Program; therefore, no further evaluation is needed under CERCLA.

Table 12-4-1
OU 10 Wetlands FCM (Phase 2)
Receptor: Green Heron (Butorides virescens)

Sediment Ingestion Rate[a] : 0.00023 kg/day
Surface Water Ingestion Rate[b]: 0.0227 L/day
Food Ingestion Rate[c]: 0.0115 kg/day

Body Weight[d]: 0.241 kg

Contaminant		Sediment Concentrations mg/kg	Surface Water Concentrations mg/L	Tissue Concentrations mg/kg	Sediment Exposure mg/day	Water Exposure mg/day	Prey Exposure mg/day	Total Exposure mg/day	Daily Dose mg/kgBW/day	NOAEL mg/kdBW/day	LOAEL mg/kdBW/day	NOAEL HQ	LOAEL HQ
Mercury													
	Max	0	1.3	0	0	0.0295	0.0000	0.02951	0.1224	0.44	0.86	2.78E-01	1.42E-01
	Average	0.0455	0.2942	0.091	0.000010465	0.0067	0.0010	0.007735305	0.0321	0.44	0.86	7.29E-02	3.73E-02
Total BHC													
	Max	0.0067	0.00015	0.0067	0.000001541	0.0000	0.0001	0.000081996	0.0003	0.563	2.25	6.04E-04	1.51E-04
	Average	0.0025	0.00012	0.0025	0.000000575	0.0000	0.0000	0.000032049	0.0001	0.563	2.25	2.36E-04	5.91E-05
Total Chlordane													
	Max	0.0023	0.00005	0.005405	0.000000529	0.0000	0.0001	6.38215E-05	0.0003	2.14	10.7	1.24E-04	2.47E-05
	Average	0.0006	0.00005	0.00141	0.000000138	0.0000	0.0000	0.000017488	0.0001	2.14	10.7	3.39E-05	6.78E-06
Dieldrin													
	Max	0.0004	0	0.001932	0.00000908	0.0000	0.0000	0.00000908	0.0000	0.044	0.44	8.56E-04	8.56E-05
	Average	0.0008	0.0001	0.003864	0.00001816	0.0000	0.0000	0.00001931	0.0001	0.044	0.44	1.82E-03	1.82E-04
Total DDT													
	Max	0.264	0.0002	1.13256	0.00006072	0.0000	0.0130	0.0130897	0.0543	0.051	0.512	**1.06E+00**	1.06E-01
	Average	0.049	0.00016	0.21021	0.00001127	0.0000	0.0024	0.002432317	0.0101	0.051	0.512	1.98E-01	1.97E-02
Total Endrin													
	Max	0.0132	0	0.0132	0.000003036	0.0000	0.0002	0.000154836	0.0006	0.01	0.1	6.42E-02	6.42E-03
	Average	0.0045	0.00015	0.0045	0.000001035	0.0000	0.0001	0.00005619	0.0002	0.01	0.1	2.33E-02	2.33E-03
Total PCB													
	Max	0.3580	0	0.587	0.00008234	0.0000	0.0068	0.00683422	0.0284	0.112	1.12	2.53E-01	2.53E-02
	Average	0.1069	0.004	0.175	0.000024587	0.0001	0.0020	0.002131521	0.0088	0.112	1.12	7.90E-02	7.90E-03

Notes:
Sediment Exposure = Sediment Concentration * Sediment Ingestion Rate (mg/day)
Surface Water Exposure = Surface Water Concentration * Water Ingestion Rate (mg/day)
Prey Exposure = Tissue Concentration * Food Ingestion Rate (mg/day)
Total Exposure = Sediment Exposure + Surface Water Exposure + Prey Exposure (mg/day)

Daily Dose = Total Exposure / Body Weight (mg/kgBW/day)

NOAEL HQ = Daily Dose/NOAEL (mg/kgBW/day)
LOAEL HQ = Daily Dose/LOAEL (mg/kgBW/day)

[a] = Estimated based on the results of Beyer et al 1994.
[b] = Calder and Braun 1983.
[c] = Kushlan 1978
[d] = Niethammer and Kaiser 1983.

Table 12-4-2
OU 10 Wetlands FCM (Phase 2)
Receptor: Mink (*Mustella vison*)

Sediment Ingestion Rate[a] : 0.003 kg/day
Surface Water Ingestion Rate[b]: 0.0578 L/day
Food Ingestion Rate[c]: 0.029 kg/day

Body Weight[d]: 0.55 kg

Contaminant		Sediment Concentrations mg/kg	Surface Water Concentrations mg/L	Tissue Concentrations mg/kg	Sediment Exposure mg/day	Water Exposure mg/day	Prey Exposure mg/day	Total Exposure mg/day	Daily Dose mg/kgBW/day	NOAEL mg/kdBW/day	LOAEL mg/kdBW/day	NOAEL HQ	LOAEL HQ
Mercury													
	Max	0	1.3	0	0	0.0751	0.0000	0.07514	0.1366	0.032	0.16	**4.27E+00**	8.54E-01
	Average	0.0455	0.2942	0.091	0.0001365	0.0170	0.0026	0.01978026	0.0360	0.032	0.16	**1.12E+00**	2.25E-01
Total BHC													
	Max	0.0067	0.00015	0.0067	0.0000201	0.0000	0.0002	0.00022307	0.0004	0.014	0.14	2.90E-02	2.90E-03
	Average	0.0025	0.00012	0.0025	0.0000075	0.0000	0.0001	0.000086936	0.0002	0.014	0.14	1.13E-02	1.13E-03
Total Chlordane													
	Max	0.0023	0.00005	0.005405	0.0000069	0.0000	0.0002	0.000166535	0.0003	3.9	7.8	7.76E-05	3.88E-05
	Average	0.0006	0.00005	0.00141	0.0000018	0.0000	0.0000	0.00004558	0.0001	3.9	7.8	2.12E-05	1.06E-05
Dieldrin													
	Max	0.0004	0	0.001932	0.0000012	0.0000	0.0001	0.000057228	0.0001	0.015	0.15	6.94E-03	6.94E-04
	Average	0.0008	0.0001	0.003864	0.0000024	0.0000	0.0001	0.000120236	0.0002	0.015	0.15	1.46E-02	1.46E-03
Total DDT													
	Max	0.264	0.0002	1.13256	0.000792	0.0000	0.0328	0.0336478	0.0612	0.6	3	1.02E-01	2.04E-02
	Average	0.049	0.00016	0.21021	0.000147	0.0000	0.0061	0.006252338	0.0114	0.6	3	1.89E-02	3.79E-03
Total Endrin													
	Max	0.0132	0	0.0132	0.0000396	0.0000	0.0004	0.0004224	0.0008	0.092	0.92	8.35E-03	8.35E-04
	Average	0.0045	0.00015	0.0045	0.0000135	0.0000	0.0001	0.00015267	0.0003	0.092	0.92	3.02E-03	3.02E-04
Total PCB													
	Max	0.3580	0	0.587	0.001074	0.0000	0.0170	0.01810048	0.0329	0.05	0.1	6.58E-01	3.29E-01
	Average	0.1069	0.004	0.175	0.0003207	0.0002	0.0051	0.005636064	0.0102	0.15	0.31	6.83E-02	3.31E-02

Notes:
Sediment Exposure = Sediment Concentration * Sediment Ingestion Rate (mg/day)
Surface Water Exposure = Surface Water Concentration * Water Ingestion Rate (mg/day)
Prey Exposure = Tissue Concentration * Food Ingestion Rate (mg/day)
Total Exposure = Sediment Exposure + Surface Water Exposure + Prey Exposure (mg/day)

Daily Dose = Total Exposure / Body Weight (mg/kgBW/day)

NOAEL HQ = Daily Dose/NOAEL (mg/kgBW/day)
LOAEL HQ = Daily Dose/LOAEL (mg/kgBW/day)

[a] = Guilday 1957.
[b] = Based on Morrison 1957.
[c] = Chew 1951.
[d] = Estimated based on the results of Beyer et al. 1994.

Table 12-4-3
OU 10 Phase II Data
Red Drum Exposure Model

OU 10	Hg in Sediment (Cs) (ppm)	MeHg in Forage Fish (Cf) (ppm)[A]	MeHg in Crustaceans (Ccr) (ppm)	MeHg in Invertebrates (Cinv) (ppm)	MeHg in Red Drum Tissue (ppm)	NOAEL HQ	LOAEL HQ
OU 10 Maximum	0.046	0.0552	0.01288	0.0046	0.12	0.79	0.39
OU 10 Average	0	0	0	0	0.00	0.00	0.00

Note:
[A] = Forage Fish tissue concentrations calculated BSAF of 2.0 from Evans and Engel 1994.