N42237.AR.001222
NSB KINGS BAY
5090.3a

MILITARY MUNITIONS RESPONSE PROGRAM BASEWIDE PRELIMINARY ASSESSMENT REPORT NSB KINGS BAY GA

7/17/2013

RESOLUTION CONSULTANTS

MILITARY MUNITIONS RESPONSE PROGRAM
BASEWIDE PRELIMINARY ASSESSMENT REPORT

NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

Revision: 0

Prepared for:

Department of the Navy
Naval Facilities Engineering Command, Southeast
Naval Submarine Base Kings Bay
Jacksonville, Florida 32212

Prepared by:

A Joint Venture of AECOM & ENSAFE
1500 Wells Fargo Building
440 Monticello Avenue
Norfolk, Virginia 23510

Comprehensive Long-Term Environmental Action Navy
Contract Number N62470-11-D-8013
CTO JM15

July 2013

MILITARY MUNITIONS RESPONSE PROGRAM
BASEWIDE PRELIMINARY ASSESSMENT REPORT

NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

Revision: 0

Prepared for:

Department of the Navy
Naval Facilities Engineering Command, Southeast
Naval Submarine Base Kings Bay
Jacksonville, Florida 32212

Prepared by:

A Joint Venture of AECOM & ENSAFE
1500 Wells Fargo Building
440 Monticello Avenue
Norfolk, Virginia 23510

Comprehensive Long-Term Environmental Action Navy
Contract Number N62470-11-D-8013
CTO JM15

July 2013

CLEAN, Program Manager
David A. Warren

Reviewed By
Michael Ervine, Sr. Technical Advisor

EXECUTIVE SUMMARY

The Department of Defense has established the Military Munitions Response Program (MMRP), under the Defense Environmental Restoration Program, to address munitions and explosives of concern (MEC) and munitions constituents (MC) at "other than operational" military ranges and other sites. Closed and transferring military ranges and sites not located on an operating range are considered "other than operational."

This report represents a Preliminary Assessment (PA) for Naval Submarine Base (NSB) Kings Bay, in Camden County, Georgia. Applicable Department of Defense, United States Navy, and United States Environmental Protection Agency guidance for conducting and documenting PAs were followed and modified, where appropriate, to address unique aspects of MEC and MC. This PA was conducted to identify areas within NSB Kings Bay that may have been impacted by MEC or releases of MC and that meet requirements for inclusion under the MMRP.

NSB Kings Bay occupies approximately 16,168 acres, approximately eight miles north of the Georgia-Florida border. Historically, the area now occupied by NSB Kings Bay was established as a United States Army ocean terminal, referred to as Kings Bay Army Terminal or MOTKI. Following construction efforts in the mid to late 1950s, the Army terminal remained inactive and was never used for its intended purpose of transporting ammunition and other explosives. NSB Kings Bay was commissioned on 1 July 1978, to serve as the east coast location for its fleet ballistic missile submarine support facility and has remained active since that date. The current mission is to provide support to the fleet ballistic missile system and to maintain and operate facilities for administration and personnel support for submarine force operations. The installation currently includes several areas where munitions or explosives are managed including the Strategic Weapons Facility Atlantic Complex, Torpedo Complex, loading/unloading dock areas, small arms ranges, magazines and holding areas, and an open burn/open detonation area. Munitions and explosives managed, issued, or stored at NSB Kings Bay include but are not limited to flares, grenades, dynamite, explosives used by the Explosive Ordnance Disposal detachment, Tomahawk missiles, Triton missiles, torpedoes, and small arms ammunition.

As detailed in the *Basewide Preliminary Range Assessment Work Plan, Naval Submarine Base Kings Bay, Georgia*, prepared by Resolution Consultants and dated 19 October 2012, the primary objective was to collect sufficient data to identify munitions response areas (MRAs) eligible for inclusion in the MMRP. Furthermore, this PA serves to offer a determination on if MMRP eligible MEC and/or MC sites (if identified) pose a threat to human health or the environment.

During data collection efforts, the Resolution Consultants team conducted internet research; interviewed NSB Kings Bay personnel; reviewed various databases, historical documents, and records maintained at on-Base and off-Base repositories; and reviewed historical aerial photographs to identify areas where munitions and explosives were historically and are presently managed and to assess each area for the potential presence of MEC and MC. Based on the collective findings of the data collection process, the following potential MRAs were identified at NSB Kings Bay:

- Armory, Building 5090
- Blue Star Shipping Disposal Area, Site 9
- Blue Star Shipping Disposal Area, Site 10
- Dock Area
- Defense Ordnance Support Facility Small Ordnance Magazines, Buildings 5074 through 5077
- Explosive Ordnance Disposal Ordnance Magazines, Buildings 4968 through 4973
- Earthen Bunkers/Berms
- Indoor Range, Building 3072
- Indoor Shoot House
- Open Burn/Open Detonation Area, Buildings 4979 and 4980, Solid Waste Management Unit 11
- Small Arms Range, Buildings 3067, 3068, and 3913, Sold Waste Management Unit 8
- Safe Haven Holding Yard, Building 5911
- Security Magazine, Building 2028
- Skeet Range, Buildings 3902, 3009, 3010, 3011, and 3016
- Strategic Weapons Facility Atlantic Complex
- Torpedo Complex, Buildings 5078, 5079, 5082, 5083, and 5084

Potential MRAs, as listed above, were screened for MMRP eligibility based on Defense Environmental Restoration Program criteria, as follows: 1) the release occurred prior to 30 September 2002; 2) the release is not associated with a Formerly Used Defense Site, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that has operated after 30 September 2002; and 3) the "site" was not identified or included in the Navy's Risk Management Information System, prior to 30 September 2000.

Based on the findings of the comprehensive dataset and pursuant to MMRP eligibility criteria, no potential MRAs at NSB Kings Bay were determined to be eligible for inclusion under the MMRP; thus, no additional investigation and/or response actions under the MMRP are recommended at this time.

TABLE OF CONTENTS

Figures

Tables

Appendices
(Included on CD-ROM)

List of Acronyms

°F	Degrees Fahrenheit
ft^2	Square foot
Army	United States Army
bgs	Below ground surface
Booz Allen	Booz Allen Hamilton
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DoD	Department of Defense
DON	Department of Navy
DOSF	Defense Ordnance Supply Facility
EOD	Explosive Ordnance Disposal
ESO	Explosive Safety Officer
ESQD	Explosive Safety Quantity Distance
FUDS	Formerly Used Defense Sites
GA DEP	Georgia Department of Environmental Protection
GSA	General Services Administration
IAS	Initial Assessment Study
lbs	Pounds
Lt.	Lieutenant
MC	Munitions constituents
MCL	Maximum Contaminant Level
MEC	Munitions and explosives of concern
mm	Millimeter
MMRP	Military Munitions Response Program
MRA	Munitions response area
MRP	Munitions Response Program
Navy	United States Navy
NARA	National Archives and Records Administration
NAVFAC	Naval Facilities Engineering Command
NEESA	Naval Energy and Environmental Support Activity
NET	Net explosive weight
NFA	No Further Action
NIRIS	Navy Installation Restoration Information Solution
NOSSA	Navy Ordnance Safety and Security Activity
NSB	Naval Submarine Base

OB	Open Burn
OD	Open Detonation
PA	Preliminary assessment
PA Work Plan	Resolution Consultants. *Basewide Preliminary Range Assessment Work Plan, Naval Submarine Base Kings Bay, Georgia.* 19 October 2012.
RCRA	Resource Conservation and Recovery Act
RG	Record groups
SSBN	Submersible, Ship, Ballistic, Nuclear
SSGN	Submersible, Ship, Guided, Nuclear
SWFLANT	Strategic Weapons Facility Atlantic
SWMU	Sold Waste Management Unit
U.S. EPA	United States Environmental Protection Agency

1.0 INTRODUCTION

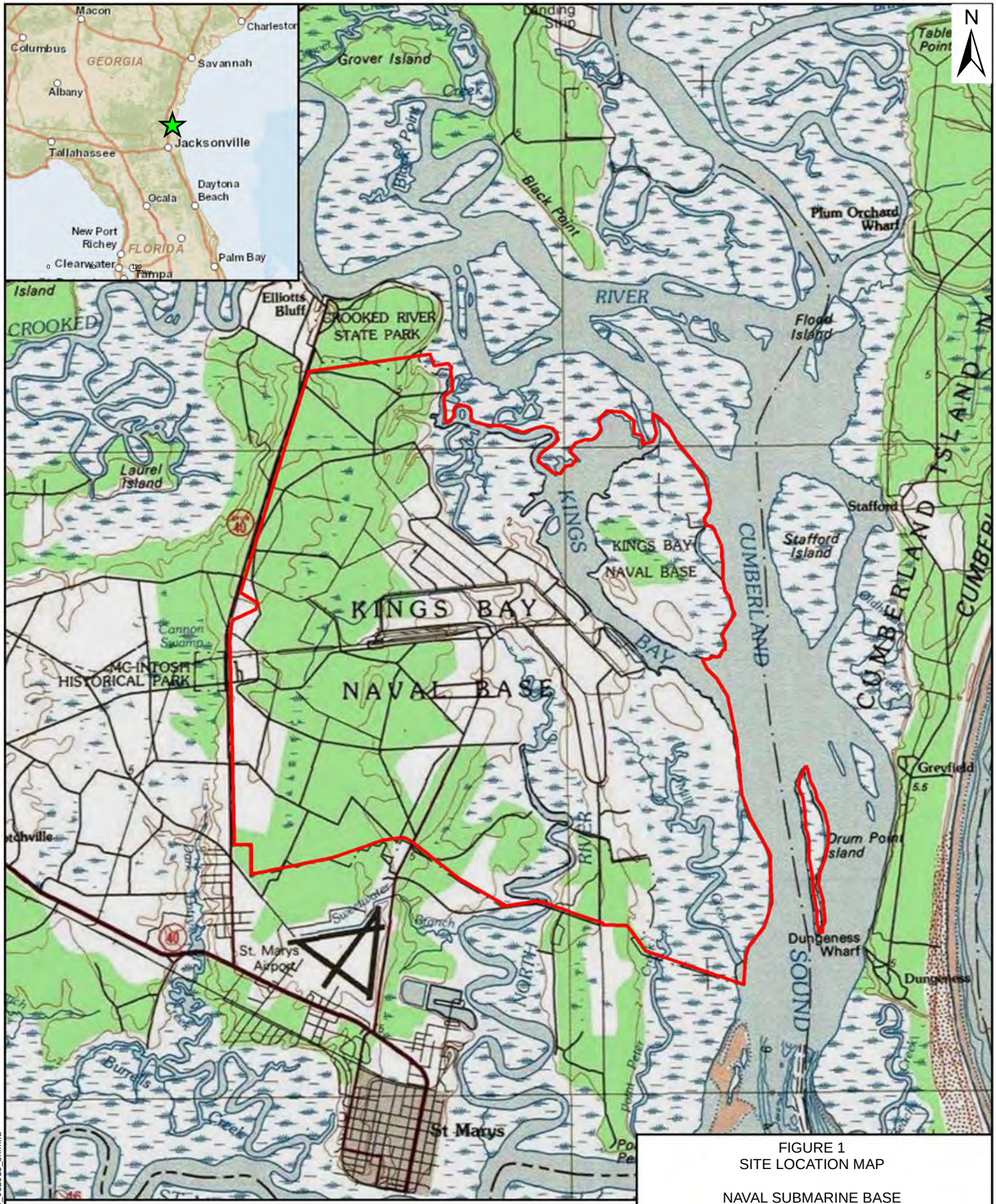
This report, prepared by Resolution Consultants on behalf of Naval Facilities Engineering Command (NAVFAC) Southeast, under Contract Task Order JM15 of the Comprehensive Long-Term Environmental Action Navy IV Program Contract no. N62470-11-D-8013, represents a Basewide Munitions Response Program (MRP) Preliminary Assessment (PA) for Naval Submarine Base (NSB) Kings Bay, in Camden County, Georgia (Figure 1-1).

The Department of Defense (DoD) has established the Military Munitions Response Program (MMRP), under the Defense Environmental Restoration Program, to address munitions and explosives of concern (MEC) (including unexploded ordnance and discarded military munitions) and munitions constituents (MC) at "other than operational" military ranges and other sites. Closed and transferring military ranges and sites not located on an operating range are considered "other than operational." This report addresses other than operational ranges and sites at NSB Kings Bay, an active installation. Applicable DOD, United States Navy, and United States Environmental Protection Agency (U.S. EPA) guidance for conducting and documenting PAs were followed and modified, where appropriate, to address unique aspects of MEC and MC.

Activities, as described herein, were conducted in accordance with the *Basewide Preliminary Range Assessment Work Plan, Naval Submarine Base Kings Bay, Georgia,* hereafter referred to as the PA Work Plan in this document, (Resolution Consultants 2012), and the *Guidance for Performing Site Inspections Under the Comprehensive Environmental Response, Compensation, and Liability Act; Interim Final* (U.S. EPA 1992). This document complies with the *Navy Munitions Response Program Guidance* (Department of Navy [DON] 2005a), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (U.S. EPA 1986), and the National Oil and Hazardous Substances Pollution Contingency Plan in Title 40 of the Code of Federal Regulations (CFR), Part 300.

1.1 Purpose and Approach

The primary objective of this PA was to collect sufficient data to identify munitions response areas (MRAs) eligible for inclusion under the MMRP. For purposes of this report, potential MRAs are defined as areas where munitions and explosives were historically and/or are currently managed. Furthermore, the PA serves to offer a determination on if MMRP eligible MEC and/or MC sites (if identified) pose a threat to human health or the environment.



Basemap Source: Harrietts Bluff, Georgia Quadrangle Topographic Map
http://services.arcgisonline.com/arcgis/services/USA_Topo_Maps
© 2011 National Geographic Society, i-cubed. Publish Date: 1982
(c) 2010 Microsoft Corporation and its data suppliers

FIGURE 1
SITE LOCATION MAP

NAVAL SUBMARINE BASE
KINGS BAY, GEORGIA

NAVFAC Naval Facilities Engineering Command

RESOLUTION CONSULTANTS

REQUESTED BY: T. Sims	DATE: 5/28/2013
DRAWN BY: S. Hodskins	TASK ORDER NUMBER: CTO JM15

X:\Kings Bay MMRP\SiteMap_052013_sh.mxd

The PA process involves collecting and reviewing existing and available information concerning MEC and MC at NSB Kings Bay. During data collection efforts, the Resolution Consultants team conducted internet research; interviewed NSB Kings Bay personnel; reviewed historical documents, records, and databases maintained within on-Base and offsite repositories; and reviewed historical aerial photographs to identify potential MRAs. Next, information obtained during the data collection effort was used to assess each potential MRA for the potential presence of MEC and MC, and ultimately screen each area for MMRP eligibility. This PA report summarizes data collection efforts, identifies potential MRAs, and offers conclusions with regards to MMRP eligibility.

This PA Report is intended to provide a comprehensive summary of available information relating to the use of explosives and munitions at NSB Kings Bay. It is based, in part, on information provided in historical documents, as referenced in Appendix B, and thus is subject to the limitations and qualifications associated with such documents.

1.2 Report Organization

This PA report is organized as follows:

Section 1: Introduction — describes the purpose and approach

Section 2: Installation Background — provides a brief description of the installation's location, setting, and history

Section 3: Physical and Environmental Setting — summarizes the physical and environmental setting

Section 4: Data Collection — describes data collection efforts and lists information obtained, along with respective sources

Section 5: Data Evaluation — identifies potential MRAs and facilitates screening for MMRP eligibility

Section 6: Conclusion and Recommendations — summarizes comprehensive findings and presents recommendations moving forward

Section 7: References — provides a comprehensive list of references used in preparation of this report

The following supporting information are included, as appendices, on compact disc:

Appendix A: Log Books
Appendix B: Historical Documents and Records
Appendix C: Historical Aerial Photographs

2.0 INSTALLATION BACKGROUND

2.1 Location and Setting

NSB Kings Bay occupies approximately 16,168 acres, in the southeast corner of Georgia (NEESA 1985). NSB Kings Bay is approximately 8 miles north of the Georgia-Florida border, approximately 4 miles inland from the Atlantic Ocean, and approximately 2 miles north of the city of St. Mary's, Georgia (Figure 1-1).

2.2 History

To address the need for an east coast port capable of transporting ammunition and other explosives in the event of a national emergency, the United States Army (Army) began acquiring the property presently occupied by NSB Kings Bay in the early 1950s. Construction of the military ocean terminal was initiated in 1955 and completed in 1958. The Army terminal was known as the Kings Bay Army Terminal, Military Ocean Terminal Kings Bay, and MOTKI (NEESA 1985). During construction efforts, a 200-foot wide channel, equipped with two turning basins, was dredged to the Cumberland Sound. The most prominent feature of the terminal was a 2,000-foot long, 87-foot wide concrete and steel dock. The dock was equipped with three railroad tracks, enabling simultaneous loading of several ammunition ships via both rail and truck. The Army laid 47 miles of railroad tracks, with spurs, off the main line running to temporary storage areas protected by earthen barricades/bunkers. Since there was no immediate operational need, the Army terminal was placed in an inactive/ready status from 1956 until 1978. During this time, the terminal was used for reserve training and contingency purposes in the event of a natural disaster (NEESA 1985).

The privately owned and operated Blue Star Shipping Company signed a lease to use a portion of the installation for commercial shipping and receiving from 1959 through 1979 (Reddick, 1976). The Army terminal was never activated to serve its' intended purpose of munitions management/transportation.

In 1976, the United States Navy (Navy) selected the former Army terminal as the east coast location for its fleet ballistic missile submarine support facility. On 1 July 1978, Naval Submarine Support Base Kings Bay was established under a developmental status (NEESA 1985). Following significant renovation, the USS Simon Lake and the USS James Monroe arrived at NSB Kings Bay in 1979. Later in 1979, the Navy selected NSB Kings Bay as the preferred east coast site for the Ohio-class submarine. In 1980, after a one-year environmental impact study was completed and with Congressional approval, the Secretary of the Navy announced NSB Kings Bay as the future home of the Trident submarine. Subsequently, infrastructure for three major commands was constructed: Trident Training Facility (TTF), Trident Refit Facility (TRF) and Strategic Weapons Facility, Atlantic (SWFLANT). On 15 January 1989, the first Trident submarine, the USS Tennessee (SSBN 734), arrived at NSB Kings Bay, followed by the USS Pennsylvania later that year. NSB Kings Bay held a commissioning for USS West Virginia in October 1990 and for USS Kentucky in July 1991; USS Maryland in June 1992; USS Nebraska in July 1993; USS Rhode Island in July 1994; USS Maine in August 1995, and USS Wyoming in July 1996 (Booz Allen 2009). The commissioning of USS Louisiana in September 1997 gave Kings Bay its full complement of ten Trident submarines (Booz Allen 2009).

The end of the Cold War and the reorganization of military forces in the 1990s affected Kings Bay. A nuclear policy review recommended the Navy reduce the Ohio-class fleet ballistic-missile submarines from 18 to 14 by 2005. In order to meet the review recommendation, the four oldest Ohio-class submarines were decommissioned and converted to guided missile platforms. In addition to normal refit activities, the conversion of submarines to platforms required a significant effort at NSB Kings Bay (Booz Allen 2009). The USS Pennsylvania, Kentucky, Nebraska, Maine, and Louisiana, were moved to Naval Base Kitsap, Washington, as part of balancing the Trident fleet. The USS Florida (SSGN 728) arrived at NSB Kings Bay in May 2006 and the USS Georgia (SSGN 729) in 2007.

NSB Kings Bay, now occupying the former Army terminal and several thousand additional acres, has served as an east coast submarine base since 1979. The current mission is to provide support to the fleet ballistic missile system and to maintain and operate facilities for administration and personnel support for submarine force operations (CH2MHILL 2012a).

3.0 PHYSICAL AND ENVIRONMENTAL SETTING

The following sections provide general information on the physical and environmental setting at NSB Kings Bay, including climate, topography, geology, hydrology, hydrogeology, land use, cultural and historical resources, and biological resources.

3.1 Climate

The climate at NSB Kings Bay is characterized by hot and wet summers and cool and dry winters (Booz Allen 2009). This region receives an average of approximately 50 inches of rainfall per year. The month of January is typically the coldest month of the year, with an average temperature of 51 degrees Fahrenheit (°F). July and August are typically the hottest months of the year, with an average high temperature of 81°F (CH2MHILL 2012b). Temperatures rarely rise above 100°F due to the moderating effect of the ocean (Booz Allen 2009).

3.2 Topography

The land in and around NSB Kings Bay is generally flat and marshy and traversed by slow, meandering streams (Booz Allen 2009). Topographic elevations range from 0 feet above mean sea level, along Kings Bay and Cumberland Sound, to approximately 30 feet above mean sea level at the western installation boundary (CH2MHILL 2012b). Significant slopes exist along the stream banks or the eastern shoreline, which is an ancient barrier island formation.

3.3 Geology

NSB Kings Bay is underlain by sediments of back-barrier island and barrier island origin characteristic of the Barrier Island sequence District of the Coastal Plain Physiographic Province. The uppermost water-bearing (surficial aquifer) unit is approximately 30 to 80 feet thick and is isolated from the underlying Floridan aquifer by a regional confining layer, the Hawthorn Formation. This unit consists of fine sands interbedded with silty and/or clayey fine sand layers (CH2MHILL 2012b).

Local soils constrain development because of their poor drainage characteristics. In general, soils are derived from marine sediments and consist primarily of sands on the upland areas and clays in the tidal wetland areas. The upland soils have similar characteristics, except for the Cainhoy fine sand, which is the only well drained soil type at NSB Kings Bay. The primary soil classification is Mandarin fine sands, characterized by poorly drained soils with approximately 0 to 2 percent slope. Mandarin fine sands cover approximately 75 percent of NSB Kings Bay. The soils of minor extent in this area are Pelham, Rutledge, Meggett fine sand, Pottsburg, and Cainhoy soils, with the Bohicket Capers soils association occurring in the saltwater marshes (CH2MHILL 2012b).

3.4 Hydrology

Major surface water bodies on and adjacent to NSB Kings Bay include the North River, Cumberland Sound, Kings Bay, and Marianna and Mill Creeks. Other surface water bodies on the Installation include approximately 300 acres of open water (13 man-made ponds totaling 175 acres, 60 acres of estuarine waters, and 75 acres of other lakes and ponds), wetland areas, and a series of open ditches that convey storm water to the Atlantic Ocean. Freshwater ponds on the western portion of NSB Kings Bay were man-made, initially intended for storm water retention or drained and recreated as freshwater fisheries (CH2MHILL 2012b).

3.5 Hydrogeology

Three aquifers exist at NSB Kings Bay: the water table aquifer, the secondary artesian aquifer, and the primary artesian aquifer (NEESA 1985). Aquifer system characteristics are summarized in Table 3-1 and briefly discussed below.

Table 3-1
Aquifer System Characteristics at NSB Kings Bay

Aquifer System Characteristics	Approximate Value		
	Water Table Aquifer	Secondary Artesian Aquifer	Primary Artesian Aquifer
Type	Unconfined	Confined	Confined
Depth-to-groundwater (feet bgs)	6-8	40-90	470-570
Thickness (feet)	40-90	380-530	Unknown
Inferred groundwater flow direction	East	Unknown	Unknown

The water table aquifer typically occurs at approximately 6 to 8 feet below ground surface (bgs). The aquifer consists of sands and limestone with a thickness of 40 to 90 feet. On the western portion of NSB Kings Bay, the aquifer is composed of loose to dense fine sands. On the eastern portion of NSB Kings Bay, the sands are only about 40 to 60 feet thick, and overlie an approximate 60 foot thick layer of limestone. The water is characterized slightly acidic, with elevated organic carbon concentrations, and generally less mineral content than deeper groundwater. The overall groundwater gradient slopes to the west-northwest with an approximate gradient of 0.003 feet per foot. The groundwater eventually migrates eastward and discharges into streams and springs (NEESA 1985). Use of the water table aquifer beneath NSB Kings Bay is primarily limited to irrigation. NSB Kings Bay operates twenty irrigation wells screened in the water table aquifer (CH2MHILL 2012b).

The secondary artesian aquifer occurs at approximately 40 to 90 feet bgs. This aquifer consists of isolated limestone lenses located between the water table aquifer and the primary artesian aquifer with a thickness range of 380 to 530 feet. The limestone lenses are highly variable in thickness and extent (NEESA 1985). The secondary aquifer is not widely used because of its extremely variable water yield (CH2MHILL 2012b).

The primary artesian aquifer occurs at approximately 470 to 570 feet bgs. This aquifer is divided into two water bearing zones with different types of limestone, separated by a dense, 100 to 150-foot thick confining layer (NEESA 1985). Three, 900-foot deep, water wells are screened in the primary artesian aquifer and are used by NSB Kings Bay as a source of drinking water. Groundwater is pumped from the three water wells and treated by aeration, filtration, softening, pH adjustment, chlorination, and fluoridation (CH2MHILL 2012b). Locations of public water supply and irrigation wells at NSB Kings Bay are depicted on the *1999 Wells, Intake and Discharge Structures, and Water Treatment Facilities Map* (DON 1999c), included in Appendix B.

3.6 Land Use

Currently, NSB Kings Bay supports the fleet ballistic missile system and submarine force operations. Land use can be classified as industrial, commercial, residential, recreational, and undeveloped. Undeveloped land includes forests, wetlands, open fields, and grassy areas (Booz Allen 2009). Future land use is anticipated to remain consistent with present.

Land immediately surrounding NSB Kings Bay includes the city of St. Mary's adjacent to the south; undeveloped wooded areas, residential areas, and an elementary school adjacent to the west; Crooked River State Park along the northern border; and Kings Bay and the Cumberland Sound along the eastern border (Booz Allen 2009).

3.7 Cultural and Historical Resources

Archeological research indicates a pre-Columbian Indian presence, throughout the area, dating back thousands of years. Early in the 19th century, much of what is now NSB Kings Bay was occupied by plantations. The plantation system declined following the Civil War, and the land was broken up into smaller residential holdings used for small scale farming, hunting, fishing, and harvesting of shellfish. Aboriginal groups and Euro-American settlers chose the northeast portion of NSB Kings Bay for settlements because of its relatively abundant natural resources. A total of 34 aboriginal and historical sites have been identified, with 27 sites potentially eligible for the National Register of Historic Places. Historic areas are located along the coast and adjacent to the North River and are categorized as archaeologically sensitive zones requiring special management practices to preserve the natural resources including the wetlands and bays they contain (NEESA 1985).

3.8 Biological Resources

3.8.1 Federal and State Special Status Species

In 1997, rare plant and animal species surveys were conducted to identify threatened, endangered, and rare species potentially present at NSB Kings Bay (CH2MHILL 2012b). Additional surveys were also conducted in 2003 and 2004 by Gulf South Research Corporation according to the 2012 *Air Modeling and Risk Assessment Process for Open Burning and Open Detonation, SUBASE Kings Bay, Kings Bay, Georgia* (CH2MHILL 2012b). Based on these surveys, 12 state-listed plant species and five state-listed terrestrial vertebrate species (one of these five is also federally listed) potentially occupy NSB Kings Bay. Vertebrate surveys also identified nine listed aquatic species within or near NSB Kings Bay. The federal and state statuses of these species are provided in Table 3-2.

Table 3-2
Summary of Known or Potential Special Status Species

Common Name	Scientific Name	Federal Status	State of Georgia Status
Plants			
Dwarf pawpaw	*Asimina pygmaea*	—	Regionally Rare
White spikerush	*Eleocharis albida*	—	Regionally Rare
Green-fly orchid	*Epidendrum conopseum*	—	Species of Special Concern
Wild coco	*Pteroglossaspis ecristata*	—	Regionally Rare
Florida privet	*Forestiera segregata*	—	Regionally Rare
Pond spice	*Litsea aestivalis*	—	Threatened
Bluff white oak	*Quercus austrina*	—	Regionally Rare
Chapman oak	*Quercus chapmanii*	—	Regionally Rare
Tiny-leaf buckthorn	*Sageretia minutiflora*	—	Threatened
Hooded pitcher plant	*Sarracenia minor*	—	Species of Special Concern
Bartram air-plant	*Tillandsia bartramii*	—	Species of Special Concern
Ball-moss	*Tillandsia recurvata*	—	Threatened
Terrestrial Vertebrates			
Gopher tortoise	*Gopherus polyphemus*	—	Threatened
Least tern	*Sterna antillarum*	—	Species of Special Concern
Sherman's fox squirrel	*Scriurus niger shermani*	—	Species of Special Concern
Wood stork	*Mycteria americana*	Endangered	Endangered
Southeast American kestrel	*Falco sparverius paulus*	—	Species of Special Concern
Aquatic Vertebrates			
West Indian manatee	*Trichechus manatus*	Endangered	Endangered
Green sea turtle	*Chelonia mydas*	Threatened	Threatened
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	Endangered
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	Endangered
Kemp's Ridley sea turtle	*Lepidochelys kempi*	Endangered	Endangered
Loggerhead sea turtle	*Caretta caretta*	Threatened	Threatened
Northern right whale	*Balaena glacialis*	Endangered	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered	Endangered
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered	Endangered

Note:
Table referenced from the 2012 *Air Modeling and Risk Assessment Process for Open Burning and Open Detonation, SUBASE Kings Bay, Kings Bay, Georgia* (CH2MHILL 2012b).

Suitable habitat is present on the installation for several other federal- and state-protected vertebrate species including (1) swallow-tailed kite (*Elanoides forficatus*; state rare), (2) bald eagle (*Haliaeetus leucocephalus*; federally threatened, state endangered), (3) eastern indigo snake (*Drymarchon corais couperi*; federally endangered, state endangered), and (4) roundtailed muskrat (*Neofiber alleni*; state threatened). Although suitable habitat is present, these species have not been observed during biological surveys (CH2MHILL 2012b).

3.8.2 Wetlands

In 1994, wetlands on the facility were delineated by the Navy. Approximately 4,000 acres of wetlands were identified in 1994, consisting primarily of five wetland types: (1) cypress domes, (2) cypress/blackgum swamps, (3) shrub swamps, (4) low pine flatwoods, and (5) salt marsh. Man-made ponds comprise most of the open water wetlands on the installation and are currently managed as recreational fishing areas, and salt marsh wetland is the largest wetland community type found at NSB Kings Bay. In 2005, the Navy updated the wetland delineation for a portion of NSB Kings Bay (the 3,295 acres occurring in fee-owned lands) (CH2MHILL 2012b). Of the areas re-mapped in 2005, the total wetland area was 481.8 acres, and 51.8 acres were classified as "other surface waters", which are depicted in a *2005 Wetland Areas figure* (DON 2005b), included in Appendix B. Cypress/blackgum swamps were the most common wetland systems found within the 2005 wetland delineation (CH2MHILL 2012b).

4.0 DATA COLLECTION

During data collection efforts, information was obtained from internet research, review of records maintained in offsite historical archives and at NSB Kings Bay, review of historical aerial photographs, and via interviews with NSB Kings Bay personnel. Resolution Consultants data collection site visit was accomplished, in accordance with the *PA Work Plan* (Resolution Consultants 2012), during the week of 18 March 2013. Copies of field notes, as recorded in bound logbooks, are included as Appendix A. Copies of historical records, as obtained during data collection efforts, are provided in Appendix B. Pertinent information has been incorporated into findings, as presented in Sections 5 and 6 of this report.

4.1 Internet Research

Internet research was conducted to familiarize the data collection team with NSB Kings Bay. The installation's website was reviewed to obtain pertinent information on the background and mission.

4.2 Offsite Records

The data collection team requested and reviewed pertinent historical records maintained by the National Archives and Records Administration (NARA), the Washington National Records Center, NAVFAC, and the Navy Ordnance Safety and Security Activity (NOSSA). Select pre-1940 records are maintained in NARA Archives I, located in Washington, D.C., while records for between 1940 and the mid-1950s are stored in NARA Archives II facility in College Park, Maryland. NARA's Cartographic Branch and Still Pictures Branch are also located at the Archives II facility. NARA operates a regional branch, in Atlanta, Georgia. The Washington National Records Center operates an archive facility for high security military files in Suitland, Maryland. NAVFAC maintains select files in Norfolk, Virginia. A more comprehensive inventory is available via the Navy Installation Restoration Information Solution (NIRIS) on-line database. NOSSA historically maintained a hard copy database of military ranges in their Indian Head, Maryland Headquarters.

Resolution Consultants contacted each of the above reference entities and requested any and all files regarding NSB Kings Bay from the following textual record groups (RG):

RG 38 — Records of the Office of Naval Operations
RG 71 — Records of the Bureau of Yards and Docks
RG 72 — Records of the Bureau of Aeronautics (Naval Air Installations)
RG 74 — Records of the Bureau of Ordnance
RG 80 — General Records of the Department of the Navy
RG 181 — Records of the Office of Naval Districts and Shore Establishments

RG 51 — Bureau of the Budget
RG 77 — Chief of Engineers
RG 92 — Quartermaster General
RG 121 — Public Buildings Service
RG 165 — War Department General and Special Staffs
RG 168 — National Guard Bureau
RG 269 — General Services Administration
RG 270 — War Assets Administration
RG 291 — Federal Property Resources Service
RG 334 — Records of Interservice Agencies
RG 385 — Naval Facilities Engineering Command, 1948-1999

Cartographic records regarding NSB Kings Bay were requested, as follows:

RG 23 — Coast and Geodetic Survey
RG 30 — Bureau of Public Roads
RG 57 — United States Geological Survey
RG 71 — Bureau of Yards and Docks
RG 77 — Chief of Engineers
RG 92 — Quartermaster General
RG 385 — Naval Facilities Engineering Command, 1917-1989

Aerial and still photographs regarding NSB Kings Bay were requested, as follows:

RG 71 — General Records of Bureau of Yards and Docks
RG 80 — General Records of the Department of the Navy

In response to the request for records, Mr. Chris Killilay, NARA I Archives Specialist, stated that since the Army did not begin to purchase land for the terminal until 1954 and the Navy did not take command until 1978, no records are maintained at NARA's Archive I facility. Furthermore, Mr. Nathaniel Patch, NARA II Navy Archives Specialist, responded that Archives II has yet to receive any records pertaining to NSB Kings Bay. A visit to review records was not necessary, since no pertinent records are maintained at Archives I or II.

Mr. Nathan Jordan, NARA Regional Archives Specialist, responded that pertinent records maintained by NARA's regional office were limited to Daily Logs from 1979-1986, maintained in RG 181, and Federal Property Resources Service/Real Property Files, maintained in RG 291. The federal property files included an *Installation Survey Report, Military Ocean Terminal, Kings Bay, Georgia* (DoD 1974). Mr. Jordan provided Resolution Consultants access to such files, during a visit on 19 November 2012.

Mr. Matthew Staden, Navy Records Manager, stated that no pertinent records are maintained at the Washington National Records Center, thus a visit was not necessary for this facility.

Ms. Bonnie Capito, NAVFAC's Librarian and NARA Certified Records Manager, was unable to locate pertinent records in NAVFAC hard copy files and directed the data collection team to historical records maintained via NIRIS. The following pertinent documents were downloaded from NIRIS and reviewed by the data collection team.

- *Initial Assessment Study of NSB Kings Bay, Georgia* (NEESA, 1985)
- *Potential Sources of Contamination Site Investigation Solid Waste Management Resource Conservation and Recovery Act Facility Work Plan NSB Kings Bay, Georgia* (ABB 1991)
- *Site Assessment Report for Skeet and Rifle Ranges at SUBASE Kings Bay, Georgia* (EnSafe 2003)
- *Groundwater Analytical Results Small Arms Range, NSB Kings Bay, Georgia* (Aerostar 2007)
- *Class 2 Property Record- Weapons Qualification (Small Arms/Indoor) Range, Facility #3913* (DON 2012)

Ms. Sherry McCahill of NOSSA reported that no closed, transferring, or transferred ranges, currently referred to as "other than operational" ranges, were reported at NSB Kings Bay, during NOSSA's most recent data call in 2000. Furthermore, Ms. Cahill stated that according to historical NOSSA records through 2000, two operational ranges existed at NSB Kings Bay. Such ranges included a permitted open burn (OB)/open detonation (OD) area and a small arms range.

4.3 NSB Kings Bay Records

Several weeks prior to the data collection site visit, a pre-visit planning package, describing the types of data desired, reiterating the request for support during data collection efforts, and providing a list of data elements desired for each MEC and/or MC site, was distributed to NSB Kings Bay personnel in the following departments:

- Real Estate
- Range Operations
- Explosive Ordnance Disposal (EOD)
- Engineering
- Environmental
- Mapping
- Public Works
- Public Affairs
- Natural Resources
- Weapons
- Security
- Safety

Furthermore, the pre-visit planning package requested access to any pertinent records, during the forthcoming data collection site visit. In response to this request, the following relevant records were identified and reviewed by the data collection team:

Environmental Records:

- Environmental Department Files
- Installation Restoration Program Files and Administrative Record
- *Technical Memorandum, Skeet and Rifle Range Soil Remediation and Costs* (EnSafe 2003)
- *Corrective Action Work Plan for Small Arms Range Clearance and Decommissioning* (Kemron 2005)
- *Small Arms (Rifle and Pistol) Range Clearance Verification Report* (Kemron 2006)
- *RCRA Facility Assessment Report, NSB Kings Bay* (Booz Allen 2009)
- *RCRA Permit Renewal Application Volume 1, NSB Kings Bay* (CH2MHILL 2012a)

Real Estate Records:

- *Land Management Plan* (United States Army 1968)

EOD/Safety Records:

- *Email Correspondence Regarding Explosive Ordnance Disposal and Burn Area* (DON 1985)
- Memorandum: *Explosive Ordnance Disposal and Burn Area* (DON 1985)
- *Explosive Safety Siting NSB Kings Bay* (DON 1988)
- *Information and Regulations Governing the Use of Demolition Range* (DON 1991)
- *Application of the RCRA to Conventional Explosive Ordnance Operations* (DON 1993)
- *NAVSUBASE Kings Bay Instruction 8027.2E. Subject: NAVSUBASE Kings Bay Demolition Range Standard Operating Procedures* (DON 1997)
- *NSB Kings Bay Explosives Safety Inspection Plan* (DON 2007a)
- 2010 Email: Outdoor Range Area (DON 2010)

Maps:

- Various engineering department maps
- Various geo-database files
- 1999 Facility Map, SUBASE Kings Bay (DON 1999a)
- 1999 General Services Administration (GSA) Land Use Figure, SUBASE Kings Bay (DON 1999b)
- Various aerial photographs, as provided in Appendix C, and discussed in detail below

4.4 Aerial Photographs

Historical aerial photographs from 1951, 1960, 1979, 1983, 1994, 1999, 2001, and 2012, as obtained from NSB Kings Bay's mapping department, were reviewed to identify temporal changes. Historical aerial photographs are included as Appendix C. A summary of observations is provided below.

- 1951: Land use primarily limited to agricultural and undeveloped, prior to development as the Kings Bay Army Terminal in 1956.

- 1960: Aerial depicts the dock, support buildings, and an extensive network of railroad tracks. What appears to be earthen berms or bunkers are visible near the center of the developed area and at a railroad yard to the northeast.

- 1979: Although the 1979 aerial does not depict NSB Kings Bay in its entirety, features are nearly identical to the 1960 aerial, with the exception of additional buildings immediately southwest of the dock. Two rectangular-shaped areas, possibly used for disposal, were observed southwest of the dock. A large body of water is now present to the south of the dock.

- 1983: Although the 1983 aerial only covers the northern half of NSB Kings Bay, significant buildup occurred since 1979. In contrast to the 1979 aerial, a larger network of roads, additional buildings, and construction-site preparation is apparent. Railroad track segments and earthen berms/bunkers to the west-northwest of the dock appear to have been demolished.

- 1994: Residential-type structures and a golf course are present at the northwest portion; additional buildings are present at the west-central portion; and additional buildings are present near the dock. A second dock is apparent at the northeast corner of Kings Bay. The earthen berms/bunkers and much of the railroad track network are no longer present. The body of water to the south of the dock appears to have been filled.

- 1999: Features, as depicted in the 1999 aerial, are nearly identical to the 1994 aerial. The body of water that was presumably filled before 1994, includes two smaller bodies of water, while the remainder of the area shows signs of vegetative growth.

- 2001: Features nearly identical to the 1999 aerial.

- 2012: Features nearly identical to the 2001 aerial.

4.5 Interviews

Based on responses received from the pre-visit planning package and telephone screening, Resolution Consultant's data collection team interviewed NSB Kings Bay personnel regarding past and present management and use of explosives and munitions. Interviews were conducted during the March 2013 site visit and via follow-up telephone conversations. Personnel interviewed, along with a description of types of information provided, are included below.

Mr. Thomas Stofflet, Installation Restoration Program Manager, NSB Kings Bay Environmental Department — Mr. Stofflet, who served as Resolution Consultant's primary point of contact for data collection efforts, has worked at NSB Kings Bay for approximately 25 years. Mr. Stofflet assisted in developing the list for interview candidates and locating pertinent records. Additionally, Mr. Stofflet provided detailed information regarding historical assessment and cleanup activities, along with general information with regards to installation history and historical munitions management and range operations at NSB King Bay.

Mr. James Colter, Environmental Program Manager, NSB Kings Bay Environmental Department — Mr. Colter has managed NSB Kings Bay's environmental program for approximately 1 year. Mr. Colter provided detailed information regarding regulatory compliance type issues.

Mr. Marvin Brantley, Explosives Safety Officer (ESO), NSB Kings Bay Safety Department — Mr. Brantley has served as the ESO for NSB Kings Bay's TRF for approximately 20 years. Mr. Brantley provided general information with regards to historical and current munitions management at NSB King Bay.

Ms. Elizabeth Thomas, SWFLANT ESO, NSB Kings Bay Safety Department — Ms. Thomas provided general information with regards to historical and current munitions management at NSB King Bay.

Lt. Bruce Batterson, Detachment Officer, NSB Kings Bay EOD Department — Lt. Batterson, who has served as an EOD Detachment Officer for approximately 2.5 years, provided detailed information with regards to munitions management and operations at the OB/OD unit.

Mr. Robert Tighe, Mr. Charles Ratcliff, Mr. Russell Byrd, and Mr. Ron Dubois, Range Point of Contact, NSB Kings Bay Security Forces — In a combined interview, the above referenced individuals provided detailed information with regards to munitions management and operations at various ranges.

Mr. Jim Moore, Civil Engineer, NSB Kings Bay Engineering/Real Estate Department — Mr. Moore worked in the NSB Kings Bay environmental office for approximately 6 years in the late 1980s and early 1990s prior to moving over to the planning and dredging department. In 1991, Mr. Moore served as the primary point of contact for dredging operations at NSB Kings Bay. Mr. Moore provided general information with regards to installation history and historical munitions management and range operations at NSB King Bay.

Mr. Paul Schoenfeld, Natural Resources Manager, NSB Kings Bay Environmental Department — Mr. Shoenfeld, who has worked at NSB Kings Bay for approximately 19 years, provided detailed information regarding biological resources and general information with regards to installation history, physical and environmental setting, and historical munitions management and range operations at NSB King Bay.

5.0 DATA EVALUATION

5.1 Identification of Potential MRAs

Based on the collective dataset, the following potential MRAs were identified during the data collection process:

- Armory, Building 5090
- Blue Star Shipping Disposal Area, Site 9
- Blue Star Shipping Disposal Area, Site 10
- Dock Area
- Defense Ordnance Supply Facility Small Ordnance Magazines, Buildings 5074 through 5077
- EOD Ordnance Magazines, Buildings 4968 through 4973
- Earthen Bunkers/Berms
- Indoor Range, Building 3072
- Indoor Shoot House
- OB/OD Area, Buildings 4979 and 4980, Sold Waste Management Unit (SWMU) 11
- Small Arms Range, Buildings 3067, 3068, and 3913, SWMU 8
- Safe Haven Holding Yard, Building 5911
- Security Magazine, Building 2028
- Skeet Range, Buildings 3902, 3009, 3010, 3011, and 3016
- SWFLANT Complex
- Torpedo Complex, Buildings 5078, 5079, 5082, 5083, and 5084

Figure 5-1 depicts potential MRAs on an installation map. Table 5-1 presents pertinent information, as obtained during the data collection process, for each potential MRA.

FIGURE 5-1
LOCATIONS OF POTENTIAL MUNITIONS RESPONSE AREAS
NAVAL SUBMARINE BASE
KINGS BAY, GEORGIA

NAVFAC Naval Facilities Engineering Command
RESOLUTION CONSULTANTS

REQUESTED BY: S. HODSKINS	DATE: 6/10/2013
DRAWN BY: M. SENNE	TASK ORDER NUMBER: CTO JM15

X:\Navy\Kings Bay_Sub_Base\Potential_MRA_SitesMS.mxd

Table 5-1
Summary of Potential MRAs

Armory, Building 5090				
Location	**Approximate Area**	**Operational Dates**	**Status**	**Category**
Eastern boundary, along USS James Monroe Avenue	7,500 ft^2	~1990s to present	Active	Storage Area
Summary of Activities Performed and History				
Per interviews with NSB Kings Bay personnel, the armory continues to store ammunition for United States Coast Guard escort boats. The Armory is in close proximity to the United States Coast Guard dock.				
Blue Star Shipping Disposal Area, Site 9				
Location	**Approximate Area**	**Operational Dates**	**Status**	**Category**
Eastern boundary, along USS James Monroe Avenue	0.25 acres	1959 to 1974	Inactive- No Further Action	Disposal Area
Summary of Activities Performed and History				
According to the Initial Assessment Study (IAS) (NEESA 1985), from 1959 through 1974, the Blue Star Shipping Company, operated an approximate 0.25 acre waste burn/disposal area, in an area now occupied by a parking lot associated with NSB Kings Bay's dock. Wastes disposed included approximately 1,400 cubic yards of pallets, paper, dunnage, and an unknown quantity of dynamite sticks. According to the IAS, no hazardous waste was historically disposed at Site 9. The area was completely excavated during the construction of adjacent buildings. The parking lot was constructed over this area, in the late 1970s. Site 9 was listed as requiring no further action in the IAS.				
Blue Star Shipping Disposal Area, Site 10				
Location	**Approximate Area**	**Operational Dates**	**Status**	**Category**
Eastern boundary, along Meadowlark Trail	0.25 acres	1974 to 1979	Inactive- No Further Action	Disposal Area
Summary of Activities Performed and History				
According to the IAS (NEESA 1985), from 1974 through 1979, the Blue Star Shipping Company operated an approximate 0.25 acre waste burn/disposal area, in an area east of Building 5080. Wastes disposed included approximately 1,400 cubic yards of pallets, paper, dunnage, and an unknown quantity of dynamite sticks. According to the IAS, no hazardous waste was historically disposed at Site 10. The area was completely excavated during the construction of the T-Shed parking lot in the early 1980s. Site 10 was listed as requiring no further action in the IAS.				

Table 5-1
Summary of Potential MRAs

Dock Area				
Location	**Approximate Area**	**Operational Dates**	**Status**	**Category**
Eastern boundary	645 acres	~1958 to present	Active	Support Facility

Summary of Activities Performed and History

According to the IAS (NEESA 1985), prior to 1979, the dock area was used for loading and offloading of various materials, including explosives, by the Blue Star Shipping Company.

Quarterdeck Watch Log Records from 1983 describe blasting activities at NSB Kings Bay's "Water Front Area." According to the records (DON 1983), five blasting events occurred on 30 July 1983, four events occurred on 31 July 1983, and two events occurred on 13 August 1983. The blasting involved 400 pounds (lbs) of explosives placed in 12 holes, 800 lbs of explosives placed in 24 holes, and 1,800 lbs of explosives placed in 48 holes (DON 1983). The log records did not include additional details on the blasting location or type(s) of explosives used. Although speculative, the blasting events may have been conducted to prepare areas along the waterfront for construction.

Construction and expansion of the dock occurred between 1979 and 1989 (NEESA 1985). NSB Kings Bay's dock continues to support submarine fleet operations. Activities include loading/unloading of supplies, arming/disarming of weapons, maintenance, and refueling. Explosive Safety Quantity Distance (ESQD) arcs, as depicted on a 1999 GSA Land Use figure (DON 1999b), suggest that munitions and/or explosives are likely loaded and unloaded at the dry docks (Buildings 5097 and 5109) and at the northwestern end of the dock. Based on available information reviewed and obtained via interviews, munitions and/or explosives managed at NSB Kings Bay's dock are limited to the loading and unloading of missiles, torpedoes, and small arms ammunition.

DOSF Small Ordnance Magazines, Buildings 5074 through 5077				
Location	**Approximate Area**	**Operational Dates**	**Status**	**Category**
Southeastern portion of NSB Kings Bay, east of USS Kamehameha Avenue	0.75 acres	~1990s to present	Active	Storage Area

Summary of Activities Performed and History

Based on available information, including ESQD arcs (DON 1999b), small arms ordnance have been stored in Buildings 5074 through 5077, since the early 1990s. Due to the sensitive nature of DOSF operations, details on the quantities and types of munitions and explosives were not provided; however, this storage unit remains active.

EOD Ordnance Magazines, Buildings 4968 through 4973				
Location	**Approximate Area**	**Operational Dates**	**Status**	**Category**
North-central portion of NSB Kings Bay, north of USS Martano Vallejo Road	2.5 acres	~1985 to present	Active	Storage Area

Summary of Activities Performed and History

According to Security Forces personnel (Mr. Robert Tighe, Mr. Charles Ratcliff, Mr. Russell Byrd, and Mr. Ron Dubois), the EOD Ordnance Magazines , also referred to as Buildings 4968 through 4973, were and are presently used to temporarily store materials slated for disposal at the OB/OD area. EOD Ordnance Magazines also store explosives used by EOD and potentially other munitions or explosives, including grenades (Booz Allen 2009). According to the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) Report, Bunker 4973 historically stored smokeless powder used for training K-9 units (Booz Allen 2009). The RFA Report reported that no evidence indicates a release has occurred and listed the OB/OD area, and associated bunkers and magazines, as requiring no further action.

Table 5-1
Summary of Potential MRAs

Earthen Berms/Bunkers

Location	Approximate Area	Operational Dates	Status	Category
1) Central portion of NSB Kings Bay, presently occupied by SWFLANT Complex 2) East-central area of NSB Kings Bay, east of USS Kamehameha Avenue 3) North-central area, south of Sparrow Trail	360 acres	~1958 to ~1983	Inactive- Demolished	Storage Area

Summary of Activities Performed and History

According to Mr. Stofflet and as reported in the 1985 IAS, earthen berms, erroneously referred to as bunkers in the IAS report, first appear on historical aerial photographs starting in the late 1950s. These features, initially constructed as part of the Army terminal, were likely built to help contain accidental explosions; however, available information suggests that the berms were never used for their intended purpose. This conclusion is supported by a Letter from Walter C. Moreland (Assistant Commissioner, Office of Real Property) to Mr. Charles F. Bingman (Deputy Assistant Director Organization and Special Project Division Office of Management and Budget Washington, CD 20503) which stated that NSB Kings Bay was "designed for the safe handling of military explosive cargo, was completed in 1958 (DoD 1974). Apparently, it has never been utilized for its designed purpose. It has been on "inactive status" since 1958" (DoD 1974). In addition, the 1985 IAS states that "no ordnance supplies have been stored in the bunkers" (NEESA 1985). The Navy demolished the majority of the berms in the early 1980s; however, earthen berms remain at the OB/OD area and the EOD Ordnance Magazines (Buildings 4968 through 4973).

Indoor Range, Building 3072

Location	Approximate Area	Operational Dates	Status	Category
Southern boundary, north of USS Daniel Webster Road, immediately south of the Skeet Range	35,000 square feet (ft^2)	~2005 to present	Active	Range

Summary of Activities Performed and History

Per Mr. Stofflet and Mr. Tighe, the Indoor Range was constructed at the southern portion of the former skeet range, in 2005. According to NSB Kings Bay Security Forces, ongoing training exercises at this range involve live fire of 9 millimeter (mm), 5.56 mm, and 12-gauge, small arms ammunition. Spent ammunition is collected and disposed offsite.

Indoor Shoot House

Location	Approximate Area	Operational Dates	Status	Category
Southern boundary, northeast of USS Daniel Webster Road	2,100 ft2	~2005 to present	Active	Range

Summary of Activities Performed and History

According to Mr. Tighe, the Indoor Shoot House was constructed at the southern portion of the former small arms range, in 2005. Since that time through present, the Indoor Shoot House has facilitated training by lasers. According to Mr. Tighe and Mr. Stofflet, live ammunition is not used at the Indoor Shoot House.

Table 5-1
Summary of Potential MRAs

OB/OD area, Buildings 4979 and 4980, SWMU 11

Location	Approximate Area	Operational Dates	Status	Category
North-central portion of NSB Kings Bay, south of USS Proteus Road	2 acres	~1985 to present	Active	Disposal Area

Summary of Activities Performed and History

According to a Memorandum dated 15 April 1985 (DON 1985), an OB/OD area, situated inside of a U-shaped earthen berm, has been used for EOD ordnance disposal since 1985. The earthen berm is approximately 500 feet long by 200 feet wide, with a small, reinforced concrete-enclosed safety bunker (crew shelter) at the open end. Berm walls are constructed to an elevation of approximately 20 feet and serve as a protective barrier. The OB/OD area is used for the thermal treatment of scrap propellant, off-spec ammunition, waste munitions and explosives, and smokeless powder generated through naval support operations. Materials are temporarily stored at the EOD Ordnance Magazines (Buildings 4968 through 4973), prior to transport to the OB/OD area for treatment (Booz Allen 2009). According to Lt. Batterson, only materials from NSB Kings Bay are processed at the OB/OD area.

The OB/OD area continues to operate as a RCRA hazardous waste treatment and storage facility, under NSB Kings Bay's Hazardous Waste Facility (40 CFR Part 270) Permit (CH2MHILL 2012a). The OB/OD area is permitted for treatment by OD of up to 1,200 lbs of hazardous waste munitions and explosives per day and OB of up to 4,000 lbs of hazardous waste munitions and explosives per day (Booz Allen 2009). The OB area has a capacity of 1,000 lbs of net explosive weight per day. The OD area has a capacity of 1,200 lbs of net explosives weight per day. The Navy abides by a self-imposed limit of 150 lbs of net explosives weight per detonation (CH2MHILL 2012a). The OB/OD area has an explosive safety arc of 1,250 feet (Booz Allen 2009). This area is designated as a Class C demolition range, and waste explosives are detonated on the ground surface without secondary containment (Booz Allen 2009). The types of reactive wastes that have been authorized for OD are (DON 1997):

1. Detonators
2. Bulk dynamite
3. Rocket and missile warheads
4. Explosive-loaded grenades
5. High explosive bombs
6. Mortar ammunition
7. Projectiles

Explosives that cannot be openly detonated are treated through burning inside an open, metal box, equipped with secondary containment. While not in use, the box is covered to prevent accumulation of storm water. The device is constructed of materials capable of withstanding intense heat and providing adequate containment of initiating fluids, as well as any residual ash. The OB/OD area has an ESQD arc of 1,250 feet (Booz Allen 2009). The following types of ammunition and explosives are authorized for treatment for open burning (DON 1997):

1. Black powder
2. Dynamite in bulk
3. Floating smoke pots and similar ammunition
4. Group C chemical ammunition
5. Bulk high explosives
6. Incendiary bomb clusters AN-M8 and AN-M2
7. Incendiary bombs, gasoline-gel, and/or gasoline-waste cotton filled
8. Nitrocellulose
9. Primers
10. Pyrotechnics
11. Rocket motor propellants
12. Smokeless powder
13. Trinitrotoluene demolition blocks
14. Tracer mix and other pyrotechnic mixtures

Soil and groundwater in the vicinity of the OB/OD Unit is sampled and analyzed on an annual basis. According to NSB Kings Bay personnel and historical documents reviewed, analytical results indicate that soil and groundwater have not been impacted by OB/OD operations. Based on available file material reviewed, no release of hazardous constituents from this unit appears to have occurred. The RFA report listed the OB/OD unit as requiring no further action (Booz Allen 2009). According to Mr. Stofflet and Mr. Colter, the OB/OD area remains a RCRA-regulated unit, under the current RCRA permit (CH2MHILL 2012a).

Table 5-1
Summary of Potential MRAs

Small Arms Range, Buildings 3067, 3068, and 3913 (SWMU 8)

Location	Approximate Area	Operational Dates	Status	Category
Southern portion of NSB Kings Bay, northeast of USS Daniel Webster Road	9.5 acres	~1980s to ~2003	Inactive- No further action, Area now occupied by Indoor Shoot House	Range

Summary of Activities Performed and History

A rifle/pistol range, referred to as the small arms range in the 2009 RFA Report (Booz Allen 2009), formerly operated in the southeastern portion of NSB Kings Bay. The relatively flat range, faced north, and was circumscribed by an earthen berm. The combined range area was approximately one acre in size. The rifle firing portion of the range was approximately 600 yards long and 270 feet wide, with a covered firing line at the south end of the range and large earthen berms on the north, east, and west side. The pistol area was approximately 25 yards long (Booz Allen 2009). Range operations were supported by three small buildings – Building 3068 (offices and maintenance equipment), Building 3067 (restrooms), and 3080 (close quarters combat training facility) (Booz Allen 2009). According to Mr. Paul Schoenfeld, the ranges were used exclusively by military personnel. According to Security Forces, ammunition used was limited to 9 mm, 7.62 mm, 5.56 mm, and 12-gauge.

A 2003 *Site Assessment Report* (EnSafe 2003) summarizes findings of soil and groundwater investigation activities at the former small arms range. Soil samples were collected from berms, a target pit at the base of the rear backstop berm, and along the range apron, and groundwater samples were collected from the area between the target pit and the berm. All samples were analyzed for total lead. Results were well below the applicable Georgia Environmental Protection Agency (GA EPD), Type 3 (non-residential) Risk Reduction Standard of 400 milligrams per kilogram; however, soil within the first two feet of the berm surface was intentionally not sampled because it was decided that this soil would likely be removed during forthcoming closure of the range. Lead was not measured above the U.S. EPA Maximum Contaminant Level (MCL) of 0.015 milligrams per liter, in groundwater samples collected at the ranges (Kemron 2006.

Remediation activities, including the removal of the top two feet of soil, lead, and lead contaminated soil, were conducted in 2005 (Kemron 2006). Results associated with confirmatory soil samples were below the applicable screening guideline for lead. Upon completion of remediation activities, the range was demolished. In 2007, groundwater samples were collected from two monitoring wells and one onsite irrigation well at the small arms range. Results showed no detectable levels of lead in the groundwater monitoring wells and a lead level below the applicable U.S. EPA MCL in the irrigation well (Aerostar 2007). As documented in the RFA Report, on 25 November 2008, GA DEP notified NSB Kings Bay that no further action was required to address contamination at the small arms range (Booz Allen 2009). This information was confirmed in an interview with Mr. Stofflet and Mr. Colter. Mr. Stofflet stated that although NSB Kings Bay's small arms range has not been formally closed by the Navy, this range is inactive. In 2005, the Indoor Shoot House, which continues to operate, was constructed over the southern portion of the historical small arms range.

Safe Haven Holding Yard, Building 5911

Location	Approximate Area	Operational Dates	Status	Category
Central portion of NSB Kings Bay, between USS Henry L. Stimson Road and USS Martano Vallejo Road	2.5 acres	~1990s to present	Active	Storage Area

Summary of Activities Performed and History

A 1999 land use figure (DON 1999b) shows an ESQD arc originating from Building 5911, indicative of munitions and/or explosive storage. According to NSB Kings Bay personnel, this building is currently used to store munitions and/or explosives.

Table 5-1
Summary of Potential MRAs

Security Magazine, Building 2028				
Location	**Approximate Area**	**Operational Dates**	**Status**	**Category**
Western portion of NSB Kings Bay, southeast of the intersection of USS Tecumseh Road and USS Henry Clay Boulevard	285 ft^2	~1980 to present	Active	Storage Area
Summary of Activities Performed and History				
According to interviews with NSB Kings Bay security forces, a limited onsite supply of small arms ammunition is stored in Building 2028.				

Skeet Range, Buildings 3902, 3009, 3010, 3011, and 3016				
Location	**Approximate Area**	**Operational Dates**	**Status**	**Category**
Southern boundary, north of USS Daniel Webster Road, approximately 1,500 feet west of the small arms range	1.6 acres	~1980s to present	Inactive, Area now occupied by Indoor Range	Range
Summary of Activities Performed and History				
According to Mr. Schoenfeld, a skeet range, consisting of two towers and a relatively flat grassy area, was historically used for recreational purposes. According to historical aerial photographs, the range faced north and transitioned to a wet, wooded area, to the north of the firing point. According to Mr. Stofflet, the skeet range became inactive sometime prior to a 2003 Site Assessment (EnSafe 2003), which involved the collection and analysis of soil samples for lead. Lead concentrations in soil at the skeet range were reported below GA EPD, Type 3 (non-residential) Risk Reduction Standard of 400 milligrams per kilogram (EnSafe 2003). In 2005, the Indoor Range, which continues to operate, was constructed over the southern portion of the skeet range.				

SWFLANT Complex				
Location	**Approximate Area**	**Operational Dates**	**Status**	**Category**
Central portion of NSB Kings Bay	400 acres	~1980 to present	Active	Support Facility/Storage Area
Summary of Activities Performed and History				
According to Mr. Stofflet and Mr. Colter, the SWFLANT Complex is currently used for the assembly and storage of Triton missiles and associated components. Due to the sensitive nature of operations, additional details on activities conducted and munitions managed within the SWFLANT Complex were not provided.				

Torpedo Complex, Buildings 5078, 5079, 5082, 5083, and 5084				
Location	**Approximate Area**	**Operational Dates**	**Status**	**Category**
Southeastern portion of NSB Kings Bay, east of USS Kamehameha Avenue	4 acres	~1990s to present	Active	Storage Area
Summary of Activities Performed and History				
A 1999 land use figure (DON 1999b) shows an ESQD arc originating from the Torpedo Complex, indicative of munitions and/or explosive storage. The land use figure depicts Buildings 5078 and 5079 as torpedo magazines. According to Mr. Stofflet and Colter, torpedoes continue to be stored at the Torpedo Complex. According to Mr. Brantley, the torpedoes arrive at NSB Kings Bay in a ready-for-issue state and are not re-used or maintained onsite.				

5.2 MMRP Screening

Table 5-2 screens each potential MRA for MMRP eligibility, based on the following Defense Environmental Restoration Program criteria (DoD 2001):

1. Release, as defined by CERCLA as any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, occurred prior to 30 September 2002; or,

2. Release is not associated with a Formerly Used Defense Site, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002; and

3. "site" was not identified or included in the Navy's Risk Management Information System, prior to September 30, 2000.

In addition, potential MRA designations **eligible** for inclusion under the MMRP include Closed, Transferring, or Transferred Ranges, areas that may potentially contain MEC or MC in soil or groundwater, and areas where munitions or explosives were managed in a way that may have resulted in a release to the environment.

Potential MRA designations **not eligible** for inclusion under the MMRP are considered exempt from further investigation and include active ranges, active facilities, and buildings and areas where munitions or explosives were stored that likely did not result in a release to the environment. Such areas were likely specifically intended for the proper storage of munitions or explosives (i.e., bunkers, storage facilities, lockers, etc.).

Table 5-2
Military Munitions Response Program Screening Table

Armory, Building 5090	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NA**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a Closed, Transferring, or Transferred Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***
Blue Star Shipping Disposal Area, Site 9	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NO**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**YES**
Does area consist of a Closed, Transferring, or Transferred Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***
Blue Star Shipping Disposal Area, Site 10	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NO**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**YES**
Does area consist of a Closed, Transferring, or Transferred Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***

Table 5-2
Military Munitions Response Program Screening Table

Dock Area	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NA**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a Closed, Transferring, or Transferred Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***
DOSF Small Ordnance Magazines, Buildings 5074 through 5077	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NA**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a Closed, Transferring, or Transferred Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***
EOD Ordnance Magazines, Buildings 4968 through 4973	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NA**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a Closed, Transferring, or Transferred Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***

Table 5-2
Military Munitions Response Program Screening Table

Earthen Bunkers/Berms	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NA**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a Closed, Transferring, or Transferred Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***
Indoor Range, Building 3072	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NA**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a Closed, Transferring, or Transferred Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***
Indoor Shoot House	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NA**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a Closed, Transferring, or Transferred Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***

Table 5-2
Military Munitions Response Program Screening Table

OB/OD Area, Buildings 4979 and 4980, SWMU 11	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NO**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a Closed, Transferring, or Transferred (CTT) Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***
Small Arms Range, Buildings 3067, 3068, and 3913, SWMU 8	
Did a documented release occur prior to 30 September 2002?	**YES**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NO**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a CTT Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***
Safe Haven Holding Yard, Building 5911	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NA**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a CTT Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***

Table 5-2
Military Munitions Response Program Screening Table

Security Magazine, Building 2028	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NA**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a CTT Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***
Skeet Range, Buildings 3902, 3009, 3010, 3011, and 3016	
Did a documented release occur prior to 30 September 2002?	**YES**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NO**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a CTT Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***
Strategic Weapons Facility Atlantic Complex	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NA**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a CTT Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***

Table 5-2
Military Munitions Response Program Screening Table

Torpedo Complex, Buildings 5078, 5079, 5082, 5083, and 5084	
Did a documented release occur prior to 30 September 2002?	**NO**
Is the release associated with FUDS, operational range, active munitions demilitarization facility, or active waste military munitions treatment or disposal unit that operated after 30 September 2002?	**NA**
Was area included in the Navy's Risk Management Information System, prior to 30 September 2000?	**NO**
Does area consist of a CTT Range that may potentially contain MEC or MC in soil or groundwater?	**NO**
Does information exist to indicate that munitions or explosives were managed in a way that may have resulted in a release to the environment?	**NO**
Is Potential MRA eligible for study under Military Munitions Response Program?	***NO***

Notes:

DOSF	=	Defense Ordnance Support Facility
EOD	=	Explosive Ordnance Disposal
FUD	=	Formerly Used Defense Site
MEC	=	Munitions and Explosives of Concern
MC	=	Munitions Constituents
NA	=	Not Applicable
OB/OD	=	Open Burn/Open Detonation
Potential MRA	=	Potential Munitions Response Area
SWMU	=	Solid Waste Management Unit
CTT	=	Closed, Transferring or Transferred

6.0 CONCLUSIONS AND RECOMMENDATIONS

Military operations were not initiated at NSB Kings Bay until 1978. Due to its relatively short timeline as an active installation, historical use and management of explosives and/or munitions is limited. In general, munitions and explosives managed, issued, or stored at NSB Kings Bay include, but are not limited to, flares, grenades, dynamite, explosives used by the EOD detachment, Tomahawk missiles, Triton missiles, torpedoes, and small arms ammunition (9 mm, 7.62 mm, 5.56 mm, and 12-gauge). Potential MRAs, defined as areas where explosives and/or munitions were historically or are presently managed, include support facilities, storage and disposal areas, and ranges. Many of these areas, including the dock, the SWFLANT Complex, the Torpedo Complex, two ranges, various magazines, and the OB/OD area, remain in active status. Potential MRAs, classified as inactive, have been thoroughly assessed during historical studies, which concluded that no evidence exists to indicate that releases have occurred. Historical small arms training and recreational skeet ranges have been redeveloped as active small arms training facilities.

Based on the findings of the comprehensive dataset and pursuant to MMRP eligibility criteria, no potential MRAs at NSB Kings Bay were determined to be eligible for inclusion under the MMRP; thus, at this time, no additional investigation and/or response actions are recommended under the MMRP. It should be noted that if the status of a potential MRA changes to "closed" or "inactive", the potential MRA should be re-evaluated for MMRP eligibility.

7.0 REFERENCES

Aerostar Environmental Services. *Groundwater Analytical Results Small Arms Range, NSB Kings Bay, Georgia.* October 2007.

ABB Environmental. *Potential Source of Contamination Site Investigation Solid Waste Management Units RCRA Facility Work Plan NSB Kings Bay, Georgia.* October 1991.

Batterson, B. (Interview). Detachment Officer, NSB Kings Bay Explosives Ordnance Disposal Department. 912-573-2078. 20 March 2013.

Booz Allen Hamilton. *Final RCRA Facility Assessment Report, U.S. Naval Submarine Base Kings Bay, Georgia.* January 2009.

Brantley, M. (Interview). Explosives Safety Officer, NSB Kings Bay Safety Department. 912-573-3217. 20 March 2013.

Byrd, R. (Interview). Range Point of Contact, NSB Kings Bay Security Forces. 912-573-4293. 21 March 2013.

CH2MHILL, Inc. *RCRA Permit Renewal Application Volume 1, Submarine Base Kings Bay, Kings Bay, Georgia*. July 2012a.

CH2MHILL, Inc. *Air Modeling and Risk Assessment Process for Open Burning and Open Detonation, SUBASE Kings Bay, Kings Bay, Georgia*. December 2012b.

Colter, J. (Interview). Environmental Program Manager, NSB Kings Bay Environmental Department. 912-573-8263. 21 March 2013.

Department of Defense. *Management Guidance for the Defense Environmental Restoration Program*. Office of the Deputy Under Secretary of Defense. September 2001.

Department of Defense. (Letter) *Installation Survey Report, Military Ocean Terminal, Kings Bay, Georgia*. June 1974.

Department of Navy (DON). *Waste Information Document*. January 2013.

— DON. *Class 2 Property Record- Weapons Qualification (Small Arms/Indoor) Range, Facility # 3913.* May 2012.

— DON. (Email). *Outdoor Range Area.* January 2010.

— DON. *NSB Kings Bay Explosives Safety Inspection Plan.* January 2007a.

— DON. Waste Information Document. September 2007b.

— DON. (Memorandum). *Navy Munitions Response Program Guidance*. June 2005a.

— DON. Wetland Areas figure. 2005b.

— DON. (Memorandum) *Range Closure Nominations*. 1 August 2002.

— DON. Facility Map, SUBASE Kings Bay. 1999a.

— DON. General Services Administration Land Use Figure, SUBASE Kings Bay. 1999b.

— DON. Wells, Intake and Discharge Structures, and Water Treatment Facilities Map. June 1999c.

— DON. *NAVSUBASE Kings Bay Instruction 8027.2E.* Demolition Range Standard Operating Procedure. January 1997.

— DON. *Application of the Resource Conservation and Recovery Act to Conventional Explosive Ordnance Operations*. September 1993.

— DON. *Information and Regulations Governing the Use of the Demolition Range.* October 1991.

— DON. Explosive Safety Siting NSB Kings Bay. September 1988.

— DON. (Memorandum). *Explosive Ordnance Disposal and Burn Area*. 15 April 1985.

— DON. *Quarterdeck Watch Log Record.* 20 February 1983 to 19 August 1983.

Dubois, R. (Interview). Range Point of Contact, NSB Kings Bay Security Forces. 912-573-4293. 21 March 2013.

EnSafe Inc. *Site Assessment Report for the Skeet and Rifle Ranges at SUBASE Kings Bay, Georgia*. September 2003.

EnSafe Inc. (Technical Memorandum). *Skeet and Rifle Range Soil Remediation and Costs.* 2003.

Kemron. Small Arms (Rifle and Pistol) Range Clearance Verification Report, Rev. 1, U.S. Navy–Naval Submarine Base Kings Bay, Georgia. November 2006.

Kemron. Corrective Action Work Plan for Small Arms Range Clearance and Decommissioning. 2005.

Moore, J. (Interview). Civil Engineer, NSB Kings Bay Engineering/Real Estate Department. 912-573-4759. 21 March 2013.

NEESA. Initial Assessment Study of NSB Kings Bay, Georgia. September 1985.

Ratcliff, C. (Interview). Range Point of Contact, NSB Kings Bay Security Forces. 912-573-4293. 21 March 2013.

Reddick, Marguerite. Camden's Challenge. Camden County Historical Commission. 1976.

Resolution Consultants. Basewide Preliminary Range Assessment Work Plan, Naval Submarine Base Kings Bay, Georgia. October 2012.

Schoenfeld, P. (Interview). Natural Resources Manager, NSB Kings Bay Environmental Department. 912-573-4678. 20 March 2013.

Stofflet, T. (Interview). Installation Restoration Program Manager, NSB Kings Bay Environmental Department. 912-573-4646. 21 March 2013.

Thomas, E. (Interview). SWFLANT Explosives Safety Officer, NSB Kings Bay Safety Department. 912-573-4689. 20 March 2013.

Tighe, R. (Interview). Range Point of Contact, NSB Kings Bay Security Forces. 912-573-8858. 2013.

United States Army. Land Management Plan. 1968.

United States Environmental Protection Agency (U.S. EPA). 40 Code of Federal Regulation 300. *National Oil and Hazardous Substances Pollution Contingency Plan*. 2013. Retrieved from: http://ecfr.gpoaccess.gov

— U.S. EPA. *Guidance for Performing Site Inspections Under CERCLA; Interim Final.* September 1992. Retrieved from: http://www.epa.gov/superfund/sites/npl/hrsres/si/sitoc.pdf

— U.S. EPA. *Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986*. (42 United States Code §§ 9601-9675).

Appendix A (On CD)
Logbooks

Appendix B (On CD)
Documents and Records

Appendix B
Documents and Records

- Booz Allen Hamilton. *Final RCRA Facility Assessment Report, U.S. Naval Submarine Base Kings Bay, Georgia.* January 2009.
- CH2MHILL, Inc. *RCRA Permit Renewal Application Volume 1, Submarine Base Kings Bay, Kings Bay, Georgia*. July 2012a.
- CH2MHILL, Inc. *Air Modeling and Risk Assessment Process for Open Burning and Open Detonation, SUBASE Kings Bay, Kings Bay, Georgia*. December 2012b.
- Department of Defense. (Letter) Installation Survey Report, Military Ocean Terminal, Kings Bay, Georgia. June 1974.
- Department of Navy. *Quarterdeck Watch Log Record.* 20 February 1983 to 19 August 1983.
- Department of Navy. (Memorandum). *Explosive Ordnance Disposal and Burn Area*. 15 April 1985.
- Department of Navy. *NAVSUBASE Kings Bay Instruction 8027.2E.* Demolition Range Standard Operating Procedure. January 1997.
- Department of Navy. Facility Map, SUBASE Kings Bay. 1999a.
- Department of Navy. General Services Administration Land Use Figure, SUBASE Kings Bay. 1999b.
- Department of Navy. Wells, Intake and Discharge Structures, and Water Treatment Facilities Map. June 1999c.
- Department of Navy. (Memorandum) *Range Closure Nominations*. 1 August 2002.
- Department of Navy. Wetland Areas figure. 2005b.
- Department of Navy. Waste Information Document. September 2007b.
- Department of Navy. (Email). *Outdoor Range Area.* January 2010.
- Department of Navy (DON). *Waste Information Document*. January 2013.
- EnSafe Inc. *Site Assessment Report for the Skeet and Rifle Ranges at SUBASE Kings Bay, Georgia*. September 2003.
- Kemron. Small Arms (Rifle and Pistol) Range Clearance Verification Report, Rev. 1, U.S. Navy–Naval Submarine Base Kings Bay, Georgia. November 2006.
- NEESA. Initial Assessment Study of NSB Kings Bay, Georgia. September 1985.

Appendix C (On CD)
Historical Aerial Photographs