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NAS WHITING FIELD
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ECOLOGICAL TRIP REPORT NAS WHITING FIELD FL
1/1/1994
ABB ENVIRONMENTAL SERVICES, INC

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**NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA**

ECOLOGICAL TRIP REPORT

Prepared by:

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Prepared for:

**Department of the Navy, Southern Division
Naval Facilities Engineering Command
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Jeffrey Adams, Remedial Project Manager

January, 1994

ABB Environmental Services, Inc.





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NAS Whiting Field
Milton, Florida

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1.0 INTRODUCTION

This report serves as a trip report for ecological field activities conducted between October 4-7, 1993, at Naval Air Station Whiting Field (NAS Whiting Field), in Milton, Florida. During this time period, two ecologists from ABB Environmental Services, Inc. (ABB-ES) conducted ecological field activities in the Clear Creek Floodplain, adjacent to the Navy Installation Restoration (IR) program Site 16, at NAS Whiting Field. This region is here-in-after referred to as the Clear Creek Floodplain Site (CCFS).

1.1 OBJECTIVES. The primary objectives of this phase of the ecological field program were outlined in a September 13, 1993 memorandum from ABB-ES to Mr. Jeffrey Adams, of the Navy's, Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). These ecological field program objectives were developed following a review of the June 10, 1993 comments of the United States Environmental Protection Agency (USEPA) on the NAS Whiting Field Remedial Investigation (RI) Phase II-A, Technical Memorandum No. 1, Surface Water and Sediment Assessment (ABB-ES, 1993a). The objectives of this program were also discussed in a September 22, 1993 telephone conference call between ABB-ES, the USEPA, and the Navy. Personnel present during this telephone conference call were Mr. John Bleiler (ABB-ES), Mr. Eric Blomberg (ABB-ES), Mr. Jeff Adams (SOUTHNAVFACENGCOM), and Mr. Robert Pope (USEPA).

The following objectives were established for the October 4-7, 1993, phase of the NAS Whiting Field ecological field program:

- Identify and delineate the wetlands boundary in the known contaminated regions of the CCFS;
- Conduct limited field verification of the wetlands cover types in the CCFS; and,
- Map the approximate densities of white-topped pitcher plant (*Sarracenia leucophylla*) populations in the CCFS.

The results of this phase, as well as other phases, of the ecological field program at the CCFS will be incorporated into an Ecological Risk Assessment for the CCFS.



January 10, 1994

Commanding Officer
ATTN: Jeffrey Adams, Code 18510
Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29411-0068

**SUBJECT: Ecological Trip Report
Clear Creek Floodplain Site
Naval Air Station Whiting Field
Milton, Florida**

Dear Mr. Adams:

Transmitted with this letter please find two copies of the trip report for ecological field activities conducted by ABB Environmental Services, Inc. at the Clear Creek Floodplain Site, at Naval Air Station Whiting Field, in Milton, Florida. Pursuant to your request, copies of this trip report have been forwarded to the offices of the Florida Department of Environmental Protection and the United States Environmental Protection Agency, Region IV.

We look forward to discussing the results of this phase of the ecological investigation with you at your convenience. Please don't hesitate to contact either of us directly if any questions arise.

Sincerely,

ABB ENVIRONMENTAL SERVICES, INC.

Rao V.R. Angara
Task Order Manager

John A. Bleiler
Senior Environmental Scientist

cc: Tracy Stenner (ABB-ES)
Eric Blomberg (ABB-ES)
~~Robin Futch~~
File 7560.33

ABB Environmental Services, Inc.



2.0 SITE DESCRIPTION

2.1 SITE DESCRIPTION. NAS Whiting Field is located in Florida's northwest coastal area approximately 7 miles north of Milton and 20 miles northeast of Pensacola (Figure 2-1). The Clear Creek floodplain lies within the Western Highlands physiographic division of Santa Rosa County in the Coastal Plain Province. The Western Highlands are characterized by a well drained, southward sloping plateau with numerous streams. Clear Creek is located to the west and south of the installation and is a tributary to the Blackwater River, which discharges into the estuarine waters of the East Bay and Escambia Bay coastal systems.

The CCFS lies in the southwestern portion of NAS Whiting Field, to the northwest of Site 16. Site 16, a former Open Disposal and Burning Area, received the majority of the wastes generated at NAS Whiting Field between 1943 and 1965. The wastes were burned for volume reduction using waste diesel fuel.

The CCFS currently consists of several acres of densely vegetated freshwater wetlands characterized by standing and flowing water, former beaver pond impoundments, and palustrine freshwater wetlands. A precise definition of the CCFS boundaries is not currently available. Much of the surface water within the study area may come from a concrete drainage ditch in the northeastern portion of the study area. The concrete drainage ditch originates at the west end of the South Field runway No. 13. This ditch drains rainwater from the western end of the South Field runways. Groundwater discharge may also contribute to the presence of surface water at the CCFS.

The Navy conducted two studies (Phase I RI and Phase II-A RI) between 1990 and 1992 to evaluate evidence of surface water or sediment contamination in Clear Creek and its floodplain as a result of NAS Whiting Field operations (ABB-ES, 1992 and 1993a). These studies indicated that extensive sediment contamination existed in the CCFS.

Based on the results of these two RI studies, the Clear Creek Floodplain Investigation (CCFI) was initiated by the Navy to remove any drums from the floodplain in the vicinity of Site 16, define the horizontal and vertical extent of contamination, and determine the source of the contamination. The procedures, methodologies, analytical results, and recommendations of the CCFI were presented in the July, 1993 CCFI Report (ABB-ES, 1993b).

Information contained in this trip report is intended to supplement the CCFI report and to provide additional ecological information regarding the CCFS. This information will also be used in the ecological risk assessment for this site. Additional work is currently scheduled in 1994 to complete the CCFS investigation.

3.0 SUMMARY OF ECOLOGICAL FIELD PROGRAM

This CCFS ecological field program was conducted between October 4 and 7, 1993. All ecological data were recorded in a bound field log book, on photocopied data forms, or using a handheld tape recorder. All tape recorded notes have been transcribed to the bound field log book. Thirty-five milli-meter slide photographs were taken throughout this phase of the ecological field program.

Details of the ecological activities conducted during this phase of the field program are presented in the following subsections.

3.1 WETLANDS DELINEATION. The primary objective of this task was to identify and delineate wetlands in the known contaminated regions of the CCFS. All wetlands at the CCFS were identified and delineated in accordance with applicable federal and state guidelines, rules, and regulations.

The Florida wetlands boundary was defined according to Chapter 17-301 of the Florida Department of Environmental Protection (FDEP) (formerly Florida Department of Environmental Regulation [FDER]) regulations on Surface Waters of the State. These regulations state that:

"The line demarcating the landward extent of surface waters, as defined by Section 403.031, F.S., shall be established for any water body, pursuant to Section 403.817, F.S., by dominant plant species. Dominance shall be determined in a plant stratum (canopy, sub-canopy, or ground cover). The canopy is composed of all woody plants with a trunk 4 inches or greater in diameter at breast height (dbh). DBH is measured at 4.5 feet above the ground. The subcanopy is composed of all woody plants with a trunk or stem and between 1 and 4 inches and a height greater than 3 feet. The ground cover includes all other plants..."

The Federal wetlands boundary was determined using criteria for hydric soils, hydrophytic vegetation, and wetland hydrology as provided in the 1987 United States Army Corps of Engineers (USACE) Wetlands Delineation Manual (USACE Waterways Experiment Station, 1987). This manual presents technical guidance for identifying wetlands and for distinguishing wetlands from aquatic habitats and other non-wetlands.

In order to delineate the wetlands boundary at the CCFS, 25 wetland/upland boundary stations were flagged with orange surveyor's flagging. These 25 stations (labeled A1 to A25) are depicted on Figure 3-1. The wetland boundaries in the Clear Creek floodplain were generally abrupt and well defined topographically; as a result, the Florida and federal wetlands boundary line was found to be identical.

The following text presents a brief summary of the hydric soils, hydrophytic vegetation, and wetland hydrology indicators that were used to delineate the wetland boundary at the Clear Creek floodplain site.

3.1.1 Plant Community The upland plant community at the Clear Creek Floodplain site is best described as a mesic upland pine-dominated community. Wetlands communities at the upland/wetland boundary portions of the site are generally best classified as floodplain wetlands. Additional detail regarding the community composition of these community cover categories is found in Subsection 3.2 of this trip report.

Information regarding the dominant flora at three transects along the upland/wetlands boundary is included in Attachment A.

3.1.2 Soils Soils at the Clear Creek Floodplain site were classified according to the 1980 "Soil Survey of Santa Rosa County, Florida" (U.S. Department of Agriculture, Soil Conservation Service, 1980). This publication indicated that upland soils in the vicinity of the site were Troup Loamy

Sands, and that wetland (e.g., floodplain) soils were in the Bibb-Kinston association. Soils in the Bibb-Kinston association are generally poorly drained, nearly level soils which are frequently found along stream floodplains. In both the Kinston and the Bibb soils, the water table is at a depth of less than 10 inches for 6 months or more during most years. Both soils are subject to frequent flooding and have moderate permeability. Soils of the Troup series are loamy and siliceous. This well-drained upland soil type is frequently found on upland slopes, and is typically characterized by a water table greater than 6 feet below the surface.

Field verification of the Bibb-Kinston association and Troup series soil types was conducted at three transects on the wetland/upland boundary, in accordance with 1987 USACE guidelines (see Attachment A).

3.1.3 Wetland Hydrology Signs of wetland hydrology observed at the Clear Creek Floodplain site included inundated and saturated soils, standing water at the surface, wetland drainage patterns, watermarks on woody vegetation, and sediments deposits.

Information regarding the wetland hydrology at three transects along the upland/wetland boundary is included in Attachment A.

3.2 COVER TYPE VERIFICATION. The primary objective of this ecological field program task was to conduct limited field verification of the National Wetlands Inventory (NWI) wetlands cover types in the Clear Creek floodplain adjacent to Site 16. NWI maps are prepared by the U.S. Fish and Wildlife Service to identify, classify, and map wetlands and other aquatic habitats. In order to define wetlands cover types, NWI maps employ the technical classification system of Cowardin et al. (1979).

The NWI map for the Milton North quadrangle indicated that the primary wetlands cover type in the CCFS is a palustrine forested wetlands dominated by broad-leaved deciduous trees (see Figure 3-2). According to Cowardin et al. (1979), palustrine forested wetlands are characterized by woody vegetation that is 6 meters or taller. These wetlands generally possess an overstory of trees, and understory of young trees and shrubs, and a herbaceous layer.

The CCFS was found to be a palustrine forested wetland dominated by broad-leaved deciduous trees, as indicated in the NWI maps. However, the large scale of the NWI maps is not ideal to evaluate sites comprising only a few acres, such as the CCFS. In order to provide additional detail regarding the community cover types and ecological receptors at the CCFS, a more detailed ecological cover type map was prepared (Figure 3-1). This map includes cover types that were identified through field traverses of the floodplain site.

In general, cover type were assigned according to the Florida Natural Areas Inventory (FNAI) and Florida Department of Natural Resources (FDNR) 1990 "Guide to the Natural Communities of Florida". This document presents a hierarchical classification of 81 "Natural Community Types" that have been assigned by the FNAI to represent the original biological associations in Florida. Cover types at the CCFS broadly fall into what FNAI refers to as Mesic Upland and Floodplain Wetland "Natural Community Categories".

Within the Mesic Upland and Floodplain Wetland Natural Community Categories, the FNAI Natural Community Types that best characterize the site are depicted in Figure 3-1. It is important to recognize that significant overlap exists between FNAI cover types because of overlapping species distribution and physical characteristics. In addition, the Clear Creek Floodplain site is a physically altered and contaminated site; the FNAI cover types represent the original, natural biological associations of Florida, and do not fully correspond with the cover types observed during the ecological field program. The following text briefly describes the FNAI Natural Community Cover Types mapped at the Clear Creek Floodplain site:

3.2.1 Mesic Uplands Mesic Uplands are defined by FNAI (1990) as "dry to moist hills of sand with varying amounts of clay, silt or organic material. This Natural Community Category typically contains a diverse mixture of needle- and broad-leaved, temperate woody species.

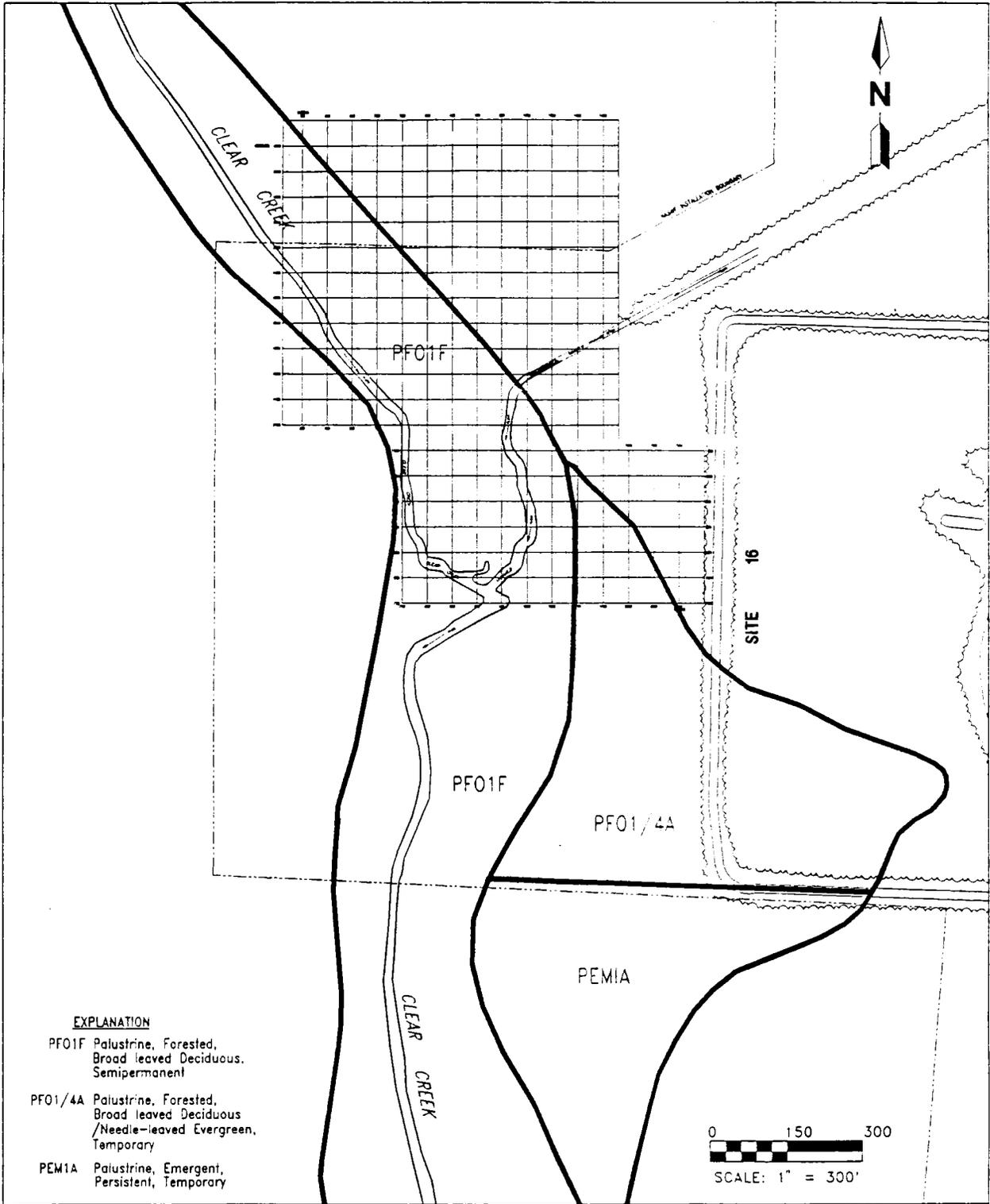
3.2.1.1 Upland Pine Forest Upland pine forest occurs upgradient of the eastern portion of the CCFS. This cover type is characterized by widely spaced longleaf pine (*Pinus palustris*), and includes slash pine (*Pinus elliotii*), water oak (*Quercus nigra*), laurel-leaved oak (*Q. laurifolia*), black cherry (*Prunus serotina*), largeleaf magnolia (*Magnolia grandiflora*), and various holly species (*Ilex* spp.). Greenbriar (*Smilax bona-nox*), blueberry (*Vaccinium arbutifolium*), poison ivy (*Toxicodendron radicans*), and bracken fern (*Pteridium aquilinum*) dominate the understory at the upland portion of the CCFS.

The CCFS upland pine forest also shares some characteristics of upland mixed forest, with various hardwood species occurring throughout the coniferous forest stands.

3.2.2 Floodplain Wetlands According to FNAI (1990), the Floodplain Wetlands Natural Community Category typically occurs on flat, alluvial sand or peat substrates associated with riverine systems. Floodplain wetlands are generally not permanently inundated, but are subjected to frequent flooding.

Although an attempt has been made to differentiate the floodplain communities at the CCFS based upon the degree of saturation and inundation, as well as the vegetative cover type, significant overlap exists between FNAI cover types.





**FIGURE 3-2
NATIONAL WETLANDS
INVENTORY COVER TYPES**



CLEAR CREEK FLOODPLAIN

**NAS WHITING FIELD
MILTON, FLORIDA**

Therefore, distinctions between floodplain cover types is not intended to represent clearly demarcated ecological community boundaries.

3.2.2.1 Floodplain Forest This cover type at the CCFS occurs on slightly drier soils within the floodplain. The site's floodplain forest is dominated by buttressed woody vegetation, including tupelo, red maple, white cedar (*Chamaecyparis thyoides*) and sweet bay magnolia (*Magnolia virginiana*). Swamp titi (*Cyrilla racemiflora*) tends to dominate much of the dense shrub community in the upper regions of the floodplain, and black titi (*Cliftonia monophylla*) occurs sparsely at the site. Several holly species (*Ilex* spp.), Virginia willow, poison ivy, royal fern (*Osmunda cinnamomea*), and chain fern (*Woodwardia areolata*) all occur regularly throughout the floodplain forest at the CCFS. This cover type has been referred to as Nyssa/Magnolia floodplain forest on Figure 3-1. In addition, un-contaminated portions of the site to the east of the unnamed tributary have been referred to as Ligustrum/Ilex floodplain forest, since a shrub community dominated by hollies and privet (*Ligustrum sinense*) occurs in this region.

The CCFS floodplain forest is associated with and grades into floodplain swamp. Portions of these floodplain communities also resemble the FNAI baygall seepage wetland community cover type. Baygall seepage wetlands are frequently found at the base of slopes where downslope seepage contributes to a saturated, peaty substrate.

3.2.2.2 Floodplain Swamp This cover type at the CCFS occurs on wetter, flooded soils in low spots, channels, and depressions within the Clear Creek floodplain. The site's floodplain swamp is dominated by buttressed woody vegetation, including tupelo and red maple. Swamp titi tends to be the dominant member of the CCFS floodplain swamp shrub community, which is typically sparser than the dense understory that characterizes the site's floodplain forest. Goldenclub (*Orontium aquaticum*) is a dominant member of the herbaceous community in the site's floodplain swamp, particularly in areas with year-round standing water. These areas have been designated on Figure 3-1 as deepwater *Orontium* floodplain swamp (i.e., those open areas with 1 meter or more standing water) and *Nyssa/Orontium* floodplain swamp (i.e., those forested areas with less than 1 meter standing water). Additional herbaceous species noted in the CCFS floodplain swamp include beggar ticks (*Bidens mitis*), marsh St. John's wort (*Triadenum virginicum*), an orchid (*Platanthera repens*), three-way sedge (*Dulichium arundinaceum*), and pipewort (*Eriocaulon decangulare*).

The CCFS floodplain swamp is associated with and grades into floodplain forest. Portions of these floodplain communities also resemble the FNAI baygall seepage wetland community cover type. Baygall seepage wetlands are frequently found at the base of slopes where downslope seepage contributes to a saturated, peaty substrate.

***Paspalum* Bog.** A small region of marshy, bog habitat occurs to the east of the unnamed tributary in the southeastern portion of the CCFS. This region is characterized by a dense, floating mat of rooted herbaceous vegetation atop 1 to 2 feet of standing water. This region does not appear to meet any of the characteristics of the natural communities outlined in the FNAI (1990) publication; however, it has certain characteristics of floodplain marsh and basin wetland bog.

Vasey grass (*Paspalum urvillei*) dominates the herbaceous community in this portion of the site. This graminoid is native to South America, but has been naturalized in several southeastern states. Few woody species occur in this region, although an occasional red maple sapling was observed on the floating mat. Additional herbaceous species observed in the *Paspalum* bog include a rush species (*Juncus* sp.), horsetail (*Equisetum* sp.), and water pennywort (*Hydrocotyle* sp.).

The CCFS *Paspalum* bog is associated with and grades into floodplain forest and floodplain swamp. It occurs directly to the east of dredged unnamed tributary and may originally have been created from floodplain wetland communities as a result of human activity.

3.3 PITCHER PLANT SURVEY. The primary objective of this ecological field program task was to map the locations of the white-topped pitcher plant (*Sarracenia leucophylla*) at the CCFS. During the Phase II-A surface water and sediment sampling program, numerous specimens of the white-topped pitcher plant were observed in the vicinity of the site.

The white-topped pitcher plant is a state-endangered species in Florida, and is a candidate for listing under the federal Endangered Species Act (Florida Game and Freshwater Fish Commission [FGFWFC], 1991). The white-topped pitcher plant has been previously observed at NAS Whiting Field, within northern portions of the Clear Creek floodplain in the vicinity of Forest Stand 23 (Environmental Protection Systems, Inc. [EPS], 1991). However, prior to the Phase II-A sampling program, it was not known to occur in the floodplain in the vicinity of Site 16.

This species is a perennial herb that grows from a heavy rhizome. It is typically found in open bogs, with sphagnum mosses (*Sphagnum* spp.) and other plants characteristic of moist, acidic conditions. The major risks to the white-topped pitcher plant include habitat destruction for agricultural and forestry purposes. This species is known to occur in southwestern Georgia, in Florida, and in southeastern Mississippi. In Florida, this species is limited to 12 counties in the western portions of the panhandle (Florida Committee on Rare and Endangered Plants and Animals, undated).

The pitcher plant population at the CCFS was surveyed through visual inspection of all plant populations within the study area. During the original CCFI, a geophysical survey was conducted in the floodplain to determine the presence or absence of buried ferrous objects. A 50 foot by 50 foot survey grid was established throughout the floodplain to facilitate the geophysical survey. This 50 foot by 50 foot survey grid was used as the basis for the pitcher plant survey in the Clear Creek floodplain.

In order to evaluate the approximate abundance and density of pitcher plants in this region, white-topped pitcher plant distributional data were superimposed on the existing geophysical grid map. Because the grid did not extend into the north-western portion of the floodplain, it was extended into this region for the purpose of the pitcher plant study. Belt transects were conducted, on foot, within each 2500 square foot (ft²) grid (50 foot by 50 foot) by two field ecologists examining the grid for the presence of the white-topped pitcher plants. Several grids in the northwestern portion of the site were inaccessible on foot and were accessed via an aluminum canoe. Whenever a colony of white-

topped pitcher plants was encountered, the approximate number of individuals in the colony was estimated and recorded on the base map. For several representative grid squares, additional information regarding the Natural Community Cover Type was also recorded in the field log book and on field data sheets. Figure 3-3 presents the results of the white-topped pitcher plant study. Rather than expressing population density as a single number, numbers of pitcher plants per 2500 ft² grid square were expressed as a range of numbers (i.e., 0-5, 5-10, 10-20, 20-50, 50-100, 100-200, 200 plus).

White-topped pitcher plants were found throughout the northern and northwestern portions of the CCFS. No pitcher plants were observed to the south or east of the drainage ditch carrying water from the NAS Whiting Field airfields. Densities of pitcher plants ranged from less than 5 per 2500 ft², to greater than 200 per 2500 ft². The highest pitcher plant density was observed in the northwestern portion of the site, to the west of the former beaver pond impoundment. Plants in this region were frequently greater than 1 meter in height and exhibited luxurious growth. Species co-occurring with pitcher plants in this region included goldenclub (*Orontium aquaticum*), beggar ticks (*Bidens mitis*), st. john's wort (*Hypericum nitidum*), Virginia willow (*Itea virginica*), tupelo (*Nyssa sylvatica*), and pipewort (*Eriocaulon decangulare*). This plant community is similar to the community which co-occurs with pitcher plants in the northern portion of NAS Whiting Field, in the Clear Creek floodplain (EPS, 1991).

Over 1150 individual specimens of white-topped pitcher plant are estimated to occur in the CCFS. Because the white-topped pitcher plant is known to occur elsewhere in the Clear Creek floodplain at NAS Whiting Field, the total number of individual specimens at the installation is likely considerably higher.

3.3.1 Water Sundew (*Drosera intermedia*) While conducting the white-topped pitcher plant survey, a second state-listed species, the water sundew (*Drosera intermedia*), was observed at the CCFS. This diminutive carnivorous plant is designated as threatened by the state of Florida. The water sundew has been previously observed elsewhere at the northern portion NAS Whiting Field, in the Clear Creek floodplain at Forest Stand 23 (EPS, 1991).

The water sundew is a small perennial herb that ranges throughout much of eastern North America. In Florida, it is known to occur sporadically in the Peninsula and in the Panhandle. This species typically occurs in bogs with open standing water (Florida Committee on Rare and Endangered Plants and Animals, undated).

The water sundew's diminutive stature makes it a difficult plant to survey at the CCFS. It appears to be most abundant in the southern end of the former beaver impoundment located in the northeasterly region of the CCFS, where it co-occurs with white-topped pitcher plant (see Figure 3-3). It is estimated that at least 600 specimens of the water sundew occur at the CCFS; however, this number could represent a low estimate, as this small plant is easily over-looked in the dense, impenetrable terrain that characterizes this portion of the CCFS.

4.0 TRIP REPORT SUMMARY

In summary, at least 1150 individual white-topped pitcher plants are known to occur at the CCFS. In addition, a second state-listed plant species, the water sundew, was observed at the CCFS. The vegetative cover types at the site include mesic uplands and floodplain wetlands; the boundary between the CCFS wetland and adjacent uplands has been delineated. Several figures have been prepared summarizing known information regarding: (1) ecological communities at the CCFS; (2) the CCFS wetland delineation; and (3) the presence of rare and endangered flora at the CCFS.

The information contained in this trip report is intended to supplement the CCFI report and to provide additional ecological information regarding the CCFS. Data contained herein will be incorporated into the forthcoming Ecological Risk Assessment for the CCFS. Additional work is currently scheduled in 1994 to complete the CCFS investigation.

ATTACHMENT A

REFERENCES

- ABB Environmental Services, 1992, Technical Memorandum No. 4, Surface Water and Sediments. Naval Air Station Whiting Field, Milton, Florida: prepared for SOUTHNAVFACENGCOC, Charleston, South Carolina
- ABB Environmental Services, 1993a, Technical Memorandum No. 1, Final Draft, Surface Water and Sediment and Sediment Assessment. Naval Air Station Whiting Field, Milton, Florida: prepared for SOUTHNAVFACENGCOC, Charleston, South Carolina
- ABB Environmental Services, 1993b, Clear Creek Floodplain Investigation Report. Naval Air Station Whiting Field, Milton, Florida: prepared for SOUTHNAVFACENGCOC, Charleston, South Carolina
- Cowardin, L.M., Carter, V., Golet, F.C., and LaRoe, E.T. 1979, Classification of Wetlands and Deepwater Habitats of the United States, U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C.
- Environmental Protection Systems, 1991, Survey of Rare, Threatened, and Endangered Plants at Naval Air Station Whiting Field and Nearby Outlying Landing Fields, Final Report, Environmental Planning Systems, Inc., Pensacola, Florida, April 26, 1991.
- Florida Committee on Rare and Endangered Plants and Animals, undated, Rare and Endangered Biota of Florida, Volume 5, Plants. University Press of Florida, Gainesville, Florida
- Florida Game and Freshwater Fish Commission (FGFWFC), 1991, Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida. Compiled by D.A. Wood, Endangered Species Coordinator.
- Florida Natural Areas Inventory (FNAI), 1990, Guide to the Natural Communities of Florida. FNAI and Florida Department of Natural Resources, Tallahassee, Florida.
- United States Army Corps of Engineers (USACE), Waterways Experiment Station, 1987, Corps of Engineers Wetlands Delineation Manual, USACE, Washington, D.C.
- United States Department of Agriculture, Soil Conservation Service, 1980. Soil Survey of Santa Rosa County, Florida.

DATA FORM 1
WETLAND DETERMINATION

(A-1)
Aggravant

Applicant Name: N/As Whiting Fld Application Number: --- Project Name: Creek - Floriplein
State: IL County: Santa Rosa Legal Description: --- Township: --- Range: ---
Date: 5 OCT 1993 Plot No.: A-1 Section: A
Transect

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk. (see remark)

Species	Indicator Status	Species	Indicator Status
<u>Trees</u>		<u>Herbs</u>	
1. <u>Pinus palustris</u>	<u>FACU*</u>	7. <u>Pteridium aquilinum (3)</u>	<u>FACU</u>
2. <u>Cercocarpus lanifolia (1)</u>	<u>FACW</u>	8.	
3.		9.	
<u>Saplings/shrubs</u>		<u>Woody vines</u>	
4. <u>Magnolia grandiflora (1)</u>	<u>FAC*</u>	10. <u>Smilax bona-nox (3)</u>	<u>FAC</u>
5. <u>Ilex vomitoria (1)</u>	<u>FAC</u>	11.	
6. <u>Quercus nigra (sapl) (1)</u>	<u>FAC</u>	12.	

% of species that are OBL, FACW, and/or FAC: 6/7. Other indicators: ---
Hydrophytic vegetation: Yes --- No X. Basis: Pinus palustris

Soil
Series and phase: Trois Leamy Sand On hydric soils list? Yes ---; No X.
Mottled: Yes ---; No X. Mottle color: red at 24"; Matrix color: ---.
Gleyed: Yes --- No X Other indicators: none.
Hydric soils: Yes --- No X; Basis: Soil survey, Santa Rosa Co. USFCS
(description on back)

Hydrology
Inundated: Yes ---; No X. Depth of standing water: none present.
Saturated soils: Yes ---; No X. Depth to saturated soil: 22".
Other indicators: dry loamy sand / no hydro. indicators.
Wetland hydrology: Yes ---; No X. Basis: ---.
Atypical situation: Yes ---; No X.
Normal Circumstances? Yes X No ---.
Wetland Determination: Wetland ---; Nonwetland X.

Comments:
- 15' - 20' above present boundary
A transect is 41° from SD-1
- open understory
- clear topographic distinction
- trees are dominant strata

Determined by: JLB / NR
32

SOILS

- 0 - pine needle/oak litter - partially decomposed
- 0-4" dark brown duff w/ fibrous root matter
- 4" - 7" 10YR 5/2 dark gray/brown loamy sand
- 7" - 24" 10YR ~~4/4~~ 4/4 yellowish-brown loamy sand
- saturated soil at 20"-22"

A1
usgril.

DBH w/in 30'

Pines (P. palustris)
FACU

16.9"
14.4"
16.5"
14.3"
11.9"
9.3"

Quercus SB. FAC
2.7"

83.3
80% pine aerial coverage

96% FACU

downgraded

DATA FORM 1
WETLAND DETERMINATION

Applicant Name: NAS WHITING Application Number: Project Name: Clean Creek Floodplain
State: FL County: Santa Rosa Legal Description: Township: Range:
Date: 5 OCT 93 Plot No.: A-2 Section: A
Transect

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

Species	Indicator Status	Species	Indicator Status
<u>Trees</u>		<u>Herbs</u>	
*1. <i>Nyssa sylvatica</i>	OBL	7. <i>Sphagnum</i> 50%	OBL Grass 15%
2. <i>Pinus palustris</i>	FACW+	8. <i>Carex</i> sp.	20%
*3. <i>Magnolia virginiana</i>	FACW+	9. <i>Woodwardia virginiana</i>	15% OBL
<u>Saplings/shrubs</u>		<u>Woody vines</u>	
4. <i>Ilex vomitoria</i> (1)	FAC	10. <i>S. bonariensis</i> (4 stems)	FAC
5. <i>Cynilla coccinea</i> (10)	FACW (1)	11. <i>O. laurifolia</i>	FACW (1)
6. <i>Clathrus alniifolius</i> (1)	FACW	12. <i>Viburnum acerifolium</i>	FACW
* = Unknown (2) % of species that are OBL, FACW, and/or FAC: <u>N/A</u> . Other indicators: <u>buttressed + swollen tree bases</u>			

Itea
FACW

Hydrophytic vegetation: Yes No Basis: OBL + FACW

Soil

Series and phase: B:bb Series On hydric soils list? Yes ; No
Mottled: Yes ; No Mottle color: ; Matrix color:
Gleyed: Yes No Other indicators:
Hydric soils: Yes No Basis: Soil Survey Santa Rosa Co. US 15
(see reverse)

Hydrology

Inundated: Yes ; No Depth of standing water: 1" in seep pockets / 12' at 220" H2O (6")
Saturated soils: Yes ; No Depth to saturated soil: Surface
Other indicators: buttressed trees, stained leaves, wetland hydrology
Wetland hydrology: Yes ; No Basis:
Atypical situation: Yes ; No
Normal Circumstances? Yes No
Wetland Determination: Wetland ; Nonwetland

Comments:

- dense mud layer

Determined by: JAS/NA
B2

A-2 SOIL CORE

A 2
downed

- 0 - 1/2" leaf litter (1° tussock leaves)
- 0 - 6" dark grey silt loam, many roots, granules 10YR 3/1
- gradual boundary below 6" -> 6"
- 6" - 28" gray silt loam (10YR 5/2) with grey mottles 7.5YR 4/6
fine granular sand, few roots
- 28" - 36" yellow ^{brown} grey silt loam 10YR 6/6

standing water at surface / saturated + inundated

<u>Trees</u>	FACU	FACW	OBC
<u>P. palustris</u>		<u>Mag. v. g.</u>	<u>Nyssa sylv.</u>
18.2		9"	6.7"
		12.8"	9"
		8.2"	9"
18.2		5.4"	6.6"
		10.2"	29.3
		<u>45.6</u>	

$\Sigma = 93.1$

80% FACW or OBC

BI - 10/1/93

DATA FORM 1
WETLAND DETERMINATION

Applicant Name: NAS WHITING FIELD Application Number: Project Name: Clean Creek Floodplain
State: FL County: Santa Rosa Legal Description: Township: Range:
Date: 5 OCT 93 Plot No.: B1 Section: B
Transect

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk. (see map)

<u>Species</u>	<u>Indicator Status</u>	<u>Species</u>	<u>Indicator Status</u>
<u>Trees</u>		<u>Herbs</u>	
1. <u>G. lamifolia</u>	<u>FACW</u>	7.	
2. <u>P. palustris</u>	<u>FACU+</u>	8.	<u> </u>
3. <u>Magnolia grandiflora</u>	<u>FAC+</u>	9.	
<u>Saplings/shrubs</u>		<u>Woody vines</u>	
4. <u>Magnolia grandiflora (1)</u>	<u>FAC+</u>	10. <u>S. bona-nox</u>	<u>5 FAC</u>
5. <u>Vaccinium elliptici (2)</u>	<u>FACT</u>	11. <u>Urtica rotund.</u>	<u>1 FAC</u>
6. <u>Ilex vomitoria (1)</u>	<u>FAC</u>	12.	<u>2</u>
<u>Common Florida</u>	<u>FACU</u>		
% of species that are OBL, FACW, and/or FAC: <u>9</u> . Other indicators: <u> </u>			
Hydrophytic vegetation: Yes <u> </u> No <u>X</u> . Basis: <u> </u>			

Soil

Series and phase: Troup loamy sand On hydric soils list? Yes ; No X.
Mottled: Yes ; No X. Mottle color: ; Matrix color: .
Gleyed: Yes No X Other indicators: .
Hydric soils: Yes No X; Basis: Soil Survey Santa Rosa Co, USGS (reverse)

Hydrology

Inundated: Yes ; No X. Depth of standing water: NONE.
Saturated soils: Yes ; No X. Depth to saturated soil: .
Other indicators: no hydric indicators.
Wetland hydrology: Yes ; No X. Basis: .
Atypical situation: Yes ; No X.
Normal Circumstances? Yes No .
Wetland Determination: Wetland ; Nonwetland X

Comments:

Ca. 100' E of ditch, 41° off wetland line (10' N of 950, 1300)
- open understory

Determined by: FB/NR

SOILS

- 0 - mixed l.l. pine (*P. palustris*) + May-grass litter (2")
- 0-3" 10 YR 5/2 gray-brown fine loamy sand, considerable fine roots
- 3" - 14" 10 YR 5/4 dark yellow-brown loamy sand, fine grained

~~14" - 24" 10 YR 5/6~~

14" - 24" 10 YR 5/6 yellowish-red fine sandy loam saturated at ca 26"

B1
48

DISH

Plants (Trees 30')

P. palustris

- 14.6
- 8.6
- 7.7
- 20.3"
- 16.1"
- 16.9"

83.8

~~16.0~~

May grass

- 4.3"
- 5.8"
- 3.2"
- 5.8"
- 3.4"
- 4.1"

26.6

O. lanifolia

- 3.8"
- 3.5 5"
- 5.9"
- 5.5"
- 4.3"
- 3.2"
- 6.7"

32.5

O. sp

3.8"

3.8

$\Sigma = 146.7$

43% FAC, FACW, OBL

57% FACU

DATA FORM 1
WETLAND DETERMINATION

B2
downgraded

Applicant Name: NAS Whiting Field Application Number: — Project Name: Clean Creek Floodplain
 State: FL County: Santa Rosa Legal Description: — Township: — Range: —
 Date: 9 OCT 93 Plot No.: B-2 Section: B-

Transsect

Vegetation [List the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

Species	Indicator Status	Species	Indicator Status
<u>Trees</u>		<u>Herbs</u>	
1. <i>Magnolia virginiana</i>	FACW-	7. <i>Ornithogalum virginicum</i>	OBL
2. <i>Nyssa sylvatica</i>	OBL	8. <i>Sphagnum</i> (dominant)	30-40% OBL
3. <i>Chaenocarya thymifolia</i>	OBL	9. <i>Chamaetypis</i> (20%)	OBL
		grass (30%)	<i>Rhynchospora</i> (1)
			OBL

<u>Saplings/shrubs</u>		<u>Woody vines</u>	
4. <i>Chamaetypis</i> (3)	FACW	10. <i>Sida acuta</i> (1)	FAC
5. <i>Cynilla</i> (5)	FACW	11.	
6. <i>Fraxinus</i> (1)	FACW	12.	

% of species that are OBL, FACW, and/or FAC: 9/14. Other indicators: —
 Hydrophytic vegetation: Yes No Basis: FACW + OBL dominant

Soil
 Series and phase: Bibb-Kinstan Associa On hydric soils list? Yes ; No
 Mottled: Yes ; No . Mottle color: —; Matrix color: —
 Gleyed: Yes No Other indicators: —
 Hydric soils: Yes No ; Basis: Soil survey Santa Rosa Co., USFCS

Hydrology
 Inundated: Yes ; No . Depth of standing water: 0
 Saturated soils: Yes ; No . Depth to saturated soil: 4"
 Other indicators: string leaf, H₂O marks on rotten trunks, sedimentation
 Wetland hydrology: Yes ; No . Basis: —
 Atypical situation: Yes ; No .
 Normal Circumstances? Yes No .
 Wetland Determination: Wetland ; Nonwetland

Comments:
 - topography distinct
 - dense shrub layer

Determined by: JAB/VR
 B2

SOILS

DE down

- 0 - magnolia leaf litter (w/ Nycya) 2.5" thick
- 0 - 5" organic root mass, ^{6-12"} dark grey fine silty loam
 10 YA 3/1 fine granular structure
 (~~no~~ roots)
- 12" ~~6"~~ - 18" grey w/ slight yellow silt loam, fine granular
 10 YA 5/2 to 10 YA 4/2
- 18" - 26" light brownish grey silt loam, no roots,
 fine granular
 - matrix of 10 YA 5/3 w/ mottles
 at 7.5 YA 4/6

<u>Trees</u>		DBH (trees w/in 30')		
<u>Chaerogon</u>	<u>OBC + Gyrids</u>	<u>Nyssa syl.</u>	<u>O. nigra</u>	<u>FACW</u>
		4.7"	4.6"	6.9
		4.0		4.7
		3.8"		5.1
		3.3"		10.9"
		4.5"		
		5.1"		
		5.4"		
		4.1"		
		4.5		
		4.6"		
		3.8"		
		4.7		
		<u>52.5</u>		
23.1			4.6	27.6

$\Sigma = 107.8$

95% OBC or FACW

DATA FORM 1
WETLAND DETERMINATION

C-2
up gradient

Applicant Name: NAJ Whiting FLL Application Number: Project Name: Clean Creeks Floodplain
 State: FL County: Santa Rosa Legal Description: Township: Range:
 Date: 5 OCT 02 Plot No.: C-2 Section:
 Transect

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

Trees		Herbs	
Species	Indicator Status	Species	Indicator Status
1. <u>OUCA</u>		7. <u> </u>	
2. <u> </u>		8. <u> </u>	
3. <u> </u>		9. <u> </u>	
Saplings/shrubs (open indicator)		Woody vines	
4. <u>Jlex umata (3)</u>	FAC	10. <u>Toxicodendron radicans</u>	50 FAC
5. <u>Myrsine (3)</u>	FAC+	11. <u>Smilax bona-nox</u>	50 FAC
6. <u>Mg virgin (1)</u>	FACw+	12. <u> </u>	

% of species that are OBL, FACW, and/or FAC: 8/8 Other indicators:
 Hydrophytic vegetation: Yes No Basis: FAC 10

Soil USSC
 Series and phase: Trough loamy sand On hydric soils list? Yes ; No
 Mottled: Yes ; No Mottle color: ; Matrix color:
 Gleyed: Yes No Other indicators:
 Hydric soils: Yes No Basis: Soil Survey, Santa Rosa Co, USSCS

Hydrology
 Inundated: Yes ; No Depth of standing water: NONE
 Saturated soils: Yes ; No Depth to saturated soil: 28"
 Other indicators:
 Wetland hydrology: Yes ; No Basis: no indicators
 Atypical situation: Yes ; No
 Normal Circumstances? Yes No
 Wetland Determination: Wetland ; Nonwetland

Comments:

Determined by: JTB/NAJ

SOILS

CR
UR

- 0 - pine/may grandiflora 2" leaf litter
- 0 - 4" grey-brown medium 10 YR 5/3
to fine loamy sand
- 4" - 13" yellowish brown fine granular loamy
sand (10 YR 4/4)
- 13" - 30" yellow brown fine granular/sand (loamy)
10 YR 5/6

Saturated 28"
H₂O at 30" 36"

May grad (FAC ⁺)	May ^(D5H) via (FACW)	Q. laevis (FACW)	Q. ?
8.5 4.4	6.5	5.8	10.9
6.1 6.5	3.05	6.9	6.5
5.9 8	9.55	12.7	17.4
<u>31.8</u>			

Cornus florida (FACU)	P. palustris (FACU)	Q. nigra (FAC)
5.6	12.6	13.9
6.3 (dead)	18	
5.9	30.6	13.9
<u>17.8</u>		

- 31.8 FAC⁺
- 9.6 FACW⁺
- 12.7 FACW
- 17.4 Q. ? = FAC
- 17.8 FACU
- 30.6 FACU⁺
- 13.9 FAC

85% FAC OR FACW

133.8

DATA FORM 1
WETLAND DETERMINATION

C-2
downy oak

Applicant Name: NAS Whitig Field Application Number: _____ Project Name: Creek Floodplain
 State: FL County: Santa Rosa Legal Description: _____ Township: _____ Range: _____
 Date: 5 OCT 93 Plot No.: C-2 Section: C

Transect

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

Species	Indicator Status	Species	Indicator Status
<u>Trees</u>		<u>Herbs</u>	
1. <i>Nyssa sylvatica</i>	OBL	7. <i>Woodwardia vir.</i>	60% OBL
2. <i>Mg virginiana</i>	FACW*	8. <i>Osmia regalis</i>	30% OBL
3.		9. <i>Sphagnum</i>	10% OBL
<u>Saplings/shrubs (dense)</u>		<u>Woody vines</u>	
4. <i>Acer rubrum</i>	10 FAC	10. <i>Toxicodendron radicans</i>	50 FAC
5. <i>Cyrilla</i>	80 FACW	11. <i>Smilax bonariensis</i>	50 FAC
6. <i>Ilex?</i>	5 FAC	12.	

dead?

% of species that are OBL, FACW, and/or FAC: 10. Other indicators: bothland
 Hydrophytic vegetation: Yes No . Basis: Dominant of OBL over

Soil

Series and phase: Bald Series On hydric soils list? Yes _____; No _____
 Mottled: Yes ; No _____ Mottle color: _____; Matrix color: _____
 Gleyed: Yes _____ No Other indicators: _____
 Hydric soils: Yes _____ No ; Basis: USCS, Soil Survey of Santa Rosa Co. (over for soil profile)

Santa Rosa Co.

Hydrology

Inundated: Yes _____; No . Depth of standing water: 0.5" 10' down from plot
 Saturated soils: Yes ; No _____ Depth to saturated soil: 0"
 Other indicators: stained leaves; steady H₂O w/in 10'; buttressed trees
 Wetland hydrology: Yes ; No _____ Basis: _____
 Atypical situation: Yes _____; No .
 Normal Circumstances? Yes No _____
 Wetland Determination: Wetland ; Nonwetland _____

H₂O
TBL at
8"

Comments:

ca 50' S of L 1150
(130°) 8 1100

Determined by: JB / NR

AT L 1150
8 11050

- Topography distinct
- dense shrub layer

C2
down

SOILS

sweet bay/tupelo leaf litter
 0-4" fibrous root matter
 4"-12" dark grey silt loam, fine to medium granular
 10 YR 3/1 - some fine roots + medium roots
 12"-24" dark grey silt loam 10 YR 5/2 w/ matter
 fine granular / matter at 10 YR 5/3

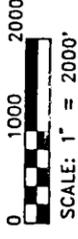
- sat. to surface
 - GW at 8"

TREES (dbh)

DBL Nyssa	FACW Magnolia
5.4	10.2
4.4	6.3
5.7	7.4
4.3	9.1
4.3	10.3
4.4	8.8
4.4	6.2
5.4	5.7
	1
<hr/>	<hr/>
38.3	64

100% FACW = DBL

102.3



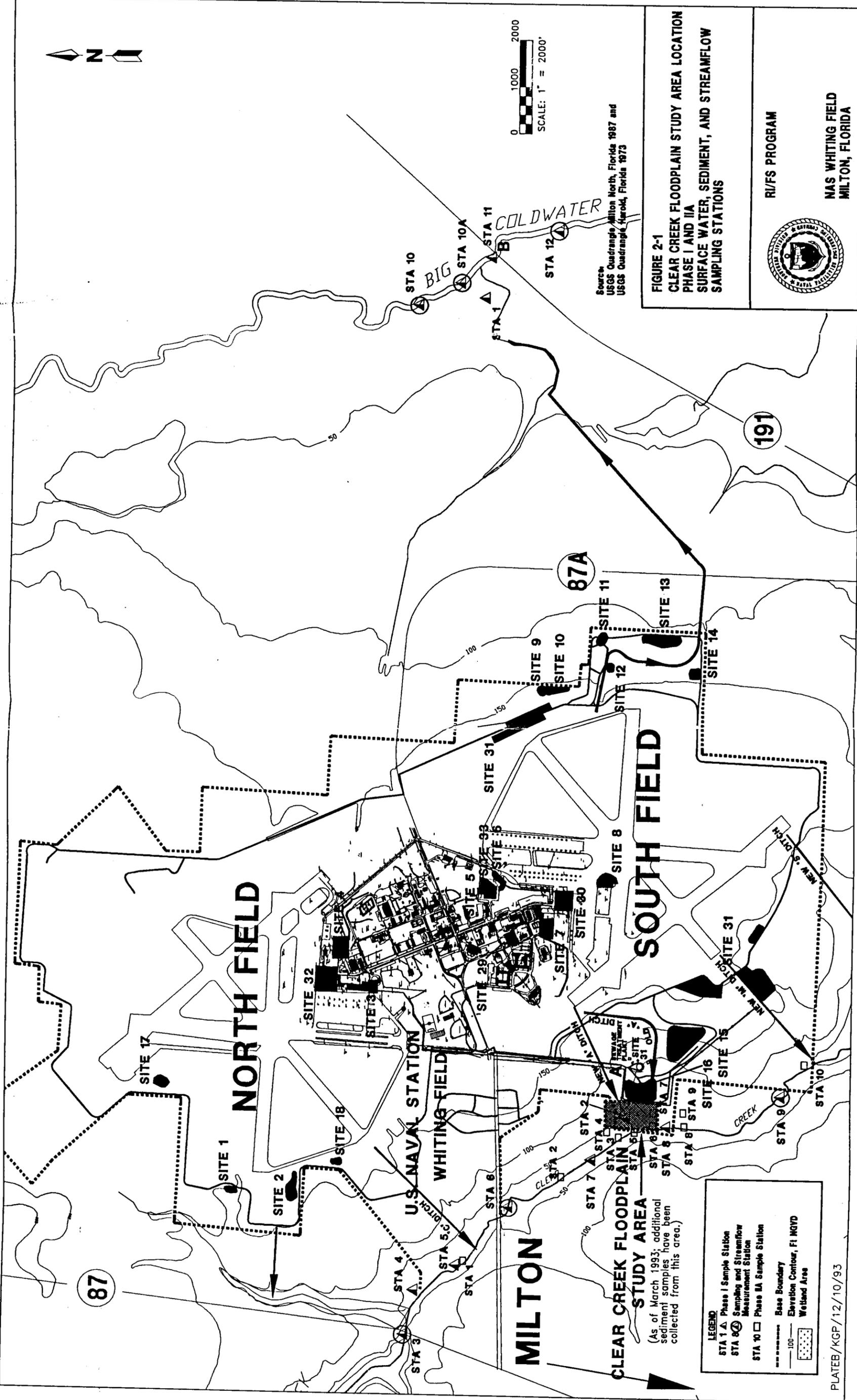
Source:
USGS Quadrangle Milton North, Florida 1987 and
USGS Quadrangle Harold, Florida 1973

FIGURE 2-1
CLEAR CREEK FLOODPLAIN STUDY AREA LOCATION
PHASE I AND IIA
SURFACE WATER, SEDIMENT, AND STREAMFLOW
SAMPLING STATIONS



R/I/F/S PROGRAM

NAS WHITING FIELD
MILTON, FLORIDA



LEGEND

- STA 1 Δ Phase I Sample Station
- STA 8 \otimes Sampling and Streamflow Measurement Station
- STA 10 \square Phase IIA Sample Station
- Base Boundary
- 100- Elevation Contour, F1 NGVD
- Wetland Area

STUDY AREA
(As of March 1993; additional sediment samples have been collected from this area.)