4

Naval Air Station Whiting Field

Milton, Florida
CERCLIS #FL2170023244

Site Exposure Potential

The Naval Air Station (NAS) Whiting Field site occupies approximately 1,000 hectares in northwestern Florida, about 32 km northeast of Pensacola (Figure 1). The site is located within the Clear Creek and Big Coldwater Creek watersheds, approximately 7 km upstream from the Blackwater River. Clear Creek meanders in and out of the eastern site boundary and Big Coldwater Creek is approximately 3 km beyond the western site boundary. Water from the Blackwater River flows successively into Blackwater Bay, East Bay, Pensacola Bay, and eventually, the Gulf of Mexico. NAS Whiting Field is approximately 65 km from the Gulf of Mexico.

NAS Whiting Field has served as a naval aviation training facility since 1943. Historical records indicate that NAS Whiting Field generated a variety of wastes related to pilot training, the operation and maintenance of aircraft and ground support equipment, and the station's facility maintenance activities. Before hazardous waste management programs were established, most of the hazardous wastes were reportedly disposed on-site. It has been estimated that thousands of liters of wastes, including paints, paint thinners, solvents, waste oils, gasoline, hydraulic fluids, aviation gasoline (AVGAS), tank-bottom sludges, transformer fluids containing PCBs, and paint-stripping wastewater were potentially dumped

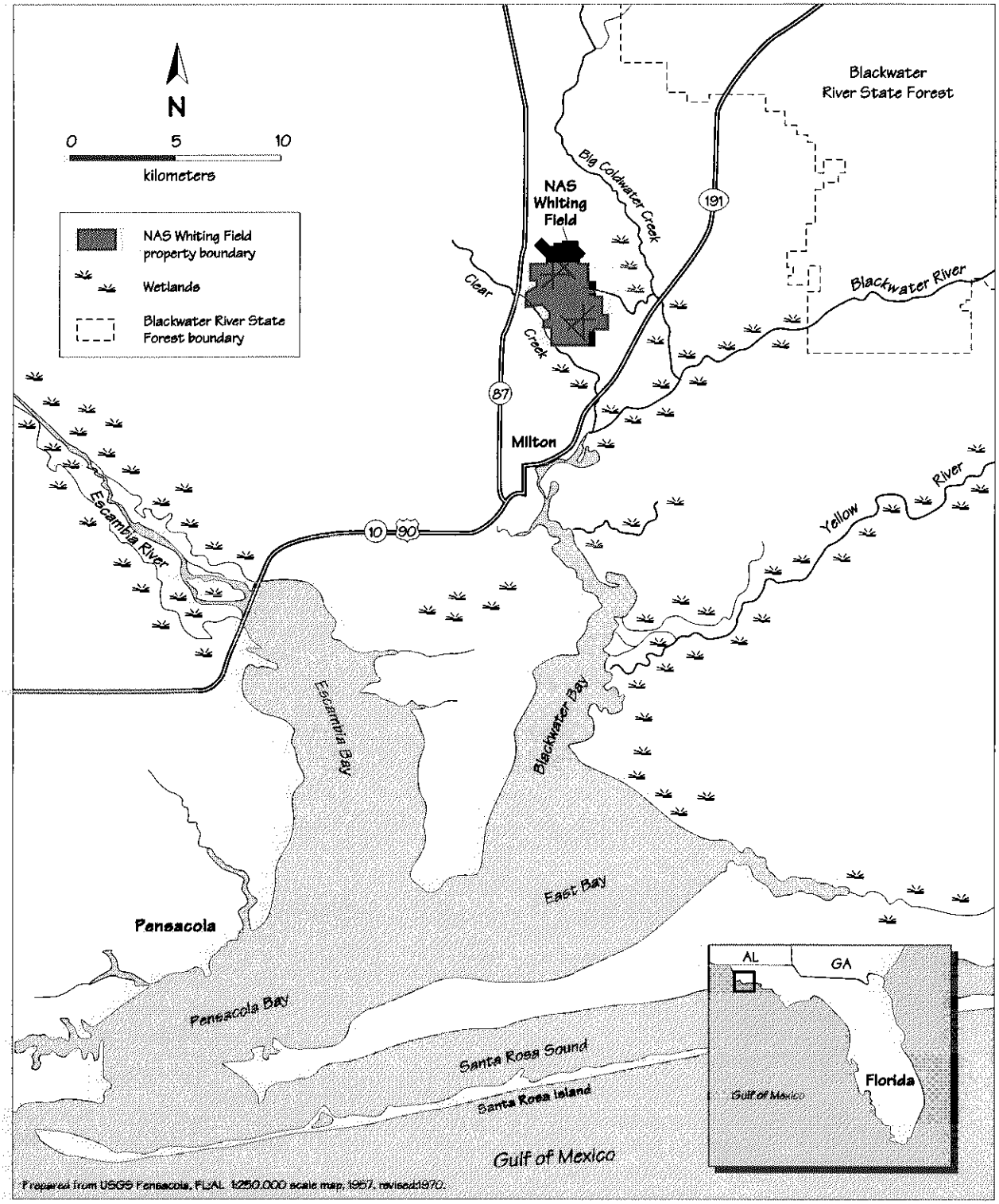

Figure 1. Location of NAS Whiting Field in Milton, Florida.

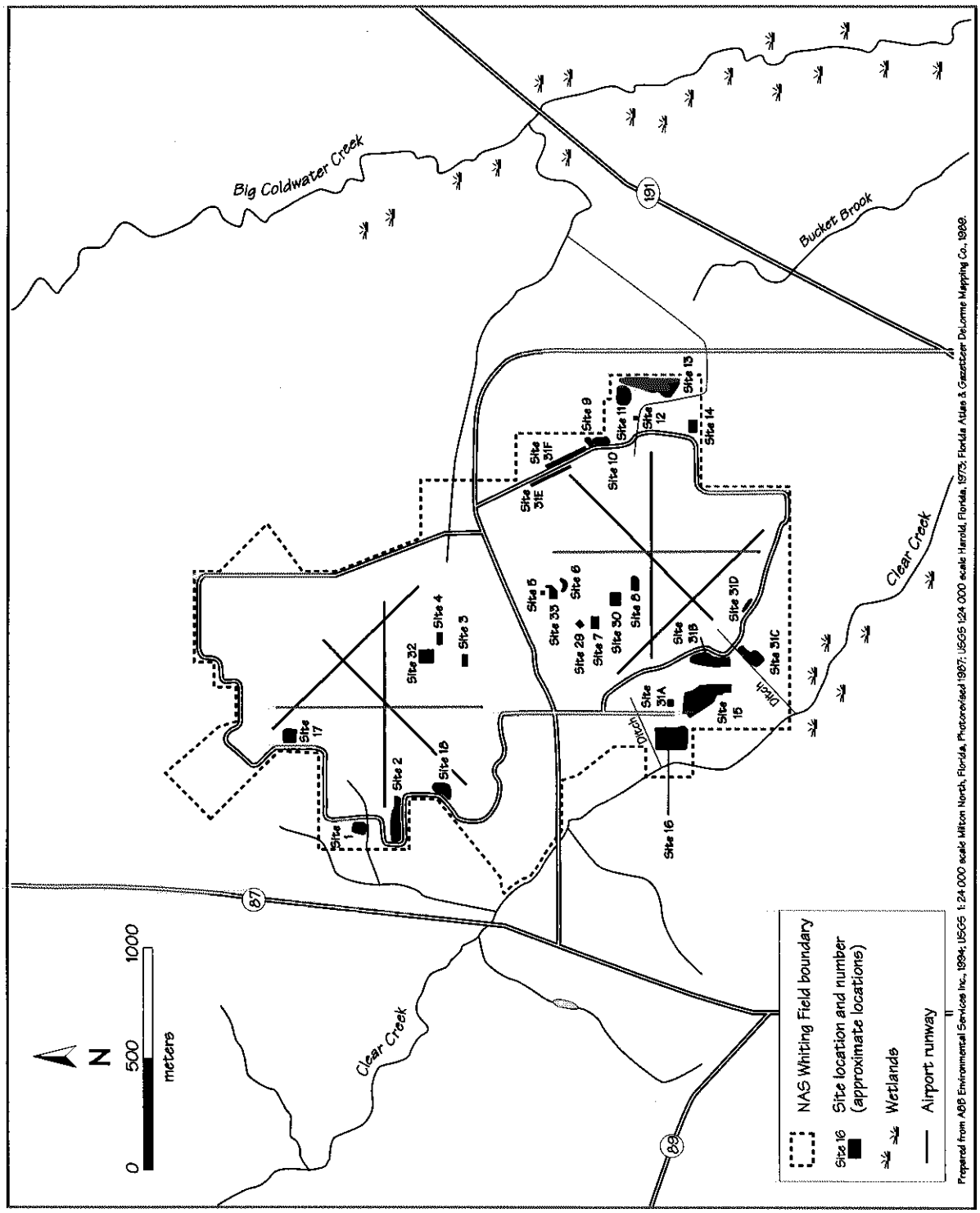

Figure 2. Waste sites at NAS Whiting Field.

Table 1. Waste sites of concern at NAS Whiting Field.

Site	Site Description	Period of Operation	Types of Materials Disposed or Spilled
1	Northwest Disposal Area	1943 - 1965	Refuse, waste paints, thinners, solvents, waste oils, hydraulic fluids
2	Northwest Open Disposal Area	1976 - 1984	Construction and demolition debris, tires, furniture
3	Underground Waste Solvent Storage Area	1980 - 1984	Waste solvents, paint stripping residue, and 450-liter spill
4	North AVGAS Tank Sludge Disposal Area	1943 - 1968	Tank bottom sludge containing tetraethyl lead
5	Battery Acid Seepage Pit	1964 - 1984	Waste electrolyte solution containing heavy metals and waste battery acid
6	South Transformer Oil Disposal Area	1940s - 1960s	PCB-contaminated dielectric fluid
7	South AVGAS Tank Sludge Disposal Area	1943 - 1968	Tank bottom sludge containing tetraethyl lead
8	AVGAS Fuel Spill Area	1972	AVGAS containing tetraethyl lead
9	Waste Fuel Disposal Pit	1950s - 1960s	Waste AVGAS containing tetraethyl lead
10	Southeast Open Disposal Area(A)	1965 - 1973	Construction and demolition debris, waste solvents, paint, oils, hydraulic fluids, PCBs, pesticides, and herbicides
11	Southeast Open Disposal Area(B)	1943 - 1970	Construction and demolition debris, waste solvents, paint, oils, hydraulic fluid, and PCBs
12	Tetraethyl Lead Disposal Area	1968	Tank bottom sludge and fuel filters contaminated with tetraethyl lead
13	Sanitary Landfill	1979 - 1984	Refuse, waste solvents, paint, hydraulic fluids, and asbestos
14	Short-Term Sanitary Landfill	1978 - 1979	Refuse, waste solvents, oils, paint, hydraulic fluids
15	Southwest Landfill	1965 - 1979	Refuse, waste paints, oils, solvents, thinners, asbestos, hydraulic fluid
16	Open Disposal and Burning Area	1943 - 1965	Refuse, waste paints, oils, solvents, thinners, PCBs, hydraulic fluid
17	Crash Crew Training Area	1951 - Present	JP-5 (light petroleum)
18	Crash Crew Training Area	1951 - Present	JP-5 (light petroleum)
29	Auto Hobby Shop	1940s - Present	Paints, oils, and solvents
30	South Field Maintenance Hangar	1940s - Present	Fuels, solvents, and oils
31	Sludge Drying Beds and Disposal Areas (A through F)	1940s - 1990	Sludge from wastewater treatment plant
32	North Field Maintenance Hangar	1940s - Present	Fuels, solvents, and oils
33	Midfield Maintenance Hangar	1940s - Present	Fuels, solvents, and oils

into on-site disposal areas (ABB 1992a). Disposal areas and waste sites at NAS Whiting Field are described in Table 1. Figure 2 shows the locations of the waste sites.

NAS Whiting Field is located on a plateau bounded by Clear and Big Coldwater creeks, both tributaries to the Blackwater River. The airfield and installation facilities are located on relatively flat, open land. An extensive storm drainage system collects runoff from industrial, support, and runway areas of NAS Whiting Field in a series of concrete drainage ditches that discharges to Clear Creek and Big Coldwater Creek. In general, surface runoff from sites west of the airfields drains into Clear Creek, and surface runoff from sites east of the airfields drains into Big Coldwater Creek. None of the waste sites at NAS Whiting Field is located within the one hundred-year floodplain (ABB 1992b).

The surficial aquifer at NAS Whiting Field lies within sand and gravel sediments, which extend to about 100 m below ground surface. Two deep artesian aquifers, the Upper Floridan and Lower Floridan, lie below the sand-and-gravel aquifer. Groundwater in the sand-and-gravel aquifer at the site flows south-southwest towards Clear Creek in the western half of the installation and to the southeast towards Big Coldwater Creek in the eastern half. Hydraulic conductivities calculated from slug tests and pumping tests conducted at NAS Whiting Field ranged from 3 to 46 m/day (ABB 1992c).

NOAA Trust Habitats and Species

Primary habitats of concern to NOAA are surface waters, bottom substrates, and associated estuarine and palustrine wetlands of Clear Creek, Big Coldwater Creek, the Blackwater River, and Blackwater Bay. Secondary habitats of concern to NOAA are surface waters and associated bottom substrates of East Bay.

The Blackwater River system drains a total area of 2,227 km^2 and extends 94 km in total length (Florida Game and Fresh Water Fish Commission 1983). Big Coldwater Creek, a major tributary of the Blackwater River with a similarly large drainage area, has fast-flowing waters and a sandy substrate. Clear Creek is a narrow, shallow, slow-moving creek with a sandy substrate. Big Coldwater Creek and Clear Creek are both freshwater near NAS Whiting Field. The lower reaches of the Blackwater River are low-gradient and tidal, with shallow depths allowing regular fluctuations in salinity. Surface waters typically range from brackish (5 to 20 ppt) to saline (>20 ppt), depending on precipitation and tidal activity. Sandy substrates and small patches of sea grasses, which provide excellent cover and forage for juvenile fish and invertebrate species, are commonly found farther downstream in Blackwater Bay. Rushes (*Juncus* spp.) predominate at the headwaters of Blackwater Bay and the lower reaches of the Blackwater River (Florida Game and Fresh Water Fish Commission 1983; Stith personal communication 1992).

American eel are found throughout the Blackwater River watershed. Big Coldwater Creek provides habitat for American eel and, possibly, striped mullet and hogchoker, although the presence of the latter two species has not been confirmed (Bass personal communication 1995). The lower reaches of the Blackwater River provide nursery habitat during high-salinity periods for tarpon, Gulf menhaden, bay anchovy, pinfish, sand seatrout, spotted seatrout, spot, Atlantic croaker, red drum, striped mullet, code goby, and southern flounder. Gulf killifish and sheepshead minnow spawn in the tidal freshwater reaches of the river (NOAA 1990).

Blackwater Bay provides spawning, nursery, and adult habitat for numerous NOAA trust species (Table 2; Peruga personal communication 1994; Stith personal communication 1994; Bass personal communication 1995). The area also is habitat for the salt marsh topminnow, a species of special concern to the State of Florida, and the Gulf sturgeon, a species listed by the Federal government as threatened (Peruga personal communication 1994). Consequently, the State of Florida has designated the entire Escambia and Santa Rosa counties coastal plain as a critical area of state concern. Gulf sturgeon are historically known to prefer larger, deeper channels, but were recently observed in the Blackwater River. Gulf sturgeon may migrate past the site to upstream spawning habitats (Peruga personal communication 1994).

The Blackwater River provides an extensive sport fishery for striped bass and various freshwater fishes. Angling efforts in Big Coldwater Creek, however, are not directed toward NOAA trust resources. Fish species of commercial and recreational significance in Blackwater Bay include red drum, southern flounder, and spotted seatrout (Bass personal communication 1992). Red drum and spotted seatrout are the most popular sport fisheries in the area, and are known to migrate upstream to the lower reaches of the Blackwater River as juveniles (Stith personal communication 1994). There are no restrictions on fisheries other than general regulations on take, season, and minimum size (Bass personal communication 1994).

All shellfisheries in Blackwater Bay are closed due to fecal coliform believed to originate in urban areas at the northern end of Blackwater Bay. There are no other health advisories or restrictions.

The Florida Game and Fresh Water Fish Commission runs the Blackwater River State Hatchery, about 15 km upstream from the site. This hatchery specializes in producing striped bass, stocked as juveniles in the Blackwater River over the past eight years to help restore the striped bass fishery (Bass personal communication 1992). It is unknown whether striped bass were historically present in the Blackwater River, although there are native populations in the Yellow River to the southeast. Since 1987, approximately 220,000 juvenile striped bass have been released in the Blackwater River. These efforts have been more successful recently, although spawning has yet to be observed because stocked fish are just reaching reproductive maturity (Yeager personal communication 1994). In the future, striped

Table 2. NOAA trust resources that use Blackwater Bay.

Species		Habitat			Fisheries	
Common Name	Scientific Name	Spawning Ground	Nursery Ground	Adult Forage	Comm. Fishery	Recr. Fishery
ANADROMOUS/CATADROMOUS SPECIES						
Gulf sturgeon[1]	*Acipenser oxyrinchus desotoi*		♦	♦		
American eel	*Anguilla rostrata*		♦	♦		
Striped bass	*Morone saxatilis*		♦	♦		♦
MARINE/ESTUARINE FISH						
Skipjack herring	*Alosa Chrysochloris*	♦	♦	♦		
Bay anchovy	*Anchoa mitchilli*	♦	♦	♦	♦	
Hardhead catfish	*Arius felis*	♦	♦	♦		
Gaftopsail catfish	*Bagre marinus*	♦	♦	♦		
Gulf menhaden	*Brevoortia patronus*		♦	♦		
Crevalle jack	*Caranx hippos*		♦	♦	♦	♦
Bull shark	*Carcharhinus leucas*		♦	♦		
Sand sea trout	*Cynoscion arenarius*	♦	♦	♦	♦	♦
Spotted sea trout	*Cynoscion nebulosus*	♦	♦	♦	♦	♦
Gizzard shad	*Dorosoma cepedianum*	♦	♦	♦		
Threadfin shad	*Dorosoma petenense*	♦	♦	♦		
Killifishes	*Fundulus spp.*	♦	♦	♦		
Saltmarsh topminnow	*Fundulus jenkinsi*	♦	♦	♦		
Pinfish	*Lagodon rhomboides*		♦		♦	♦
Spot	*Leiostomus xanthurus*		♦	♦	♦	♦
Inland silverside	*Menidia beryllina*	♦	♦	♦		
Atlantic croaker	*Micropogonias undulatus*		♦	♦	♦	♦
Striped mullet	*Mugil cephalus*		♦	♦	♦	
Southern flounder	*Paralichthys lethostigma*		♦	♦	♦	♦
Red drum	*Sciaenops ocellatus*		♦	♦	♦	♦
Atlantic needlefish	*Strongylura marina*	♦	♦	♦		
Florida pompano	*Trachinotus carolinus*		♦	♦	♦	♦
Hogchoker	*Trinectes maculatus*		♦	♦		
INVERTEBRATE SPECIES						
Blue crab	*Callinectes sapidus*		♦	♦	♦	♦
American oyster	*Crassostrea virginica*	♦	♦	♦	♦	♦
Brown shrimp	*Penaeus aztecus*		♦	♦	♦	♦
Pink shrimp	*Penaeus duorarum*		♦	♦	♦	♦
White shrimp	*Penaeus setiferus*		♦	♦	♦	♦
Common rangia	*Rangia cuneata*	♦	♦	♦	♦	♦

1: Federally threatened species.

bass may use habitat in Big Coldwater Creek for spawning and adult foraging because of these stocking efforts (Bass personal communication 1995).

Site-Related Contamination

Trace elements, PCBs, and PAHs are the primary contaminants of concern to NOAA at the site. Table 3 summarizes the contamination found in

soils during Phases I and IIA of the remedial investigation at NAS Whiting Field (ABB 1992d, 1994).

Groundwater sampling was conducted as part of the Phase I RI (ABB 1992e). This study consisted of field screening of samples for metals and VOCs, so these data can only be used as a qualitative screening assessment of groundwater contamination at the site. Elevated concentrations of VOCs were detected in groundwater at various locations, but did not exceed the LOEL for those compounds by more than ten times. Lead concentrations exceeded the freshwater chronic AWQC of 3.2 µg/l by more than ten times at Site 7, the South AVGAS Tank Sludge Disposal Area (860 µg/l), and at Site 5, the Battery Acid Seepage Pit (37 µg/l).

Table 3. Extent of contamination in soils at source areas of concern to NOAA at NAS Whiting Field[1].

Source Areas	Extent of Contamination in Soils	Proximity to Surface Water Body
Site 11 Southeast Open Disposal Area	Total PAHs were detected at 14 mg/kg (no screening guidelines for PAHs); lead was detected at 2,200 mg/kg (over 200 times greater than the screening guideline).	This site is next to a drainage ditch that flows into a tributary to Big Coldwater Creek.
Sites 1, 12, 13, and 16 Various Landfills and Disposal Areas	Concentrations of trace elements at these sites were slightly greater than screening guidelines.	These sites are next to drainage ditches that flow into tributaries of either Big Coldwater Creek or Clear Creek.
Sites 17 and 18 Crash Crew Training Areas	Total PAHs at Site 18 were 43 mg/kg; copper was detected at 860 mg/kg (29 times greater than screening guideline).	These sites are more than 500 m from a drainage ditch that flows into a tributary to Clear Creek.
Sites 31 and 32 Sludge Disposal and Maintenance Hangar	At Site 31, PCBs were detected at 1.5 mg/kg; concentrations of cadmium, lead, mercury, and silver were over 150 times greater than their screening guidelines. At Site 32, PAHs were detected at 69 mg/kg.	All sites are at least 300 m from drainage ditches leading to tributaries of Clear Creek or Big Coldwater Creek.
Sites 5 and 6 Battery Acid and Transformer Oil Disposal Areas	Concentrations of trace elements at these sites were slightly greater than screening guidelines, except for copper, detected at Site 6 at 10,900 mg/kg (over 350 times greater than screening guideline). PCBs in soil from Site 6 were detected at 0.6 mg/kg.	Both sites are about 1 km from the tributary to Big Coldwater Creek.
Sites 3, 4, 7, 8 and 9 Fuel-related Areas	Concentrations of trace elements at these sites were slightly greater than screening guidelines.	Located no closer than 300 m from drainage ditches leading to tributaries of Clear Creek or Big Coldwater Creek.
Sites 2, 10, 14, and 15 Various Landfills and Disposal Areas	Concentrations of trace elements at these sites were slightly greater than screening guidelines. At Site 2, PCBs were detected at 0.32 mg/kg.	Located no closer than 300 m from drainage ditches leading to tributaries of Clear Creek or Big Coldwater Creek.
Sites 29, 30, and 33 Auto Body Shop and Maintenance Hangars	Concentrations of trace elements at these sites were slightly greater than screening guidelines.	Located no closer than 500 m from tributaries to Clear Creek or Big Coldwater Creek.

1: Based on data presented in Phase I and Phase IIA reports (ABB 1992d, ABB 1994).

During Phase I, sediment samples were collected from two drainage ditches: one in the southwest part of the NAS near Sites 15 and 16, and one in the southeast part of the NAS near Sites 11, 12, 13, and 14. Neither trace elements nor organic compounds were detected at concentrations above their screening guidelines (ABB 1992d).

Surface water and sediment samples were collected from Clear Creek and Big Coldwater Creek during the Phase I RI. Concentrations of contaminants did not exceed screening guidelines for surface water or sediment at any of the sampling stations, except for one station in the Clear Creek floodplain near Site 16 (ABB 1992b). Here, concentrations of copper and lead were marginally elevated in sediment (38 mg/kg and 330 mg/kg, respectively). Based on these results, additional surface water and sediment samples were collected from Clear Creek in July and August 1992 as part of the Phase IIA RI (ABB 1993a) and in March 1993 during a separate investigation of the Clear Creek Floodplain (ABB 1993b). Table 4 summarizes the maximum concentrations of contaminants detected during these two studies. In general, the most contaminated sediments were collected from a bog downgradient from a concrete drainage ditch leading from Site 16 to an unnamed tributary of Clear Creek.

Table 4. Maximum concentrations of contaminants detected in surface water and sediment collected from Clear Creek and adjacent floodplain near Site 16 at NAS Whiting Field (ABB 1992b, ABB 1994).

	Surface Water (µg/l)		Sediment (mg/kg)	
Contaminant	Clear Creek near Site 16	Freshwater Chronic AWQC[1]	Clear Creek near Site 16	ERL[2]
Trace Elements				
Arsenic	1.2	190	73	8.2
Cadmium	4	1.1+	20	1.2
Chromium	12	11	120	81
Copper	19	12+	440	34
Lead	9.3	3.2+	980	47
Mercury	0.17	0.012	6.5	0.15
Nickel	43	160+	12	21
Silver	2.9	0.12	110	1.0
Zinc	27	110+	1,300	150
Organic Compounds				
Total PAHs	ND	300*	3.0	4.02
PCBs	ND	0.014	0.45	0.023

1: EPA (1993)
2: Long and MacDonald (1992)
+: Hardness-dependent criterion; 100 mg/l $CaCO_3$ used
ND: Not detected; detection limits not available.
*: Lowest Observable Effect Level.

Summary

Sediment and surface water data at NAS Whiting Field indicate that trace elements, PAHs, and PCBs may have been transported from Site 16 to sediment in wetlands associated with Clear Creek at concentrations that pose a threat to aquatic organisms. American eel are the only NOAA trust species likely to be found near the contaminated sediments. Although striped mullet, hogchoker, and striped bass may use downgradient reaches of Big Coldwater Creek, data indicate that contaminants have not yet migrated this far from the source.

References

ABB Environmental Services, Inc. 1992a. Remedial Investigation and Feasibility Study, Technical Memorandum No. 6, Phase I Data Summary and Phase IIA Work Plan, Naval Air Station Whiting Field, Milton, Florida. North Charleston, South Carolina: U.S. Navy, Southern Division, Naval Facilities Engineering Command.

ABB Environmental Services, Inc. 1992b. Remedial Investigation and Feasibility Study, Technical Memorandum No. 4, Surface Water and Sediments, Naval Air Station Whiting Field, Milton, Florida. North Charleston, South Carolina: U.S. Navy, Southern Division, Naval Facilities Engineering Command.

ABB Environmental Services, Inc. 1992c. Remedial Investigation and Feasibility Study, Technical Memorandum No. 2, Hydrogeologic Assessment, Naval Air Station Whiting Field, Milton, Florida. North Charleston, South Carolina: U.S. Navy, Naval Facilities Engineering Command.

ABB Environmental Services, Inc. 1992d. Remedial Investigation and Feasibility Study, Technical Memorandum No. 3, Soils Assessment, Naval Air Station Whiting Field, Milton, Florida. North Charleston, South Carolina: U.S. Navy, Southern Division, Naval Facilities Engineering Command.

ABB Environmental Services, Inc. 1992e. Remedial Investigation and Feasibility Study, Technical Memorandum No. 5, Groundwater Assessment, Naval Air Station Whiting Field, Milton, Florida. North Charleston, South Carolina: U.S. Navy, Southern Division, Naval Facilities Engineering Command.

ABB Environmental Services, Inc. 1993a. Remedial Investigation and Feasibility Study, Phase IIA, Technical Memorandum No. 1, Surface Water and Sediment Assessment, Naval Air Station Whiting Field, Milton, Florida. North Charleston, South Carolina: U.S. Navy, Southern Division, Naval Facilities Engineering Command.

ABB Environmental Services, Inc. 1993b. Clear Creek Floodplain Investigation Report, Naval Air Station Whiting Field, Milton, Florida. North Charleston, South Carolina: U.S. Navy, Southern Division, Naval Facilities Engineering Command.

ABB Environmental Services, Inc. 1994. Draft Remedial Investigation and Feasibility Study, Phase IIA, Technical Memorandum No. 3, Soils Assessment, Naval Air Station Whiting Field, Milton, Florida. North Charleston, South Carolina: U.S. Navy, Southern Division, Naval Facilities Engineering Command.

Bass, G., Fisheries Biologist, Blackwater River State Hatchery, Florida Game and Fresh Water Fish Commission, Florida, personal communications, June 18, 1992, December 16, 1994, and July 24, 1995.

Florida Game and Fresh Water Fish Commission. 1983. Completion report for investigations project as required by Federal Aid in Fish Restoration. Study III. Rivers of Florida and their fishes. Dingell-Johnson Project F-36. Tallahassee: North Florida Streams Research Projects. 397 pp.

Long, E.R., and D.D. MacDonald. 1992. National Status and Trends Program approach. In: *Sediment Classification Methods Compendium.* EPA 823-R-92-006. Washington, D.C.: Office of Water, U.S. Environmental Protection Agency.

National Oceanic and Atmospheric Administration. 1990. *Distribution and Abundance of Fishes and Invertebrates in Eastern Gulf of Mexico Estuaries.* Rockville, Maryland: Strategic Assessment Branch, Office of Ocean Resources Conservation and Assessment.

Peruga, F., Fisheries Biologist, U.S. Fish and Wildlife Service, Panama City, Florida, personal communications, June 18, 1992 and December 19, 1994.

Stith, L., Fisheries Biologist, U.S. Fish and Wildlife Service, Panama City, Florida, personal communications, June 18, 1992 and December 16, 1994.

U.S. Environmental Protection Agency (EPA). 1993. *Water quality criteria.* Washington, D.C.: U.S. Environmental Protection Agency, Office of Water, Health and Ecological Criteria Division. 294 pp.

Yeager, D., Fisheries Biologist, Blackwater River State Hatchery, Florida Game and Fish Commission, Milton, Florida, personal communication, December 16, 1994.