

New London Naval Submarine Base

Groton, Connecticut

Region 1

CTD980906515

Site Exposure Potential

The New London Submarine Base (Subbase) is located on the eastern bank of the Thames River estuary in southeastern Connecticut (Figure 1). The 220-hectare site includes approximately 3 km of shoreline less than 4 km from Long Island Sound. The Subbase was constructed as a moorage facility and coaling station for the Atlantic Fleet in 1886. A permanent Subbase was established in 1916; a submarine training facility was added in 1917. The base was greatly expanded during World Wars I and II and is now the base command for the

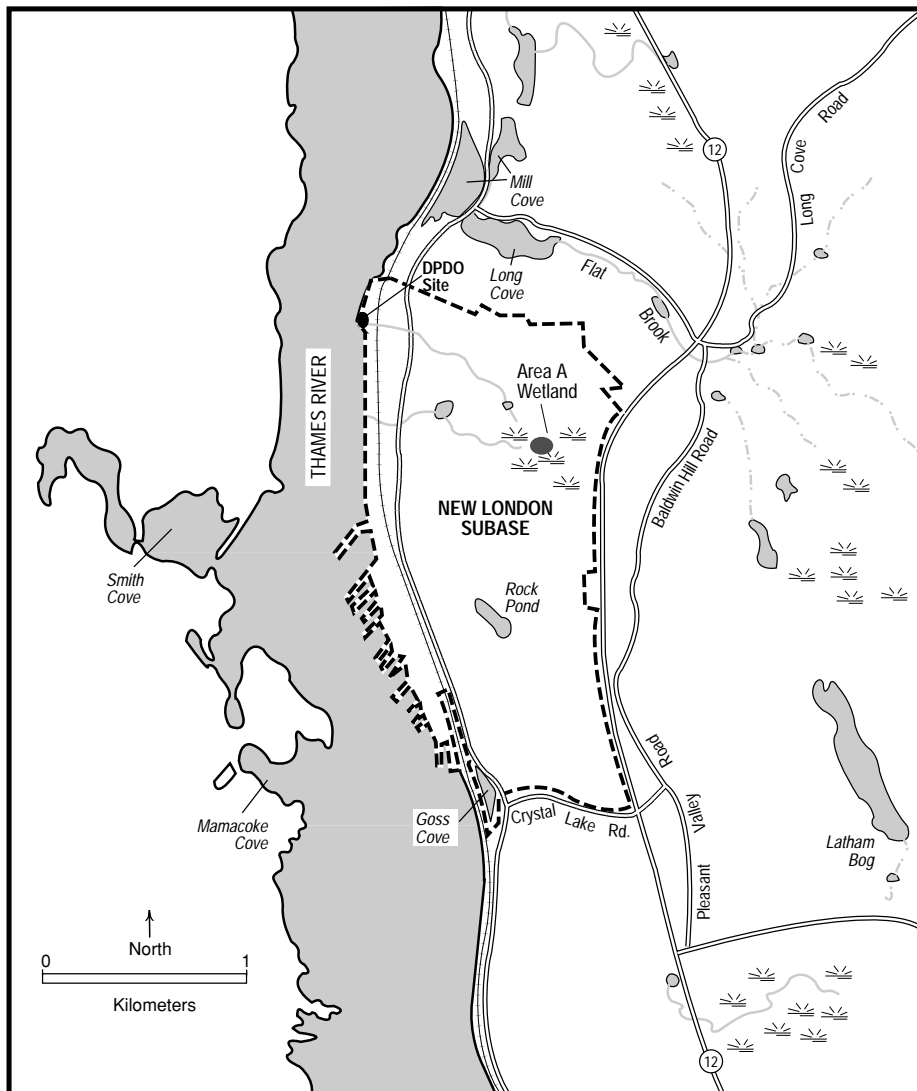
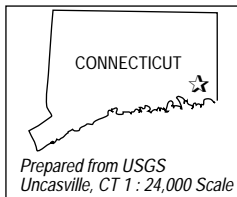


Figure 1.
New London
Naval Submarine
Base, Groton,

New London Naval Submarine Base

**Site Exposure
Potential,**
cont.

Atlantic Naval Submarine Fleet. The Subbase includes housing, training facilities, administrative offices, a hospital, submarine maintenance, repair and overhaul facilities, and torpedo assembly and overhaul shops (Atlantic Environmental Services 1989).

Activities at the base generated a variety of wastes, including waste oils, solvents, contaminated fuels, construction debris, acids, PCBs, and pesticides. The site served as a landfill and burning ground from 1950 to 1969 and waste and cover materials were used to fill the shoreline. Until the early 1970s, most of these materials were disposed of in on-site landfills. Although some liquid materials were stored in drums or underground tanks for off-site reprocessing or disposal, some liquid wastes may have been disposed of in drain fields or storm drain systems. The Area A landfill was used for disposal of all non-recyclable materials from all Subbase operations from 1957 to 1973. In addition, drums, transformers, and electrical switches are stored on-site on a concrete pad. Cover material for this landfill consisted of highly porous gravels. The wetland area was used for upland disposal of dredge spoils from the Thames River.

Surface geology at the Subbase is characterized by a thin layer of unconsolidated glacial tills overlying bedrock. Outcroppings of bedrock have been mapped throughout the site. The water table is inferred to be close to the soil surface because of the presence of wetlands in several areas of the Subbase. Several surface drainages are present at the site, including ponds and streams. Surface water discharges to the Thames at four points along the shoreline; two outlets are located near the northern boundary, one outlet is at Pier 26, and the major outlet is at Goss Cove. Surface water runoff also discharges to the Thames River.

Several potentially contaminated sites are located in shoreline areas, making surface water runoff or groundwater discharge a likely pathway for transport of contaminants. Surface water transport is an important pathway for several major upland sites because they are located near or in wetlands and streams that discharge to the Thames River.

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Site-Related Contamination

Preliminary data presented in the Installation Restoration Study (IRS) plan of action (Atlantic Environmental Services 1989) indicated that trace elements, PAHs, pesticides, and some volatile organic compounds were present in soil, surface water, and sediment at elevated levels on the Subbase. Activities on the Subbase and past disposal practices may have contributed to groundwater contamination, but no data on groundwater were presented in the IRS plan of action. Maximum concentrations of contaminants detected in these matri-

Table 1. Maximum concentrations of contaminants at site compared with applicable screening levels.

	Water		Soil		Sediment	
	Surface Water µg/l	AWQC ¹ µg/l	Soil mg/kg	Average U.S. Soil ² mg/kg	Sediment mg/kg	ER-L ³ mg/kg
INORGANIC SUBSTANCES						
antimony	400	1600*	13	1	36	2
cadmium	30	1.1+	4.4	0.06	2.5	5
copper	120	12+	1000	30	33	70
cyanide	175	5.2	0.10	NA	2.5	NA
lead	ND	3.2+	750	10	5960	35
mercury	ND	0.012	ND	0.03	0.28	0.15
nickel	80	160+	130	40	32	30
zinc	152	110+	1100	50	170	120
ORGANIC COMPOUNDS						
benzo(a)anthracene	NT	NA	5.6	NA	1.2	0.23
benzo(a)pyrene	NT	NA	2.6	NA	0.75	0.40
fluoranthene	NT	NA	12	NA	1.85	0.60
phenanthrene	NT	NA	18	NA	0.75	0.225
pyrene	NT	NA	9.3	NA	1.35	0.35
DDD	NT	NA	ND	NA	79	0.002
DDE	NT	NA	ND	NA	7.4	0.002
DDT	NT	0.001	ND	NA	59	0.001
1: Ambient water quality criteria for the protection of aquatic life, freshwater chronic criteria presented (EPA 1986). 2: Lindsay (1979). 3: Effective range-low; the concentration representing the lowest 10 percentile value for the data in which effects were observed or predicted in studies compiled by Long and Morgan (1990). + Hardness-dependent criteria; 100 mg/l CaCO ₃ used. * Insufficient data to develop criteria. Value presented is the Lowest Observed effect Level (LOEL). ND: Not detected at method detection limit; detection limit not reported NT: Not analyzed NA: Screening level not available						

ces are presented in Table 1 (Atlantic Environmental Services 1989) along with applicable screening levels for determining concentrations of concern to NOAA.

Copper, lead, nickel, and zinc were extremely elevated in soils from the Defense Property Disposal Office (DPDO) area next to the Thames River. Additional trace elements were also present at high concentrations. PAHs were measured in soil at levels shown to have toxic effects in other studies (Long and Morgan 1990).

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Site-Related Contamination, *cont.*

Surface water samples in the vicinity of the Area A Landfill and the associated wetland in the northern Subbase had high concentrations of cadmium, copper, zinc, cyanide, and several phthalate esters. Sediment from these same areas had extremely high levels of lead, DDT, other trace elements, and PAHs. Surface waters and groundwater from this area discharge into several streams that flow past other sites under investigation and enter the Thames River at the DPDO site.

Table 2.
Species and habitat use in the lower Thames River near the site.

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NOAA Trust Habitats and Species

The lower Thames River is an important estuarine habitat used by anadromous and marine species for spawning, nursery grounds, and adult forage (Table 2; Minta personal communication 1990). Commercial and recreational fisheries are active in the area.

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NOAA Trust Habitats and Species, *cont.*

The Thames River is a major corridor for anadromous species, including sea-run brown trout, American shad, hickory shad, alewife, striped bass, and blueback herring. Blueback herring, alewife, and American shad spawn approximately 24 km upstream of the site. The Connecticut Department of Environmental Protection is attempting to restore the historical Atlantic salmon run in the Thames River watershed. Currently, eggs are stocked in upstream tributaries, and fish passage-ways are being planned for several upstream dams (Minta personal communication 1990).

The section of the river near the Subase is used as a spawning ground for winter flounder, and as a seasonal nursery ground for bluefish and young striped bass. Major recreational fisheries in the area include those for striped bass, bluefish, and eel (Minta personal communication 1990).

Invertebrate resources include quahog, blue crab, and lobster; quahog and lobster are fished commercially and blue crab recreationally. Commercial harvests of quahog must undergo depuration before sale, and recreational harvesting of bivalves is restricted because of unsafe levels of fecal coliform in tissue.

References

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Lindsay, W.L. 1979. Chemical Equilibria in Soils. New York: John Wiley & Sons. 449pp.

Long, E.R. and L.G. Morgan. 1990. The potential for biological effects of sediment-sorbed contaminants tested in the National Status and Trends Program. NOAA Technical Memorandum. NOS OMA-52. Seattle: Coastal and Estuarine Assessment Branch, NOAA. 175 pp + Appendices.

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