

Naval Construction Battalion Center

North Kingston, Rhode Island
Region 1

RI6170022036

Site Exposure Potential

The Davisville Naval Construction Battalion Center (NCBC) is located in North Kingston, Rhode Island, 16 km south of Providence (Figure 1). The site consists of four areas: the main center, the West Davisville storage area, Camp Fogherty, and a decommissioned naval air station at Quonset Point. The Navy acquired the property in 1939 and constructed Naval Air Station (NAS) Quonset Point for training, overhauling and supplying aircraft, and coastal defense. In 1942, other properties were developed for naval construction battalion training. After World War II, the NAS remained in operation but the NCBC was inactive until 1951 when the site was designated Headquarters NCBC. The NAS was decommissioned in 1974, and activities at the NCBC were reduced to the current low level of operation (TRC 1988).

During NAS operations, waste materials, including battery acid, paint thinners, solvents, degreasers, transformer oils, jet fuels, and sewage sludge were disposed on the NCBC property. From 1946 to 1972, wastes generated from activities at the NCBC and the NAS were either burned or disposed at the

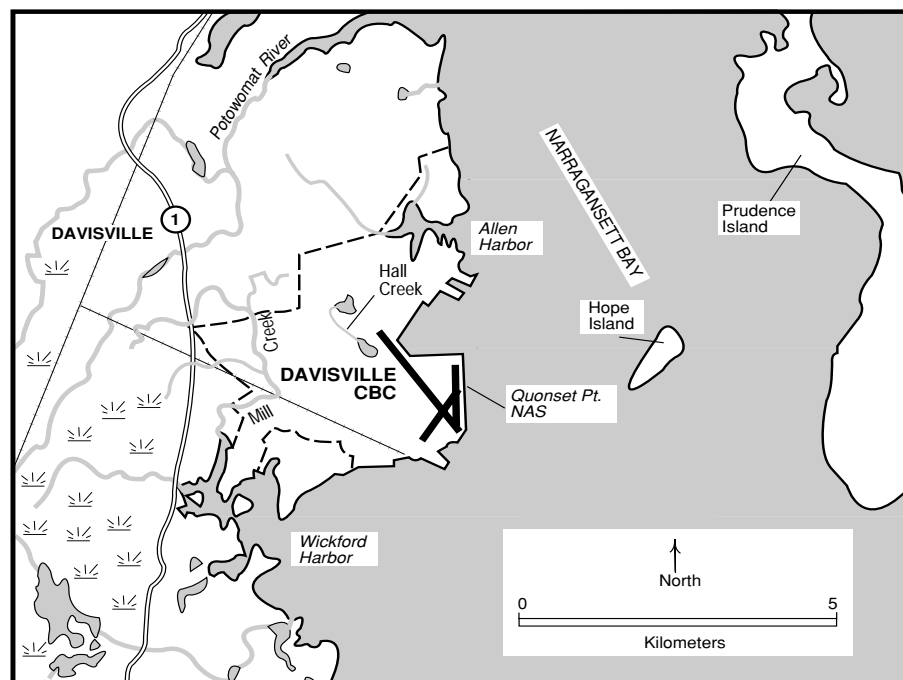
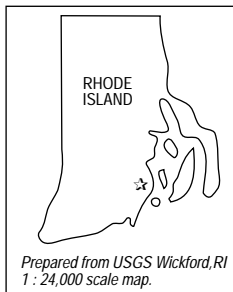


Figure 1.
Naval
Construction
Battalion Center,
North Kingston,
Rhode Island.

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Site Exposure Potential, *cont.*

Allen Harbor landfill, on the western shore of Allen Harbor. Much of the NCBC-Davisville site is contiguous with Narragansett Bay. The site contains several low-lying marshy areas and is transected by several streams that discharge to the bay, including Mill Creek and Hall Creek. Local groundwater is unconfined and the water table is often within 0 to 3 m of the ground surface. The flow of groundwater reflects surface topography and is from the higher lands in the west towards Narragansett Bay. Locally, groundwater may flow downgradient to the nearest surface water drainage, but all surface water on the site ultimately discharges to Narragansett Bay. Groundwater is a significant source of recharge for local streams, contributing approximately 50 percent of the average annual stream flow (TRC 1988).

Both surface water and groundwater transport are potential pathways of contamination to NOAA resources.

Site-Related Contamination

An initial assessment of the site identified 14 potentially contaminated areas. Following agency review, ten of those areas were judged to represent a potential threat to human health or the environment and a verification study was conducted (TRC 1988). With the exception of the Allen Harbor landfill, most sites were found to pose a minimal risk to aquatic resources. An additional investigation of the levels of contamination in various media was performed as part of a detailed risk assessment for this area (EPA 1988a; EPA 1988b). Contaminants detected in soil, sediment, surface water, and biota included total petroleum hydrocarbons (TPH), PCBs, DDT, and inorganic substances. Maximum concentrations of contaminants in various matrices sampled are presented in Table 1 (EPA 1988a; EPA 1988b; TRC 1988) with available screening levels.

Concentrations of inorganic substances were high in surface water and sediment collected from Allen Harbor. Copper, lead, mercury, and zinc exceeded their screening criteria for sediments; lead, mercury, silver, and zinc exceeded their AWQC. All inorganic substances shown in Table 1 were above background levels in soil collected from the landfill. DDT and PCBs were elevated in sediment and soil from this same area. Most of these substances were present in tissues of quahog

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Site-Related Contamination, *cont.*

collected from Allen Harbor.

Additional measures of sediment toxicity were made as part of the 1988 risk assessment (EPA 1988a). Amphipod bioassays using sediment from the Allen Harbor landfill resulted in mortalities ranging from 22.7 to 97.3 percent. Histopathological examinations of clam tissues showed an incidence of neoplasms in softshell clams that ranged from 8 to 23 percent. Results from an index of physiological response for mussels placed in Allen Harbor indicated that the mussels were experi-

Table 1.
Maximum concentrations of contaminants of concern at the site.

	Water		Soil		Sediment		Tissue
	Surface Water µg/l	AWQC ¹ Marine µg/l	Soil mg/kg	Average ² U.S. Soil mg/kg	Sediment mg/kg	ER-L ³ mg/kg	Tissue mg/kg
INORGANIC SUBSTANCES							
arsenic	ND	36	21	5	4.1	33	
cadmium	8.4	9.3	26	0.06	2.2	5	1.9
chromium	9.1	50	100	100	62	80	4.5
copper	ND	2.9	1300	30	97	70	56
lead	12.7	5.6	34000	10	87	35	2.8
mercury	.23	0.025	3.5	0.03	0.77	0.15	0.068
nickel	ND	8.3	250	40	30	30	13
silver	100	2.3	7.5	0.05	1.4	1	1.2
zinc	180	86	3000	50	210	120	34
ORGANIC COMPOUNDS							
DDT	ND	0.001	690	NA	0.007	0.001	ND
DDE	ND	a ⁴	39	NA	0.036	0.002	0.006
DDD	ND	NA	55	NA	0.006	0.002	0.004
PCBs	NT	0.03	1.3	NA	0.498	0.050	0.204
TPH ⁴	800	NA	7800	NA	4020	NA	NT

1: Ambient water quality criteria for the protection of aquatic life, marine 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).
 4: Total Petroleum Hydrocarbons
 a: AWQC marine acute criteria, no chronic criteria available (EPA 1986).
 NA: Screening level not available
 ND: Not detected at method detection limit
 NT: Not analyzed

NOAA Trust Habitats and Species

encing some type of stress, possibly related to poor water quality. An additional source of contamination to Allen Harbor is boat traffic from two marinas in the harbor (Munns personal communication 1990).

Habitats of concern to NOAA in the vicinity of NCBC include Allen Harbor, two on-site creeks that run into Allen Harbor, and the nearshore areas of Narragansett Bay north and south of the harbor. Narragansett Bay in the vicinity of the site

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NOAA Trust Habitats and Species, cont.

provides habitat for numerous species of bottomfish, pelagic fish, and invertebrates (Table 2; Oviatt and Nixon 1973; Johnston et al. 1989; Munns personal communication 1990). Allen Harbor is a

Table 2. Species and habitat use in Narragansett Bay, including Allen Harbor.

Species		Habitat		
Common Name	Scientific Name	Spawning	Nursery	Adult Forage
ANADROMOUS/CATADROMOUS FISH				
American shad	<i>Alosa sapidissima</i>		◆	◆
alewife	<i>Alosa pseudoharengus</i>		◆	◆
striped bass	<i>Morone saxatilis</i>		◆	◆
MARINE/ESTUARINE Fish				
Atlantic menhaden	<i>Brevoortia tyrannus</i>		◆	◆
Atlantic herring	<i>Clupea harengus</i>			◆
Atlantic tomcod	<i>Microgadus tomcod</i>		◆	◆
butterfish	<i>Peprilus triacanthus</i>			◆
bluefish	<i>Pomatomus saltatrix</i>		◆	◆
winter flounder	<i>Pseudopleuronectes americanus</i>		◆	◆
windowpane	<i>Scophthalmus aquosus</i>			◆
scup	<i>Stenotomus chrysops</i>			◆
<u>Invertebrates</u>				
blue crab	<i>Callinectes sapidus</i>			
American oyster	<i>Crassostrea virginica</i>	◆	◆	◆
ribbed mussel	<i>Geukensia demissa</i>	◆	◆	◆
American lobster	<i>Homarus americanus</i>			◆
quahog	<i>Mercenaria mercenaria</i>	◆	◆	◆
softshell clam	<i>Mya arenaria</i>	◆	◆	◆

soft-bottom environment with especially rich invertebrate resources. The city would like to expand the municipal marina located in the harbor, but these plans conflict with fishermen who wish to reopen the area for harvesting of quahog and softshell clams (Oviatt and Nixon 1973; Munns personal communication 1990).

Invertebrate resources of considerable commercial and recreational value are found in Allen Harbor, including quahog, soft-shell clams, oysters, and ribbed mussels. In recent years, closures by the Rhode Island Department of Environmental Management have restricted shellfish harvesting in most of the areas around the NCBC. Allen Harbor, formerly the site of a major commercial and recreational quahog fishery, has been closed since 1983 because of contaminants detected in quahog tissue. This closure

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Habitats and
Species,**
cont.

References

will be reevaluated after review of the results of ongoing investigations by the Navy. Quahog and softshell clams are harvested in areas outside of and to the north of Allen Harbor. To the south, the Quonset Point area and Wickford Harbor are closed for shellfish harvesting because of high levels of fecal coliform bacteria (Johnston et al. 1989; Migliori personal communication 1990).

Information on fish resources in Allen Harbor and the on-site creeks is limited, but several marine species use the area seasonally, including winter flounder, bluefish, striped bass, and alewife. It is possible that alewife may spawn in the creeks (Munns personal communication 1990).

Johnston, R.K., P.E. Woods, G.G. Pesch, and W.R. Munns, Jr. 1989. Assessing the impact of hazardous waste disposal sites on the environment: Case studies of ecological risk assessments at selected Navy hazardous waste disposal sites. Proceedings of the 14th Annual Army Environmental R&D Symposium, Williamsburg, Virginia, November 14-16, 1989.

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.

Migliori, J., Senior Environmental Scientist, Department of Water Resources, Rhode Island Department of Environmental Management, Providence, personal communication, July 12, 1990.

Munns, W., U.S. Environmental Protection Agency, Environmental Research Laboratory, Narragansett, Rhode Island, personal communication, July 12, 1990.

Oviatt, C.A. and S.W. Nixon. 1973. The demersal fish of

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References, *cont.*

Narragansett Bay: an analysis of community structure, distribution and abundance. Estuar. and Coastal Mar. Sci 1: 361-378.

TRC Environmental Consultants. 1988. U.S. Department of Navy Installation Restoration Program. RI/FS Work Plan. Naval Construction Battalion Center. Davisville, Rhode Island. Philadelphia: Northern Division Naval Facilities, Engineering Command.

U.S. Environmental Protection Agency. 1986. Quality criteria for water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-87-003.

U.S. Environmental Protection Agency. 1988a. Progress report. Risk assessment pilot study, Naval Construction Battalion Center, Davisville, Rhode Island. San Diego: Marine Environmental Support Office of the Naval Ocean Systems Center.

U.S. Environmental Protection Agency. 1988b. Final interim report. Risk assessment pilot study, Phase I, Naval Construction Battalion Center, Davisville, Rhode Island. San Diego: Marine Environmental Support Office of the Naval Ocean Systems Center.