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## Old Navy Dump

Kitsap County, Washington  
CERCLIS #WA8680030931

### ■ Site Exposure Potential

The Old Navy Dump site lies along the western shore of Clam Bay, an embayment off the west side of Rich Passage, in Kitsap County, Washington (Figure 1). The U.S. Environmental Protection Agency and NOAA National Marine Fisheries Service (NMFS) operate laboratories on the site. The site is approximately 2.1 km north of Manchester, Washington.

Potential sources of hazardous waste releases at the site, all of which are associated with historic naval operations, include an inactive landfill, an inactive burn pit, a former paint and sandblasting shop, a former fire fighting school, and a former

submarine net depot (Figure 2). The submarine net depot operated from 1945 to approximately 1963. A tidal lagoon was landfilled from about 1946 to 1958 with wastes generated on-site and at nearby Puget Sound naval Station in Bremerton, Washington (Hart Crowser 1995). The edge of the landfill is visible along the shoreline within the intertidal zone. The landfilled wastes are reported to include scrap metal from submarine net construction, paper and wood waste, paint cans, and, possibly, dispensary waste products. Wastes from the on-site dispensary and waste paper products were reportedly burned in the burn pit near the edge of Clam Bay. A paint and sandblasting shop associated with the naval depot

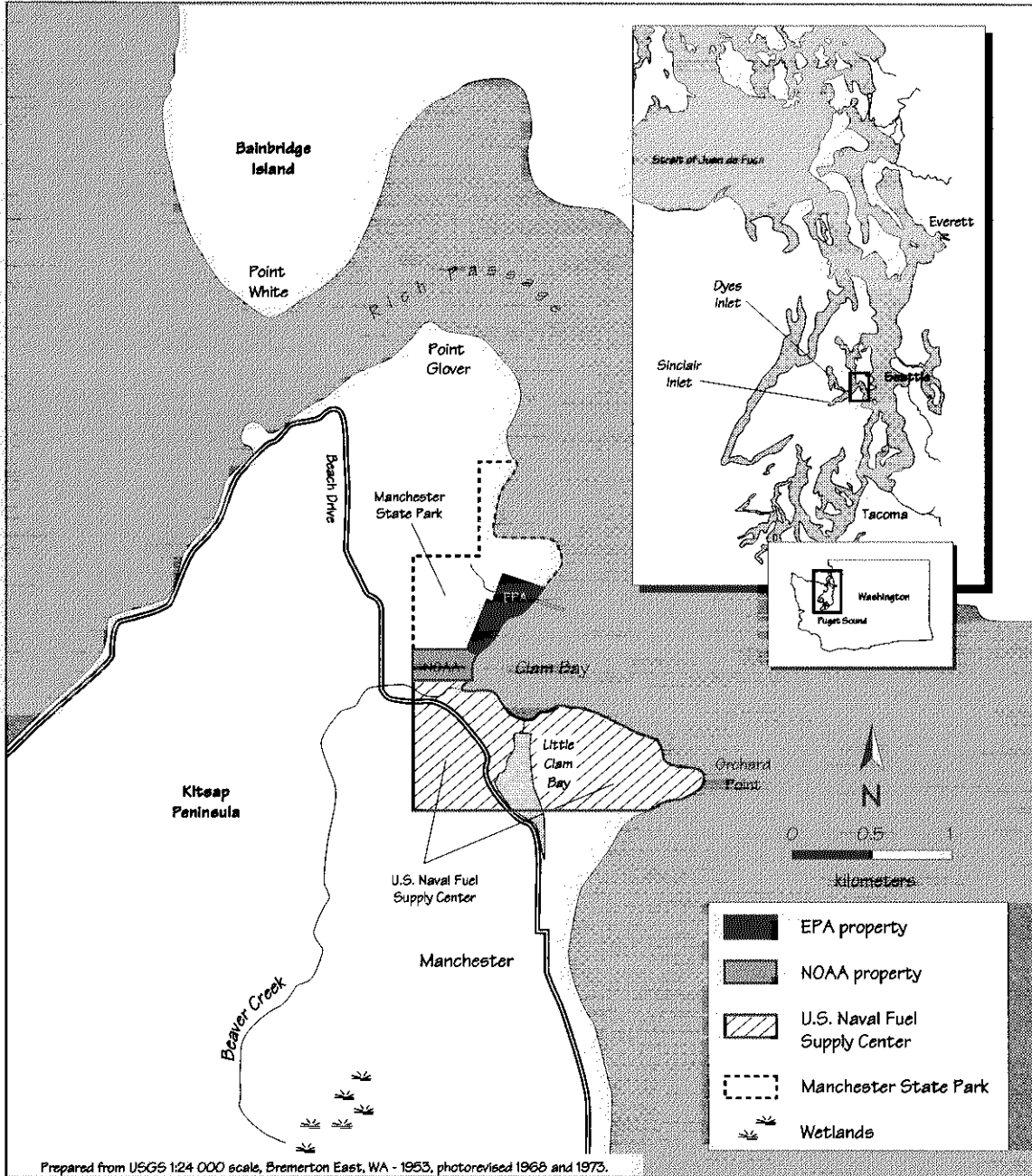


Figure 1. Location of the Old Navy Dump site in Manchester, Washington.

was removed sometime between 1957 and 1973 (Hart Crowser 1994). From World War II until the late 1950s, the fire fighting school was used by the U.S. Navy for training and practice in

extinguishing shipboard fires. The school may possibly have been used briefly in 1970.

Potential contaminant transport pathways to Clam Bay are erosion from the landfill into the

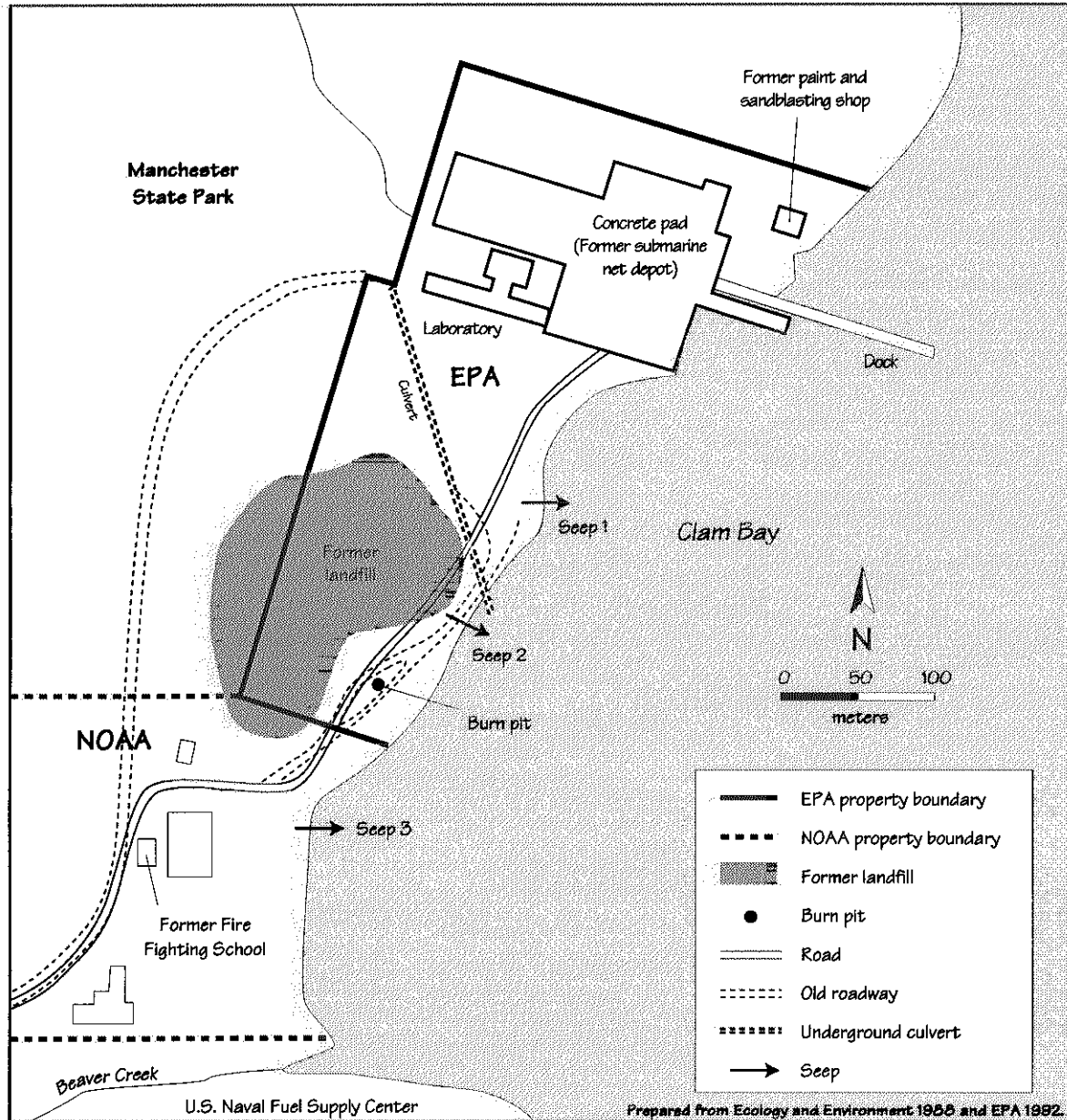


Figure 2. Detail of the Old Navy Dump site in Manchester, Washington.

intertidal area, groundwater discharge, and surface water runoff. The site is underlain by glacial till to depths ranging from 3 to 20 m, and by fill material. Groundwater has been encoun-

tered at depths ranging from 0.6 to 3.0 m bgs. Groundwater flows across the site, east-southeast toward Clam Bay (Hart Crowser 1994). Several groundwater seeps are located in the intertidal

area east of the former landfill and fire training facility (EVS 1994). Surface runoff and an unnamed stream are diverted around the landfill into a culvert that discharges into Clam Bay. The culvert carries runoff from the hillside west of the laboratory and flows underneath the laboratory before it discharges into Clam Bay. Two surface-water drains also enter the culvert southwest of the laboratory (Hart Crowser 1994).

## ■ NOAA Trust Habitats and Species

Habitats of concern to NOAA are the surface waters and associated bottom substrates of Clam Bay, Rich Passage, and west central portions of Puget Sound. These waters are vital to marine fish and shellfish resources because they provide mixing and transition zones from the cool, dense, saline, ocean waters of Puget Sound to the warmer, less saline water layers of the shallow shelves, bays, and channels of the Kitsap Peninsula (Williams et al. 1975). An extensive shoreline with associated intertidal and subtidal zones abuts the site.

Aquatic habitats of Clam Bay are valuable nursery and adult forage areas for a large number of trust resources. Moreover, numerous aquatic species use the area to spawn. Table 1 lists aquatic species, habitat usage, and the existing commercial and recreational fisheries near the Old Navy Dump. Anadromous fish of particular interest to

NOAA because of their commercial and recreational importance in the area include chinook, chum, and coho salmon, and steelhead and cutthroat trout. Marine invertebrate populations within the study area are relatively abundant and typically representative of species found in Puget Sound. Broad intertidal flats and bars provide excellent spawning and nursery substrate for mollusks. In general, these species congregate near intertidal and subtidal flats, especially where eelgrass beds are available (Zichke personal communication 1994).

A number of marine mammals that are federally listed as threatened and endangered, and of special concern to Washington state, are common visitors to surface waters near the site. The state-monitored harbor seal (*Phoca vitulina*) is the most common marine mammal observed in the area. California sea lions (*Zalophus californianus*), another state-monitored species, seasonally migrate into the area from November through late spring. The Steller sea lion (*Eumetopias jubatus*), a federally threatened species, is also an occasional visitor to central Puget Sound waters during the fall, winter, and spring. Both species of sea lion use the surface waters of the Sound to feed on migrating salmon and steelhead trout. Dall's porpoise (*Phocoenoides dalli*) and orca whales (*Orcinus orca*), both state-monitored species, also use central Puget Sound year-round. Gray whales (*Eschrichtius robustus*), a species only recently removed from the Federal endangered species list (and now state-monitored), periodically migrate into Sinclair and Dyes inlets to feed on ghost

Table 1. NOAA trust resources that use west-central Puget Sound around the Old Navy Dump site, Manchester, Washington.

Species		Habitat			Fisheries	
Common Name	Scientific Name	Spawning Ground	Nurs. Ground	Adult Forage	Comm. Fishery	Recr. Fishery
<b>ANADROMOUS FISH</b>						
Cutthroat trout	<i>Oncorhynchus clarki clarki</i>		♦	♦		♦
Pink salmon	<i>Oncorhynchus gorbuscha</i>		♦	♦	♦	♦
Chum salmon	<i>Oncorhynchus keta</i>		♦	♦	♦	♦
Coho salmon	<i>Oncorhynchus kisutch</i>		♦	♦	♦	♦
Steelhead trout	<i>Oncorhynchus mykiss</i>		♦	♦		♦
Chinook salmon	<i>Oncorhynchus tshawytscha</i>		♦	♦	♦	♦
<b>MARINE FISH</b>						
Pacific sand lance	<i>Ammodytes hexapterus</i>		♦	♦		
Sablefish	<i>Anoplopoma fimbria</i>			♦		♦
Speckled sanddab	<i>Citharichthys stigmaeus</i>		♦	♦		
Arrow goby	<i>Clevelandia ios</i>	♦	♦	♦		
Pacific herring	<i>Clupea harengus pallasii</i>	♦	♦	♦	♦	♦
Sculpin	<i>Cottus spp.</i>	♦	♦	♦		
Shiner perch	<i>Cymatogaster aggregata</i>		♦	♦	♦	♦
Striped sea perch	<i>Embiotoca lateralis</i>		♦	♦	♦	♦
Northern anchovy	<i>Engraulis mordax</i>		♦	♦		
Buffalo sculpin	<i>Enophrys bison</i>		♦	♦		
Pacific cod	<i>Gadus macrocephalus</i>		♦	♦	♦	♦
Threespine stickleback	<i>Gasterosteus aculeatus</i>	♦	♦	♦		
Rex sole	<i>Glyptocephalus zachirus</i>		♦	♦		♦
Flathead sole	<i>Hippoglossoides elassodon</i>		♦	♦		
Kelp greenling	<i>Hexagrammus decagrammus</i>		♦	♦	♦	
Ratfish	<i>Hydrolagus colliei</i>		♦	♦		
Surf smelt	<i>Hypomesus pretiosus</i>		♦	♦	♦	♦
Rock sole	<i>Lepidopsetta bilineata</i>	♦	♦	♦		♦
Pacific staghorn sculpin	<i>Leptocottus armatus</i>		♦	♦		
Pacific hake	<i>Merluccius productus</i>		♦	♦		♦
Pacific tomcod	<i>Microgadus proximus</i>		♦	♦		
Dover sole	<i>Microstomus pacificus</i>	♦	♦	♦		♦
Ling cod	<i>Ophiodon elongatus</i>		♦	♦		♦
English sole	<i>Parophrys vetulus</i>		♦	♦		♦
Starry flounder	<i>Platichthys stellatus</i>	♦	♦	♦		♦
C-O sole	<i>Pleuronichthys coenosus</i>		♦	♦		♦
Sand sole	<i>Psettichthys melanostictus</i>		♦	♦		♦
Cabezon	<i>Scorpaenichthys marmoratus</i>		♦	♦		
Rockfish	<i>Sebastes spp.</i>		♦	♦		♦
Pile perch	<i>Rhacochilus vacca</i>		♦	♦	♦	♦
Walleye pollock	<i>Theragra chalcogramma</i>		♦	♦		

Table 1, cont.

Common Name	Scientific Name	Spawning Ground	Nurs. Ground	Adult Forage	Comm. Fishery	Recr. Fishery
INVERTEBRATE SPECIES						
Dungeness crab	<i>Cancer magister</i>		♦	♦		♦
Red crab	<i>Cancer productus</i>		♦	♦		
Pacific oyster	<i>Crassostrea gigas</i>	♦	♦	♦		
Pacific coast squid	<i>Loligo opalescens</i>		♦	♦		
Bent-nosed clam	<i>Macoma nasuta</i>	♦	♦	♦		♦
Soft-shell clam	<i>Mya arenaria</i>	♦	♦	♦		
Shrimp	<i>Pandalus spp.</i>		♦	♦		
Geoduck clam	<i>Panope generosa</i>	♦	♦	♦		
Sea cucumber	<i>Parastichopus californicus</i>	♦	♦	♦	♦	♦
Native littleneck clam	<i>Protothaca staminea</i>	♦	♦	♦	♦	♦
Kelp crab	<i>Pugettia productus</i>	♦	♦	♦		
Butter clam	<i>Saxidomus giganteus</i>	♦	♦	♦		♦
Horse gaper clams	<i>Tresus spp.</i>	♦	♦	♦		
Manila clam	<i>Venerupis japonica</i>	♦	♦	♦	♦	♦

shrimp during the spring and early summer (Calambokidas personal communication 1994).

There are moderate commercial and recreational fisheries near the site. In areas of Rich Passage, there is usually moderate sport fishing for salmon in September and October. The nearshore waters in the area support a demersal sport fishery that targets Pacific cod, starry flounder, and several species of sole. There is infrequent sport crabbing for Dungeness crab offshore in Port Orchard and Rich Passage. In addition, there are Atlantic salmon net pen operations both at the end of the dock on the EPA property and offshore in Rich Passage (Zichke personal communication 1994). The intertidal area next to the landfill is closed to commercial and recreational shellfish harvesting because of potential contamination from the landfill (Kievit 1995).

Beaver Creek, a moderate-gradient freshwater stream, discharges into Clam Bay immediately south of the site, next to and south of the NOAA/NMFS property. Beaver Creek is 4 km long and shallow, with sand/gravel substrates and riffle/pool profiles. The laboratory uses the creek's small run of coho salmon for research (Mahnken personal communication 1994).

## ■ Site-Related Contamination

Data collected during the site investigations indicate that soils, groundwater, surface water, and sediment at the Old Navy Dump site contain elevated concentrations of site-related contaminants (Tables 2 and 3; Ecology and Environment 1988; EPA 1992). Some of these contaminants were also detected in tissue samples of clams

(native littleneck clam, *Protothaca staminea*; bentnose clam, *Macoma nasuta*; and *Macoma irus*) from Clam Bay. Trace elements and PCBs are the primary contaminants of concern to NOAA at the Old Navy Dump site.

Soils in the inactive landfill are heavily contaminated with arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc (Table 3). Concentrations of all of these trace elements exceeded their respective average concentrations found in the earth's crust, by up to five orders of magnitude. PCBs were also detected in soils collected from the landfill, although screening guidelines are not available for these compounds in soils (EPA 1992).

Marine sediments sampled next to the landfill were heavily contaminated with trace elements and PCBs. These samples were collected from along the mean high-water line and lower intertidal area. Lower levels of contamination were found in sediments from on-site streams and wetlands (Table 3). Trace elements have also been detected in samples collected from groundwater seeps along the shoreline, and in surface water near the landfill and burn pit (Table 2; EPA 1992).

Concentrations of contaminants in clam tissue from the site often exceeded concentrations in clam tissue from the reference station, but not substantially. However, highly variable contaminant concentrations were found in tissue samples

Table 2. Maximum concentrations of contaminants in groundwater, surface water, and seepage water at the Old Navy Dump site.

	Groundwater (µg/l)	Marine Surface Water (µg/l)	Seep Water (µg/l)	AWQC <sup>1</sup> (µg/l)
TRACE ELEMENTS				
Cadmium	17	<20	<20	9.3
Copper	33	350	320	2.9 <sup>2</sup>
Mercury	<0.1	<0.1	0.13	0.025
Nickel	11	<100	<100	8.3
Zinc	38	250	150	86
PCBs				
Aroclor 1260	<0.072	<0.072	0.11	0.03
<sup>1</sup> Chronic ambient water quality criteria for the protection of marine organisms (EPA 1993). <sup>2</sup> Chronic value not available; acute value presented.				

Table 3. Maximum concentrations of contaminants in soil and sediment at the Old Navy Dump site.

	Soil (mg/kg)		Sediment (mg/kg)		
	Landfill	Average <sup>2</sup>	Marine Sediment	Stream Sediment	ERL <sup>3</sup>
<b>TRACE ELEMENTS</b>					
Arsenic	52	5.2	57	2.6	8.2
Cadmium	23,000	0.06	8.3	0.2	1.2
Chromium	690	37	140	19	81
Copper	23,000	17	19,000	52	34
Lead	56,000	16	2,700	26	46.7
Mercury	1.7	0.06	0.49	0.04	0.15
Nickel	930	13	490	16	21
Zinc	24,000	48	3,100	51	150
<b>PCBs</b>					
Aroclor 1260	5.5	NA	5.5	0.48	0.0227 <sup>4</sup>
<b>DIOXINS/FURANS (µg/kg)</b>					
Total Dioxins/Furans	8.3	NA	NT	NT	NA
Total 2, 3, 7, 8-TCDD Toxicity Equivalent Concentration (TEC) <sup>1</sup>	0.026	NA	NT	NT	NA
<sup>1</sup> Total includes undetected concentrations at one-half the sample detection limit. <sup>2</sup> EPA (1983) <sup>3</sup> Effects 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 MacDonald (1992). <sup>4</sup> Screening guidelines are for total PCBs. NA Screening guideline was not available. NT Not tested.					

collected from the same reference station. Concentrations of PCBs were detected at a substantially higher concentration in tissue (maximum of 4,000 µg/kg) collected close to the site versus the reference location (maximum of 71 µg/kg; Hart Crowser 1995).

## Summary

Available studies indicate that former U.S. Navy activities at the site have contaminated soil, sediment, groundwater, and surface water at the Old Navy Dump site. The areas of greatest concern are the landfill area, the former fire fighting school, and the former submarine net depot. Contaminants have been detected in tissues of clam species from intertidal habitats



next to the site. Nearby areas of Puget Sound provide important spawning, nursery, and adult forage habitat for numerous trust species. In addition, the threatened Steller sea lion uses habitat close to the site, as do four species of marine mammals monitored by the State of Washington.

## ■ References

- Ecology and Environment. 1988. Site inspection report for U.S. EPA Manchester Laboratory, Manchester, Washington. Seattle: U.S. Environmental Protection Agency, Region 10.
- Calambokidas, J., Research Biologist, Cascadia Research Collective, Olympia, Washington, personal communication, December 16, 1994.
- EVS Consultants. 1994. Site visit to the EPA Manchester Laboratory. Seattle: National Oceanic and Atmospheric Administration, Hazardous Materials Response and Assessment Division.
- Hart Crowser. 1994. Manchester Annex RI/FS Preliminary Scoping, Old Navy Landfill and Fire Training Areas, Manchester, WA. Seattle: U.S. Army Corps of Engineers.
- Hart Crowser. 1995. Draft Addendum Scoping Report, Manchester Annex Site. Seattle: U.S. Army Corps of Engineers.
- Kievit, R.E., U.S. Environmental Protection Agency, Lacey, Washington, memorandum of April 17, 1995 regarding Preliminary Natural Resource Survey comments, 3 pp.
- Mahnken, C., Fisheries Biologist, National Marine Fisheries Service, Manchester, Washington, personal communication, December 16, 1994.
- U.S. Environmental Protection Agency (EPA). 1983. *Hazardous waste land treatment*. EPA/530/SW-83/874. Cincinnati: Municipal Environmental Research Laboratory. 702 pp.
- U.S. Environmental Protection Agency (EPA). 1992. Site investigation of an Old U.S. Navy Dump Site near Manchester, Washington. Seattle: Region 10, Environmental Services Division.
- 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.
- Williams, R.W., R. Laramie, and J. Ames. 1975. *A catalog of Washington streams and salmon utilization*. Volume I. Puget Sound. Olympia: Washington Department of Fisheries.
- Zichke, J., fax transmission of December 16, 1994 regarding NOAA trust resource use and existing fisheries of Dyes Inlet, Fisheries Harvest Manager, Suquamish Tribe, Suquamish, Washington.

