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Hamilton Island Landfill

North Bonneville, Washington
Cerclis #WA5210890096

Site Exposure Potential

The Hamilton Island Landfill site encompasses 97 hectares on Hamilton Island in the Columbia River, adjacent to North Bonneville, Washington (Figure 1). The site is located within the one hundred-year flood plain of the Columbia River. There are emergent wetlands along the southern shore of the peninsula and along Hamilton Slough, which forms 1.3 km of the western boundary of the site. Hamilton Slough joins the Columbia River at the western toe of the peninsula. The Columbia River, which flows along the eastern and southern boundaries of the site, discharges to the Pacific Ocean 260 km downstream.

From 1977 to 1982, the site was used as a disposal area for construction and demolition debris

generated during construction of the second powerhouse at the Bonneville Dam. The waste materials were reportedly disposed of in four spoils areas on the site. Two of these areas, one of which was the main disposal area (Area A), were located on the island proper. The remaining two spoils areas were located on the filled portion of Hamilton Slough and north of the filled slough. Materials disposed of at the site included scrap steel, sheet metal, bentonite, concrete and concrete curing compounds, pentachlorophenol-treated lumber, solvents, paints, degreasers, plastics, and gear and lubricating oils. In 1982, the site was closed and the landfill disposal areas were seeded and fertilized (USACOE, 1990).

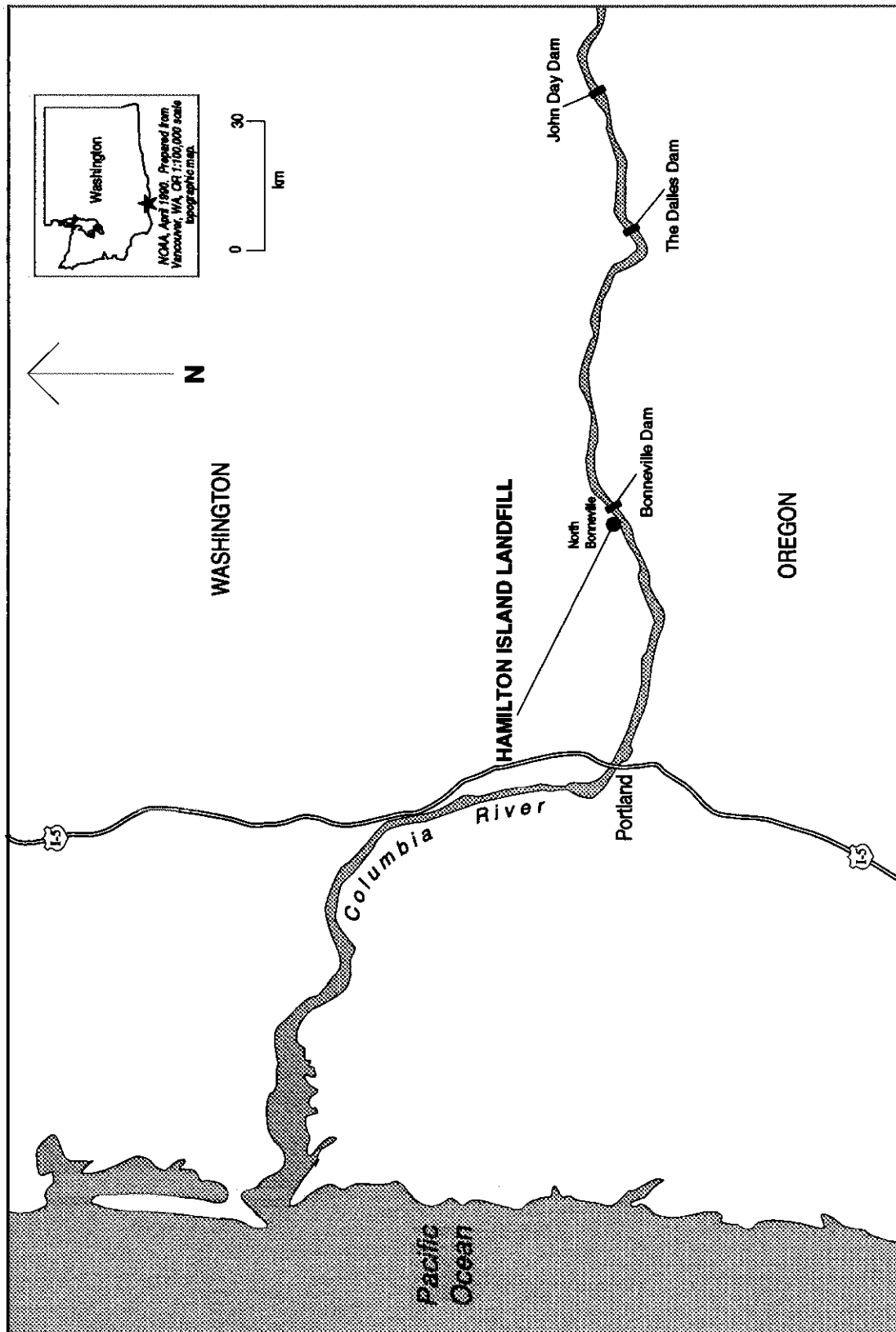


Figure 1. General location of the Hamilton Island Landfill site in North Bonneville, Washington.

There is groundwater in two aquifers beneath the site, but information on the depths below land surface to the aquifers was not available. Shallow groundwater at the site tends to follow the topographic contours and discharges to Hamilton Slough and the Columbia River. Groundwater in the deeper aquifer flows south beneath the landfill and is recharged by the Columbia River. The Bonneville Hatchery, located across the river at Tanner Creek, uses groundwater from the deeper aquifer for hatchery operations. Surface water runoff from the site discharges to Hamilton Slough and the Columbia River via drainage ditches, culverts, and overland flow. Numerous leachate seeps also discharge to the wetlands, Hamilton Slough, and the Columbia River (USACOE, 1990). Groundwater, surface water, and leachate discharge are potential pathways of contamination from the site to NOAA resources and associated habitats.

NOAA Trust Habitats and Species

The habitats of primary concern to NOAA are the surface waters and associated bottom substrates of Hamilton Slough, the Columbia River, and the emergent wetlands adjacent to the site. Secondary habitats of concern include Hardy and Greenleaf sloughs, which are within 2 km of the site. The Columbia River is tidal fresh water in the vicinity of the site. The Bonneville Dam,

3 km upstream of the landfill, is the upstream limit of tidal influence (Willis, personal communication 1991). The upstream limit of estuarine water in the river is about 220 km downstream of the site.

The emergent wetlands and low-velocity sloughs near the site provide spawning, nursery, and adult habitat for numerous species (Table 1; ODFW and WDF, 1989; Dehart and Karr, 1990; USACOE, 1990; Dammers, personal communication 1991; Nielson, personal communication 1991; Willis, personal communication 1991). Hamilton, Hardy, and Greenleaf sloughs also link the Columbia River to perennial spawning tributaries (Hamilton, Hardy, and Greenleaf creeks).

The Columbia River in the vicinity of the site is an important congregation area during upstream and downstream anadromous fish migrations, particularly for several runs of salmon (Willis, personal communication 1991). All anadromous fish that spawn in the vicinity of and above the Bonneville Dam pass by the site at some point. In 1989, an estimated 3.2 million fish passed through the Bonneville Dam during outmigration (USACOE, 1990).

Hardy and Hamilton creeks are recognized as the most valuable of the Bonneville-area salmon production locations and support runs of wild chum and coho salmon (Fiscus, 1991). NOAA has been petitioned to give Federal threatened and endangered status to these remnant natural runs of chum salmon and lower Columbia River wild coho salmon. These salmon, along with

Table 1. Species, habitat use, and commercial and recreational fisheries in the Columbia River in proximity of Bonneville Pool.

Species		Habitat				Fisheries	
Common Name	Scientific Name	Spawning	Nursery	Migration Route	Adult Forage	Comm.	Recr.
ANADROMOUS SPECIES							
green sturgeon	<i>Acipenser medirostris</i>			♦	♦		♦
white sturgeon	<i>Acipenser transmontanus</i>	♦	♦	♦	♦	♦	♦
American shad	<i>Alosa sapidissima</i>	♦	♦	♦	♦		♦
Pacific lamprey	<i>Lampetra tridentatus</i>				♦		
steelhead trout	<i>Oncorhynchus mykiss</i>	♦	♦	♦	♦		♦
chum salmon	<i>Oncorhynchus keta</i>	♦	♦	♦		♦	♦
coho salmon	<i>Oncorhynchus kisutch</i>	♦	♦	♦		♦	♦
sockeye salmon	<i>Oncorhynchus nerka</i>			♦		♦	♦
chinook salmon	<i>Oncorhynchus tshawytscha</i>			♦		♦	♦
cutthroat trout	<i>Oncorhynchus clarki</i>	♦	♦	♦	♦		♦
eulachon	<i>Thaleichthys pacificus</i>	♦	♦	♦		♦	♦
NON-ANADROMOUS SPECIES							
3-spine stickleback	<i>Gasterosteus aculeatus</i>	♦	♦		♦		
rainbow trout	<i>Oncorhynchus mykiss</i>				♦		♦
walleye	<i>Stizostedion vitreum</i>	♦	♦		♦		♦

chinook and sockeye salmon and steelhead trout, form 11 major runs and 51 different stock groups, the majority of which pass by the Hamilton Island Landfill site (Columbia River Fish and Wildlife Authority, 1990).

Other species of significance or occurrence in the vicinity of the site include white sturgeon, sea-run cutthroat trout, American shad, and eulachon. These species are known to use habitat near the site for spawning and nursery grounds.

The Columbia River supports important commercial and recreational fisheries for salmon, steelhead trout, white sturgeon, and American shad.

Although the commercial fishing effort in the vicinity of the site is small, sport fisheries are extremely popular, and may be the predominant recreational use in the area (Neilson, personal communication 1991; Willis, personal communication 1991). There is bank fishing on the shoreline of Hamilton Island. Six salmon hatcheries are located near the site, but only the Bonneville Hatchery (across the Columbia River on Tanner Creek) is in the immediate vicinity. Chum and coho salmon smolts and jacks released from this hatchery use the habitat around the vicinity of the landfill for nurseries.

Site-Related Contamination

Data collected during preliminary site investigations indicate that trace elements have contaminated groundwater, leachate seeps, surface water, soils, and sediments at the Hamilton Island Landfill site (USACOE, 1990). A single soil sample also indicated that PCBs may be present. However, surface water and sediment samples have not been collected from Hamilton Slough or the Columbia River, which are the principal habitats of concern to NOAA. Maximum concentrations of trace elements detected at the site are summarized in Table 2, along with applicable screening levels.

Concentrations of chromium, copper, lead, nickel, silver, and zinc measured in groundwater and seeps exceeded applicable ambient water quality criteria (U.S. EPA, 1986) by one to three orders of magnitude. Cadmium and mercury were also detected in groundwater or seeps at concentrations exceeding screening criteria. Surface water samples were collected from on-site drainage ditches and a pond. Copper and lead were the only trace elements detected at concentrations exceeding screening criteria in surface waters from a culvert discharging directly to the Columbia River.

Elevated concentrations of arsenic, cadmium, copper, lead, mercury, silver, and zinc were

Table 2. Maximum concentrations of contaminants of concern at the Hamilton Island Landfill site.

	Water				Soil		Sediment	
	Ground-water	Seeps	Surface Water	AWQC ¹	Surface Soil	Average ² U.S. Soil	Sediment	ER-L ³
	µg/l	µg/l	µg/l	µg/l	mg/kg	mg/kg	mg/kg	mg/kg
INORGANIC SUBSTANCES								
arsenic	540	48	<5	190	16	5	4.7	33
cadmium	7.3	670	0.6	0.8 ⁺	15	0.06	12	5
chromium	1,600	1,500	ND	11	32	100	32	80
copper	8,000	7,900	26	8.5 ⁺	89	30	52	70
lead	3,100	200	2.9	1.9 ⁺	61	10	9.4	35
mercury	3.1	<0.2	ND	0.012	1.1	0.03	ND	0.15
nickel	2,500	2,200	ND	110 ⁺	26	40	29	30
silver	17	66	ND	0.12	8.2	0.05	10	1
zinc	14,000	29,000	62	76 ⁺	260	50	96	120

1: Ambient water quality criteria for the protection of aquatic organisms. Freshwater chronic criteria presented (EPA, 1986).
 2: Lindsay (1979).
 3: 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 Morgan (1990).
 +: Hardness-dependent criteria (68 mg/l CaCO₃ used).
 NA: Screening level not available.
 ND: Not detected at method detection limit.

detected in soils throughout the landfill. Cadmium and silver were the only elements measured at elevated concentrations in sediments collected from a pond in an on-site wetland.

PCBs were measured in one soil sample from the landfill. Aroclor 1260 was detected at a concentration of 0.08 mg/kg in a soil sample collected from the southern face of the main disposal area. PCBs were not detected in leachate seep, surface water, or sediment samples. On-site groundwater was not analyzed for PCBs.

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