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New Hampshire Plating Co., Inc.

Merrimack, New Hampshire
Cerclis #NHD001091453

Site Exposure Potential

The 1.2-hectare New Hampshire Plating Company, Inc., in Merrimack, New Hampshire (Figure 1), is approximately 200 m west of the Merrimack River within the 100-year floodplain. Electroplating operations were conducted at the site from 1962 to 1985. Spent plating bath solutions and sludge from the electroplating process were discharged to an unlined infiltration lagoon north of the electroplating facility (Figure 2). In addition, two unlined ponds north of the infiltration lagoon received effluent from the lagoon during periods of high flow. An underground fuel storage tank is also located on the site. In 1987, cyanide salts and various other materials associated with the electroplating process were removed from the on-site building,

and an estimated 115,000 kg of lime and 3,000 l of sodium hypochloride solution were discharged to the infiltration lagoon (Site Inspection Reports 1989, 1990).

Surface water runoff and groundwater are the potential pathways of contamination from the site to NOAA resources and associated habitats. On-site surface water features include the unlined infiltration lagoon and two ponds (Figure 2). The lagoon and ponds have been classified as palustrine wetlands. Surface water from these wetlands discharges north to an unidentified drainage system, which reportedly discharges to the Merrimack River (Listing Site Inspection Report 1990). The Merrimack River is about

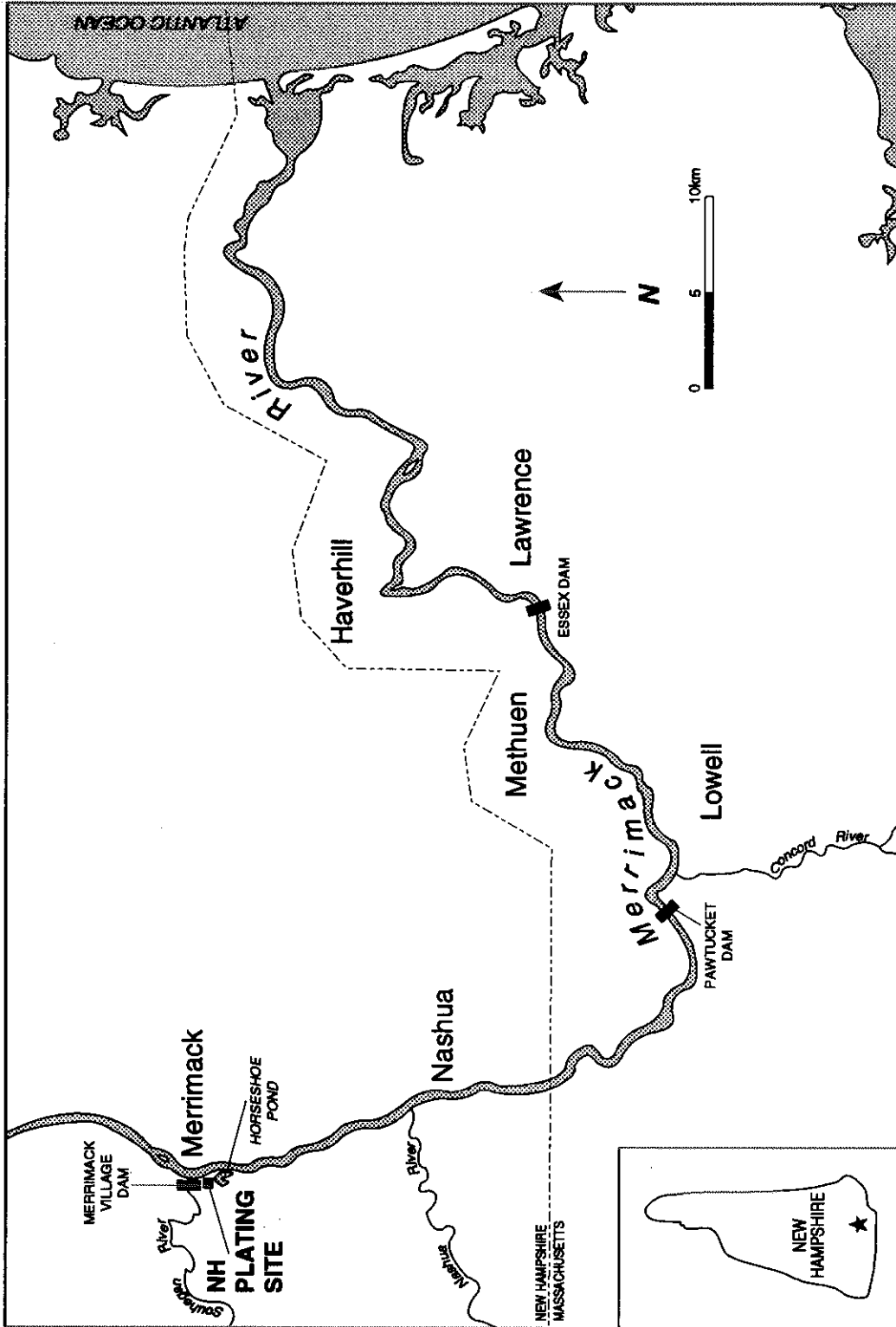


Figure 1. The New Hampshire Plating site in Merrimack, New Hampshire.

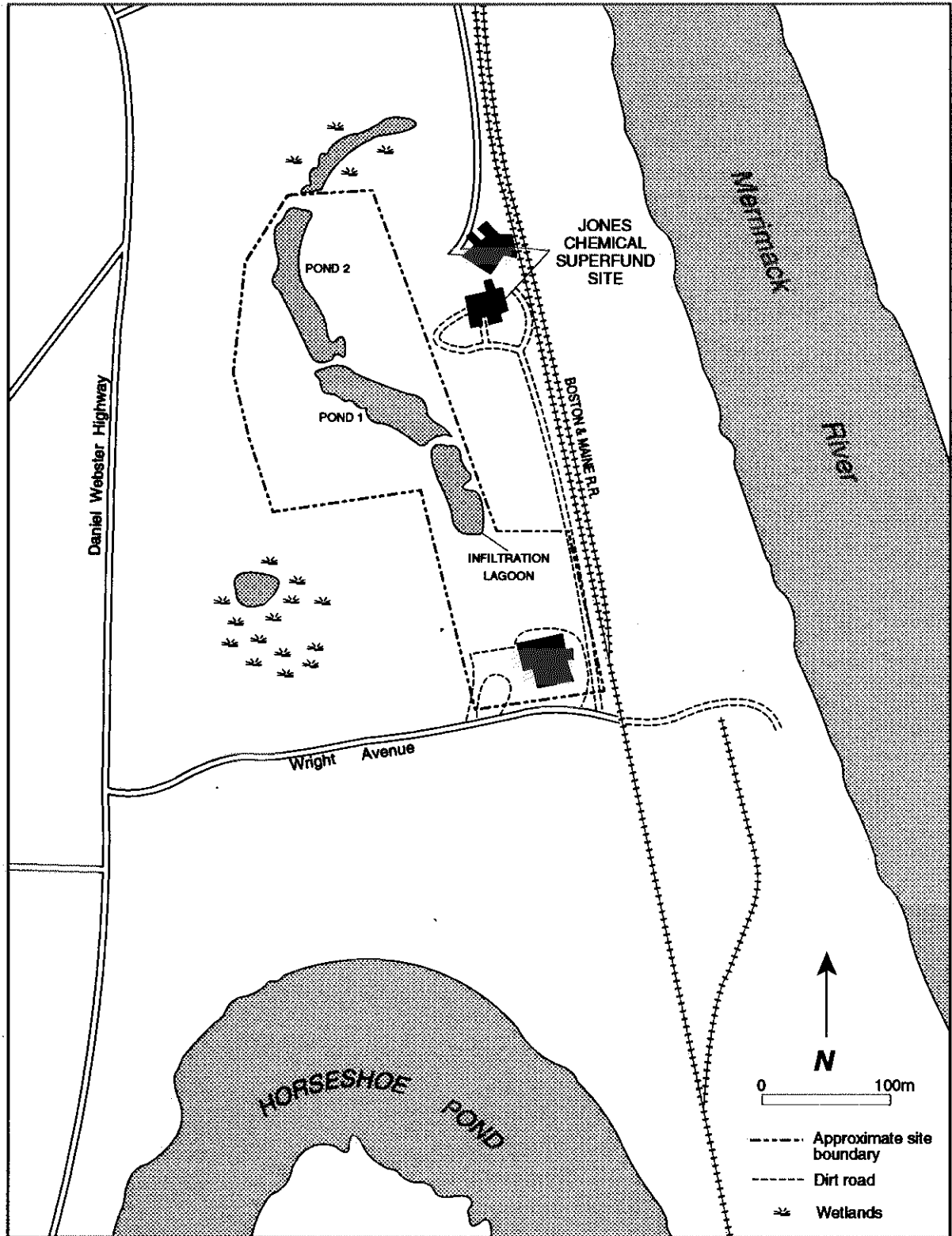


Figure 2. Features at the NH Plating site.

200 m wide near the site and flows south, discharging directly to the Atlantic Ocean 72 km downstream of the site. Groundwater occurs in two aquifers beneath the site. However, the confining silt/clay layer between them is discontinuous. The average depth to shallow groundwater is 4.5 m below ground surface. Information on the depth to the deeper aquifer was not available. Groundwater in both aquifers flows east toward the Merrimack River and south toward Horseshoe Pond, which is located approximately 450 m south of the site. Although a groundwater divide reportedly exists between Horseshoe Pond and the Merrimack River, surface water from the pond discharges to the river via Naticook Brook.

At least six other Superfund sites were identified within an 800-m radius of the site: Harcros Chemical, Inc.; Jones Chemical, Inc.; Louis/Chung Property; New England Circuits/Electropac; and New England Pole and Wood Treating Corporation. The Jones Chemical Superfund site borders New Hampshire Plating to the east (Figure 2). The Savage Well Superfund site, is 13 km upstream of New Hampshire Plating on the Souhegan River; other Superfund sites are downstream on the Merrimack River or associated tributaries.

NOAA Trust Habitats and Species

The Merrimack River and Horseshoe Pond are the habitats of primary concern to NOAA. There are six species of anadromous and catadromous fish in the Merrimack River near the site (Table 1; Greenwood, personal communication 1992; McKeon, personal communication 1992). American shad, alewife, and blueback herring use the lower portion of the Souhegan River and the mainstream of the Merrimack River for spawning, nursery, and adult habitat. Out-migrating juvenile Atlantic salmon use the Merrimack River near the site for nursery habitat (Greenwood, personal communication 1992). Sea lamprey occur primarily in the mainstream of the channel of the Merrimack River. No special habitats or endangered fish species have been identified near the site (The Cadmus Group, 1990).

Horseshoe Pond, 450 m south of the site and encompassing approximately 1.3 hectares, is an oxbow lake created by a former Merrimack River meander. Naticook Brook flows south-southeast from the pond for approximately 0.7 km before discharging to the Merrimack River. Although limited data were available regarding resource use in Horseshoe Pond, its proximity to the Merrimack River and the lack of any physical obstructions suggest that American shad, blueback herring, and American eel may occur periodically in the pond (J. McKeon, personal communication 1992).

Table 1. Species, habitat use, and recreational fisheries in the Merrimack River near the site.

Species		Habitat			Fisheries	
Common Name	Scientific Name	Spawning	Nursery	Adult Forage	Comm. ¹	Recr.
ANADROMOUS SPECIES						
American shad	<i>Alosa sapidissima</i>	♦	♦	♦		♦
blueback herring	<i>Alosa aestivalis</i>	♦	♦	♦		♦
Atlantic salmon	<i>Salmo salar</i>		♦			♦
alewife	<i>Alosa pseudoharengus</i>	♦	♦	♦		♦
sea lamprey	<i>Petromyzon marinus</i>			♦		
CATADROMOUS SPECIES						
American eel	<i>Anguilla rostrata</i>		♦	♦		♦
1 There are no commercial fisheries on the Merrimack River or its tributaries.						

The Merrimack Village Dam in Merrimack is approximately 0.5 km upstream of the confluence of the Souhegan and the Merrimack rivers (Figure 1). The dam now contains fish passage facilities which allow the out-migration of juvenile salmon from the upper reaches of the Souhegan River, where intensive State stocking of salmon fry occurs annually (Greenwood, personal communication 1992).

Adult Atlantic salmon migrating upstream from the Atlantic Ocean are trapped at the Essex Dam and used for brood stock at the Federal Nashua Fish Hatchery (Tisa, personal communication 1990; Greenwood, personal communication 1992). Although incidental escapes have occurred in the past, these numbers of escaping salmon were considered insignificant. The New Hampshire Department of Fish and Game is developing plans to allow increased upstream migration of adult Atlantic salmon by 1993 (Greenwood, personal communication, 1992).

The Pawtucket and Essex dams in the lower reaches of the Merrimack River at Lowell and Lawrence, respectively, operate fish passage facilities that extend upstream fish migration within range of the site.

There is no commercial fishing in the Merrimack River watershed. There is sport fishing predominantly for warm-water species and trout upstream of the Merrimack Village Dam on the Souhegan River. There is considerable sport fishing for American shad, blueback herring, and alewife in the Merrimack River (Table 1). There are no restrictions on size, limit, or season for these three anadromous species. Horseshoe Pond maintains a history of boating, fishing, and swimming activities (Toxicological/Health Risk Evaluation, undated).

Site-Related Contamination

Data collected during preliminary investigations indicate that the sludge in the lagoon, groundwater, and surface water is contaminated. Trace elements are the primary contaminants of concern to NOAA. Maximum concentrations of these inorganic substances are presented in Table 2, along with applicable screening criteria (U.S. EPA, 1986; Listing Site Inspection Report, 1990). Volatile organic compounds were measured in on- and off-site media, but at concentrations less than those known to threaten NOAA resources.

Sludge samples collected from the infiltration lagoon in 1981 indicated concentrations of cadmium and chromium one order of magnitude higher than in subsequent sampling. In addition,

high concentrations of copper (62,000 mg/kg), lead (860 mg/kg), nickel (15,000 mg/kg), and silver (1.67 mg/kg) were detected in the lagoon sludge samples collected in 1981. Between 1984 and 1989, high concentrations of cadmium, chromium, zinc, and cyanide were detected in sludge samples collected from the infiltration lagoon and the two ponds. The concentrations of these elements were not reported in the data collected from the site between 1984 and 1989 (Listing Site Inspection Report, 1990).

Concentrations of cadmium, chromium, and cyanide exceeded applicable screening criteria [ten-times ambient water quality criteria (AWQC)] for the protection of freshwater organisms (U.S. EPA, 1986) in less than 50 percent of

Table 2. Maximum concentrations of contaminants of concern at the site.

	Water			Sludge Lagoon mg/kg
	Groundwater µg/l	Surface Water µg/l	AWQC ¹ µg/l	
INORGANIC SUBSTANCES				
<u>Trace Elements</u>				
cadmium	500	4,000	1.1*	2,500
chromium	180	8,300	11	2,400
copper	100	1,400	12*	NR
lead	20	<100	3.2*	NR
nickel	140	500	160*	NR
silver	<30	<100	0.12	NR
zinc	530	NR	110*	20,000
<u>Other</u>				
Cyanide	610	6,400	5.2	1,300
1: Ambient water quality criteria for the protection of aquatic organisms. Marine chronic criteria presented (EPA, 1986).				
*: Hardness-dependent criteria (100 mg/l CaCO ₃ used).				
NR: Data not reported.				

the groundwater samples collected from on- and off-site groundwater monitoring wells between 1983 and 1989. The maximum concentrations of cadmium and cyanide were measured in groundwater wells in the vicinity of the infiltration lagoon and the first pond. The maximum concentration of chromium was detected in an off-site groundwater well located between the site and the Merrimack River. In addition, groundwater samples collected in 1981 from at least three monitoring wells of unknown location indicated concentrations of copper, lead, and silver exceeding AWQC.

Surface water samples were collected from the infiltration lagoon and the two on-site ponds between 1984 and 1989. Concentrations of cadmium, chromium, copper, nickel, and cyanide measured in surface water from the lagoon exceeded applicable AWQC. Cyanide was also measured at high concentrations in the two ponds, but these samples were not analyzed for trace elements. In surface water samples previously collected from the lagoon in 1981 and 1982, concentrations of cadmium, chromium, and silver were one to two orders of magnitude greater than those measured in subsequent sampling. Lead (20 µg/l) and zinc (95,000 µg/l) were also measured in lagoon surface water during the 1981 sampling.

Concentrations of cadmium (28 µg/l), chromium (40 µg/l), and cyanide (580 µg/l) exceeded applicable AWQC in a surface water sample collected from Horseshoe Pond during the 1981 site investigation. There was no additional sampling for trace elements in the pond.

No sampling of surface water or sediments for trace elements was conducted in the Merrimack River in the vicinity of the site.

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