Route 561 Dump

Gibbsboro, New Jersey

EPA Facility ID: NJ0000453514

Basin: Lower Delaware

HUC: 02040202

Executive Summary

The Route 561 Dump is located approximately 16 km (10 mi) east of the Delaware River within the Cooper River watershed. The area was used to dump paint waste and sludges generated by a local paint manufacturer. Soils, groundwater, surface water, and sediments are contaminated with trace elements and PAHs at concentrations that exceed screening guidelines. The habitats of primary concern to NOAA are the surface water and sediments in White Sand Branch, Bridgewood Lake, and Millard Creek. The catadromous American eel is the trust resource present in the Cooper River and its tributaries due to several impassable dams on the river. However, fish passage facilities have been installed at the lowermost dam and will likely be installed on the remaining dams, which would allow anadromous fish access to the upper watershed in the future. A consumption advisory is in effect for all fish, shellfish, and crustaceans in the Cooper River and its tributaries.

Site Background

The Route 561 Dump property consists of approximately 1.2 hectares (2.9 acres) in Gibbsboro, New Jersey (Figure 1). White Sand Branch traverses the property and flows southwesterly approximately 1 km (0.6 mi) to Bridgewood Lake. Bridgewood Lake discharges into Millard Creek, which flows approximately 2 km (1.2 mi) to the Cooper River. The Cooper River flows in a northwesterly direction for approximately 15 km (9 mi) to the Delaware River (Weston 1997).

The Route 561 Dump property was used to dump paint waste and sludges generated by a local paint manufacturer from an unknown date to 1978 (USEPA 1998). There is no information regarding disposal history on the property (Hamill 2000). During a site inspection in 1994, the New Jersey Department of Environmental Protection (NJDEP) found a blue-green material on and beneath the ground surface, and in the surface waters of a wetland located on the property. There is no indication that any substances other than sewage and non-contact refrigeration water have been discharged to the septic system, located in the northeast corner of the property (Figure 2; USEPA 1998).

NJDEP and the U.S. Environmental Protection Agency (EPA) conducted preliminary assessments and site inspections in 1994 and 1995, respectively. In 1997 the property owner conducted a soil removal action followed by capping and revegetation of highly contaminated areas (Hamill 2000). The EPA proposed the Route 561 Dump site for listing on the National Priorities List in July 1998 (USEPA 2000a).

Groundwater discharge and surface water runoff into White Sand Branch are the primary pathways for contaminant migration to NOAA trust resources. White Sand Branch originates from Clement Lake west of the property (Figure 2). The stream flows southwesterly across the property,

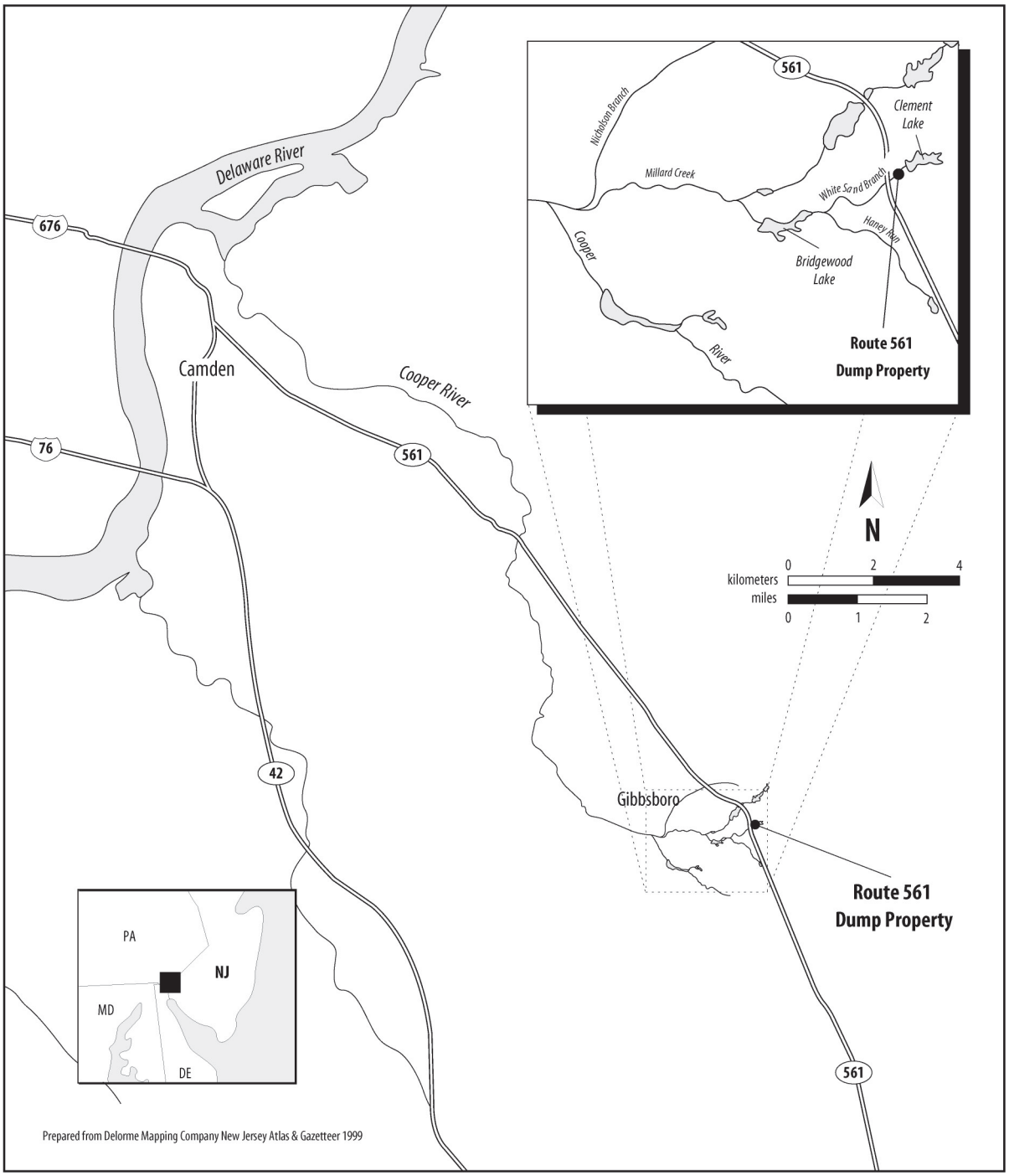

Figure 1. Location of the Route 561 Dump property in Gibbsboro, New Jersey.

briefly loses definition as it flows through a wetland, and reforms at the southern end of the property. The stream leaves the property via a culvert under Route 561 (USEPA 1999a). The 100-year floodplain encompasses the property (USEPA 1997). Groundwater occurs at depths between 0.5 to 2.0 m (1.6 to 6.6 ft) beneath the property within the Potomac-Raritan-Magothy aquifer system (Weston 1997). Groundwater flows northwest on the site. Soils are typically sandy, loose, and highly permeable (USEPA 1997).

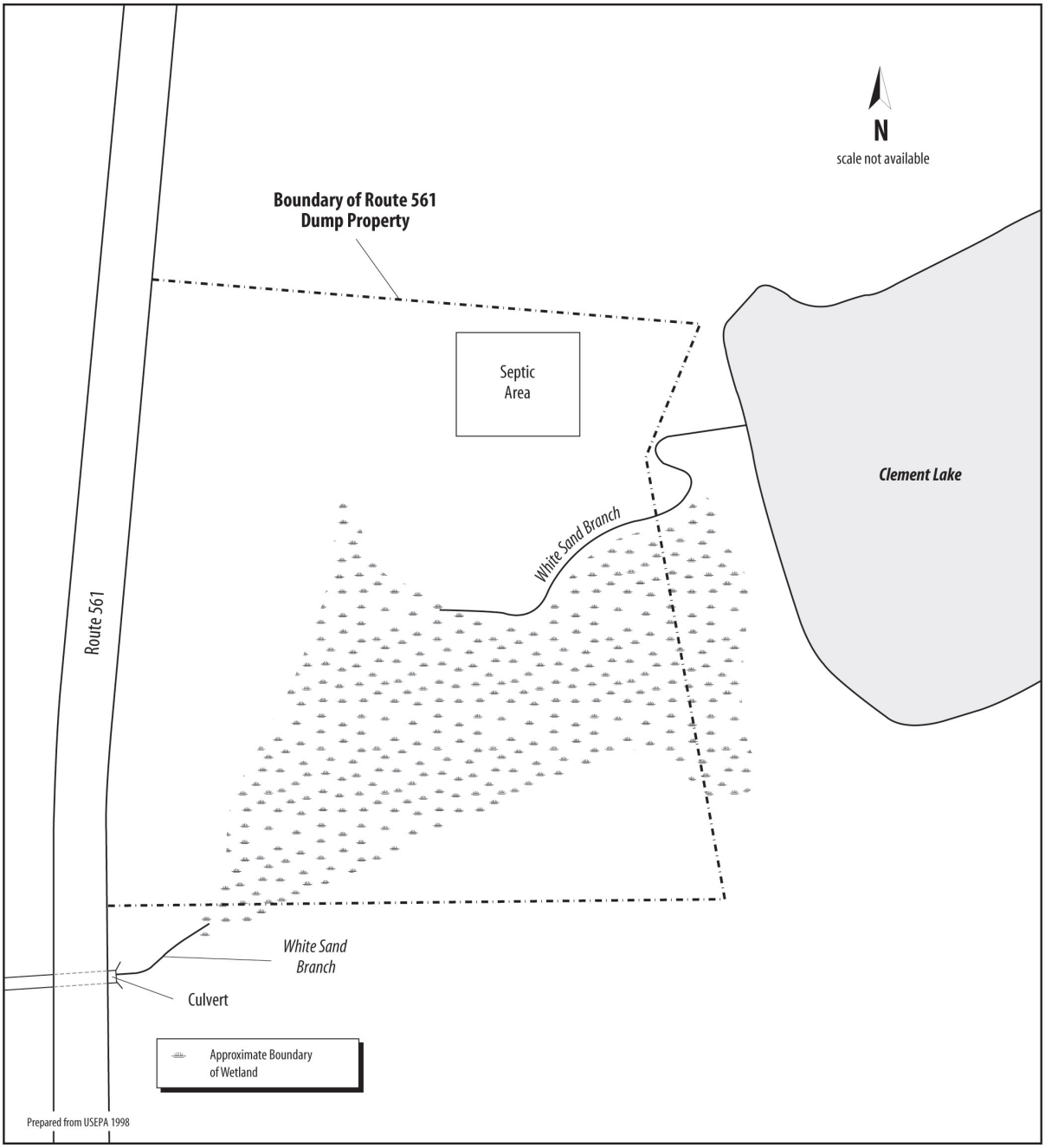

Figure 2. Detail of the Route 561 Dump property.

NOAA Trust Resources

The NOAA trust habitats of primary concern are the surface water and sediments in White Sand Branch, Bridgewood Lake, and Millard Creek. These streams and lakes make up the headwaters of the Cooper River basin, a tributary of the lower Delaware River. The streams are small, generally less than 3 m (10 ft) wide and 1 m (3.3 ft) deep with substrates ranging from silts to sands. Bridgewood Lake is approximately 2 to 3 ha (5 to 7 acres) in size. No information on bottom substrates or depths was available, but the fish communities in both the lake and streams are composed of warm water resident species such as sunfish, catfish, carp, and shiners (Carberry 2000).

Table 1. Maximum concentrations of contaminants of concern found at the Route 561 Dump (McMullan 1995; Sodano 1998; USEPA 1999a).

	Soil (mg/kg)		Water (µg/L)			Sediment (mg/kg)	
Contaminant	Soil	Mean U.S.[a]	Ground water	Surface water	AWQC[b]	Sediment	TEL[c]
TRACE ELEMENTS							
Arsenic	130,000	5.2	3,800	5.5	150	6,100	5.9
Cadmium	490	0.06	14	<1.9	2.2[d]	16	0.596
Chromium	18,000	37	2,500	<2.8	11	8,000	37.3
Copper	34,000	17	3,000	4.7	9[d]	1,400	35.7
Lead	190,000	16	37,000	44	2.5[d]	87,000	35
Mercury	9	0.058	1.5	<0.10	0.77	<0.06	0.174
Nickel	16	13	1,400	<8.1	52[d]	3.1	18
Silver	2.6	0.05	N/A	<2.7	0.12	<0.62	1.0[e]
Zinc	870	48	2,700	31	120[d]	14	123.1
Total PAHs							
	11	NA	ND	ND	300[f]	12	4.022[e]

NA Screening guidelines not available
N/A Data not available
ND Not detected; detection limit not available.
< Not detected; value presented is the detection limit.
a Shacklette and Boerngen (1984), except for cadmium and silver, which represent average concentrations in the earth's crust from Lindsay (1979).
b National Recommended Water Quality Criteria (USEPA 1999b). Freshwater chronic criteria presented.
c TEL; Threshold Effects Level; Freshwater sediment value. Concentration below which adverse effects were rarely observed (geometric mean of the 15 percent concentration in the effects data set) as compiled by Smith et al. (1996).
d Criterion expressed as a function of total hardness; concentrations shown correspond to hardness of 100 mg/Le TEL not available; marine Effects Range-Low (ERL) presented. ERL represents the 10th percentile for the data set in which effects were observed or predicted in studies compiled by Long et al. (1995).
f Lowest observable effect level; value for chemical class; freshwater chronic value not available; marine acute value presented

The catadromous American eel is the NOAA trust resource present in the Cooper River and its tributaries. Anadromous blueback herring and alewife are present near the mouth of the river. Several lowhead dams on the river block upstream migration of anadromous species. The first dam is located approximately 4 km (2 mi) upstream of the mouth and about 16 km (10 mi) downstream of the Route 561 Dump. American eel can traverse lowhead dams and are found throughout the Cooper River basin using the streams and lakes as adult habitat (Carberry 2000).

The installation of fish passage facilities at dams on the Cooper River is presently underway. Fish passage facilities were installed at the lowermost dam in 1998 and are planned at two additional dams. Although several more dams are on the river, it is likely that passage facilities will be installed at these as well, eventually allowing access to the upper Cooper River basin by anadromous fish. Blueback herring and alewife are the anadromous species most likely to use the small streams and lake habitats in the upper basin as spawning areas and juvenile nurseries.

Recreational fisheries in the Cooper River basin are limited. The lakes and streams within the basin are not stocked or managed for recreational fisheries and no commercial fisheries are present (Carberry 2000). A consumption advisory is in effect for all fish, shellfish, and crustaceans in the Cooper River, including its drainage due to PCB, dioxin or chlordane contamination (NJDEP 1999). The fish consumption advisory based on chlordane contamination has been in effect since 1993 (USEPA 2000b).

Site-Related Contamination

Data collected during field investigations indicate that soil, groundwater, surface water, and sediment are contaminated with trace elements and PAHs. Maximum contaminant concentrations from investigations conducted by the NJDEP and the EPA are summarized in Table 1, along with the appropriate screening guidelines. The NJDEP investigation collected 13 soil, one groundwater, four surface water, and three sediment samples (Industrial Corrosion Management Inc. 1994; Sodano 1998). The EPA investigation collected 11 subsurface soil, four surface soil, and four sediment samples. All media were analyzed for trace elements, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), PCBs, and pesticides (McMullan 1995; USEPA 1998).

Trace elements in soils have been detected at concentrations substantially greater than screening guidelines (Table 1). The greatest concentrations of arsenic, copper, lead, and mercury detected in subsurface soils exceed screening guidelines by three to five orders of magnitude. Maximum cadmium and chromium concentrations exceed guidelines by three orders of magnitude. Although soil guidelines are not available, elevated concentrations of PAHs were also detected in soils on the property.

Arsenic, chromium, copper, lead, nickel, and zinc were an order of magnitude greater than the Ambient Water Quality Criteria (AWQC) in the only groundwater sample collected (Table 1). Concentrations of lead in surface waters also exceeded screening guidelines (Table 1). Lead concentrations in surface water increased from 3 µg/L upstream of the property to 44 µg/L downstream (USEPA 1997).

Arsenic, cadmium, chromium, copper, and lead were detected in sediment at concentrations exceeding the screening guidelines. The maximum lead concentrations detected in sediment exceeded guidelines by three orders of magnitude. PAHs were also detected in sediments at concentrations exceeding the screening guidelines (Table 1).

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