Emmell's Septic Landfill

Galloway Township, NJ

EPA Facility ID: NJD980772727

Basin: Mullica-Toms

HUC: 02040301

Executive Summary

Emmell's Septic Landfill was a land disposal facility permitted for septic and sewage sludge waste, although other types of industrial and miscellaneous wastes were apparently disposed of there. The property is located near Morses Mill Stream within the Mullica River watershed, about 600 m (2,000 ft) from NOAA trust resource habitats.

Groundwater is the primary pathway for migration of contaminants from the landfill. Trace elements have been detected at elevated concentrations in soil and groundwater. Substantial concentrations of PCBs have been measured in soils. Insufficient analyses were conducted in groundwater to verify PCB concentrations there. The presence of volatile organic compounds (VOCs) at the site does not pose a risk to NOAA trust resources, but may increase the potential for PCBs to migrate through groundwater. No surface water or sediment sampling has been conducted down-gradient from the site.

Site Background

Emmell's Septic Landfill is located in Galloway Township, New Jersey. The landfill is located on 15 hectares (38 acres) approximately 0.6 km (2,000 ft) north of Morses Mill Stream, which discharges to Mill Pond and then Nacote Creek approximately 4 km (2.5 mi) downstream. Nacote Creek flows for 7.1 km (4.4 mi) before discharging into the Mullica River. The Mullica River empties into Great Bay an additional 7.4 km (4.6 mi) downstream (Figures 1 and 2).

Emmell's Septic Landfill was an active land disposal facility for septic and sewage sludge waste from 1967 to 1979. A permit was issued for land application of septic and sewage sludge on the property, but other types of wastes, including household garbage, tire piles, drums, paint sludges, gas cylinders, and construction and industrial wastes have been observed on the property. During this period, the New Jersey Department of Environmental Protection (NJDEP) noted repeated violations, including pooled wastes in trenches and lagoons, failure to submit engineering designs and Annual Operations Statements, and failure to maintain a dike on the premises to prevent septic flow into wooded areas adjacent to the site. An inspection report in July 1979 noted crushed drums with paint-like material in a pit. The property has been abandoned since 1979 (NJDEP 1997; USEPA 1999a). During a site investigation by NJDEP in 1984, contaminants including several volatile organic compounds (VOCs) and metals, were identified in soil and groundwater samples. In 1984 the Atlantic County Health Department closed residential wells northeast of the site after VOCs were detected in five residential wells (Weston 1993).

The primary pathway for migration of contaminants from the site to NOAA trust resources is through groundwater. Soils in the area are described as loamy sand and gravel with relatively high

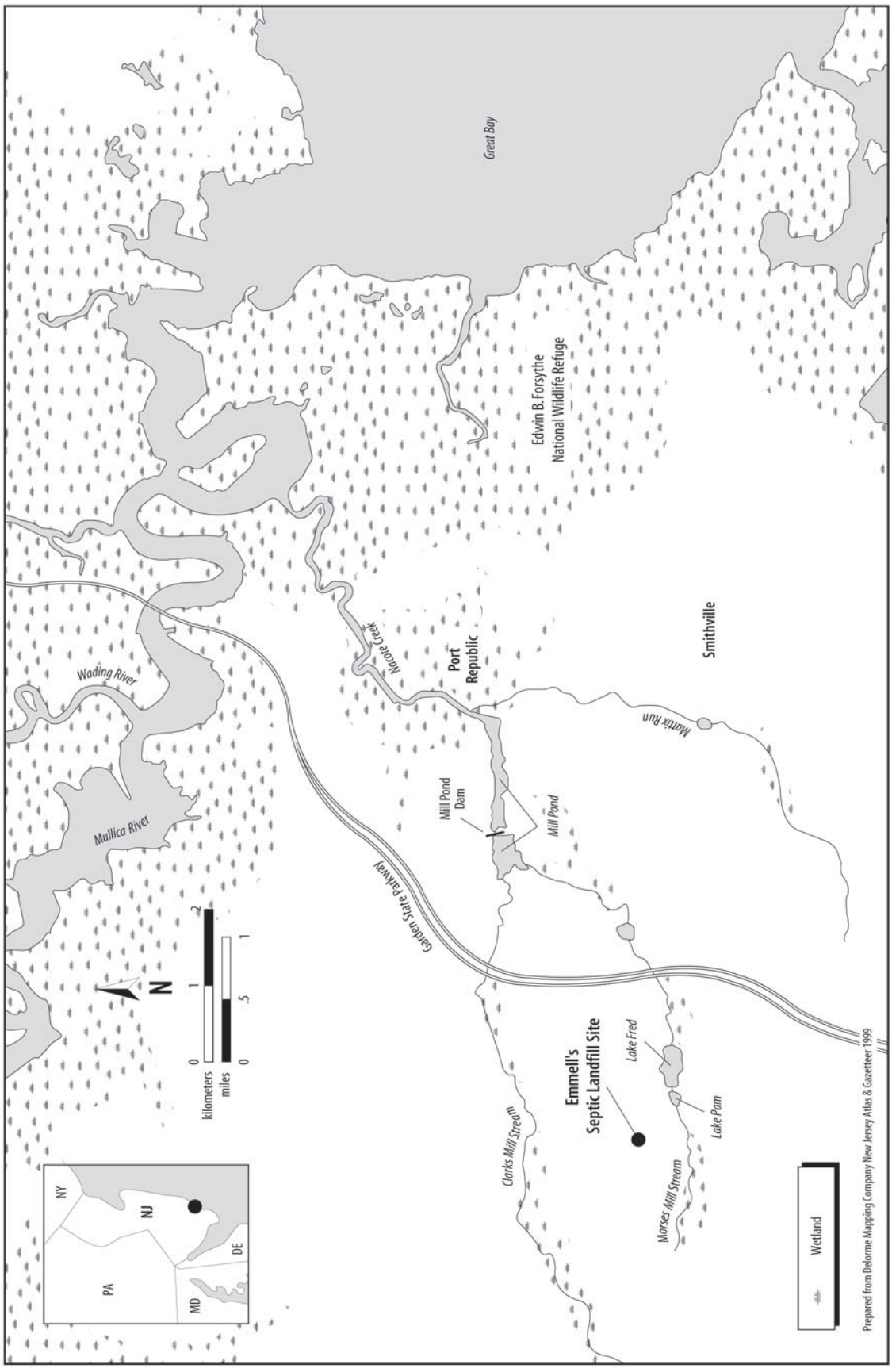

Figure 1. Location of the Emmell's Septic Landfill Site in Galloway Township, New Jersey.

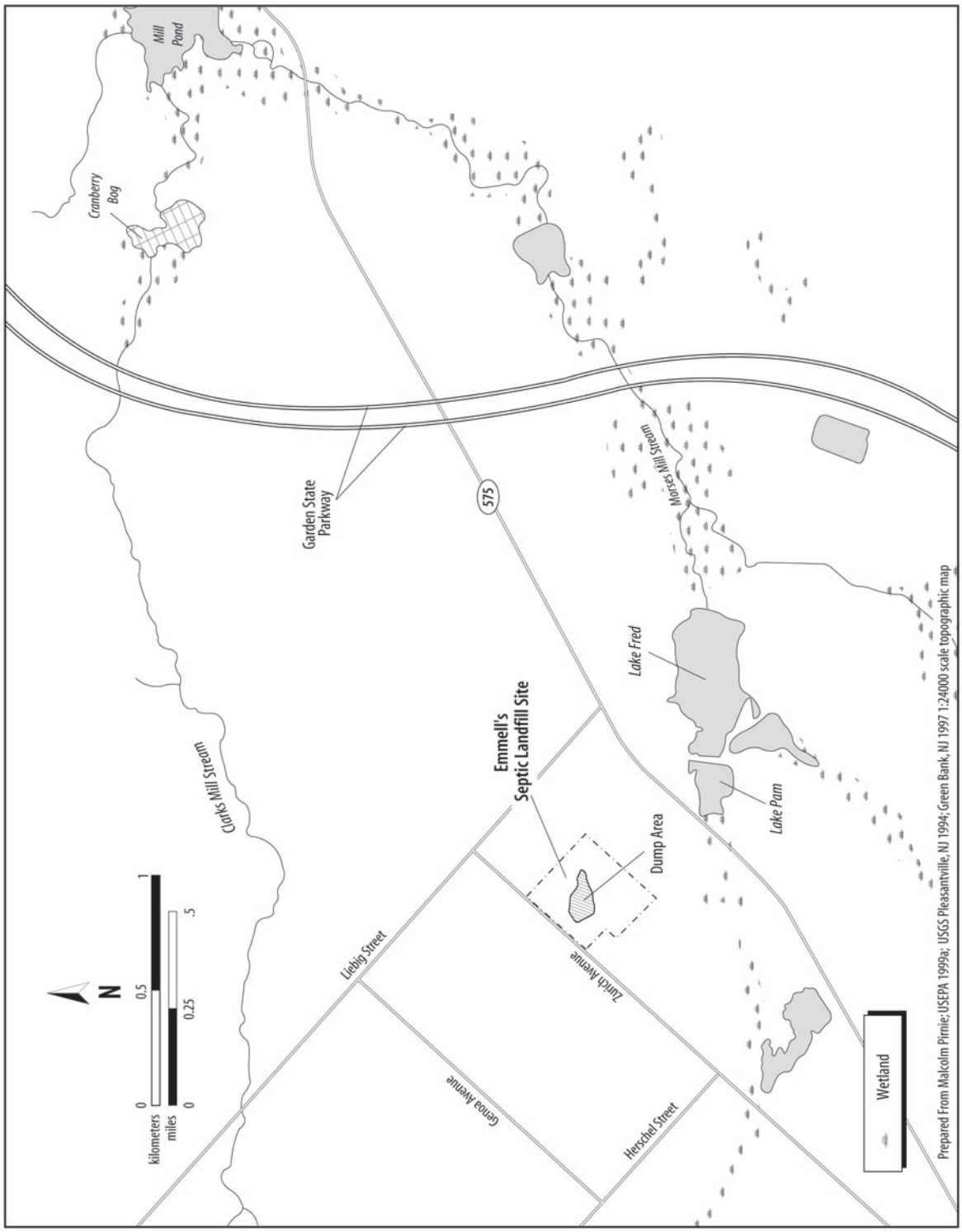

Figure 2. Detail of the Emmell's Septic Landfill Site.

permeability (NJDEP 1997). Groundwater in encountered from 1.3 to 4.6 m (4.4 to 15 ft) bgs, and the direction of flow near the site is southeast towards Morses Mill Stream. The estimated rate of contaminant transport in the groundwater is 0.3 m/day (0.9 ft/day) (NJDEP 1997). There are no surface water pathways from the site to Morses Mill Stream.

The U.S. Environmental Protection Agency (EPA) completed a Site Activity Report in June 1998, and the final Hazard Ranking System Evaluation was completed in April 1999. The EPA placed the site on the National Priorities List in July 1999. The EPA implemented a removal action to address drums, gas cylinders, paint waste, and contaminated soils. Over 400 drums were removed and the removal action was completed in the year 2000. Further actions pending at the site include a groundwater-focused feasibility study, a preliminary human health risk assessment, and a screening level ecological risk assessment (CDM 2001).

NOAA Trust Resources

The NOAA trust habitats of primary concern are the surface water and sediment in Morses Mill Stream, a tributary of the Mullica River (Figure 1). The stream is small with low flows of 3.4 to 5.0 cfs (Weston 1993). Morses Mill Stream meanders through Lake Pam and Lake Fred, two ponds located about 300 m (1,000 ft) downstream of the landfill (Weston 1993). Lake Fred is formed by a small, unnamed dam (Byrne 2002). Morses Mill Stream flows an additional 3.5 km (2.2 mi) to Mill Pond, which is formed by an impassable dam.

Table 1 presents NOAA trust resources found in streams near the landfill. The catadromous American eel is the trust resource documented in Morses Mill Stream (Carberry 2000). American eel can traverse the spillways of lowhead dams and are found throughout the stream from juvenile to adult life stages (Carberry 2000). Warm-water fish including sunfish, minnows, shiners, catfish, and carp use this low-gradient stream (Carberry 2000).

About four km (2.5 mi) downstream of the landfill, anadromous alewife use the area below Mill Pond and Nacote Creek for spawning and as a juvenile nursery. Alewife enter the stream in the spring spawning runs and juveniles reside in the basin until they out-migrate later in the fall. Anadromous striped bass use the Mullica River near the confluence of Nacote Creek, but not the area further upstream (Byrne 2002). There are no plans to put fish passage facilities on the Mill Pond dam (Carberry 2000).

Table 1. NOAA trust resources present in streams near the Emmell's Septic Landfill site in the Mullica River watershed (Carberry 2000, Byrne 2002, Normant 2002).

Species		**Habitat Use**			**Fisheries**	
Common Name	**Scientific Name**	Spawning Area	Nursery Area	Adult Habitat	Rec. Fishery	Comm. Fishery
MARINE/ESTUARINE FISH						
Alewife	*Alosa pseudoharengus*	◆	◆			
American eel	*Anguilla rostrata*		◆	◆		
Striped bass	*Morone saxatilus*		◆	◆		
INVERTEBRATES						
Blue crab	*Callinectes sapidus*	◆	◆	◆	◆	
Eastern oyster	*Crassostrea virginica*	◆	◆	◆		◆

There are no known recreational or commercial fisheries in Morses Mill Stream. Recreational fishing for alewife and striped bass occurs further downstream on the Mullica River (Byrne 2002). There is recreational fishing for blue crab on Nacote Creek, particularly the lower tidal reaches near the Mullica River (Carberry 2000). The waters of Nacote Creek are classified as Special Restricted, which means that permits for depuration are required. This restriction has eliminated recreational shellfish harvesting in Nacote Creek. Commercial harvesting of eastern oysters from leased shellfish beds still takes place in Nacote Creek (Normant 2002).

No health advisories are in effect on Morses Mill Stream, Nacote Creek, or the Mullica River. However, a health advisory is in effect on the Wading River, a tributary to the Mullica River, restricting the consumption of largemouth bass and chain pickerel due to high concentrations of mercury in edible fish tissue (USEPA 2000).

The Edwin B. Forsythe National Wildlife Refuge is located approximately 10 km (6.2 mi) downstream of the site near the mouth of the Mullica River. The U.S. Fish and Wildlife Service actively protects and manages the 16,000 hectares (40,000 acres) of tidal wetlands for migratory birds (USFWS 2000).

Site-Related Contamination

In 1996, the NJDEP collected 20 groundwater samples at the landfill for VOC analyses (NJDEP 1997); the Township of Galloway collected 19 soil samples and seven groundwater samples (Churchill Consulting Engineers 1997). Of the 19 soil samples collected, two were analyzed for PCBs, two for semi-volatile organic compounds (SVOCs), four for VOCs, and 16 for total petroleum hyrocarbons (TPH). The groundwater samples were analyzed for all contaminants. In 1997 and 1998, EPA collected 23 soil samples and 20 groundwater samples for VOC analyses (Weston 1998). Seven of the groundwater samples were also analyzed for trace elements. In addition, 10 test pit samples were collected from areas containing debris and waste material. These samples were analyzed for trace elements, PCBs, VOCs, SVOCs, and pesticides.

Trace elements and PCBs are the primary contaminants of concern at the site. Table 2 presents the maximum concentrations of contaminants detected in soils and groundwater compared to screening guidelines. Trace elements were detected in soils at concentrations that exceeded the screening guidelines; the greatest concentrations were generally found in samples collected from the test pits. Concentrations of chromium, copper, lead, and zinc in groundwater exceeded the AWQC by at least one order of magnitude. Both soil and groundwater samples contained metals at concentrations that exceeded NJDEP Residential Direct Contact Soil Cleanup Criteria and New Jersey Groundwater Quality Standards (NJGQS) (NJDEP 1993, 1999).

In 1996, PCBs were detected in a soil sample at 960 mg/kg, three orders of magnitude greater than the screening guideline (Table 2). In 1998, PCBs were detected in a test pit soil sample at 2 mg/kg. PCBs were not detected in any of the seven groundwater samples that were analyzed for PCBs.

VOCs were detected in soils and groundwater throughout the site; concentrations in groundwater exceeded screening guidelines. Although several VOCs were detected in groundwater at the site, only chlorobenzene exceeded the AWQC (Table 2). Several VOCs were found in groundwater at concentrations that exceeded the NJGQS. Several VOCs were detected in soil at concentrations that exceeded NJDEP soil cleanup criteria. Current data suggests that the VOC plume extends horizontally about 1.2 km east of the site and 4.6 to 7.4 m (15.2 to 24.4 ft) bgs, and that contamination has reached the deeper aquifer. The VOCs at the site do not pose a direct threat to NOAA

resources, although their presence increases the potential for PCBs to migrate through groundwater to NOAA trust resources.

Table 2. Maximum concentrations of contaminants of concern detected in soils and groundwater at Emmell's Septic Landfill site compared to screening guidelines (Churchill Consulting Engineers 1997; NJDEP 1997; Weston 1998).

	Soils (mg/kg)		Water (µg/L)	
Contaminant	On-site soils/test pits	Mean U.S.[a]	Groundwater	AWQC[b]
Trace Elements				
Cadmium	12	0.06	4.4	2.2[c]
Chromium	840	37	180	11
Copper	200	17	93	9[c]
Lead	3,900	16	160	2.5[c]
Mercury	15	0.058	0.48	0.77
Nickel	37	13	ND	52[c]
Silver	3.3	0.05	ND	0.12
Zinc	1,700	48	1,200	120[c]
Organic Compounds				
PCBs	960	0.371[f]	ND	0.014
Volatile Organic Compounds				
1,1,1-trichloroethane	0.014	NA	570	18,000[d,e]
1,1,2-trichloroethane	ND	NA	46.69	9,400
1,1-dichloroethane	ND	NA	156.2	NA
1,1-dichloroethene	ND	NA	96	NA
Benzene	ND	NA	53	5,300[d,e]
Carbon tetrachloride	ND	NA	89	35,200[d,e]
Chlorobenzene	2.8	NA	204	250
cis 1,2-dichloroethene	1.9	NA	5,100	NA
Toluene	5.3	NA	5,800	17,500[d,e]
Trichloroethene	0.22	NA	40	NA
Vinyl chloride	ND	NA	960	NA
Methylene chloride	0.0024	NA	78	11,000[d,e]

NA: Screening guideline not available.

ND: Not detected; detection limits not available.

a: Shacklette and Boerngen (1984), except for silver and cadmium which are average concentrations in the earth's crust as reported by Lindsay (1979).

b: Ambient water quality criteria for the protection of aquatic organisms (USEPA 1999b). Freshwater chronic criteria are presented.

c: Freshwater criterion expressed as a function of total hardness; concentration shown corresponds to hardness of 100 mg/L.

d: Chronic criterion not available; acute criterion presented.

e: Value for summation of isomers.

f: Final Preliminary Remedial Goal for the protection of wildlife (Efroymson et al. 1997).

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