

**Kent County Landfill  
Houston, Delaware  
Region 3  
DED980705727**

**Site Exposure Potential**

From 1969 to 1980, Kent County disposed of both municipal and industrial wastes at a county-owned and operated landfill 3.5 km north of Houston, Delaware. The Kent County Landfill is believed to hold 1.5 million m<sup>3</sup> of waste and fill materials, including trash, pesticides, sludges from poultry processing plants, oil sludges, hospital wastes, waste polymers, and solvents. The landfill has no liner or leachate collection system and the base of the fill is below the top of the water table. In 1980, the county covered the landfill with one to two meters of sandy soil and vegetated the area (EPA 1986a). Leachate seeped to the surface along the northern end of the landfill. Two seeps originate near the landfill terminus and flow untreated directly into Browns Branch. The leachate stained the sediments orange in Browns Branch (NUS 1986).

The Kent County Landfill site is in a flat, relatively rural area in the Browns Branch watershed. The 44-hectare site slopes slightly from the center of the landfill toward Browns Branch. Groundwater flows from the site north-northeast toward Browns Branch. The surrounding area is forested with deciduous and coniferous species. Surface soils on-site are poorly drained with moderately permeable subsoil (EPA 1986a).

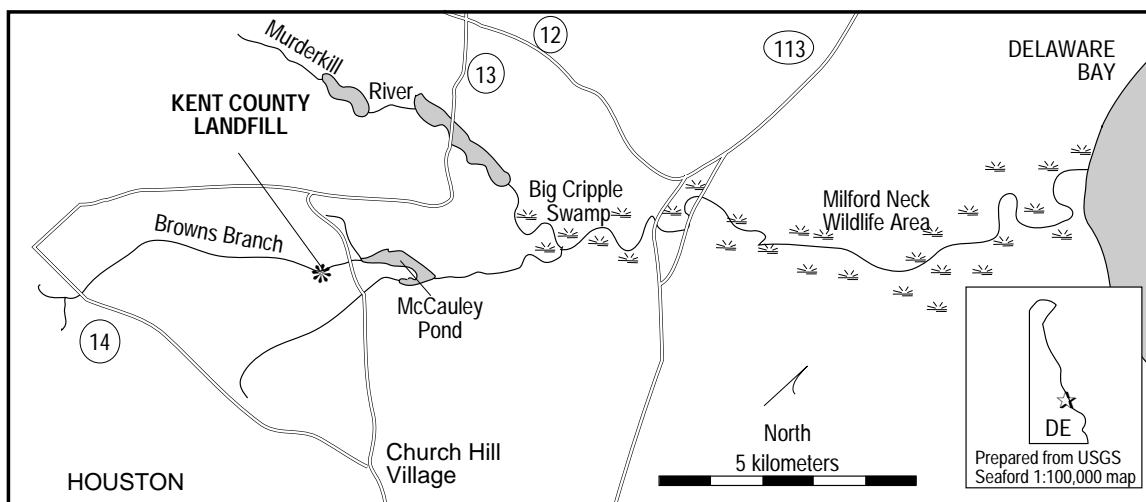


Figure 1. The Kent County Landfill site in Houston, Delaware.

Browns Branch is a medium-sized creek that flows to within 100 meters of the northern perimeter of Kent County Landfill. This creek flows 1.5 km before discharging into McCauley Pond, which is impounded for recreational fishing. Browns Branch flows 5 km below the pond before merging with Murderkill River. The lower reach of Browns Branch and the Murderkill River flow through wetland habitat, and the lower Murderkill River flows through the Milford Neck Wildlife Area. Water from the Murderkill River/wetland area enters Delaware Bay 21 km from the landfill site.

Possible contaminant migration pathways to NOAA trust resources are groundwater and leachate flow to Browns Branch.

## Site-Related Contamination

Trace metals, the contaminants of concern at the site, were detected in Browns Branch sediments, surface water, and in on-site groundwater (Table 1). Copper was the only trace metal detected in Browns Branch surface water in concentrations above AWQC. Manganese was the only trace metal found in significantly greater concentrations downstream of the site than upstream. It is difficult to assess whether other contaminants in the surface water were above or below AWQC because of high detection limits. Arsenic, cadmium, copper, lead, nickel, and zinc all exceeded AWQC in groundwater samples. Organic contaminants measured in Browns Branch surface water and groundwater were below AWQC. There was no on-site soil data available.

Table 1. Maximum concentrations of contaminants at the Kent County Landfill site (E&E 1986; NUS 1986); AWQC for the protection of freshwater aquatic life (EPA 1986b); concentrations in sediment in mg/kg, water in µg/l.

Contaminant	Browns Branch Sediment	Browns Branch Surface Water			AWQC	
		Upstream	Downstream	Groundwater	Acute	Chronic
arsenic	0.37	ND	ND	207	360	190
cadmium	0.08	<5	<5	16	3.9†	1.1†
cobalt	2.5	15	20	3360	N/D	N/D
copper	2.3	46	27	154	18†	12†
lead	5.5	<40	<40	116	82†	3.2†
mercury	ND	<1	<1	<1	2.4	0.012
manganese	ND	<20	120	45,200	N/D	N/D
nickel	1.4	ND	ND	331	1400	160
zinc	10	4	7	1110	120†	110†

†: Hardness-dependent (based on 100 mg/l CaCO<sub>3</sub>); N/D: Criteria not determined; ND: Not detected

## NOAA Trust Habitats and Species in Site Vicinity

Surface waters of interest to NOAA include the lower reach of Browns Branch to the Delaware Bay (Table 2) (Miller 1988). The dam at McCauley Pond prevents access further upstream. The reach of Browns Branch below the impoundment is more than six meters wide, with medium flow and a sand/gravel substrate. The Murderkill River is a medium-

Table 2. NOAA resource use of the Murderkill River (USFWS 1980; Miller 1988).

Species	Murderkill River and Associated Wetland
<b>INVERTEBRATES</b>	
eastern oyster	S,N
hard clam	
whelk	
<b>FISH</b>	
alewife	A
Atlantic menhaden	N
black drum	
blueback herring	A
bluefish	
summer flounder	
shortnose sturgeon	
weakfish	
white perch	N

S: spawning area; N: nursery area; A: adult area

sized, low-gradient river with low water quality caused by high nutrient loading, and low dissolved oxygen during the summer. The Murderkill River is part of a wetland system, and both the river and wetland are tidally influenced. Lower reaches of the Murderkill River and its associated wetland are mid-salinity (5-16.5 ppt) estuarine habitats.

The marine/estuarine invertebrate species in the Murderkill River are only found in the lower reaches of the river and its associated wetland. The fish species of interest to NOAA in this river are found from the mouth upstream to the impoundment at McCauley Pond (Table 2). The lower Murderkill River is closed to fishing due to high bacterial levels (Miller 1988). NOAA trust resources use Delaware Bay for spawning and nursery habitat, and as a migratory route. Commercial and recreational fisheries are also important in the bay (USFWS 1980).

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

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**References**

E&E (Ecology and Environment Inc.). 1986. Site Inspection/Sampling of Kent County Landfill, Houston, DE. Field Investigations of Uncontrolled Hazardous Waste Sites. Philadelphia: U.S. Environmental Protection Agency, Region 3.

EPA. 1986a. Hazardous Ranking System Package. Kent County Landfill (Houston). Houston, DE, EPA Region 3. Philadelphia: U.S. Environmental Protection Agency, Region 3.

EPA. 1986b. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Miller, R., Program Manager, Fisheries, Delaware Fisheries and Wildlife Services, Dover, Delaware, personal communication, January 19, 1989.

NUS. 1986. Site Inspection of Kent County Landfill. (Houston). Philadelphia: U.S. Environmental Protection Agency, Hazardous Site Control Division.

USFWS. 1980. Atlantic coast ecological inventory: Wilmington, Delaware. Washington, D.C.: U.S. Fish and Wildlife Service. 39074-A1-EI-250.