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Stauffer Chemical Company

Tampa, Florida

CERCLIS #FLD004092534

Site Exposure Potential

The 16-hectare Stauffer Chemical Company site in Tampa, Florida, is bordered to the north by the Seaboard Coastline Railroad and a construction-materials plant, to the east by the Tampa Bypass Canal, and to the west by Orient Road. The south edge is bordered by the newly constructed Hillsborough County Jail (Figure 1). From 1951 to 1986, the site was used for pesticide formulation in dust, granule, and liquid forms. The eastern and southern portions of the site are heavily wooded and overgrown. The Tampa Bypass Canal discharges into the Palm River, about 2 km downstream from the site. The Palm River enters McKay Bay 4 km below the confluence of the river and the canal. The confluence of the Palm River and McKay Bay is about 3 km from Hillsborough Bay. The site is about 64 km from the Gulf of Mexico. Although Helena Chemical Company is immediately northwest of Stauffer, no culverts or drainage pathways could be identified that would allow drainage from the Helena site to the Stauffer site (NUS 1988b).

Seven areas on the site were used for waste disposal from 1953 to 1973 (Figure 2). Hazardous substances buried included toxaphene, methyltrithion, and parathion. Toxaphene wastes from a 30,000- to 38,000-l tank car leak were

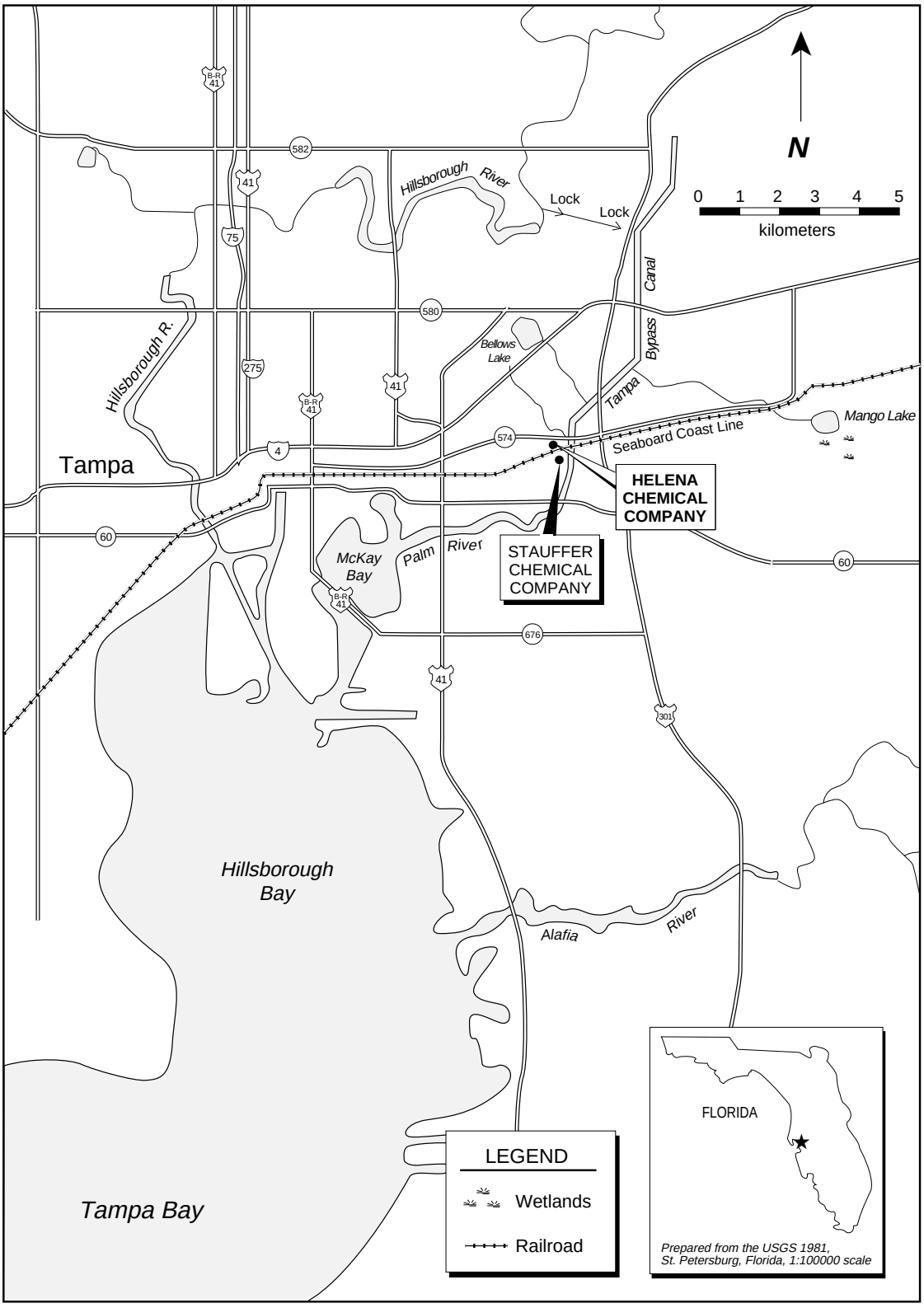

Figure 1. The Stauffer Chemical Company site, Tampa, Florida.

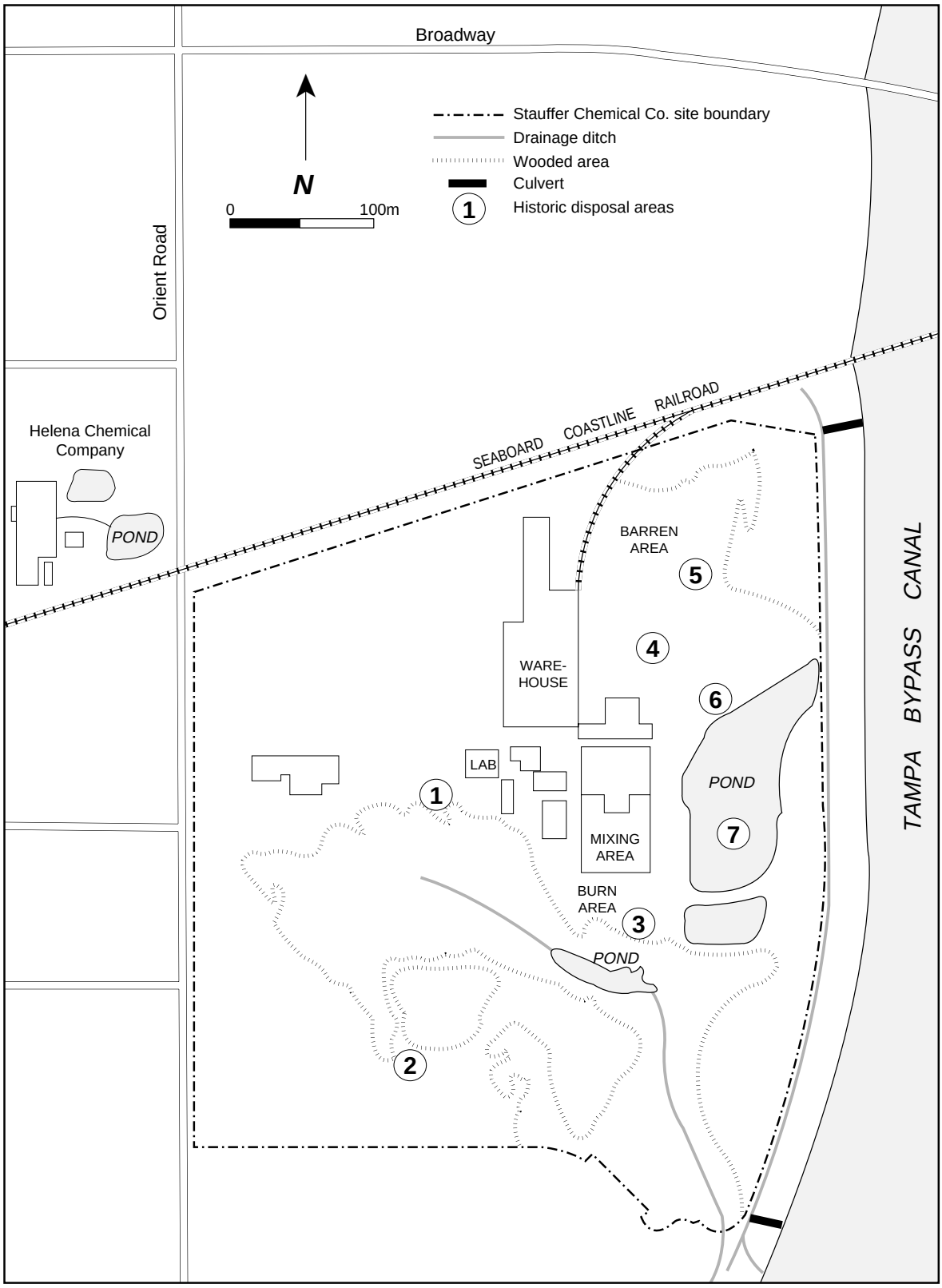

Figure 2. Detail of the Stauffer Chemical Company site, Tampa, Florida.

buried in Area One. Contaminant containment and disposal methods are not known. Areas Two and Three were used in 1967 for the disposal of methyltrithion in drums of unknown size. Twenty to thirty drums were buried in Area Two and 50 were buried in Area Three. Empty parathion drums were crushed and buried in Area Four. Area Five was the location of open sulfur piles. Open trash was burned in Area Six. The northern pond, suspected of receiving surface water runoff, is the seventh disposal area. Disposal Areas Four, Five, and Six are all within a region that is barren of vegetation (NUS 1988b).

The site's gentle eastward slope allows for drainage; surface water and groundwater are potential pathways for migration of contaminants to NOAA trust habitats. The site elevation ranges from 4.5 to 7.6 m above mean sea level. The north-central portion of the site drains east to the northern pond. The pond can overflow into a drainage ditch that parallels the canal and flows southward, but there is no other known direct connection between the pond and the drainage ditch. Within the site, two stormwater culverts lead from the drainage ditch to the canal. A separate drainage ditch flows from the wooded area toward the canal, but does not converge with the drainage ditch that parallels the canal within the area of the site. It is not known whether these ditches converge further south of the site.

The hydrogeology of the area is characterized by an unconfined surficial aquifer within terrace deposits that have an average thickness of 7.6 m. The surficial aquifer flows south and southwest, except near the on-site drainage ditch and the ponds. The Hawthorn Formation of clay, 7.6 to 10.7 m below ground surface, provides a semi-permeable confining layer. Limestone formations below the clay confining layer contain the Upper Floridan aquifer, which supplies public water. This aquifer has a south-to-southwest directional flow. The clay confining layer that separates the surficial aquifer from the Upper Floridan aquifer is present at the western portion of the site, but pinches out at the eastern portion near the canal. During construction of the canal, this confining layer was breached several times, leaving the limestone of the Floridan aquifer in contact with canal water. Contaminants in the surficial aquifer could potentially move downgradient and discharge into the canal or enter the Upper Floridan aquifer where the confining layer has been breached (NUS 1988b).

NOAA Trust Habitats and Species

Habitats of primary concern to NOAA are the surface water and associated bottom substrates of the Palm River, McKay Bay, and Hillsborough Bay. Secondary habitats of concern are the surface water and associated bottom substrates of the Tampa Bypass Canal. The Palm River and McKay Bay are tidally influenced estuarine systems that are generally less than 8 m deep.

Salinities in McKay Bay generally range from 22 to 25 ppt and fluctuate throughout the year, depending on rainfall, saltwater intrusion, and urban runoff (Estevez 1989). The tidal amplitude in McKay Bay is generally less than 1 m (McMichael personal communication 1992). Water-quality problems in the Tampa Bypass Canal and Palm River include low dissolved oxygen levels (annual averages ranging from 1.8 to 3.2 mg/l between 1980 and 1983), high coliform counts, nutrient and chlorophyll a concentrations, and biological oxygen demand. General water-quality conditions tend to worsen toward McKay Bay, where urbanization is greater (Wolfe 1990). Bottom substrate is dominated by silty sand (Dial and Deis 1986).

The tidally influenced reaches of the Palm River, McKay Bay, and Hillsborough Bay provide nursery and adult habitat for fish and invertebrates (Table 1; Beccasio et al. 1982; Kunneke and Palik 1984; McMichael personal communication 1992). Economically important, estuarine-dependent species include red and black drum, spotted seatrout, snook, sheepshead, southern flounder, Florida pompano, striped mullet, and gulf menhaden. Most of these species are offshore or coastal spawners whose larvae move inshore with the currents. Juveniles remain in protected estuaries until sexual maturity (Kunneke and Palik 1984). Species such as snook and red drum juveniles use the upper reaches of estuaries and commonly use brackish streams and canals and tidal freshwater streams (Gilmore et al. 1983; Peters and McMichael 1987). Finfish species known to occur in greatest numbers in McKay Bay include tidewater silverside, striped mullet, longnose killifish, bay anchovy, spot, scaled sardine, and pinfish (Wolfe 1990; McMichael personal communication 1992). Blue crab are known to occur in McKay Bay and likely reside in the tidally influenced portions of the Palm River (McMichael personal communication 1989). There have been no studies in the Tampa Bypass Canal to determine the presence of marine species, but it is believed that there are few, if any, marine species in the canal due to poor water quality. The Palm River would most likely be the nearest habitat to be used by NOAA trustee resources (McMichael personal communication 1992).

Species targeted for commercial harvest in Hillsborough Bay include blue crab, menhaden, mullet, pink shrimp, spot, and spotted seatrout. Striped mullet is the most important commercial species in Hillsborough Bay. Generally, any species in McKay Bay is fished recreationally. Species typically sought are red drum, sheepshead, snook, and spotted seatrout. There are no restrictions on these fisheries other than general regulations regarding take limit and minimum size. Periodically, blue crab is harvested from McKay Bay (McMichael personal communication 1992). In the region, most commercial and recreational fishing activities concentrate in Tampa Bay and in Old Tampa Bay, both south and west of Hillsborough Bay (Figure 1; Beccasio et al. 1982; McMichael personal communication 1992).

Table 1 NOAA trust fish and invertebrate species that use Hillsborough Bay, McKay Bay, and the Palm River.

Species		Habitat Use			Fisheries	
Common Name	Scientific Name	Spawning Ground	Nursery Ground	Adult Forage	Comm. Fishery	Recr. Fishery
MARINE/ESTUARINE SPECIES						
Bay anchovy	*Anchoa mitchilli*		♦	♦		
Sheepshead	*Archosargus probatocephalus*			♦		♦
American eel	*Anguilla rostrata*			♦		
Silver perch	*Bairdiella chrysoura*		♦	♦		
Gulf menhaden	*Brevoortia patronus*		♦	♦	♦	
Crevelle jack	*Caranx hippos*		♦	♦		
Snook	*Centropomus undecimalis*		♦	♦		♦
Sand seatrout	*Cynoscion arenarius*		♦	♦		
Spotted seatrout	*Cynoscion nebulosus*		♦	♦	♦	♦
Lady fish	*Elops saurus*		♦	♦		
Mojarra	*Eucinostomus* spp.		♦	♦		
Gulf killifish	*Fundulus grandis*	♦	♦	♦		
Longnose killifish	*Fundulus similis*	♦	♦	♦		
Scaled sardine	*Harengula jaguana*		♦	♦		
Pinfish	*Lagodon rhomboides*		♦	♦		
Spot	*Leiostomus xanthurus*		♦	♦	♦	
Gray snapper	*Lutjanus griseus*			♦		
Tarpon	*Megalops atlanticus*		♦	♦		
Tidewater silverside	*Menidia peninsula*		♦	♦		
Southern kingfish	*Menticirrhus americanus*			♦		
Atlantic croaker	*Micropogonias undulatus*			♦		
Striped mullet	*Mugil cephalus*		♦	♦	♦	
Atlantic thread herring	*Opisthonema oglinum*		♦	♦		
Pigfish	*Orthopristis chrysoptera*		♦	♦		
Gulf flounder	*Paralichthys albigutta*		♦	♦		
Southern flounder	*Paralichthys lethostigma*		♦	♦		
Black drum	*Pogonias cromis*		♦	♦		
Bluefish	*Pomatomus saltatrix*		♦	♦		
Red drum	*Sciaenops ocellatus*		♦	♦		♦
Spanish mackerel	*Scomberomorus maculatus*		♦	♦		
Florida pompano	*Trachinotus carolinus*		♦			
INVERTEBRATE SPECIES						
Blue crab	*Callinectes sapidus*		♦	♦	♦	
American oyster	*Crassostrea virginica*	♦	♦	♦		
Spiny lobster	*Panulirus argus*		♦			
Pink shrimp	*Penaeus duorarum*		♦		♦	
Common rangia	*Rangia cuneata*	♦	♦	♦		

The surface waters of Hillsborough and Tampa bays provide habitat for several threatened and endangered species. The federally endangered West Indian manatee (*Trichechus manatus*) uses these bays as a habitat on a seasonal basis. There are also several federally protected species of turtles in this area, including the threatened green turtle (*Chelonia mydas*), loggerhead turtle (*Caretta caretta*), endangered hawksbill turtle (*Eretmocheyls imbricata*), Kemp's ridley turtle (*Lepidochelys kempi*), and leatherback turtle (*Dermochelys coriacea*) (Beccasio et al. 1982).

Site-Related Contamination

The primary contaminants of concern to NOAA are trace elements and pesticides (NUS 1988a). Data collected during the site investigation indicated that on-site soil, sediment, groundwater, and surface water contained elevated concentrations of these contaminants. The maximum concentrations of trace elements, PAHs, and pesticides detected in soil, sediment, groundwater, and surface water are presented in Table 2 with their respective screening guidelines (Lindsay 1979; U.S. EPA 1986; Long and Morgan 1990).

Trace elements were detected in all media tested on-site. Lead and zinc concentrations in the surface soil samples collected on-site were higher than average U.S. soil concentrations for these substances (Table 2). Arsenic, copper, nickel, and zinc concentrations in the subsurface soil samples were also higher than average for U.S. soils. The sediment samples collected from the on-site drainage ditch and pond area had copper, lead, and zinc concentrations which exceed effects-range low (ER-L) values by a factor of two or more (Long and Morgan 1990). Arsenic, chromium, copper, nickel, and zinc contamination in groundwater exceeded the freshwater chronic ambient water quality criteria by more than ten times (U.S. EPA 1986). However, trace element concentrations in on-site surface water did not exceed the screening guidelines (Table 2).

Concentrations of DDT, DDE, and DDD were particularly high in sediment samples (8,700 mg/kg, 710 mg/kg, and 3,600 mg/kg, respectively). These concentrations of DDT compounds are much higher than those shown to be toxic in other studies (Long and Morgan 1990). The concentrations of BHC pesticides were also elevated in soils, groundwater, and surface water. Chlordane and endrin were detected in the surface soil at 12 mg/kg and 4.9 mg/kg, respectively. Chlordane, toxaphene, endrin, and heptachlor were detected in the subsurface soil at concentrations of 0.93 mg/kg, 0.41 mg/kg, 3.7 mg/kg, and 0.05 mg/kg respectively. The concentrations of DDT and dieldrin in groundwater and surface water samples exceeded the screening guidelines by more than 100 times. The surface water was also contaminated by aldrin at 0.21 mg/kg.

There is no analytical evidence to indicate that the contamination on the Stauffer Chemical Company site was due to the adjacent Helena Chemical Company (NUS 1988a).

Summary

Trace elements and pesticide concentrations detected in the Stauffer site's soil, sediment, and groundwater exceed screening guidelines, by more than 100 times in the cases of DDT and endrin detected in groundwater and surface water

Table 2. Maximum concentrations of contaminants in samples collected at the Stauffer Chemical Company Site (NUS 1988b).

	Soil (mg/kg)			Sediment (mg/kg)		Water (µg/l)		
	Surface	Subsurface	Average U.S.[1]	On-site	ER-L[2]	Groundwater	Surface water	AWQC[3]
INORGANIC SUBSTANCES								
Arsenic	ND	9.8	5	5.5	33	3,800	20	190
Chromium	12	33	100	62	80	22,000	27	11
Copper	23	220	30	190	70	4,400	360	12+
Lead	31	ND	10	460	35	70	320	3.2+
Mercury	ND	ND	0.03	ND	0.15	0.32	R	0.012
Nickel	ND	51	40	13	30	5,800	31	160+
Zinc	840	260	50	220	120	11,000	2,400	110+
ORGANIC COMPOUNDS								
Total PAHs	0.718	1.942	NA	0.34	4.0	ND	ND	NA
Pesticides								
Alpha BHC	3.0	1.0	NA	ND	NA	27.0	0.18	NA
Beta BHC	0.077	0.053	NA	ND	NA	3.2	0.24	NA
Delta BHC	1.3	0.05	NA	ND	NA	4.0	0.18	NA
Gamma BHC	ND	3.2	NA	ND	NA	6.6	0.11	NA
4,4'-DDE	2.9	11	NA	710	2	2.5	0.23	NA
4,4'-DDD	12	18	NA	3,600	2	17	2.7	NA
4,4'-DDT	340	12	NA	8,700	1	4.1	2.9	0.001
Dieldrin	4	12	NA	320	0.02	0.53	0.41	0.0019
Chlordane	12	0.93	NA	ND	0.5	ND	ND	0.0043
Toxaphene	ND	0.41	NA	ND	NA	ND	ND	NA
Endrin	4.9	3.7	NA	ND	0.02	ND	ND	0.0023
Heptachlor	ND	0.05	NA	ND	NA	ND	ND	0.0038
Aldrin	ND	ND	NA	ND	NA	ND	0.21	NA

1: Lindsay (1979).
2: 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).
3: Ambient water quality criteria for the protection of aquatic organisms. Freshwater chronic criteria presented (U.S. EPA 1986).
ND: Not detected at method detection limit.
NA: Screening level not available.
R: Value rejected during QA/QC.
+: Hardness-dependent. (100 mg/kg $CaCO_3$ used).

samples. NOAA is concerned that site contaminants could harm nearby endangered manatees and several threatened species of turtles, plus commercial and recreational fisheries for finfish and shellfish in the Palm River, McKay Bay, Hillsborough Bay, and the Tampa Bypass Canal.

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