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MRI Corporation

Tampa, Florida
CERCLIS #FLD088787585

■ Site Exposure Potential

The MRI Corporation site occupies 2.5 ha in an industrial area of Tampa, Hillsborough County, Florida. Drainage from the facility flows 0.35 km southeast to Sixmile Creek. Sixmile Creek flows approximately 2 km to the Palm River, which travels approximately 4.5 km to the west before reaching McKay Bay. McKay Bay extends about 5 km before joining Hillsborough Bay, an embayment of Tampa Bay and the Gulf of Mexico (Figure 1).

From 1971 until 1986, the MRI Corporation operated a scrap metal reclamation and chemical detinning facility, which is now inactive and listed for sale. The detinning process included physical

and chemical treatment of tin-coated scrap steel. The scrap metal was submerged in a series of four heated alkali baths and then sent to washing tanks. Chemical treatment and wash solutions were stored in on-site lagoons to settle solids and collect residual tin. The liquids from the alkali baths were filtered and electrowinned before acid treatment and additional settling in the lagoons. Stormwater runoff also collected in these lagoons. The lagoon bottoms containing mud and process sludges have neither been removed nor contained (Figure 2; NUS 1990).

Waste products generated at the site included scrap metal, process sludges, and treated effluent.

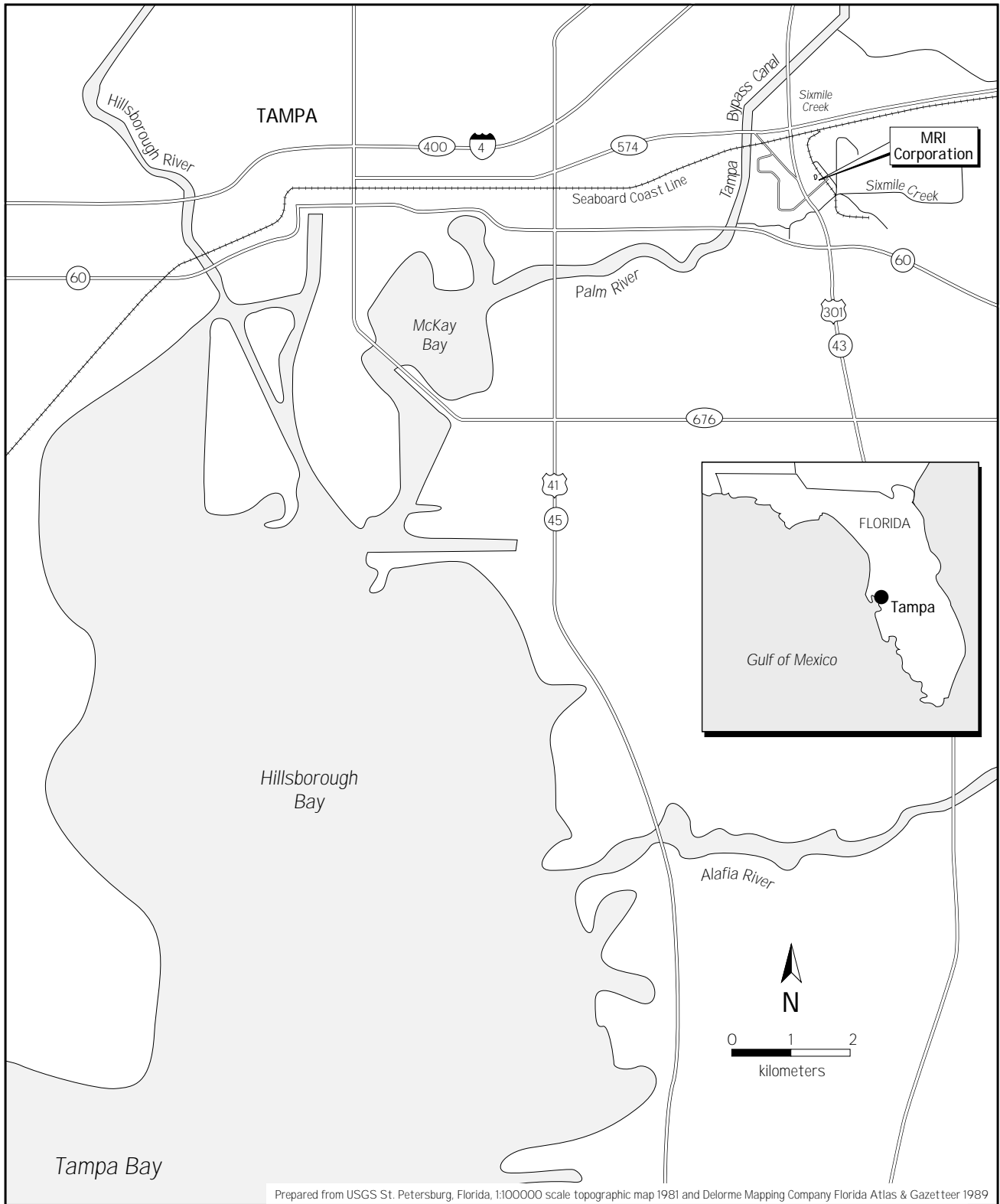


Figure 1. Location of MRI Corporation in Tampa, Florida.

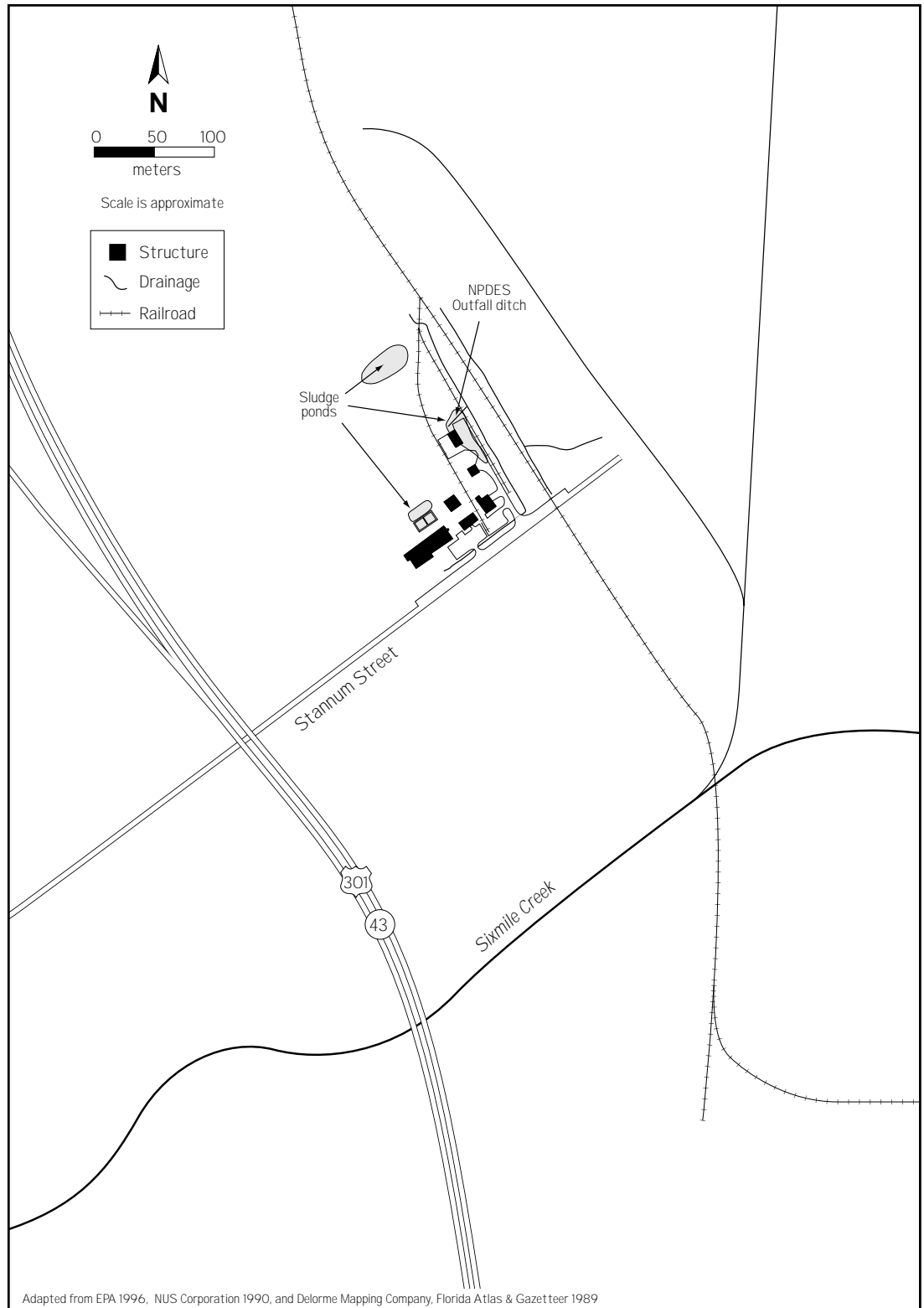


Figure 2. Detail of MRI Corporation site.

The scrap metal was compressed into 180-kg bales for off-site reuse. Process sludges were filtered, accumulated on-site, and sold for metal reclamation. Approximately 91,000 kg/year of process sludges were reclaimed and sold out of state. In 1974, waste sludge sampling detected copper, iron, lead, mercury, nickel, sodium, tin, zinc, oil, and grease (NUS 1990).

Wastewater, treated with chlorine to oxidize cyanides, was discharged to an on-site drainage ditch. Discharges to the ditch at rates of up to 19,000 L/week were allowed under a NPDES permit (NUS 1990). However, this facility had a documented history of NPDES violations. During 1984, for example, effluent monitoring indicated that zinc and mercury exceeded permit limits during January; oil and grease and both total and free cyanide exceeded permit limits during February; and total cyanide and cadmium permit limits were exceeded during March (NUS 1990).

Surface-water transport and groundwater discharge are the potential pathways of contaminant migration from the site to NOAA trust resources and associated habitats. Surface runoff from the site reportedly flows into Sixmile Creek, but no detailed information was available on surface flow. Groundwater at the site migrates to the southwest. The two principal aquifers in the area are the surficial and the Upper Floridan aquifers, which are hydraulically connected near the site. Site groundwater is encountered 2.4 m bgs.

■ NOAA Trust Habitats and Species

Habitats of primary concern to NOAA are estuarine surface waters and associated bottom substrates of the lower Palm River and McKay Bay, a shallow embayment within the Tampa Bay estuary. Many estuarine fish and invertebrates use the embayment and are the resources of concern to NOAA (Table 1).

McKay Bay is generally less than 8 m deep and salinities generally range from 22 to 25 ppt, fluctuating throughout the year depending upon rainfall, saltwater intrusion, and runoff (Estevez 1989). Silty sands dominate bottom substrates (Dial and Deis 1986).

The Palm River has low water quality; between 1980 and 1983, annual average dissolved oxygen varied from 1.8 to 3.2 mg/L. In addition, coliform counts, nutrient concentrations, and biological oxygen demand all were elevated. Water-quality conditions tend to worsen toward McKay Bay, where urbanization is greater and more point sources are present (Wolfe 1990).

The lower Palm River and McKay Bay provide nursery and adult habitat for numerous fish and invertebrate species (Kunneke and Palik 1984; Nelson et al. 1992). Most of the estuarine species spawn offshore or in coastal waters. Tidal currents carry the larvae inshore to estuarine water. Juveniles remain in protected estuaries until sexual maturity (Kunneke and Palik 1984). For example, snook and red drum juveniles are

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

Species		Habitat Use			Fisheries	
Common Name	Scientific Name	Spawning Ground	Nursery Ground	Adult Forage	Comm. Fishery	Recr. Fishery
<u>MARINE/ESTUARINE FISH SPECIES</u>						
Atlantic croaker	<i>Micropogonias undulatus</i>			◆		
Atlantic thread herring	<i>Opisthonema oglinum</i>		◆	◆		
Bay anchovy	<i>Anchoa mitchilli</i>		◆	◆		
Black drum	<i>Pogonias cromis</i>		◆	◆		
Bluefish	<i>Pomatomus saltatrix</i>		◆	◆		
Crevalle jack	<i>Caranx hippos</i>		◆	◆		
Florida pompano	<i>Trachinotus carolinus</i>		◆			
Gray snapper	<i>Lutjanus griseus</i>			◆		
Gulf flounder	<i>Paralichthys albigutta</i>		◆	◆		
Gulf killifish	<i>Fundulus grandis</i>	◆	◆	◆		
Gulf menhaden	<i>Brevoortia patronus</i>		◆	◆	◆	
Lady fish	<i>Elops saurus</i>		◆	◆		
Pigfish	<i>Orthopristis chrysoptera</i>		◆	◆		
Pinfish	<i>Lagodon rhomboides</i>		◆	◆		
Red drum	<i>Sciaenops ocellatus</i>		◆	◆		◆
Sand seatrout	<i>Cynoscion arenarius</i>		◆	◆		
Sheepshead minnow	<i>Cyprinodon variegatus</i>	◆	◆	◆		◆
Silver perch	<i>Bairdiella chrysoura</i>	◆	◆	◆		
Snook	<i>Centropomus undecimalis</i>		◆	◆		◆
Southern flounder	<i>Paralichthys lethostigma</i>		◆	◆		
Southern kingfish	<i>Menticirrhus americanus</i>			◆		
Spanish mackerel	<i>Scomberomorus maculatus</i>		◆	◆		
Spot	<i>Leiostomus xanthurus</i>		◆	◆	◆	
Spotted seatrout	<i>Cynoscion nebulosus</i>		◆	◆	◆	◆
Striped mullet	<i>Mugil cephalus</i>		◆	◆	◆	
Tarpon	<i>Megalops atlanticus</i>		◆	◆		
Tidewater silverside	<i>Menidia peninsula</i>	◆	◆	◆		
<u>INVERTEBRATE SPECIES</u>						
Bay squid	<i>Lolliguncula brevis</i>	◆	◆	◆		
Blue crab	<i>Callinectes sapidus</i>	◆	◆	◆	◆	
Common rangia	<i>Rangia cuneata</i>	◆	◆	◆		
Eastern oyster	<i>Crassostrea virginica</i>	◆	◆	◆		
Grass shrimp	<i>Palaemonetes pugio</i>	◆	◆	◆		
Hard shell clam	<i>Mercenaria spp.</i>	◆	◆	◆		
Pink shrimp	<i>Penaeus duorarum</i>		◆		◆	
<u>MARINE REPTILES</u>						
Green sea turtle	<i>Chelonia mydas</i>			◆		
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>					
Kemp's Ridley sea turtle	<i>Lepidochelys kemp</i>			◆		
Leatherback sea turtle	<i>Dermochelys coriacea</i>			◆		
Loggerhead sea turtle	<i>Caretta caretta</i>			◆		

commonly found in brackish streams and canals and tidal freshwater streams, and may be found in the lower Palm River (Gilmore et al. 1983; Peters and McMichael 1987).

Highly abundant finfish species in the Tampa Bay Estuary include Gulf menhaden, sheepshead minnow, tidewater silversides, striped mullet, red drum, bay anchovy, spot, and pinfish (Nelson et al. 1992).

Blue crab are abundant in the estuary. Both juveniles and adults use the estuary, and mating may occur in tidal portions of the Palm River. After mating, the females return to full seawater to brood eggs while the males usually remain in low-salinity waters. Crab larvae are released in full seawater zones, such as upper Tampa Bay, and are transported by currents to McKay Bay and other, lower -salinity portions of the estuary. The larvae settle and metamorphose to juveniles in the low-salinity estuary (Nelson et al. 1992).

Grass shrimp are abundant and spend their entire life cycle in the estuary. The bivalves rangia, hard shell clam, and oyster are also commonly found in the estuary (Nelson et al. 1992).

Commercial and recreational fishing activities concentrate in the outer estuaries of Tampa Bay and Old Tampa Bay. Commercial and recreational fisheries are not extensive in either McKay Bay or the lower Palm River. However, blue crab, Gulf menhaden, mullet, pink shrimp, spot, and spotted seatrout are commercially harvested in nearby Hillsborough Bay.

Recreational anglers occasionally fish available species in McKay Bay. 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 are also harvested from McKay Bay (McMichael 1992).

The surface waters of Hillsborough and Tampa bays provide habitat for several threatened and endangered species. A non-NOAA trust species, the federally endangered West Indian manatee (*Trichechus manatus*) uses these bays as seasonal habitat. Several federally protected species of turtles also are found in the area. These include the threatened green and loggerhead sea turtles, along with the endangered hawksbill, Kemp's Ridley, and leatherback sea turtles (McMichael 1992).

■ Site-Related Contamination

1990 and 1992 site inspections documented elevated concentrations of trace elements in soil, groundwater, and sediment at the site (NUS 1990; EPA 1992). Surface-water samples were not collected in either of these site inspections. Consequently, groundwater concentrations are compared to EPA Ambient Water Quality Criteria (Table 2).

Table 2. Maximum concentrations of selected contaminants detected at the MRI Corporation site.

Inorganic Substance	Soil (mg/kg)			Water (µg/L)		Sediment (mg/kg)	
	Surface Soils	Sub-Surface Soils	Mean U.S. ^a	Ground-water	AWQC ^b (µg/L)	On-site Sediment	ERL ^c
Chromium	71	38	37	930	11	41	81
Copper	370	90	17	NA	12	69	34
Lead	8700	3800	16	340	3.2	1700	46.7
Mercury	2	ND	0.06	1.4	0.012	2.6	.15
Nickel	80	20	13	160	8.3	21	209
Zinc	1800	590	48	750	86	500	150
Cyanide	1.5	1.5	NA	52,000	5.2	0.84	NA

a: Shacklette and Boerngen (1984)
b: Ambient Water Quality Criteria for Water (U.S. EPA 1993); data presented are lowest chronic marine or freshwater criteria.
c: 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 et al. (1995).
ND Not detected; detection limit not available.
NA Screening guidelines not available.

Maximum concentrations of the major contaminants are listed in Table 2 along with the appropriate screening guidelines for each medium. Data reported here for soil and sediment are from the 1992 inspection. None of the samples from the 1990 or 1992 investigations were analyzed for tin.

During the 1990 site inspection, soil and sediment samples were analyzed for VOCs, pesticides, PCBs, and PAHs. In 1990, Aroclor 1254 was detected in one surface soil sample at a concentration of 1.4 mg/kg. In addition, dieldrin was detected in one groundwater sample at a concentration of 0.028 µg/L, which exceeds the AWQC for this compound.

Summary

Limited site investigations indicate that previous activities at the MRI site caused trace element contamination of site soils, groundwater, and sediments. Surface water has not been sampled. Surface runoff and groundwater are potential transport pathways from the site to Sixmile Creek, which flows into the Palm River. Habitats of primary concern to NOAA are estuarine surface waters and associated bottom substrates of the lower Palm River and McKay Bay. These habitats support numerous estuarine fish and invertebrate species, as well as threatened and endangered sea turtles.

References

- Dial, R.S., D.R. Deis. 1986. *Mitigation options for fish and wildlife resources affected by port and other water-dependent developments in Tampa Bay, Florida*. U.S. Fish and Wildlife Service Biological Report 86(6). Washington, D.C.: U.S. Fish and Wildlife Service. 150 pp.
- Estevez, E.D., ed. 1989. *Tampa and Sarasota Bays: issues, resources, and management*. NOAA Estuary-of-the-Month Seminar Series No. 11. St Petersburg, Florida: Estuarine Programs Office, National Oceanic and Atmospheric Administration.
- Gilmore, G.R., C.J. Donohoe, and D.W., Cooke. 1983. Observations on the distribution and biology of east-central Florida populations of the common snook, *Centropomus undecimalis* (Bloch). *Florida Scientist* 46:313-336.
- Kunneke, J.T. and T.F. Palik. 1984. *Tampa Bay environmental atlas*. U.S. Fish and Wildlife Service Biological Report 85(15). Washington, D.C.: U.S. Fish and Wildlife Service. 73 pp.
- Long, E. R., D. D. MacDonald, S. L. Smith, and F. D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Environmental Management* 19: 81-97.
- McMichael, R. Fisheries Biologist, Florida Department of Fish and Wildlife, Tallahassee, personal communication, September 21, 1992.
- Nelson, D.M., M.E. Monaco, C.D. Williams, T.E. Czapla, M.E. Pattillo, L. Coston-Clements, L.R. Settle, and E.A. Irlandi. 1992. *Distribution and abundance of fishes and invertebrates in Gulf of Mexico estuaries. Volume I: Data summaries*. Rockville, Maryland: NOAA/NOS Strategic Environmental Assessments Division. 273 pp.
- NUS Corporation. 1990. Screening Site Inspection Report, Phase II, MRI Corporation, Tampa, Hillsborough County, Florida. Atlanta: Waste Protection Division, U.S. EPA.
- Peters, K.M. and R.H. McMichael, Jr. 1987. Early life history of the red drum, *Sciaenops ocellatus* (Pisces: Sciaenidae), in Tampa Bay, Florida. *Estuaries* 10:92-107.
- Shacklette, H. T. and J. G. Boerngen. 1984. *Element concentrations in soils and other surficial materials of the conterminous United States*. U.S. Geological Survey Professional Paper 1270. Washington, D.C.: U.S. Government Printing Office.
- U.S. Environmental Protection Agency (EPA). 1992. Supplemental Site Inspection Report - MRI Corporation, Tampa, Hillsborough County, Florida. Atlanta: EPA Region 4.
- U.S. Environmental Protection Agency (EPA). 1993. *Water quality criteria*. Washington, D.C.: U.S. Environmental Protection Agency, Office of Water, Health and Ecological Criteria Division. 294 pp.

Wolfe, S.H., and R.D. Drew, eds. 1990. An ecological characterization of the Tampa Bay watershed. U.S. Fish and Wildlife Service Biological Report 90(20). Washington, D.C.: U.S. Fish and Wildlife Service. 334 pp.