Mallard Bay Landing Bulk Plant

Grand Cheniere, Louisiana

EPA Facility ID: LA0000187518

Basin: Mermentau

HUC: 08080202

Executive Summary

The Mallard Bay Landing Bulk Plant (MBLBP) site is an abandoned crude oil refinery and bulk storage facility. The site is on the north bank of the Intracoastal Waterway and near Grand Lake in Cameron Parish, Louisiana. Environmental investigations at the site show that soil, groundwater, and sediments are contaminated with metals, and metals at the site are the contaminants of primary concern to NOAA. The trust habitats of primary concern to NOAA are Grand Lake and the wetlands surrounding the MBLBP site. NOAA trust resources within the area include estuarine species, both fish and invertebrates, as well as several low-salinity-tolerant marine species and the catadromous American eel. Surface water runoff is the primary pathway for the migration of contaminants from the site to NOAA trust resources.

Site Background

The Mallard Bay Landing Bulk Plant (MBLBP) site is an abandoned crude oil refinery and bulk storage facility. The site is on the north bank of the Intracoastal Waterway (ICW) and near Grand Lake in Cameron Parish, Louisiana (Figure 1). The site is composed of two tracts of land, the East and West Facilities, totaling approximately 2 ha (5 acres). The area surrounding the site is mainly undeveloped and is used for hunting and cattle ranching. The East Facility is bordered by the ICW to the north and west and by wooded wetlands to the south and east. The West Facility is bordered by a ditch and wooded wetlands to the north and west. Talen's Marine and Fuel (an active refueling facility and dock) borders the southern edge of the West Facility (Figure 2) (USEPA 1990).

The function of the plant changed many times during its operation. The MBLBP was built in the early 1980s and originally operated as a crude oil refinery. The plant was permitted to receive 5,000 barrels of mixed crude oil per day. The mixed crude oil was refined to produce naphtha (petroleum), diesel fuel oil, and No. 6 fuel oil (reduced crude). In 1981, after receiving a permit to discharge wastewater into an unnamed tributary of the ICW, the plant became a hazardous waste treatment, storage, and disposal facility (Ecology and Environment 1999a). The unnamed tributary's proximity to the site could not be determined.

During the early and mid 1980s, the MBLBP was cited with many violations. A 1987 inspection report by the Louisiana Department of Environmental Quality (LDEQ)-Hazardous Waste Division (HWD) alleged that the plant was accepting hazardous waste fuels, which the plant was not permitted to process. The same inspection report stated that MBLBP received and attempted to process styrene, resulting in serious problems within the refinery and eventually leading to its closure. A 1993 inspection by the LDEQ-Inactive and Abandoned Sites Division (IASD) documented the presence of material and sludge in several tanks, areas of stained soil, and three impoundments filled with unknown liquids (USEPA 1990; Ecology and Environment 1999b).

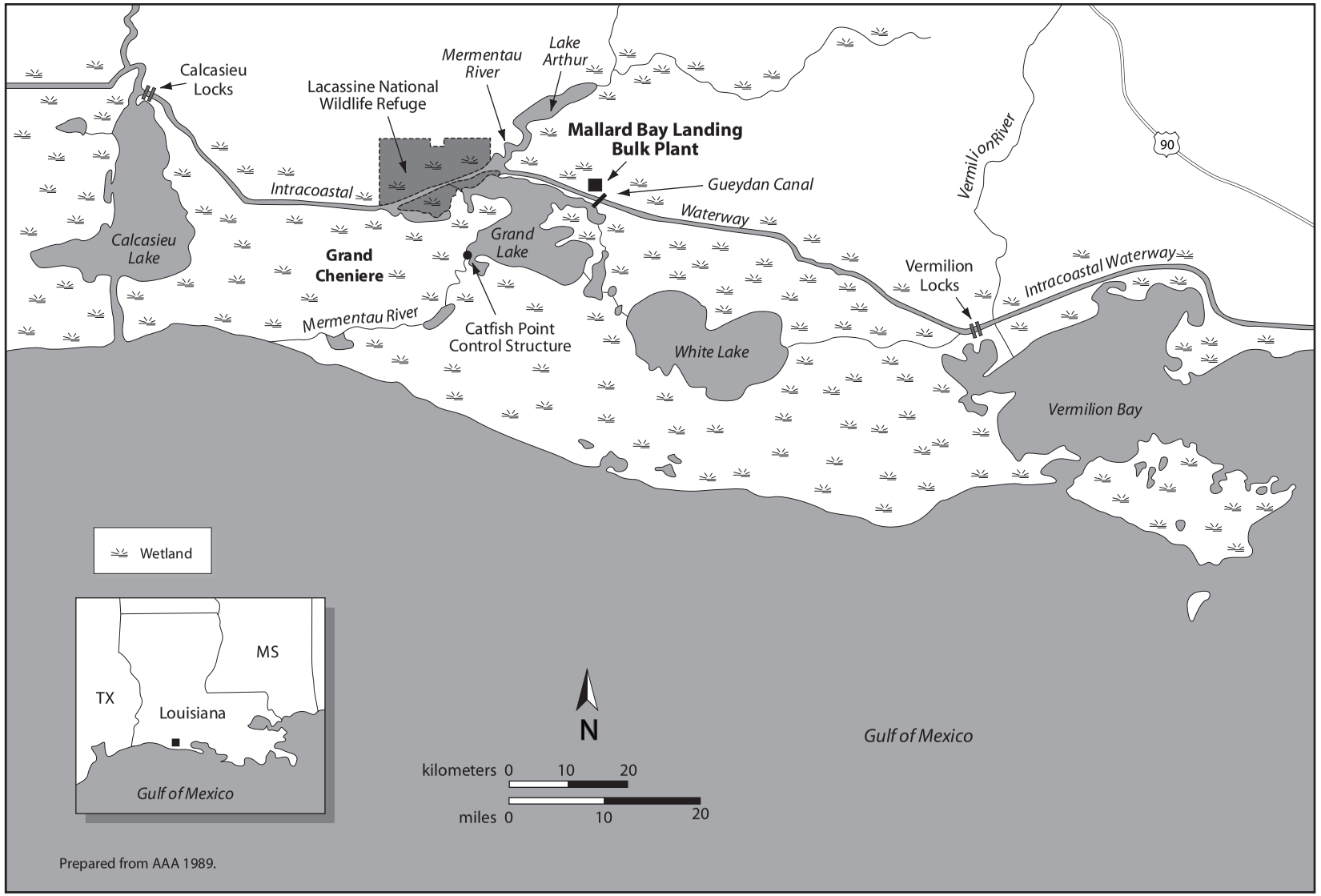

Figure 1. Location of the Mallard Bay Landing Bulk Plant site, Grand Chenier, Cameron Parish, Louisiana.

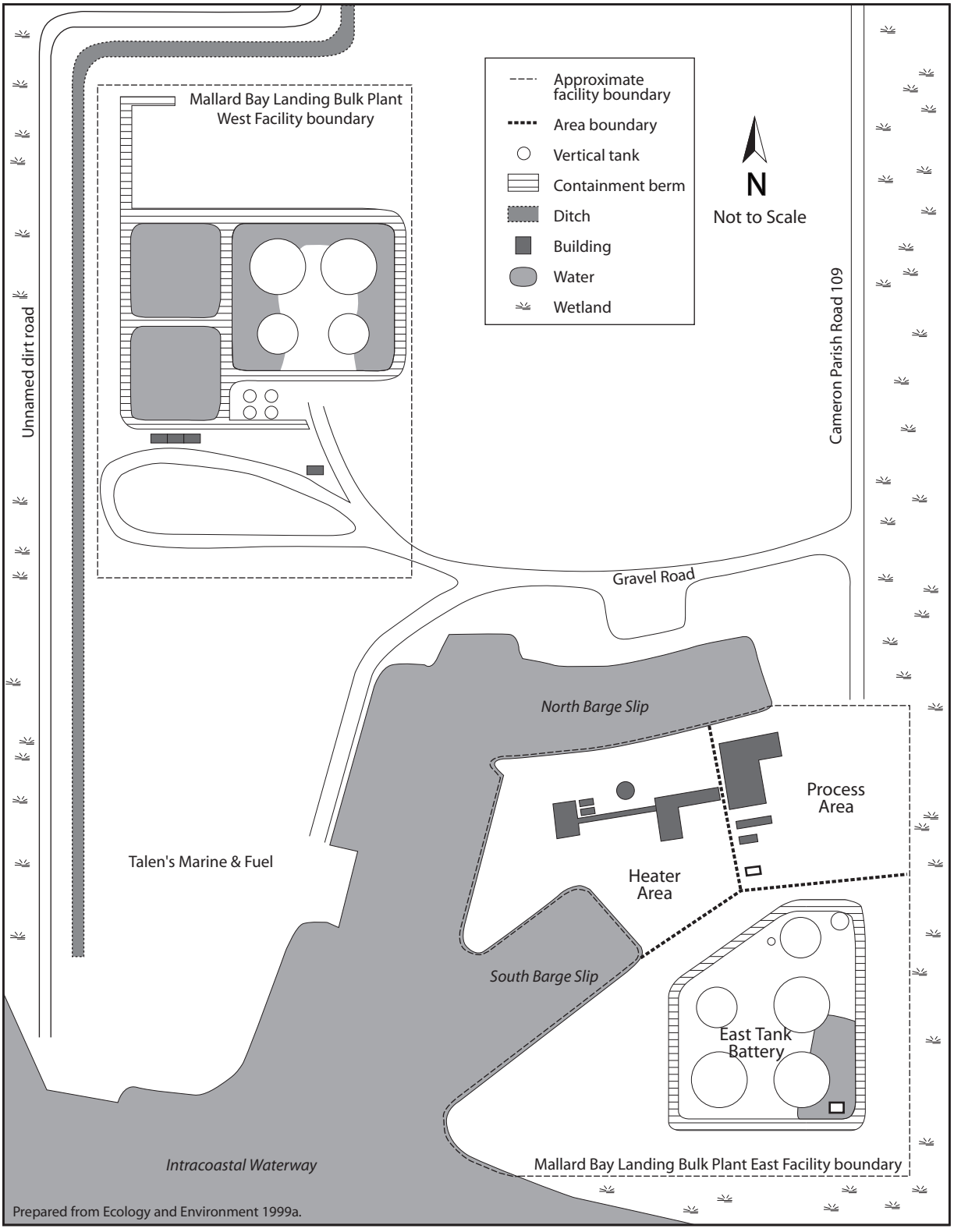

Figure 2. Detail of the Mallard Bay Landing Bulk Plant property.

In 1993, the LDEQ-IASD referred the MBLBP site to the U.S. Environmental Protection Agency (USEPA) because the site was believed to be a potentially hazardous waste site. In 1997, a Superfund Technical Assessment and Response Team (START) initiated removal assessments, which included sampling of all tanks and drums. Removal began in 1998; from January 1999 to March 1999, 3.3 million L (870,000 gal) of oil/waste material from on-site tanks was transported off the site for disposal (USEPA 1990).

The MBLBP site was placed on the National Priorities List on July 27, 2000. In 2001, field activities for a remedial investigation/feasibility study (RI/FS) were conducted, and the RI/FS report was completed in 2002. A Record of Decision for the site was issued in 2003 (USEPA 2004b). From June through October 2003, a remedial action was completed at the site by the USEPA. During the remedial action sludge, contaminated soil, and structures were removed from the site (USEPA 2004b).

Surface water runoff is the primary pathway for the migration of contaminants from the site to NOAA trust resources. Surface water runoff at the MBLBP site drains in many directions. In the vicinity of the heater/process area and the northwest section of the east tank battery (Figure 2), surface water drains into the north and south barge slips and from there into the ICW. Surface water runoff from the east tank battery also drains south and east toward the surrounding low-lying wetlands (USEPA 1990). The distance from the east tank battery to these wetlands is approximately 3 m (10 ft). Surface water from the West Facility drains west approximately 76 m (250 ft) to an unnamed drainage ditch (Ecology and Environment 1999b). Just south of the site, the ICW connects to Grand Lake via Gueydan Canal and an unnamed canal.

NOAA Trust Resources

The trust habitats of primary concern to NOAA are Grand Lake and the wetlands surrounding the MBLBP site. Grand Lake was historically part of an interior, low-salinity estuary. Construction of the Catfish Point Control Structure in 1951 helped block the flow of salt water into Grand Lake, turning the lake into a mostly freshwater ecosystem (LCWCRTF 2002). Salinity within Grand Lake can range from 0.3 to 3.5 parts per thousand in one year (USACE 2004). The only source of salt water to this ecosystem occurs when the locks are opened to allow vessel passage. The lake experiences periods of both low and high salinity, depending on the amount of rainfall and how often the locks are opened within a given time frame (Reed 2002).

The ICW, which flows between the site and Grand Lake, consists primarily of fresh water near the site. A series of locks restricts the amount of salt water entering the system. These locks include the Calcasieu Locks to the west of the site along the ICW, the Catfish Point Control Structure on Grand Lake to the south of the site, and several locks to the east of the site that block saltwater intrusion from Vermilion Bay (Figure 2) (USEPA 1990).

Estuarine and catadromous fish and invertebrate species are present in Grand Lake (Table 1). Adult American eel have been identified in Grand Lake and the Mallard Bay area. Blue crab, striped mullet, and white shrimp are estuarine species that use the lake as spawning, nursery, and adult habitat. Several marine species, including Atlantic croaker, gulf menhaden, and southern flounder, are found in Grand Lake during periods of higher salinity and use the lake for spawning and adult habitat. There is no recreational fishing of NOAA trust resources in the vicinity of the site. White shrimp are fished commercially in Grand Lake during periods of high salinity, when the shrimp become more abundant (Reed 2002). There are no fish consumption advisories or fishery closures specific to Grand Lake (LDEQ 2004).

Table 1. NOAA trust resources present in Grand Lake and Mallard Bay in the vicinity of the Mallard Bay Landing Bulk Plant site (Reed 2002).

Species		Habitat Use			Fisheries	
Common Name	Scientific Name	Spawning Area	Nursery Area	Adult Habitat	Comm.	Rec.
CATADROMOUS						
American eel	*Anguilla rostrata*			◆		
MARINE/ESTUARINE FISH						
Alligator gar[a]	*Lepisosteus spatula*	◆				
Atlantic croaker[a]	*Micropogonias undulatus*	◆		◆		
Black crappie[a]	*Pomoxis nigromaculatus*	◆		◆		
Gizzard shad	*Dorosoma cepedianum*	◆		◆		
Gulf menhaden[a]	*Brevoortia patronus*	◆		◆		
Southern flounder[a]	*Paralichthys lethostigma*	◆		◆		
Spot[a]	*Leiostomus xanthurus*	◆		◆		
Striped mullet	*Mugil cephalus*	◆	◆	◆		
Warmouth[a]	*Lepomis gulosus*	◆		◆		
White crappie[a]	*Pomoxis annularis*	◆		◆		
INVERTEBRATES						
Blue crab	*Callinectes sapidus*	◆	◆	◆		
White shrimp	*Litopenaeus setiferus*	◆	◆	◆	◆[b]	

a: Species is present during periods of high salinity within Grand Lake and Mallard Bay.

b: Commercial fishery during periods of high salinity within Grand Lake and Mallard Bay.

Site-Related Contamination

Twenty soil samples, 13 groundwater samples, and 17 sediment samples were collected from the MBLBP site. All samples were analyzed for metals, volatile organic compounds, and semivolatile organic compounds, including polycyclic aromatic hydrocarbons (PAHs) (Ecology and Environment 1999a). Based on the results of these analyses, the primary contaminants of concern to NOAA are metals. Table 2 summarizes the maximum contaminant concentrations detected in the soil, groundwater, and sediment samples and compares them to appropriate screening guidelines. Only maximum concentrations that exceeded relevant screening guidelines are discussed below. The screening guidelines are the Oak Ridge National Laboratory final preliminary remediation goals (ORNL-PRGs) for soil, the ambient water quality criteria (AWQC) for groundwater, and the threshold effects concentrations (TECs) for sediment.

Soil

Soil samples contained maximum concentrations of metals in excess of the ORNL-PRGs. The maximum concentration of arsenic slightly exceeded the ORNL-PRG. The maximum concentration of selenium exceeded the ORNL-PRG by a factor of approximately 7.5. The maximum concentrations of cadmium, chromium, and zinc exceeded the ORNL-PRGs by more than one order of magnitude. The maximum concentration of mercury exceeded the ORNL-PRG by three orders of magnitude. PAHs were also detected in soil samples, but no ORNL-PRGs are available for comparison to the maximum concentrations of PAHs.

Table 2. Maximum concentrations of contaminants of concern to NOAA detected in samples collected at the Mallard Bay Landing Bulk Plant site (Canning and Carson 1999; Ecology and Environment 1999a). Contaminant values in bold exceeded screening guidelines.

	Soil (mg/kg)		Water (µg/L)		Sediment (mg/kg)	
Contaminant	Soil	ORNL-PRG[a]	Ground-water	AWQC[b]	Sediment	TEC[c]
METALS/INORGANICS						
Arsenic	**10.1**	9.9	**2000**	150	4.5	9.79
Cadmium	**8.4**	0.38[d]	**45**	0.25[e]	ND	0.99
Chromium[f]	**28**	0.4	**210**	11	11	43.4
Copper	28	60	**280**	9[e]	9.2	31.6
Lead	40	40.5	**520**	2.5[e]	13.3	35.8
Mercury	**1.5**	0.00051	ND	0.77[g]	**0.38**	0.18
Nickel	10	30	**520**	52[e]	8.6	22.7
Selenium	**1.6**	0.21	**1900**	5.0[h]	0.8	NA
Zinc	**720**	8.5	**620**	120[e]	**640**	121
PAHs						
Anthracene	2.4	NA	ND	NA	N/A	0.0572
Fluoranthene	2.7	NA	ND	NA	N/A	0.423
Fluorene	4.6	NA	ND	NA	N/A	0.0774
Naphthalene	48	NA	ND	620[i]	N/A	0.176
Phenanthrene	13	NA	ND	NA	N/A	0.204
Pyrene	5.2	NA	ND	NA	**3.1**	0.195

a: Oak Ridge National Laboratory (ORNL) final preliminary remediation goals (PRG) for ecological endpoints (Efroymson et al. 1997).

b: Ambient water quality criteria for the protection of aquatic organisms (USEPA 2002). Freshwater chronic criteria presented.

c: Threshold Effects Concentration (TEC). Concentration below which harmful effects are unlikely to be observed (MacDonald et al. 2000).

d: Ecological soil screening guidelines (USEPA 2004a).

e: Criterion expressed as a function of total hardness; concentrations shown correspond to hardness of 100 mg/L $CaCO_3$.

f: Screening guidelines represent concentrations for $Cr.^{+6}$

g: Derived from inorganic, but applied to total mercury.

h: Criterion expressed as total recoverable metal.

i: Lowest observable effects level (LOEL) (USEPA 1986).

NA: Screening guidelines not available.

N/A: Not analyzed for.

ND: Not detected.

Groundwater

Excepting mercury, maximum concentrations of all metals for which the groundwater samples were analyzed exceeded the AWQC. The maximum concentration of zinc exceeded the AWQC by a factor of five. Maximum concentrations of arsenic, chromium, copper, and nickel exceeded AWQCs

by more than one order of magnitude, while the maximum concentrations of cadmium, lead, and selenium exceeded the AWQCs by more than two orders of magnitude. The maximum concentrations of metals were detected in a groundwater sample from the Talen's Marine and Fuel property. Organic compounds were not detected in the groundwater samples.

Sediment

The maximum concentration of mercury in sediment samples exceeded the TEC by a factor of two, while the maximum concentration of zinc exceeded the TEC by more than a factor of five. Other metals were detected in sediment samples, but at maximum concentrations that did not exceed the TECs. The maximum concentration of mercury was detected in a sample collected from the wetlands east of the East Facility. The maximum concentration of zinc occurred in a sample collected from the ICW south of the site. Pyrene, a PAH, was detected at a maximum concentration that exceeded the TEC by more than one order of magnitude.

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