

# THE LAKE BARRE OIL SPILL NRDA: FROM RESPONSE TO RESTORATION

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**ABSTRACT:** A release of approximately 6,561 barrels of crude oil from a Texaco pipeline into Lake Barre in May 1997 injured marsh, birds, and aquatic fauna. Texaco was proactive in dealing with the trustees in the Natural Resource Damage Assessment (NRDA) process and stayed directly involved throughout; resulting in a cooperative assessment. The trustees focused quickly on the key injuries that required assessment. There was early agreement to conduct a cooperative, restoration-based NRDA, and to design field studies for the injured marsh to provide inputs for scaling using habitat equivalency analysis (HEA). It also was agreed that for this incident, field studies to assess bird and aquatic faunal injury would not be cost-effective or likely improve the accuracy of injury estimates. Although agreement on a common quantification approach for faunal injury was not reached, the two sides agreed on how much restoration was appropriate.

The parties developed an extensive list of restoration alternatives, and although the trustees retained the final decision making authority, there were no significant disagreements on how various alternatives ranked according to restoration selection criteria. The selected project is planting saltmarsh vegetation on a platform of dredged material placed on East Timbalier Island by the Coastal Wetland Planning, Protection, and Restoration Act (CWPPRA) program. No CWPPRA funds were available for planting. In scaling the restoration, Texaco will only get credit for the ecological services provided by their planting above that

which would occur in the absence of planting. Factors such as erosion rates expected with and without planting and the rate of natural colonization of marsh in the absence of planting were considered in the scaling calculations.

The trustees and Texaco jointly briefed attorneys for both sides throughout the NRDA process, but were not active participants in meetings regarding technical matters. These briefings ensured a quick transition from the injury assessment and restoration project selection process to settlement negotiations. A consent decree was lodged with the court in September 1999. Texaco will implement the restoration and the monitoring plan, and pay all trustee assessment and restoration oversight costs as part of the settlement.

## Introduction

Around 4:00 p.m. CDT on May 16, 1997, a 16-inch crude oil transmission pipeline ruptured in Lake Barre, Louisiana, approximately 27 miles southeast of Houma, in Terrebonne Parish (Figure 1). Texaco Pipeline Company (hereafter Texaco) estimated that 6,561 barrels (275,562 gallons) of crude oil were discharged, although the initial aerial observations suggested a much smaller spill. Skimming and booming operations began on May 17 to control and remove surface oil, and protect sensitive

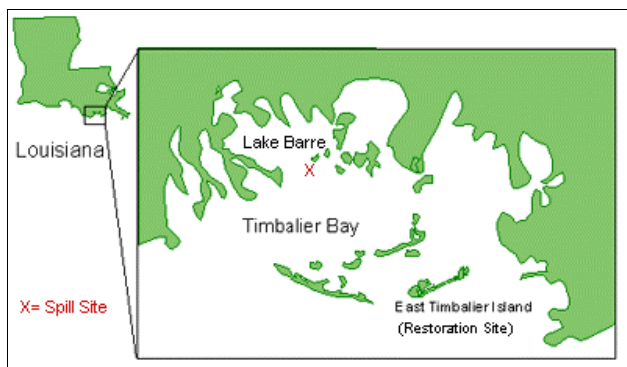


Figure 1. Location of the pipeline rupture in Lake Barre and restoration site on East Timbalier Island.

resources. Lake Barre is part of a shallow coastal estuarine system characterized by eroding salt marshes that are protected from the open Gulf of Mexico by a system of barrier islands. The area supports abundant wildlife and fishery resources, and a variety of human uses.

Under the Oil Pollution Act of 1990 (OPA 90), the parties responsible for the discharge of oil are liable for the costs to restore natural resources. The goal of OPA 90 is to make the environment and public whole after injuries to natural resources and service losses resulting from oil spill incidents. The state and federal agencies designated to act on behalf of the public for this case were: the Louisiana Oil Spill Coordinator's Office (LOSCO), Louisiana Department of Wildlife and Fisheries (LDWF), Louisiana Department of Natural Resources (LDNR), Louisiana Department of Environmental Quality (LDEQ), National Oceanic and Atmospheric Administration (NOAA), and U.S. Department of the Interior (DOI) represented by the U.S. Fish and Wildlife Service (USFWS) (collectively, "the trustees").

This paper summarizes the series of events that transpired in the Lake Barre Natural Resource Damage Assessment (NRDA) case, the resources at risk during the response, the methods that were used to assess and quantify the injuries from the spill, the settlement process, and the preferred restoration alternative.

### Resources at risk during response

The unified command system provided the structure for state and federal agency personnel along with Texaco to respond to the pipeline rupture and release. While working together within the Unified Command, the trustees and Texaco realized the need to assess injuries resulting from the incident. Marsh habitat, aquatic fauna, birds, and wildlife were recognized as the resources primarily at risk. The NRDA proceeded from this common basis of information.

**Ecological.** Large tracts of marsh were exposed to slicks or sheens. In addition, a mottled duck and a tern were found oiled and dead. Response personnel and Trustees surveyed approximately 10% of the spill-affected area (Personal communication, Conzelmann, USFWS), and observed at least 58 live oiled birds in the days following the incident. There was one report of an oiled otter, but no other reports of oiled wildlife. Estimating wildlife oiling and mortality was difficult because resident species remained hidden in marsh grass.

The trustees and Texaco sampled the water column for polycyclic aromatic hydrocarbons (PAHs) near the pipeline break. There were no reports of large-scale fish or shellfish mortality, but some small fish and invertebrates were found dead

within the marsh. Dead brown shrimp were collected in one sample, and dead juvenile blue crabs were found in one crab pot.

**Abiotic.** The trustees and Texaco collected and analyzed intertidal sediment samples to document the degradation of oil. Unvegetated oiled shorelines comprised a small proportion of the exposed shoreline. The trustees decided to combine these areas with intertidal salt marsh in the assessment.

**Human uses.** Trustees must evaluate and obtain compensation for public lost human use. A precautionary oyster harvesting closure was in effect through July 1997; this was considered a private human use loss since the affected oyster leases were managed for commercial harvest. Public access to the spill area was limited during cleanup, but nearby substitute sites for fishing and shrimping were not affected.

### Organization of the cooperative assessment group

State and federal trustees had worked together on previous spills and rapidly formed an assessment team. Local government, Terrebonne Parish, was invited to participate; they sent representatives to assessment meetings and hosted two public meetings. Coastal Wetland Planning, Protection, and Restoration Act (CWPPRA) representatives became involved when the preferred restoration project was selected; their technical input was important in restoration scaling.

Trustee and Texaco representatives agreed at the first meeting to pursue a cooperative assessment. A draft Memorandum of Agreement (MOA) developed by API was used as the starting point for an incident-specific MOA. The actual damage assessment process far outpaced negotiations to develop the MOA, and both sides agreed to work on the Consent Decree and discontinue work on the MOA. Despite the lack of a formal MOA, the trustees and Texaco formed a cooperative assessment group (CAG) to conduct the assessment and develop the restoration plan. The trustees retained final decision-making authority as specified by OPA 90.

### Ephemeral data and sample collection

Texaco collected source, water, and subsurface sediment samples soon after the incident began, and with trustee agreement were sent to the laboratory for analyses. Locations of oil slicks and sheens, exposed habitats, and birds and wildlife resources were recorded from aerial observations on at least a daily basis through May 28. Tri-State Bird Rescue and Research, Inc. and the trustees conducted field surveys of birds and wildlife. LDWF collected regularly scheduled trawl samples in Lake Barre during the incident.

### Injury assessment and quantification

The trustees identified potential injuries that required assessment based on observations and experience from previous spills. Marsh was a key injury category because of the extensive acreage exposed to oil. Although little aquatic mortality was observed, the trustees felt that the potential for injury to these resources required evaluation. Texaco used field analytical data to develop a risk-based approach in estimating injury to aquatic life. Relatively calm weather conditions and the analytical results from subtidal sediment samples suggested that the potential for injury to benthic organisms was low. Consequently, the trustees decided not to conduct benthic injury studies. Instead, the trustees used the Type A model to estimate concentrations and biotic

injury. The trustees determined that the potential for lost recreational use was small because of the short response period and the many alternate recreational sites in the vicinity, and therefore chose not to conduct any lost recreational use studies. LOSCO funded a study by Louisiana State University under its' Oil Spill Research and Development "spill of opportunity" program (OSRADP) that concluded that the incident had modest, if any, effects on recreational users (Pulsipher *et al.*, 1998). The trustees decided to pursue injury assessment for marsh and faunal injuries.

The CAG planned and implemented a field study to measure the loss of marsh services during recovery to scale compensatory restoration using HEA. Oiling vegetative status, biological, and other data were collected, in oiled and unoiled areas of marsh in July and October 1997 and June 1998. Oiled marsh was categorized as: (1) heavily oiled with significant stem mortality; (2) visibly oiled with bands or spots of oil without apparent stem mortality; and (3) known to be exposed to oil or sheen, but without visible oiling. Oiled sites in each exposure class and unoiled sites in each class were included in the assessment study. Permanent quadrats were established where percent cover was estimated, number of live stems was counted, and degree of vegetation oiling and sediment sheening was described. Each quadrat was photographed in both close-up to show the vegetation condition and from a distance to show the surrounding area. "Phototranssects" were established to record the stability of the marsh/water edge because of concerns about erosion.

Percent vegetative cover and vegetation "health" estimates were used as indices of marsh services. The observations from unoiled marsh were to be used to estimate baseline; however, differential erosion between reference and oiled marsh made the comparison inconclusive. The trustees and Texaco developed separate injury-recovery scenarios. Both approaches had similar results; the Texaco approach was used with minor revisions. The approach consisted of four scenarios that formed the basis for HEA (Table 1).

The CAG realized that an intensive field effort to measure bird, fish, and other aquatic faunal injury was necessary but not cost-effective. The trustees developed a preliminary incident-specific model that used algorithms from the Type A model modified to simulate a subsurface release. Type A model abundance data for the Lake Barre area in spring were used for birds and mammals, and historical LDWF trawl data for aquatic fauna. Texaco did not agree with this approach, but assisted in gathering model input data. The trustee model estimated a 7,465 kg loss of fish, crab, and shrimp biomass, 333 birds, and no mammals. Texaco independently estimated that 100 birds may have been killed and less than 500 kg of aquatic fauna were lost. Texaco and the trustees did not agree on the magnitude of the injury to birds and aquatic fauna, but they did agree on the type and scale of restoration needed for compensation.

This aspect of the settlement shows the importance of focusing on restoration. Rather than trying to reconcile injury estimates, the CAG developed a method to convert their respective estimates of injury into a restoration project. The trustees and Texaco were able to agree on a restoration plan that addressed the injury but acknowledged differences in the injury assessment techniques of the two groups.

Natural recovery was the appropriate primary restoration alternative, but compensatory restoration was needed for interim losses. Marsh restoration was chosen to compensate for all injuries because the injury to marsh was, by far, the largest part of the injury. Other restoration types were considered to compensate for bird and aquatic injuries, including marsh restoration, oyster reef creation, and nest-protection; marsh restoration was preferred because the magnitude of these injuries was small in relation to the marsh injury, and because habitat creation leads indirectly to restoration of fauna. HEA, a service-to-service method, was used to scale this restoration.

The trustees used a HEA approach developed for the *North Cape* NRDA to estimate restoration needs for bird and aquatic injury at Lake Barre. The biomass needed to compensate for the loss was converted from aquatic fauna and birds to a marsh equivalent by using efficiency transfers between trophic levels. The trustees shared the results of this scaling exercise with Texaco, who offered 4 acres of marsh creation as compensation for this injury. Texaco's offer exceeded the trustee's estimated restoration need and was accepted.

### Restoration options

Primary restoration was provided through natural recovery because studies indicated a short recovery period for all but the most heavily impacted marsh. The CAG identified 43 potential compensatory restoration projects. These were evaluated using multiple criteria with detailed evaluations conducted on projects that survived the initial screenings. The CAG chose planting on a CWPPRA-created marsh platform as the preferred alternative. The project was located on East Timbalier Island, and CWPPRA funding was not available for plantings (Figure 1).

The CWPPRA project, without planting, would provide some level of ecological services. The CAG needed to estimate the level of services that would be added by restoration planting. The planting design consisted of alternating planted and unplanted areas to maximize the total area enhanced by the project and opportunity for natural spread of marsh vegetation. The projected spreading of vegetation from the planted strips into the unplanted gaps was included in the scaling calculations that were developed jointly by the trustees and Texaco. The restoration plan required Texaco to plant a minimum of 18.6 acres of marsh vegetation, that was projected to spread to 58 acres over the project's 26-year lifetime.

**Table 1. Comparison of marsh injury scenarios.**

Scenario	Acres	Service loss	~Time to recovery	DSAYs
Light oiling with rapid recovery	4,165	10%	<5 months	41.9
Heavy oiling with moderate recovery	153.6	40%	2 years	26.5
Heavy oiling with slow to moderate recovery	8.1	75%	2 years	4.6
Heavy oiling with slow recovery	0.28	100%	20 years	2.6
<b>Totals</b>	<b>4,326.98</b>			<b>75.6</b>

### Settlement process

The CAG held periodic attorney briefings throughout the injury assessment process. The attorneys were, then, familiar with the basic terms of the restoration plan and provided legal advice as needed. Thus, there was a smooth transition from the technical-basis for the injury assessment and restoration plan to the legal-basis of the Consent Decree. The trustees began developing the Consent Decree in April 1999, it was lodged with the court by the end of September, allowing Texaco to implement restoration in Spring 2000. The elements of the Consent Decree were: (1) implementation and monitoring of the restoration project, and (2) payment of trustee costs.

### Conclusions

The Lake Barre NRDA case was successful because of its cooperative, pragmatic, restoration-based approach. It was cooperative in that virtually all assessment and restoration decisions were made jointly by the Trustees and Texaco. Philosophical differences between the parties were set aside to make pragmatic agreements that led to the ultimate goal: restoration. Thus, both the trustees and Texaco were satisfied that the restoration plan would make the public whole. The Lake Barre oil spill serves as an important NRDA model for future oil spill incidents.

### Biography

Warren Lorentz is the Natural Resource Specialist-NRDA for the Louisiana Oil Spill Coordinator's Office/Office of the Governor. He obtained his Master of Science in Environmental Toxicology from LSU, Baton Rouge, Louisiana and his Bachelor of Science in Biology from SUNY Oswego, Oswego, New York. Mr. Lorentz manages the NRDA program and coordinates the NRDA activities for the State of Louisiana.

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