ATTACHMENT 1

DRAFT

DAMAGE ASSESSMENT AND PRELIMINARY RESTORATION PLAN

for the March 2, 2003 crude oil discharge into Lake Washington, Plaquemines Parish, Louisiana and the December 2, 2003 and April 19, 2005 crude oil discharges into Barataria Bay, Jefferson Parish, Louisiana.

LWMIWCB

NRDA CASE FILE #LA2003-0302-0716 (Lake Washington)
NRDA CASE FILE #LA2003-1202-1200 (Mendicant Island)
NRDA CASE FILE #LA2005-0419-1950 (West Champagne Bay)

Prepared By:

Louisiana Natural Resource Trustees:

Louisiana Oil Spill Coordinator's Office
Louisiana Department of Natural Resources
Louisiana Department of Wildlife and Fisheries
Louisiana Department of Environmental Quality
Louisiana Coastal Protection and Restoration Authority

In Cooperation With:

ExxonMobil Pipeline Company

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Purpose

This document is a Draft Damage Assessment and Preliminary Restoration Plan (Draft DAPRP) prepared by the Louisiana natural resource trustees (referred to herein as the "Trustees"), in cooperation with ExxonMobil Pipeline Company (referred to herein as "EMPCo"), to recover damages for injuries to natural resources and services resulting from three unauthorized crude oil discharges into Lake Washington, Plaquemines Parish, Louisiana (March 2, 2003) and Barataria Bay (December 2, 2003 and April 19, 2005) (referred to herein as the "Incidents"). This document provides information on the natural resource injury determinations conducted to date, as part of the ongoing Natural Resource Damage Assessment (NRDA), and identifies the Trustees preliminary restoration plan for compensating the public for injuries to natural resources and services resulting from the Incidents. This Draft DAPRP also serves, in part, as the agencies' compliance with the Oil Pollution Act of 1990 (OPA) (33 USC 2701 *et seq*.) and the Louisiana Oil Spill Prevention and Response Act of 1991 (OSPRA) (La. Rev. Stat. 30:2451 *et seq.*). The Trustees invite the public to review this Draft DAPRP and submit comments to the address listed below in Section 1.6. Upon finalization of this document, a Final DAPRP will be presented to EMPCo as part of a Final Settlement Agreement requiring payment of **$2,014,500.00** to the Trustees for costs related to future implementation by the Trustees of a compensatory restoration project(s) for the Incidents.

Overview of the Incidents

Lake Washington

On March 2, 2003, the Trustees were notified of an unauthorized discharge of crude oil from a subsurface pipeline located in the Barataria estuary, approximately eight miles south-southwest of Port Sulfur, Louisiana, in the vicinity of Lake Washington, Plaquemines Parish. An estimated 995 barrels (41,790 gallons) of crude oil were released into the surrounding coastal waters. The discharged oil exposed sensitive estuarine habitats as well as birds and other wildlife to crude oil. The pipeline was owned and operated by EMPCo and pursuant to OPA they were designated as the statutory responsible party (RP) for the incident.

Mendicant Island

On December 2, 2003, the Trustees were notified of an unauthorized discharge of crude oil from a subsurface pipeline located in the Barataria estuary, approximately four miles north of Grand Isle, Louisiana, in the vicinity of Mendicant Island, Jefferson Parish. An estimated 356 barrels (14,952 gallons) of crude oil were released into West Champagne Bay. The discharged oil exposed sensitive estuarine habitats as well as birds and other wildlife to crude

oil. The pipeline was owned and operated by EMPCo and pursuant to OPA they were designated as the statutory RP for the incident.

West Champagne Bay

On April 19, 2005, the Trustees were notified of an unauthorized discharge of crude oil from a subsurface pipeline located in the Barataria estuary, approximately four miles north of Grand Isle, Louisiana, in the vicinity of Mendicant Island, Jefferson Parish. An estimated 600 barrels (25,200 gallons) of crude oil were released into West Champagne Bay. The discharged oil exposed sensitive estuarine habitats as well as birds and other wildlife to crude oil. The discharge location was situated just off the northern tip of Mendicant Island in the vicinity of the Mendicant Island incident discharge location. However, due to a different wind direction at the time of the discharge, the areas affected by oil during the West Champagne Bay incident were different from those areas impacted during the Mendicant Island incident. The pipeline was owned and operated by EMPCo and pursuant to OPA they were designated as the statutory RP for the incident.

Natural Resource Trustees and Authorities

The Oil Pollution Act of 1990 (OPA) (33 USC 2701 *et seq*.) and OSPRA (La. Rev. Stat. 30:2451 *et seq.*) are the principal federal and state statutes, respectively, authorizing federal and state agencies and tribal officials to act as natural resource trustees for the recovery of damages for injuries to natural resources and services resulting from incidents in Louisiana. As a designated trustee, each trustee agency is authorized to act on behalf of the public under state and/or federal law to assess and recover natural resource damages and to plan and implement actions to restore natural resources and services injured or lost as the result of an incident. The natural resource trustees for these Incidents include representatives from the following state agencies: Louisiana Oil Spill Coordinator's Office, Department of Public Safety and Corrections (LOSCO), Louisiana Department of Environmental Quality (LDEQ), Louisiana Department of Wildlife and Fisheries (LDWF), Louisiana Department of Natural Resources (LDNR) and Louisiana Coastal Protection and Restoration Authority (CPRA)[1]. The National Oceanic and Atmospheric Administration (NOAA) and U.S. Fish and Wildlife Service (USFWS) were also involved at the early stages.

The goal of the NRDA provisions in OPA and OSPRA are to make the environment and public whole for injury to, loss of, or lost use of trust resources and services resulting from an incident. Federal regulations governing the NRDA process under OPA can be found at 15 C.F.R. Part 990 *et seq*. These regulations were promulgated by the United States Department of Commerce, acting through NOAA, and became effective February 5, 1996. State regulations for the NRDA process under OSPRA were promulgated by LOSCO in March

[1] CPRA became a trustee in this matter per Louisiana Governor Bobby Jindal's letter to President Barack Obama, dated May 20, 2010, which designated the agency as the lead state natural resource trustee.

1999 and can be found at Louisiana Administrative Code (LAC) 43:XXIX., Chap. 1. In addition, federal and Louisiana natural resource trustees have developed the Louisiana Regional Restoration Planning Program (RRP Program) to assist natural resource trustees in carrying out their NRDA responsibilities for discharges or substantial threats of discharges of oil. A detailed description of the NRDA process can be found in Chapter 2 of this document and the Final Programmatic Environmental Impact Statement for the Louisiana RRP Program (NOAA et al., 2007).

Overview of Restoration Planning

A NRDA was conducted to determine the nature and extent of injuries to natural resources and services resulting from the Incidents and to identify restoration alternatives that would compensate the public for interim losses of ecological services. Based on information collected during Preassessment activities, the Trustees determined that the Incidents caused injuries to salt marsh vegetation, marsh sediments as well as birds and other wildlife. The Trustees and EMPCo agreed to quantify and address injury based on the development of reasonable and protective estimates of injury and in-kind compensatory restoration of the habitat. Upon completion of emergency response, containment and cleanup activities by EMPCo, the Trustees and EMPCo elected to forego active primary restoration at the individual spill sites and rely on natural recovery of the injured resources and services because additional actions to remove any residual oil from sediments could have exacerbated the injury. It was determined that approximately **15.5** acres of salt marsh habitat and **8.0** acres of freshwater marsh habitat would be required to make the public whole for interim losses of ecological services resulting from the Incidents.

After several years of working cooperatively with the Trustees developing an appropriate compensatory restoration alternative for the Incidents, in October 2016 EMPCO and the Trustees agreed to settle the NRDA damage claim for cash, in lieu of EMPCo implementing a restoration project. The cash settlement dollar amount developed by the Trustees is predicated on a Trustee-implemented marsh creation project and a crevasse-splay project, and provides for future implementation costs (see Section IV.B.2 of the Settlement Agreement). The Trustees have prepared this Draft DAPRP to: 1) present the injury assessment methods employed to quantify the natural resource injuries resulting from the Incidents; 2) identify the preferred restoration alternative; and 3) present the estimated costs of implementing the preferred restoration alternative.

Preferred Restoration Alternative

The Trustees' preferred compensatory restoration alternative is to create and/or physically protect **15.5** acres of salt marsh habitat and **8.0** acres of fresh marsh habitat using monies (**$2,014,500.00)** received from EMPCo as part of a negotiated settlement of the damage claim.

Public Comment Period

This document is available to the public for a 30-day comment period, which will begin on the date of the public notice announcing availability of the Draft DAPRP. Public comment is consistent with all state and federal laws and regulations that apply to the NRDA process, including Section 1006 of OPA, the federal NRDA Regulations at 15 CFR Part 990, Section 2480 of OSPRA, and the state NRDA Regulations at La. Admin. Code 43: Part XXIX, Chapter 1. After the 30-day public comment period, all comments received from the public will be evaluated by the Trustees and summarized in the Final DAPRP. An additional opportunity for public review will be provided in the event that the Trustees decide to make significant changes to the Draft DAPRP based on the initial public comments. Once this document has been finalized, the Trustees will present the Final DAPRP to EMPCo as part of the settlement agreement for natural resources damages related to the Incidents.

Comments on this Draft DAPRP should be sent to:

Louisiana Oil Spill Coordinators Office,
Department of Public Safety and Corrections
Attn: Charles K. Armbruster
P.O. Box 66614
Baton Rouge, LA 70896
(225) 925-6606
charles.armbruster@la.gov

1.0 INTRODUCTION

1.1 Purpose

This document is a Draft Damage Assessment and Preliminary Restoration Plan (Draft DAPRP) prepared by the Louisiana natural resource trustees (referred to herein as the "Trustees"), in cooperation with ExxonMobil Pipeline Company (referred to herein as "EMPCo"), to recover damages for injuries to natural resources and services resulting from three unauthorized crude oil discharges into Lake Washington, Plaquemines Parish, Louisiana on March 2, 2003 and Barataria Bay (December 2, 2003 and April 19, 2005) (referred to herein as the "Incidents"). This document provides information on the natural resource injury determinations conducted to date, as part of the ongoing Natural Resource Damage Assessment (NRDA), and identifies the Trustees preliminary restoration plan for compensating the public for injuries to natural resources and ecological services resulting from the Incidents. This preliminary restoration plan is predicated on a cash settlement in the amount of **$2,014,500.00** to be paid by EMPCo as part of a negotiated settlement to resolve their NRDA liability for the Incidents and will be paid in lieu of EMPCo implementing a restoration project (see Section IV.B.2 of the Settlement Agreement). The Trustees will use these settlement monies to implement compensatory restoration in the future that will make the public whole for the Incidents.

This Draft DAPRP serves, in part, as the agencies' compliance with the Oil Pollution Act of 1990 (OPA) (33 USC 2701 *et seq*.) and the Louisiana Oil Spill Prevention and Response Act of 1991 (OSPRA) (La. Rev. Stat. 30:2451 *et seq*.) and is meant to provide the public an opportunity to comment on the Trustees' final injury assessment determinations (i.e., the damage assessment) and this preliminary restoration plan. The Trustees invite the public to review this Draft DAPRP and submit comments to the address listed in Section 1.7. Once this document has undergone public review and been finalized, no additional opportunities to comment on the damage assessment and preliminary restoration plan for the Incidents will be available. Upon finalization and execution of the Final Settlement Agreement, the Final Damage Assessment and Preliminary Restoration Plan (Final DAPRP) will become the Trustees' preliminary plan for compensatory restoration. Once payment has been received from EMPCo, the Trustees will identify and evaluate potential restoration projects that will appropriately address injuries to natural resources resulting from the Incidents. A preferred alternative will be identified in a Draft Restoration Plan (DRP). The DRP will provide the public an opportunity to review and comment on the Trustees' preferred restoration alternative for the Incidents. After finalization of the DRP, a Final Restoration Plan (FRP) will be released identifying the selected compensatory restoration alternative to be implemented by the Trustees.

1.2 Natural Resource Trustees and Authorities

The Oil Pollution Act of 1990 (OPA) (33 USC 2701 *et seq*.) and OSPRA (La. Rev. Stat. 30:2451 *et seq.*) are the principal federal and state statutes,

respectively, authorizing federal and state agencies and tribal officials to act as natural resource trustees for the recovery of damages for injuries to natural resources and services resulting from oil spill incidents in Louisiana. As a designated trustee, each trustee agency and tribal official is authorized to act on behalf of the public under state and/or federal law to assess and recover natural resource damages and to plan and implement actions to restore natural resources and services injured or lost as the result of an incident. The natural resource trustees for the Incidents include representatives from the following state agencies: Louisiana Oil Spill Coordinator's Office, Department of Public Safety and Corrections (LOSCO), Louisiana Department of Environmental Quality (LDEQ), Louisiana Department of Wildlife and Fisheries (LDWF) Louisiana Department of Natural Resources (LDNR) and the Coastal Protection and Restoration Authority of Louisiana (CPRA)[2].

The goal of the NRDA provisions in OPA and OSPRA are to make the environment and public whole for injury to, loss of, or lost use of trust resources and services resulting from an incident. Federal regulations governing the NRDA process under OPA can be found at 15 C.F.R. Part 990 *et seq*. These regulations were promulgated by the United States Department of Commerce, acting through NOAA, and became effective February 5, 1996. State regulations for the NRDA process under OSPRA were promulgated by LOSCO in March 1999 and can be found at Louisiana Administrative Code (LAC) 43: XXIX, Chap. 1. In addition, federal and Louisiana natural resource trustees have developed the Louisiana Regional Restoration Planning Program (RRP Program) to assist the natural resource trustees in carrying out their NRDA responsibilities for discharges or substantial threats of discharges of oil. A detailed description of the NRDA process can be found in Chapter 2 of this document and the Final Programmatic Environmental Impact Statement for the Louisiana RRP Program (NOAA et al., 2007).

1.3 Overview of the Incidents

1.3.1 Lake Washington Incident

On March 2, 2003, the Trustees were notified of an unauthorized discharge of crude oil from a subsurface pipeline located in the Barataria estuary approximately eight miles south-southwest of Port Sulfur, Louisiana, in the vicinity of Lake Washington, Plaquemines Parish (Figure 1.1). An estimated 995 barrels (41,790 gallons) of crude oil were released into the surrounding coastal waters. The pipeline was owned and operated by EMPCo and pursuant to OPA they were identified as the statutory responsible party (RP) for the incident.

A helicopter, multiple watercraft, and other shoreline cleanup assessment techniques were used to locate oil along shorelines, conduct low-altitude and water/shoreline searches for potentially oiled birds and other wildlife as well as

[2] CPRA became a trustee in this matter per Louisiana Governor Bobby Jindal's letter to President Barack Obama, dated May 20, 2010, which designated the agency as the lead state natural resource trustee.

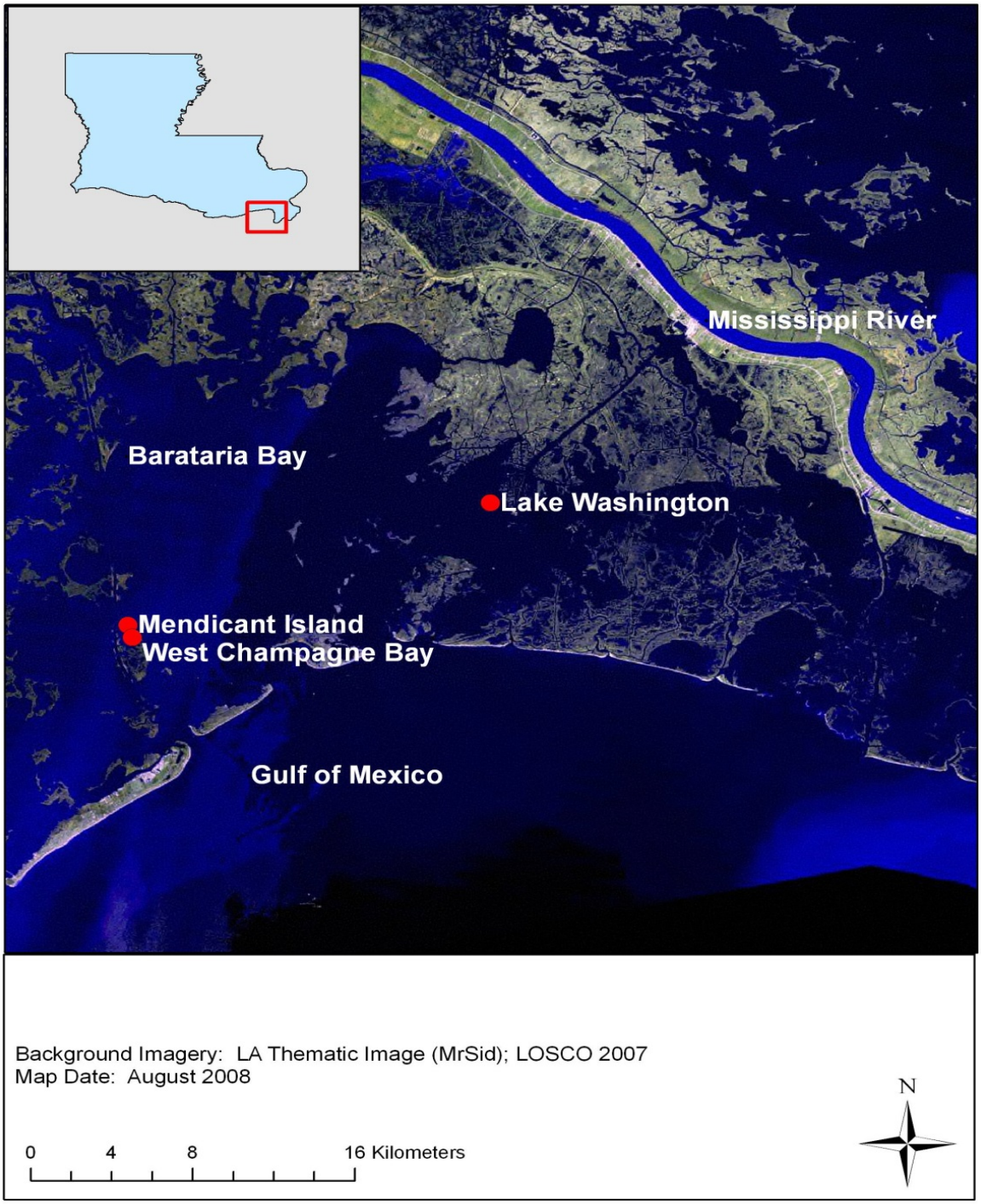


Figure 1.1 Location of Lake Washington, Mendicant Island, and West Champagne Bay Incidents.

direct clean-up activities. Due to the presence of large numbers of migrating waterfowl in the area at the time of the incident, bird hazing cannons were deployed in various locations on March 4, 2003 to deter birds from accessing oiled areas. Response activities also served to deter birds and other wildlife from

areas where clean-up operations were being conducted. The discharged crude oil exposed estuarine habitats as well as birds and other wildlife. Between March 3 and March 14, 2003, Tri-State Bird Rescue and Research, Inc. provided wildlife rescue and rehabilitation services. The Lake Washington area is typically visited by hunters and fisherman at various times of the year; however, inclement weather during the incident limited recreational use of the area.

1.3.2 Mendicant Island Incident

On December 2, 2003, the Trustees were notified of an unauthorized discharge of crude oil from a subsurface pipeline located in the Barataria estuary, approximately four miles north of Grand Isle, Louisiana in the vicinity of Mendicant Island, Jefferson Parish (Figure 1.1). An estimated 356 barrels (14,952 gallons) of crude oil were released into West Champagne Bay. The pipeline was owned and operated by EMPCo and pursuant to OPA they were identified as the statutory RP for the incident.

A helicopter, multiple watercraft, and other shoreline cleanup assessment techniques were used to locate oil along shorelines, conduct low-altitude and water/shoreline searches for potentially oiled birds and other wildlife as well as direct clean-up activities. Due to the presence of large numbers of migrating waterfowl in the area at the time of the incident, bird hazing cannons were deployed in various locations to deter birds from oiled areas. Response activities also served to deter birds and other wildlife from areas where clean-up operations were being conducted. The discharged crude oil exposed estuarine habitats as well as birds and other wildlife. Between December 3 and December 9, 2003, Wildlife Rehab & Education Inc. provided wildlife rescue and rehabilitation services. The Mendicant Island area is typically visited by hunters and fisherman at various times of the year; however, inclement weather during the incident limited recreational use of the area.

1.3.3 West Champagne Bay Incident

On April 19, 2005, the Trustees were notified of an unauthorized discharge of crude oil from a subsurface pipeline located in the Barataria estuary, approximately four miles north of Grand Isle, Louisiana, in the vicinity of Mendicant Island, Jefferson Parish (Figure 1.1). An estimated 600 barrels (25,200 gallons) of crude oil were released into West Champagne Bay. The pipeline was owned and operated by EMPCo and pursuant to OPA they were identified as the statutory RP for the incident.

A helicopter, multiple watercraft, and other shoreline cleanup assessment techniques were used to locate oil along shorelines, conduct low-altitude and water/shoreline searches for potentially oiled birds and other wildlife as well as direct clean-up activities. Bird hazing cannons, as well as Mylar balloons, were deployed on April 21, 2005 at various locations to deter birds from oiled areas. Response activities also served to deter birds and other wildlife out of the areas where clean-up operations were being conducted.

The discharge location of this incident was near the northern tip of Mendicant Island in the vicinity of the Mendicant Island discharge. Discharged crude oil exposed estuarine habitats as well as birds and other wildlife. However, due to a difference in wind direction at the time of the discharge, areas affected by oil during the West Champagne Bay incident were different from those areas impacted during the Mendicant Island incident.

1.4 Determination of Jurisdiction

Pursuant to 15 C.F.R. Part 990.41 of the regulations for conducting NRDA under OPA, the Trustees determined that legal jurisdiction to pursue restoration existed for each incident. First, each of the three oil spills constituted an "incident" within the meaning of Section 1001(14) of OPA – “any occurrence or series of occurrences having the same origin, involving one or more vessels, facilities, or any combination thereof, resulting in the discharge or substantial threat of discharge of oil." Second, each of the incidents was not an "excluded discharge" within the meaning of OPA Section 1002(c) (i.e., the Incidents were not authorized by permits issued under federal, state, or local law, or did not originate from public vessels or from an onshore facility subject to the Trans-Alaska Pipeline Authorization Act). And third, potential injury to trust resources and services under designated state trusteeship of the Trustees had occurred as a result of the Incidents.

1.5 Coordination with the Responsible Party

Pursuant to the OPA and the OSPRA, EMPCo was identified as the RP and is liable for natural resource damages (i.e., the costs of conducting the natural resource damage assessment and implementing the restoration plan) for each of the three incidents. By its participation in the development of this DAPRP and entering into any subsequent settlement with the Trustees, EMPCo neither admits nor denies such liability. OPA and OSPRA regulations direct the trustees to invite the RP to participate in the NRDA process and under the Louisiana Revised Statutes (L.R.S.) 30:2480(6)(c), the Lead Administrative Trustee (LAT) is directed to promote participation with the RP in all stages of the NRDA. Although the RP may contribute to the process in many ways, final authority to make determinations regarding injury and restoration rests solely with the trustees. Accordingly, the Trustees delivered formal invitations to EMPCo to participate in cooperative NRDAs for the Incidents and EMPCo formally accepted the Trustees’ invitations as follows:

<u>Lake Washington Incident</u>
Invitation sent: June 6, 2003
Invitation accepted: July 7, 2003

<u>Mendicant Island Incident</u>
Invitation sent: December 15, 2004
Invitation accepted: January 7, 2005

West Champagne Bay Incident
Invitation sent: July 28, 2005
Invitation accepted: August 3, 2005

On January 17, 2006, EMPCo agreed to combine the NRDAs for the three incidents into one collective NRDA and settlement. A joint settlement was preferred by the Trustees and EMPCo because of the inherent cost efficiencies associated with conducting one restoration planning effort versus three efforts and the resulting benefits to the environment. EMPCo stated its desire in each of its letters accepting the Trustees' invitations to participate in cooperative NRDA's that the assessments should be conducted expeditiously and efficiently in order to focus the resources on expenditures and activities that provide maximum direct benefit to the environment. Prior to this formal invitation and acceptance, the Trustees and EMPCo had already begun to work cooperatively to identify and quantify natural resource injuries resulting from the Incidents.

1.6 Determination to Conduct Restoration Planning

Pursuant to 15 C.F.R. Part 990.42 of the regulations for conducting NRDA under OPA, the Trustees determined that the requisite conditions existed to justify proceeding with NRDA beyond Preassessment to Restoration Planning. First, natural resource injuries had resulted from each incident and were expected to continue and result in interim losses of natural resource and services from the time of the Incidents through full recovery. Second, Response actions may not have fully addressed longer-term injuries potentially resulting from the Incidents. Third, feasible restoration alternatives existed to address injuries to natural resources and services from the Incidents. Consequently, in accordance with the regulations for OPA at 15 C.F.R. Part 990.44 and OSPRA at LAC 43: XXIX.101 *et seq*., the Trustees proceeded with a NRDA to determine the nature and extent of injuries to natural resources and services resulting from the Incidents and to identify restoration alternatives that would compensate the public for interim losses of ecological services.

For each of the three incidents, the Trustees published a Notice of Intent (NOI) to conduct Restoration Planning in the *Louisiana State Register* and several newspapers to inform the public that they were proceeding with Restoration Planning pursuant to OPA and would be opening an Administrative Record (AR). The public notices for each of the incidents were published as follows:

Lake Washington
Louisiana State Register (Vol. 29, No. 9, pp. 1952-1953) on September 20, 2003,
Baton Rouge Advocate on 9/22/03
Plaquemines Watchman and Gazette on 9/22/03
Times Picayune on 9/22/03

Mendicant Island
Louisiana State Register (Vol. 31, No. 8, pp. 2151-2152) on August 20, 2005,
Baton Rouge Advocate on 8/19/05
Houma Courier on 8/19/05
Times Picayune on 8/19/05

West Champagne Bay
Louisiana State Register (Vol. 32, No. 2, p. 343) on February 20, 2006,
Baton Rouge Advocate on 2/20/06
Houma Courier on 2/19/06
Times Picayune on 2/18/06

1.7 Overview of Natural Resource Injuries

Based on information collected during Response and Preassessment activities, the Trustees determined that injuries to salt marsh habitat, including tidally exposed mudflats, and birds occurred as a result of the Incidents. The Trustees and EMPCo used data collected during Response, as well as ground and aerial photography, field survey data, field observations, and published literature to quantify the injury. A similar approach to injury assessment was followed at all three incident sites because the habitats and nature of injuries were similar. Overall, the results of these analyses indicated that approximately 362 acres of marsh habitat and at least 69 birds were adversely affected by the Incidents. A summary of the natural resource injuries are provided below. A more in-depth analysis of the injury assessment conducted for the Incidents is described in Chapter 4 of this document.

Lake Washington Incident
The Trustees determined that the Lake Washington incident affected benthic organisms, salt marsh habitat and birds. The majority of the habitat injured was exposed to oil sheen. The Trustees estimated that 259.2 acres of habitat had been exposed to oil, including 37.3 acres of benthic (mudflat) habitat, and 23 birds were documented as dead or injured during the incident.

Mendicant Island Incident
The Trustees determined that the Mendicant Island incident affected salt marsh habitat and birds. The majority of the habitat injured was lightly oiled and exposed to oil sheen. The Trustees estimated that 98.3 acres of salt marsh habitat were injured and at least 20 birds were documented dead or injured during the incident.

West Champagne Bay Incident
The Trustees determined that the West Champagne Bay incident affected salt marsh habitat and birds. The majority of the habitat injured was oil coated or stained. The Trustees estimated that 4.5 acres of salt marsh habitat were injured and at least 26 birds were documented as dead or injured during the incident.

1.8 Overview of Restoration Planning

Upon completion of emergency response, containment and cleanup activities by EMPCo, the Trustees and EMPCo elected to forego active primary restoration of habitats impacted at the individual spill sites and rely on natural recovery as actions to remove oil from sediments could have exacerbated the injury. In addition, they agreed to quantify and address injury based on the development of reasonable and protective estimates of injury and pursue compensatory restoration for habitat and bird injury. For compensatory restoration, OPA and OSPRA regulations clearly establish trustee responsibility to seek compensation for interim losses (i.e., temporal service losses during the recovery period) pending recovery of the natural resources if technically feasible, cost-effective alternatives exist to compensate for these losses. Since interim losses would continue to accrue during the recovery period and technically feasible, cost-effective alternatives existed to compensate for these losses, the Trustees and EMPCo elected to proceed with identifying potential compensatory restoration alternatives.

The Trustees and EMPCo continued to work cooperatively over several years to identify and evaluate potential restoration alternatives that would provide appropriate compensation for the Incidents. In October 2016, EMPCo and the Trustees agreed to settle the Trustees' NRDA claim for cash, in lieu of EMPCo implementing a restoration project. It was determined that compensatory restoration of 15.5 acres of salt marsh habitat and 8.0 acres of fresh marsh habitat would be required to compensate for interim losses of ecological services resulting from the Incidents. The Trustees developed a cash settlement dollar amount predicated on costs associated with a future Trustee-implemented restoration alternative involving the creation of salt marsh and fresh marsh habitats.

1.9 Preferred Restoration Alternative

The Trustees' preferred restoration alternative is to **create 15.5 acres of salt marsh habitat and 8.0 acres of fresh marsh habitat** in the vicinity of the Incidents (i.e., Region 2)[3] using settlement monies received from EMPCo as part of a negotiated settlement (see Section IV.B.2 of the Settlement Agreement). Identification of a specific preferred restoration alternative to compensate the public for injuries to trust natural resources and interim losses of ecological services resulting from the Incidents will be provided for public review in the DRP.

1.10 Public Participation

The Trustees have compiled this Draft DAPRP in cooperation with EMPCo to: 1) present the injury assessment methods employed to quantify the natural

[3] Regional boundaries and Region 2 are described in Sections 5.0 and 5.1.2, respectively, of the Louisiana Regional Restoration Planning Program Final Programmatic Environmental Impact Statement (NOAA et al., 2007).

resource injuries resulting from the Incidents; 2) identify the preferred restoration alternative; and 3) present the estimated costs of implementing the preferred restoration alternative. Throughout the restoration planning phase of the NRDA process, the Trustees have provided the public with information on the status of injury assessment and restoration planning to facilitate public involvement in the process. This Draft DAPRP summarizes the restoration planning conducted by the Trustees to date, and is being made available to the public for a 30-day comment period beginning on the date of the public notice announcing availability of the Draft DAPRP. Public comment is consistent with all state and federal laws and regulations that apply to the NRDA process, including Section 1006 of OPA, the federal NRDA Regulations at 15 CFR Part 990, Section 2480 of OSPRA, and the state NRDA Regulations at La. Admin. Code 43: Part XXIX, Chapter 1. After the 30-day public comment period, all comments received from the public will be evaluated by the Trustees and summarized in the Final DAPRP. An additional opportunity for public review will be provided in the event that the Trustees decide to make significant changes to the Draft DAPRP based on the initial public comments.

Comments on this Draft DAPRP should be sent to:

Louisiana Oil Spill Coordinators Office,
Department of Public Safety and Corrections
Attn: Charles K. Armbruster
P.O. Box 66614
Baton Rouge, LA 70896
(225) 925-6606
charles.armbruster@la.gov

1.11 Administrative Record

The Administrative Record (AR) contains documents prepared and/or considered by the Trustees during the NRDA process (Appendix B). The information provided in the AR can facilitate public participation during restoration planning and will be available for use in future administrative or judicial review of trustee actions to the extent provided by federal and state law. Additional information and documents, including public comments received on the Draft DAPRP and restoration planning documents, will be included when complete. Arrangements to review the AR or obtain copies of documents in the AR should be made in advance by contacting the Louisiana Oil Spill Coordinator's Office at the address provided in the previous section.

2.0 THE NRDA PROCESS

NRDA is described under Section 1006(c) of the OPA (33 U.S.C. § 2706(c)) and OSPRA (L.R.S. 30:2451 *et seq.*). Both state and federal NRDA regulations provide a step-by-step process for natural resource trustees to determine injuries, assess damages and develop and implement restoration projects that compensate the public for injuries to natural resources and services impacted by an incident. This process includes three phases:

- Preassessment Phase;
- Restoration Planning Phase; and
- Restoration Implementation Phase.

Each of the three phases is described in detail in Chapter 1 of the NOAA OPA guidance document (NOAA, 1996). The following sections provide an overview of the NRDA process and were largely taken from the guidance document. It is important to note that RPs are encouraged to work cooperatively with the trustees in the NRDA process, and trustees have a regulatory requirement to invite such cooperation.

2.1 Preassessment Phase

The purpose of the Preassessment phase is to determine whether trustees have the jurisdiction to pursue restoration under OPA and, if so, whether it is appropriate to proceed with restoration planning. This preliminary phase begins when the trustees are notified of an incident by Response agencies or other persons. Based on early available information, trustees make a preliminary determination whether natural resources and services for which they are trustees under OPA or OSPRA may have been, are likely to be, or are anticipated to be injured. Through coordination with Response agencies, trustees next determine whether Response actions have addressed or will adequately address the injuries resulting from the incident, and if not, whether feasible primary and/or compensatory restoration alternatives exist to address such injuries. If the injuries will not be adequately addressed by Response actions and feasible restoration alternatives exist to address such injuries, trustees may proceed with the NRDA process.

2.2 Restoration Planning Phase

The purpose of the Restoration Planning Phase is to evaluate potential injuries to natural resources and services and use that information to determine the need for and scale of restoration actions. The Restoration Planning Phase provides the link between injury and restoration and has two basic components: injury assessment and restoration selection.

2.2.1 Injury Assessment

The goal of injury assessment under OPA and OSPRA is to determine the nature, degree and extent of injuries, if any, to natural resources and services.

This information is necessary to provide a technical basis for evaluating the need for, type of, and scale of restoration actions. OPA defines injury as an observable or measurable adverse change in or impairment of a trust resource or service. Injury may occur directly or indirectly to a natural resource and/or service (15 CFR. §990.30 and LAC 43:XXIX.109). Injury assessment may be accomplished by using field observations, field studies, lab studies, literature reviews, physical/ecological models, or any combination of these methods.

There are two stages to injury assessment: injury determination and injury quantification. Injury determination begins with the identification and selection of potential injuries to investigate. OPA and OSPRA regulations direct the trustees to consider several factors when making the injury determination, including, but not limited to:

- The natural resources and services of concern;
- The evidence indicating exposure, pathway and injury;
- The mechanism by which injury occurred;
- The type, degree, spatial and temporal extent of injury;
- The adverse change or impairment that constitutes injury;
- Available assessment procedures and their time and cost requirements;
- The potential natural recovery period; and
- The kinds of restoration actions that are feasible.

The trustees consider several factors required by OPA and OSPRA regulations before they select injury assessment procedures, including:

- The range of procedures available under the OPA regulations (15 CFR §990.27(b)) and OSPRA regulations (LAC 43:XXIX.121);
- The time and cost necessary to implement the procedures;
- The potential nature, degree and spatial and temporal extent of the injury;
- The potential restoration actions for the injury; and
- The relevance and adequacy of information generated by the procedures to meet information requirements of restoration planning.

Natural resource trustees quantify injured resources based on the extent, severity, and duration of the injury. These parameters are then translated into restoration needs. Two methods available to quantify interim losses include the Habitat Equivalency Analysis (HEA) and Resource Equivalency Analysis (REA). In cases where the RP is involved in the injury assessment process, the trustees and the RP, where appropriate, may reach agreement on reasonable and protective assumptions that allow assessment of injury with less investment of time and money in assessment studies as referenced in OSPRA (La. Rev. Stat. 30:2480[C][8]).

2.2.2 Restoration Selection

The goal of restoration under OPA and OSPRA is to restore injured natural resources to the condition that existed prior to the incident. OPA and OSPRA regulations require that this goal be achieved by restoring natural resources and compensating for interim losses of those resources and their services.

2.2.2.1 Developing Restoration Alternatives

Once injury assessment is complete or nearly complete, trustees develop a plan for restoring the injured natural resources and services. In the NRDA process, trustees identify a reasonable range of restoration alternatives, evaluate and select the preferred alternative(s) and develop a Draft and Final Restoration Plan. Acceptable restoration actions include any of the actions authorized under OPA (and OSPRA): restoration, rehabilitation, replacement acquisition of the equivalent, or some combination of those actions.

Restoration actions under OPA regulations are either primary or compensatory. Primary restoration is action taken to return injured natural resources and services to baseline conditions. For primary restoration, the regulations require trustees to consider the natural recovery option. Under this alternative, trustees would take no direct action to restore the injured natural resources and rely on natural processes for recovery. This approach relies on the capacity of ecosystems to “self-heal” and the principal advantages are ease of implementation and cost-effectiveness. Compensatory restoration is action taken to compensate for the interim losses of natural resources and services pending recovery. Each restoration alternative will provide for primary and/or compensatory restoration actions that address one or more specific injuries associated with the incident. Primary restoration actions that speed natural resource and service recovery will reduce the requirement for compensatory restoration. Therefore, the type and scale of compensatory restoration will depend on the nature of the primary restoration action, and the level and rate of recovery of the injured natural resources and services.

When identifying compensatory restoration components of the restoration alternatives, trustees must first consider compensatory restoration actions that provide services of the same type as those lost. If compensatory actions of the same type cannot provide a reasonable range of alternatives, trustees then consider other compensatory restoration actions that will provide services comparable to those lost.

2.2.2.2 Selecting a Preferred Restoration Alternative

The OPA regulations (15 CFR §990.54) and OSPRA regulations (LAC 43:XXIX.125) require trustees to identify preferred restoration alternatives based on the following criteria presented in the order given in the regulations:

(1) Cost to carry out the alternative;

(2) Extent to which each alternative is expected to meet the trustees' goals and objectives in returning the injured natural resources and services to baseline and/or compensating for interim losses;
(3) Likelihood of success of each alternative;
(4) Extent to which each alternative will prevent future injury as a result of the Incident and avoid collateral injury as a result of implementing the alternative;
(5) Extent to which each alternative benefits more than one natural resource or service; and
(6) Effect of each alternative on public health and safety (15 CFR 990.54[a]).

If the trustees conclude that two or more alternatives are equally favorable based on the above factors, the trustees must select the most cost-effective alternative.

2.2.2.3 Developing a Restoration Plan

The trustees provide a Draft Damage Assessment and Restoration Plan (DARP) to the public for review and comment. The Draft DARP describes the trustees' Preassessment activities, as well as injury assessment activities and results, evaluates restoration alternatives, and identifies the preferred restoration alternative(s). After reviewing public comments on the Draft DARP, trustees develop a Final DARP. The Final DARP becomes the basis of a claim for damages.

2.3 Restoration Implementation Phase

The Final DARP is presented to the RP(s) to implement or fund the trustees' costs of implementing the Plan, therefore providing the opportunity for settlement of the damage claim without litigation. If the RP(s) chooses to implement the restoration actions detailed in the Final DARP, then the trustees provide project oversight, which is funded by the RP(s).

Should the RP(s) decline to settle the claim, trustees are authorized to bring a civil action for damages in court or to present the claim to the federal Oil Spill Liability Trust Fund (OSLTF) or the state Oil Spill Contingency Fund (OSCF) for such damages.

2.3.1 Restoration Monitoring

Restoration monitoring is necessary to determine whether the restoration actions are providing the natural resources and services required to make the environment and public whole. In order to accomplish this task, trustees identify performance criteria against which project success is judged through the evaluation of project objectives. Performance criteria may include structural, functional, temporal and/or other demonstrable factors. The monitoring component of the Final DARP may address such factors as duration and frequency of monitoring needed to gauge progress and success and level of sampling needed to detect the attainment of objectives and goals or the need for corrective action. Monitoring is usually conducted for a portion of the project's

expected lifespan; a period of time sufficient to give assurance that the project will continue to perform as expected.

2.3.2 Corrective Action

If the monitoring program shows that the restoration actions are not meeting the performance criteria, then the trustees evaluate whether actions should be undertaken to correct the deficiencies.

3.0 AFFECTED ENVIRONMENT

This chapter provides a general description of the affected environment and natural resources that may have been injured as a result of the Incident. The Incidents occurred in Region 2 of Louisiana's RRP Program. Regional boundaries are described in Section 5.0 of the RRP Program Final Programmatic Environmental Impact Statement (FPEIS) (NOAA et al., 2007)[4]. Region 2 encompasses the Breton Sound and Barataria hydrologic basins and the lower Mississippi River basin, delta plain and modern Balize delta (Bird's-Foot Delta). Bordered to the north by the headwaters of Bayou Lafourche and the Mississippi River, Region 2 extends south to the Caminada-Moreau Headland, Plaquemines barrier system, and Bird's-Foot Delta, and from Bayou Lafourche along its western border to the Mississippi River and Mississippi River Gulf Outlet along its eastern border. The following parishes are located either partly or completely within Region 2: Ascension, Assumption, Jefferson, Lafourche, Orleans, Plaquemines, St. Bernard, St. Charles, St. James, and St. John the Baptist (Figure 3.1). Regional boundaries are further described in Section 5.0 of the RRP Program Final Programmatic Environmental Impact Statement (FPEIS) (NOAA et al., 2007).

3.1 Physical Environment

Coastal Louisiana, which includes Region 2, has been formed over the last 7,500 years and is the result of delta formations. The Barataria marshes are remnants of the ancestral Lafourche Delta complex that served as the outlet for the Mississippi River between 700 and 1,500 years ago. The modern deltaic coastal plain is experiencing land loss on the order of 16.57 square miles of marsh each year[5] due to the combined effects of levee construction, subsidence, and associated hydrologic changes (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority, 1998). Region 2 is comprised primarily of alluvial soils and Gulf Coast marsh soils, as described by Johnson and Yodis (1998). The Mississippi River runs through or adjacent to Ascension, St. Bernard, St. James, St. John the Baptist, St. Charles, Jefferson, Orleans, and Plaquemines parishes. Region 2 ground water is primarily contained within the Chicot Equivalent Aquifer System (Stuart et al., 1994). Region 2 encompasses the Breton Sound and Barataria hydrologic basins and the lower Mississippi River basin, delta plain, and modern Balize delta (Bird's-Foot Delta). The surface waters in Region 2 range from fresh to saline.

[4] Federal and Louisiana natural resource trustees developed the statewide RRP Program to assist the natural resource trustees in carrying out their NRDA responsibilities for discharges or substantial threats of discharges of oil. The goals of this statewide Louisiana RRP Program are to: 1) expedite and reduce the cost of the NRDA process; 2) provide for consistency and predictability by describing in detail the NRDA process, thereby increasing understanding of the process by the public and industry; and 3) increase restoration of lost trust resources and services. Attainment of these goals will serve to make the NRDA process as a whole more efficient in Louisiana.

[5] The estimate of 16.57 square miles of land lost per year is based on trend analyses on rate of loss for the period 1985-2010 (Couvillion et al., 2011).

Situated along the northern Gulf of Mexico between 29° and 33° north latitude, Louisiana has a climate and experiences temperature patterns that are strongly influenced by seasonal changes in atmospheric circulation. During the summer months, prevailing southerly and southeasterly winds, associated with the Bermuda High, transport warm, moist air from the Gulf of Mexico across the coast and deep into the continental United States. During the months between September and May, more variable and moderate weather conditions prevail as arctic and polar air masses associated with extratropical cyclones aperiodically inundate the state and produce cooler and drier conditions. In addition to precipitation, these storms can produce significant changes in water level in the coastal bays and marshes over relatively short periods of time. Louisiana is also susceptible to tropical weather systems such as tropical waves, tropical depressions, tropical storms, and hurricanes. These weather systems can produce significant amounts of precipitation over a very short period of time and are often accompanied by strong winds, tornadoes and storm surge along the coastal areas.

3.2 Biological Environment

As Figure 3.1 illustrates, Region 2 habitats are dominated by coastal herbaceous wetlands (i.e., fresh, intermediate, brackish, and salt marsh) and open waters in the seaward areas, while forested wetlands with some agricultural cropland/grassland and upland vegetated habitat occur in the interior portions of the Region. The following habitat types are present in Region 2 (detailed descriptions of each are provided in the Louisiana RRP Program FPEIS [NOAA et al., 2007]):

- Marsh (Salt, Brackish/Intermediate, Flotant, and Fresh);
- Wetland Forest (Evergreen, Deciduous, and Mixed);
- Wetland Scrub/Shrub (Evergreen, Deciduous, and Mixed);
- Agriculture-Cropland-Grassland;
- Wetland Barren;
- Open Water;
- Marine/Estuarine Shore;
- Freshwater Shore;
- Marine/Estuarine and Freshwater Benthic (Soft-Sedimentary);
- Marine/Estuarine Encrusting Community (Natural/Artificial Substrates);
- Living Reefs;
- Marine/Estuarine Submerged Aquatic Vegetation (SAV);
- Mangrove Swamp;
- Batture;
- Upland Forest; and
- Upland Scrub/Shrub (Evergreen, Deciduous, and Mixed).

Common biota associated with these habitat types are summarized in the Louisiana RRP Program Final Regional Restoration Plan Region 2 (NOAA et al., 2007a [Appendix A, *Common Biota and Associated Habitat Types in Region 2*

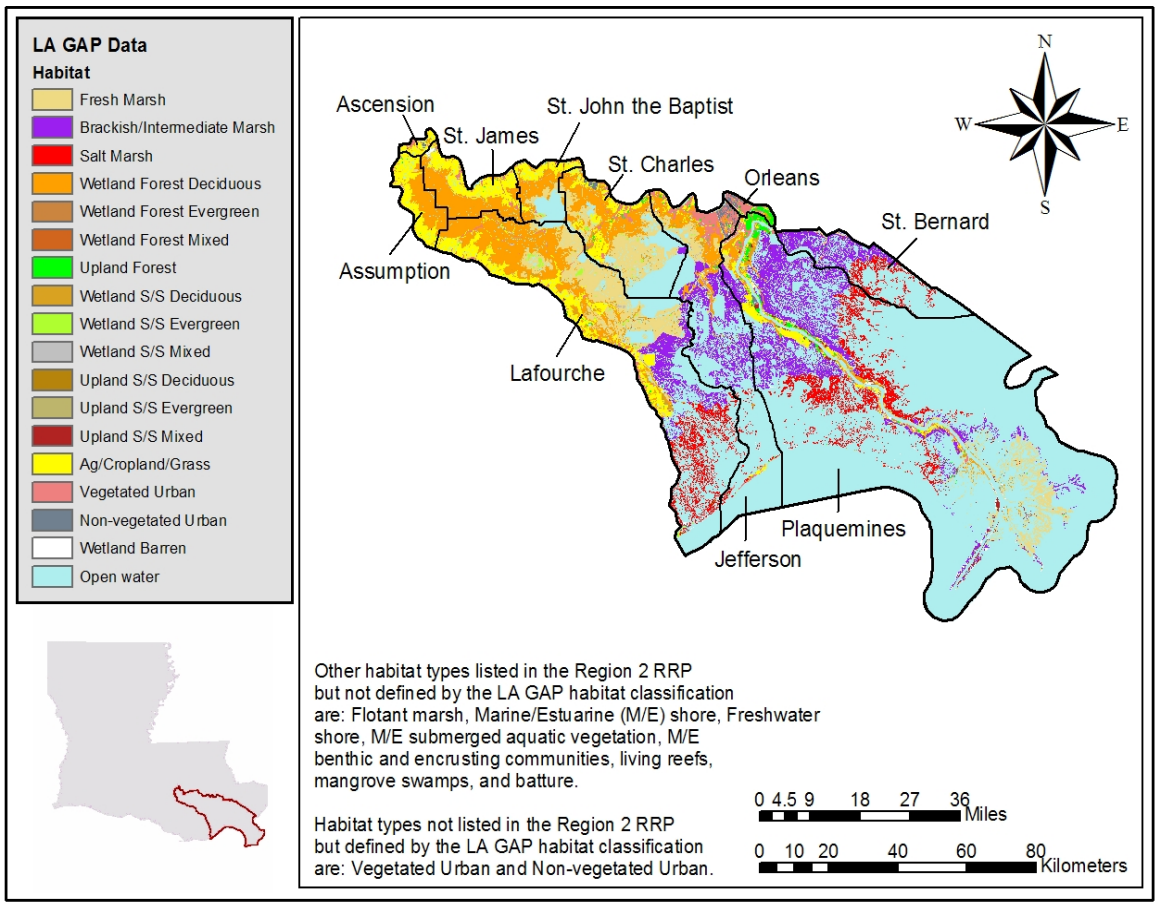


Figure 3.1: Region 2 Boundary, Parishes, and Associated Habitat Types (adapted from Hartley et al., 2000)

(Vegetation, Table A-1; Mammals, Table A-2; Reptiles and Amphibians, Table A-3; Birds, Table A-4 through Table A-9; Fish and Shellfish, Table A-10)]). Detailed descriptions of wildlife species associated with these habitat types are also described in the Louisiana RRP Program FPEIS (NOAA et al., 2007).

The Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority (1998), as part of their Coast 2050 plan, identified 21 wildlife species and species groups that rely on the habitats in Region 2 for all or part of the year. These include wading birds, seabirds and shorebirds, raptors, woodland residents including various birds and mammals, and the American alligator (*Alligator mississippiensis*).

As of May 2016, the published list of threatened and endangered species for the State of Louisiana includes 31 animal and 3 plant species (U.S. Department of the Interior, [USDOI] 2016). The following 11 threatened and endangered animal species are found in Region 2: inflated heelsplitter (*Potamilus inflatus*); red knot (*Calidris canutus rufa*); piping plover (*Charadrius melodus*); green sea turtle (*Chelonia mydas*); hawksbill sea turtle (*Eretmochelys imbricata*); Kemp's

(Atlantic) ridley sea turtle (*Lepidochelys kempii*); leatherback sea turtle (*Dermochelys coriacea*); loggerhead sea turtle (*Caretta caretta*); Gulf sturgeon (*Acipenser oxyrinchus desotoi*); pallid sturgeon (*Scaphirhynchus albus*); and West Indian manatee (*Trichechus manatus*). Critical habitat has been designated for the piping plover and Gulf sturgeon. There are no endangered plants identified in Region 2.

3.3 Socioeconomic Resources

Infrastructure within Region 2 includes 13 highways (that pass through or border the region), 77 miles of primary roads, 322 miles of secondary roads, 2,631 miles of tertiary roads, and approximately 218 miles of railroads (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority, 1998). Major bridges within or adjacent to Region 2 include the Sunshine Bridge, the Hale Hoggs Bridge (at I-310), the Huey P. Long Bridge, and the Crescent City Connection. In addition, smaller crossings over Bayou Lafourche include, but are not limited to, bridges at Rita, Raceland, Thibodaux, Freetown, and Plattenville. There are numerous private helipads in Region 2, and the nearest public heliport is located just north of Region 2 at the Louis Armstrong New Orleans International Airport. In addition, there are numerous sea planes available in the Region to rent from private companies. Commercial and recreational ports located either within or adjacent (when noted) to Region 2 include:

- Port Fourchon;
- New Orleans (adjacent);
- Braithwaite;
- LaPlace (adjacent);
- Grand Isle;
- Metairie (adjacent);
- Empire-Venice port;
- Delacroix port;
- Grand Isle port; and
- Lafitte port.

The Gulf Intracoastal Waterway, a critical shallow-draft transportation link, traverses Region 2. In addition, the Bayou Segnette Waterway, South Pass Channel, U.S. Army Corps of Engineers (USACE) maintained Barataria Bay Waterway, and the waterway from Empire to the Gulf of Mexico traverse Region 2. The Mississippi River main stem levee system comprised of levees, floodwalls, and various control structures, traverses Region 2.

The inland waters, coastal marshes, and offshore waters of Region 2 support commercial fishing and aquaculture industries. There is little forest industry in Region 2. Sugarcane, citrus and commercial fruits and vegetables are important agricultural products. Animal furs and alligator skins are also important commodities in Region 2.

Oil and gas production is important in the region. There are more than 1,500 miles of oil and gas pipelines and more than 15,000 oil and gas wells located within Region 2 (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority, 1998). The Louisiana Offshore Oil Port (LOOP), which provides deepwater tanker offloading and temporary storage of crude oil, has a pipeline that delivers product onshore through Port Fourchon to Clovelly Farms.

Region 2 has both State and National Parks that provide for the recreational use and/or preservation of natural and cultural resources. Bayou Segnette and Grand Isle State Parks are both located in Jefferson Parish. Jean Lafitte National Historic Park and Preserve, operated by the National Park Service, is located in Orleans Parish. In addition, residents of, and visitors to, Region 2 take advantage of the numerous habitat types and wildlife and fisheries resources, which provide opportunities for wildlife viewing, hunting, fishing, boating, swimming, hiking, biking, camping, and picnicking. Tourism in Region 2 is a multibillion dollar industry (Louisiana Department of Culture, Recreation, and Tourism, 2005). Within Region 2, the Louisiana Department of Wildlife and Fisheries (LDWF) manages four Wildlife Management Areas (WMAs) including Salvador/Timken, Wisner, Maurepas, and Pass-a-Loutre. The U.S. Fish and Wildlife Service (USFWS) manages two National Wildlife Refuges (NWRs): Delta and Breton NWRs. Bayou Des Allemands borders Lafourche and St. Charles Parishes and is a state-designated scenic river.

3.4 Potentially Injured Trust Resources and Services

As described in the Louisiana RRP Program FPEIS (NOAA et. al., 2007), the Louisiana RRP Program defines those trust resources and services in Louisiana that are likely to be or are anticipated to be injured (i.e., at-risk) by incidents as "potentially injured trust resources and services." The "potentially injured trust resources and services" in Region 2 are described in Chapter 3 of the Louisiana RRP Program Final Regional Restoration Plan Region 2 (NOAA et al., 2007a) and defined under three broad categories: coastal, inland, and regionwide. The following sections describe the trust resources and services in Region 2 that were most at-risk and potentially injured as a result of the Incidents.

Coastal Herbaceous Wetlands

Herbaceous wetlands are primarily salt, brackish/intermediate, and fresh marshes located in or near the coastal zone and alluvial basin. The marshes of the Mississippi River delta complex and other similar areas in Louisiana support a mix of freshwater, estuarine, and marine species. These wetlands are vital habitat for various fish, resident and migratory birds, and other wildlife. As considered here, this category includes marsh plants and the invertebrates, bacteria, algae, and sediments associated with the vegetation that contribute to all marsh habitat functions.

Beaches/Shorelines/Streambeds
Unvegetated beaches and shorelines in coastal waters include the perimeters of headlands, barrier islands, estuaries and bays, tidal mudflats, and river deltas. This zone begins at the lowest part of the intertidal zone and extends into the supratidal zone. As considered here, this injury category includes the invertebrates that burrow and/or live in this habitat. It encompasses all ecological functions performed by this habitat, including, among others, primary production by benthic diatoms in the intertidal zone and secondary production by grazers, but does not include human recreational services.

Streambeds include all wetlands and water channels, which are defined by Langbein and Iseri (1960) as natural or artificial open conduits either naturally or artificially that periodically or continuously contain moving water, or that form a connecting link between two bodies of standing water. Streambeds containing flowing water include: seasonally flooded, temporarily flooded, intermittently flooded, irregularly exposed, regularly flooded, irregularly flooded, seasonal-tidal, or temporary-tidal water regimes (Cowardin et al., 1979). As considered here, this injury category includes the substrate (soils/sediments and hard surfaces) and closely associated invertebrates, and includes all ecological functions performed by this habitat (Cowardin et al., 1979).

Water Column Organisms
As considered here, this category consists of planktonic (i.e., drifting) (including larval fish) and nektonic (i.e., swimming) organisms in marine and estuarine waters, and the ecological services these organisms provide to other trust resources. It also includes large mobile crustaceans, such as crabs and shrimp, and demersal fishes which live on or near the seafloor.

Birds
Common resident and migratory birds that are found in coastal and inland areas of Region 2, and tables describing habitat use by season, are listed in Appendix A, Common Biota and Associated Habitat Types in Region 2, Tables A-4 through A-9. This category can also include the ecological services these organisms provide to other trust resources.

Wildlife
Common mammals, reptiles, and amphibians from all habitats in Region 2 are listed in Appendix A, Common Biota and Associated Habitat Types in Region 2, Table A-2, Common Mammals in Region 2 and their Associated Habitats, and Table A-3, Common Reptiles and Amphibians in Region 2 and their Associated Habitats, and are included in this category. This injury category can also include the ecological services these organisms provide to other trust resources.

Recreational Resource Services
Human recreational services are provided by habitats and/or areas throughout Region 2. Indirect activities (e.g., hiking, biking, picnicking, or jogging) and direct

activities (e.g., bird and wildlife viewing, hunting, fishing, boating, or swimming) all take place in Region 2 and therefore are included in this category. This category does not, however, include the resources themselves that are involved in the activity.

4.0 INJURY ASSESSMENT

4.1 Summary of Preassessment Activities and Findings for the Incidents

The Trustees initiated Preassessment activities for each incident shortly after notifications. The Trustees focused on collecting ephemeral data that would address three criteria defined by the OPA (15 CFR §990.42) and OSPRA (LAC 43:XXIX.101 *et seq.*): 1) injuries have resulted or probably will result from the Incident; 2) Response actions have not adequately addressed or are not expected to address the injuries resulting from the Incident; and 3) feasible primary and/or compensatory restoration actions exist to address the potential injuries. The following summary describes the Preassessment activities and findings conducted for the Incidents.

4.1.1 Lake Washington Incident

Preassessment activities were conducted for the Lake Washington discharge during and after the Response phase to determine whether injury occurred to natural resources and services. The Trustees initially considered potential injuries to the following six resource categories: (1) marsh vegetation; (2) benthic organisms in tidally exposed mudflats; (3) water column; (4) birds; (5) other wildlife; and (6) recreational use. Two of the six potential injury categories, marsh vegetation and birds, were considered further by the Trustees during the Preassessment phase because marshes and birds were documented as oiled in the vicinity of the incident. Although benthic organisms in tidally-exposed mudflats, water column organisms, other wildlife species, and recreational use had the potential to be injured from the discharge, it was the opinion of the Trustees that documented marsh habitat and bird injuries would represent the overall injury to natural resources and services from the Lake Washington incident.

The Trustees first used information collected during Response-oriented helicopter surveys of the oiled area to target subsequent on-water assessment and avian protection activities and to assign oiling categories to discrete sections of shoreline in the affected area. The area exposed by discharged oil from the incident was divided into eight zones to facilitate Response and Preassessment activities. The northern side of Zone 1 (Figure 4.1), which is approximately 3 to 3.5 miles south-southwest of the discharge location, received the majority of the discharged oil and was the most heavily impacted area. Protective hard boom was strategically deployed during the incident to facilitate spill containment and recovery operations. Strong winds from the northeast (10 – 20 mph) and low tides played a significant role in determining the extent and severity of oiled habitat. Field notes and photos collected by the Trustees documented the severity and extent of habitat oiling from the incident and the ambient environmental conditions at the time of the field surveys. During March 7-8, 2003, the Trustees and EMPCo participated in two Shoreline Cleanup Assessment Teams (SCAT) that conducted extensive on-water surveys of potentially oiled habitat. SCAT teams calibrated the initial oiling maps for the

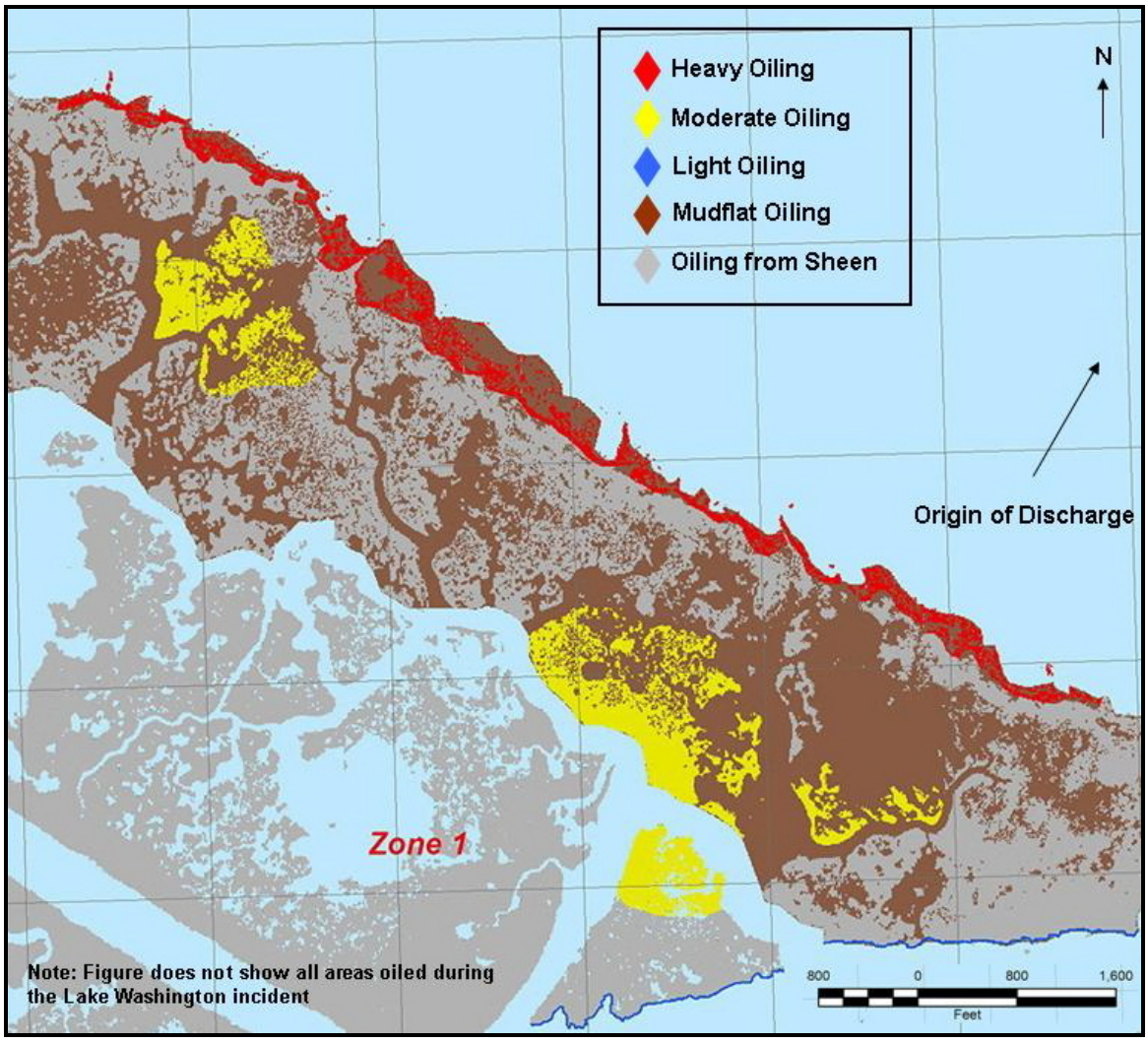


Figure 4.1. Oiling map of the Lake Washington incident that shows all heavy and moderate marsh oiling. Surrounding areas with lightly oiled habitat and additional habitats affected by sheen are not shown.

incident, located areas of recoverable oil, and assisted other field staff who were searching for oiled birds and other wildlife. Concurrent with and extending beyond SCAT operations, trained wildlife professionals representing both the Trustees and EMPCo implemented searches over approximately two weeks from boats and helicopters to document as well as capture/rehabilitate (if possible) oiled birds and wildlife. Although the Trustees and EMPCo did document and collect 25 bird carcasses following the discharge, the Trustees did not observe or receive reports of oiled wildlife (other than birds) or fish kills that may have been related to the incident.

The Trustees and EMPCo agreed to use field notes and photos collected during field surveys to assess potential injury to natural resources and services. Documentation of oiled habitat and birds was used from both the Response

phase and follow-up habitat surveys (August 4, 2003) that occurred in the Preassessment phase. On August 5, 2004, the Trustees and EMPCo agreed that the oiling map depicted in Figure 4.1 documented observations during the Response and Preassessment phases. Surrounding areas with lightly oiled vegetation and additional habitats affected by oil sheen are not shown in Figure 4.1 but are reflected in the Trustees' injury calculation of injuries to natural resources and services from the incident. The Trustees and EMPCo agreed that 23 lesser scaup (*Aythia affinis)* were oiled and died from this incident. The Lake Washington area is typically visited by hunters and fisherman at various times of the year; however, the inclement weather during the incident limited recreational use of the area.

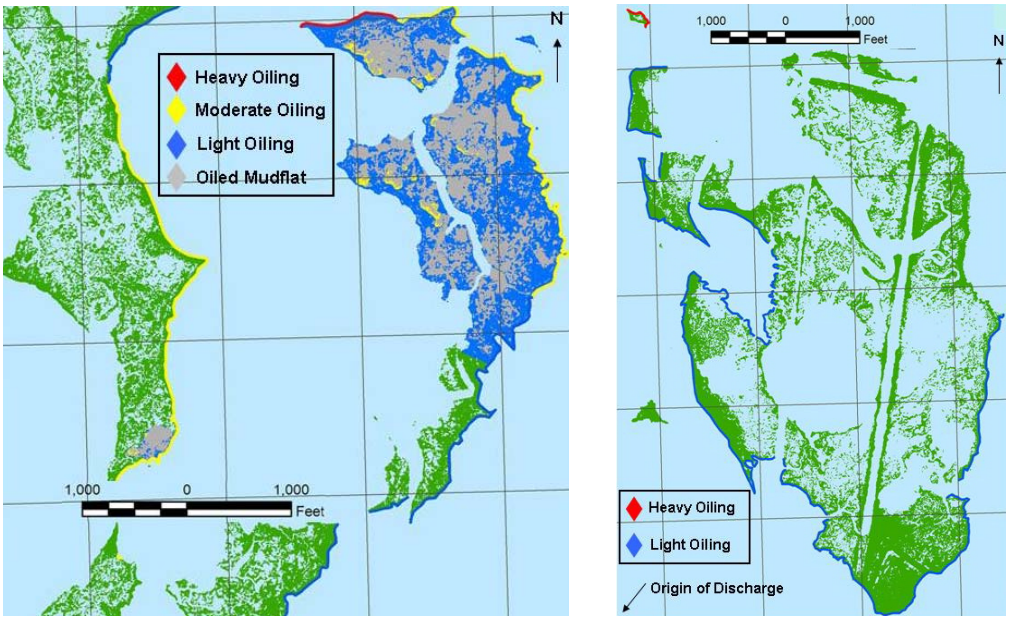
4.1.2 Mendicant Island Incident

Preassessment activities were conducted for the Mendicant Island discharge during and after the Response phase to determine whether injury occurred to natural resources and services. The Trustees initially considered potential injuries to the following resource categories: (1) marsh vegetation; (2) water column; (3) birds; (4) other wildlife; and (5) recreational use. Two of the five potential injury categories, marsh vegetation and birds, were considered further by the Trustees during the Preassessment phase because marsh vegetation and birds were documented as oiled in the vicinity of the incident. Although water column, other wildlife, and recreational use had the potential to be injured from the discharge, it was the opinion of the Trustees that protective assumptions for marsh vegetation and bird injury would represent the overall injury from the Mendicant Island incident.

Strong, but variable, winds during and after the incident played a significant role in determining the extent and severity of oiled habitat. Both Raccoon Island (Figure 4.2 Map [A]) and Mendicant Island (Figure 4.2 Map [B]) were affected. Daily helicopter overflights assisted responders in locating large pockets of recoverable oil within the affected area, creating preliminary oiling maps, directing Response activities, and conducting limited, low-altitude bird searches. Bird hazing cannons were deployed within oil impacted areas on Raccoon Island to deter birds from accessing oiled areas. Further, protective hard boom was deployed around Queen Bess island during the incident in response to sheen being observed approximately 300 feet from Queen Bess Island (east of Mendicant Island), which has a large and historically significant bird nesting colony.

During field surveys, the Trustees and EMPCo collected detailed field notes and photos in oiled areas to document the severity and extent of oiling and ambient environmental conditions. The Trustees and EMPCo used aerial photography of oiled areas to target on-water assessment activities. On-the-ground SCAT surveys on December 7, 2003 further refined oiling habitat maps (Figure 4.2 [A and B]). Additionally, this information greatly assisted the Trustees' and EMPCo's ability to direct active clean-up operations along the eastern and western areas of

Raccoon Island. On February 22, 2006, the Trustees and EMPCo agreed that maps depicted in Figure 4.2 accurately reflected oiling observations documented during the Response and Preassessment phases. Surrounding areas affected by oil sheen are not shown in Figure 4.2 but are reflected in the Trustees' calculation of injuries to natural resources and services from the incident. At least 20 birds were observed oiled by observers from the air or ground during the Mendicant Island incident. The Mendicant Island area is typically visited by hunters and fisherman at various times of the year; however, the inclement weather during the incident limited recreational use of the area.



[A] **[B]**

Figure 4.2 Oiling map of Raccoon Island [A] and Mendicant Island [B] for the Mendicant Island incident. Surrounding areas with lightly oiled habitat and additional habitats affected by sheen are not shown.

The Trustees and EMPCo agreed to collect additional information on habitat oiling and ambient environmental conditions at fixed monitoring stations during the Preassessment phase. Fixed monitoring stations were established on February 26, 2004 to facilitate data collection and to assess potential injury to marsh vegetation. The monitoring stations were placed within the marsh exposed to four oiling categories (heavy, moderate, light and sheen) and in reference areas to track habitat recovery. On July 13, 2004 the Trustees and EMPCo followed the same procedure as on the first monitoring effort. Oil persisted at several monitoring stations in the Raccoon Island area approximately seven months after the incident.

4.1.3 West Champagne Bay Incident

Preassessment activities were conducted for the West Champagne Bay discharge during and after the Response phase to determine whether injury occurred to natural resources and services. The Trustees initially considered potential injuries to the following categories: (1) marsh vegetation, (2) benthic organisms in tidally exposed mudflats, (3) water column, (4) birds, (5) other wildlife, and (6) recreational use. Although benthic organisms in tidally exposed mudflats, water column organisms, other wildlife, and recreational use had the potential to be injured from the discharge, it was the opinion of the Trustees that protective assumptions for marsh and bird injury would represent the overall injury from the West Champagne Bay incident.

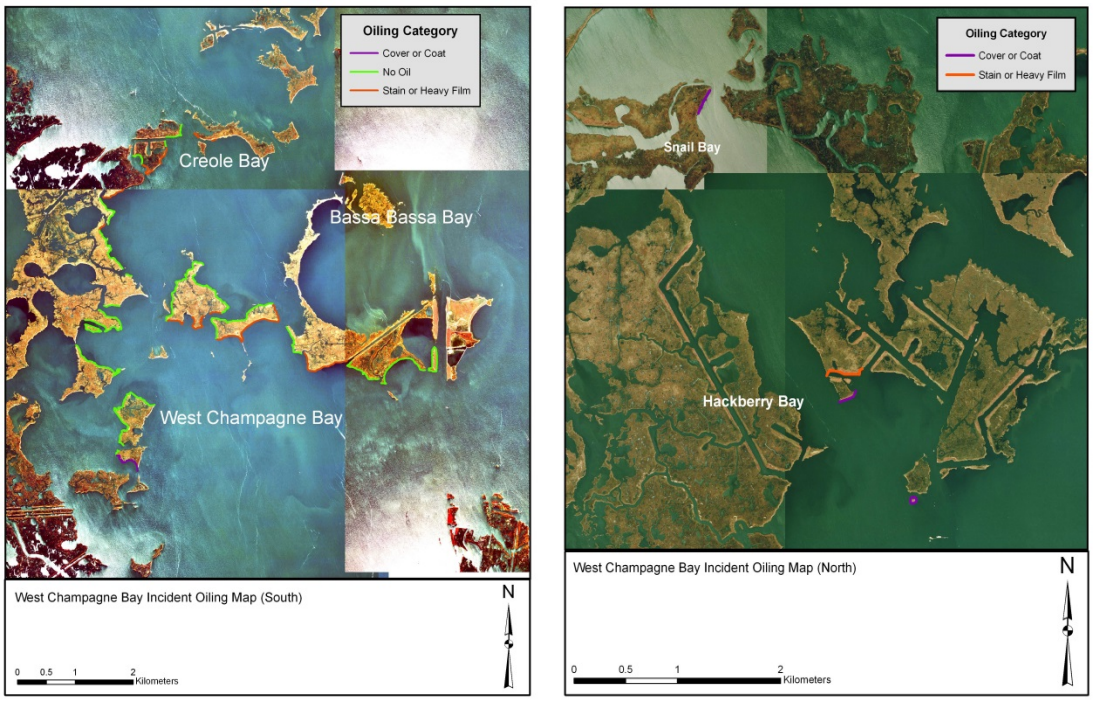
The Trustees and EMPCo recognized early similarities between the West Champagne Bay and the Mendicant Island incidents and the opportunity for an expedited NRDA approach. Protective hard boom was strategically deployed during the incident to facilitate spill containment and recovery operations. The Trustees participated in helicopter over flights and boat surveys during April 27-28, 2005 to integrate data collection during the Response and Preassessment phases. During field surveys, the Trustees and EMPCo collected field notes and photos in oiled areas to document the severity and extent of oiling and ambient environmental conditions. On February 22, 2006, the Trustees and EMPCo agreed that maps depicted in Figure 4.3 reflected oiling observations documented during the Response and Preassessment phases. Surrounding areas affected by oil sheen are not shown in Figure 4.3 but are reflected in the Trustees' calculation of injuries to natural resources and services from the incident.

Based on the information collected during the Response and Preassessment activities for the three incidents, as summarized above, the Trustees determined that injuries to marsh habitat (including tidally exposed mudflats for the Lake Washington incident) and birds had occurred as a result of the Incidents. Since feasible compensatory restoration alternatives were available to address the injuries to natural resources and services, the Trustees proceeded with restoration planning under OPA and OSPRA and opened an AR to facilitate public involvement in the Restoration Planning process.

4.2 Injury Assessment Approach

As discussed in Section 2.2.1 of this document, the goal of injury assessment under OPA and OSPRA is to determine the nature, degree and extent of injuries, if any, to natural resources and services at the spill site in order to provide a technical basis for evaluating and scaling restoration actions. After identifying the injured resources for the Incidents, the Trustees developed appropriate injury assessment procedures primarily based on: 1) information gathered during the Response and Preassessment phases of the Incidents; 2) relevant peer-reviewed literature; and 3) best professional judgment of local experts and Trustees familiar with the effects of crude oil in similar environments. The

Trustees and EMPCo agreed to employ simple, cost-effective procedures for collecting data and assessing injuries to natural resources and the ecological services related to those resources through the development of reasonable and protective assumptions that allow assessment of injury with less investment of time and money in assessment studies, as allowed for in OSPRA (La. Rev. Stat. 30:2480[C][8]).



[A] **[B]**

Figure 4.3 Oiling maps of West Champagne Bay South [A] and West Champagne Bay North [B] for the West Champagne Bay incident. Surrounding areas with habitats lightly oiled or sheened are not shown.

4.3 Injury Assessment Methods and Quantification

Injury assessment studies were conducted by the Trustees, EMPCo, and consultants with damage assessment experience for the Incidents. Descriptions of injuries are organized into the following injured resource categories: 1) marsh habitat 2) mudflat habitat (Lake Washington), and 3) birds. Although water column organisms, benthic organisms in tidally-exposed mudflats, recreational use, and other wildlife species had the potential to be injured during the Incidents, injury to these resources was not observed during comprehensive field surveys following the Incidents. Therefore it was the opinion of the Trustees that reasonable and protective assumptions for marsh and birds would represent the overall injury to natural resources and services resulting from the Incidents.

For habitat injury, the Trustees used a Habitat Equivalency Analysis (HEA) (NOAA, 2006) based approach to quantify interim service losses (i.e., service

losses incurred from the time of injury until recovery to baseline) of habitats impacted by the Incidents. Interim service losses were quantified in terms of lost service acre years, where a service acre year is the flow of services of one acre of habitat over the course of one year. The input parameters required to calculate the debit-side of the HEA (i.e., habitat injury) are: 1) total acres of injured habitat; 2) initial level of service losses; and 3) recovery curve of service flows over time. For the bird injury, the Trustees used a trophic transfer-based approach to quantify injury in terms of equivalent production at the same trophic level as the habitat restoration (French McKay and Rowe, 2003). The primary inputs used are: 1) total lost biomass (or weight of organic material); 2) trophic biomass transfer efficiencies; and 3) marsh plant production for the target habitat restoration. Using the injury parameters described in the following sections and applying a discount rate of 3% per year (NOAA, 1999), the Trustees and EMPCo quantified natural resource injuries for the Incidents.

The following sections describe the methods and results of the Trustees' injury assessments for the Incidents. Section 4.3.4 provides a summary of the total habitat and bird resource injury expressed in discounted service acre years (DSAYs) resulting from the Incidents.

4.3.1 Lake Washington Incident

4.3.1.1 Marsh and Mudflat Habitats

The Trustees and EMPCo determined that approximately 259.2 acres of marsh and mudflat habitats were injured by the incident. The total injured area was divided into four oiling categories for marsh habitat and one oiling category for mudflat habitat which reflect varying degrees of oiling and expected recovery (Figure 4.1 above):

1) Marsh area heavily oiled by the discharge (3.0 acres);
2) Marsh area moderately oiled by the discharge (6.4 acres);
3) Marsh area lightly oiled by the discharge (0.3 acres);
4) Marsh area exposed to sheen by the discharge (212.2 acres);
5) Tidally-exposed mudflat area oiled by the discharge (37.3 acres)

In developing estimates for initial service losses within marsh habitats, the Trustees and EMPCo used available data from Response and Preassessment activities to determine the level of initial service losses of habitats affected by the discharge. It was assumed that prior to the incident marsh and mudflat habitats in the vicinity of the discharge were healthy and providing 100% ecological service flows. In addition, the Trustees and EMPCo assumed that the estimated initial service loss and recovery time in each oiled area would be related to the observed and agreed upon level of oiling. Table 4.1 shows the acreage, initial service loss, and recovery time for each oiling category.

Table 4.1. Acreage and Initial Service Losses at Lake Washington

Oiling Category	Acres Injured	Initial Service Loss	Recovery Time (months)
Heavily Oiled Marsh	3.0	100%	42
Moderately Oiled Marsh	6.4	70%	24
Lightly Oiled Marsh	0.3	40%	12
Marsh Exposed to Sheen	212.2	10%	12
Oiled Mudflat	37.3	40%	2
TOTAL	259.2		

For oiled mudflat habitat, the Trustees and EMPCo agreed that ecological resources and services associated with one acre of marsh would be equivalent to five acres of mudflat, thus a 1:5 habitat equivalency ratio was used to characterize the mudflat habitat injury in terms of marsh habitat. This ratio is similar to habitat equivalency conversions between marsh and bay bottom habitats used by the Trustees in a previous pollution case in Texas (NOAA, 2000b) and oil spill case in Louisiana (LOSCO et al., 2005).

4.3.1.2 Birds

The Trustees and EMPCo determined that 23 lesser scaup were oiled and died as a result of the Lake Washington incident. To account for other oiled birds that may not have been documented, the Trustees and EMPCo agreed that the number of dead birds should be multiplied by a site-specific constant to generate an estimate of total avian mortality. The "multiplier" used in this incident was 5.13, and was developed in consultation with the U.S. Fish and Wildlife Service. The Trustees and EMPCo agreed that this was a reasonable and protective assumption to account for factors such as birds sinking after being oiled, incomplete and imperfect search effort by field staff, and scavenging by predators. When the value of the multiplier was applied to the total number of observed oiled birds (23), a total of 118 lesser scaup was determined to have been injured from oil discharged during the Lake Washington incident. After multiplying the average weight of lesser scaup (0.83 kg, as noted in The *Birds of North America* (American Ornithologist Union and the Academy of Natural Sciences of Philadelphia, 1998) by the total avian mortality (118), total lost biomass for the incident was determined to be 97.9 kg.

4.3.2 Mendicant Island Incident

4.3.2.1 Marsh Habitat

The Trustees and EMPCo worked cooperatively to assess injuries to habitat and determined that 98.3 acres of marsh habitat were injured by the incident. The total injured area was divided into four oiling categories to reflect varying degrees of oiling and expected recovery (Figure 4.2 above):

1) Area heavily oiled by the discharge (0.5 acres);
2) Area moderately oiled by the discharge (4.8 acres);
3) Area lightly oiled by the discharge (53.0 acres);
4) Area exposed to sheen due the discharge (40.0 acres);

In developing estimates for initial service losses within marsh habitats, the Trustees and EMPCo used available data from Response and Preassessment activities to determine the level of initial service losses of habitats affected by the discharge. It was assumed that prior to the incident marsh and mudflat habitats in the vicinity of the discharge were healthy and providing 100% ecological service flows. In addition, the Trustees and EMPCo assumed that the estimated initial service loss and recovery time in each oiled area would be related to the observed and agreed upon level of oiling. Table 4.2 shows the acreage, initial service loss, and recovery time for each oiling category.

Table 4.2 Acreage and Initial Service Loss at Mendicant Island

Oiling Category	Acres Injured	Initial Service Loss	Recovery Time (months)
Heavily Oiled Marsh	0.5	100%	42
Moderately Oiled Marsh	4.8	70%	24
Lightly Oiled Marsh	53.0	40%	12
Marsh Exposed to Sheen	40.0	10%	12
TOTAL	98.3		

4.3.2.2 Birds

The Trustees and EMPCo determined that 20 birds were oiled and died as a result of the Mendicant Island incident. To account for other oiled birds that may not have been documented, the Trustees and EMPCo agreed that the number of dead birds should be multiplied by a site-specific constant to generate an estimate of total avian mortality. The "multiplier" used in this incident was 10, which the Trustees believed was a reasonable and protective assumption to account for factors such as birds sinking after being oiled, incomplete and limited search effort by field staff, and scavenging by predators. When the value of the multiplier (10) was multiplied by the number of observed oiled birds (20), a total of 200 birds were determined to have been injured from oil discharged during the incident. The Trustees and EMPCo agreed to use the king rail (*Rallus elegans*) as a surrogate species to represent the variety of birds observed oiled during the incident. The king rail is the largest rail species and the Trustees believed using a large bird for the purposes of injury quantification was reasonable and protective since many of the other observed oiled birds in the area were smaller dunlins (*Calidris alpina*). After multiplying the average weight of King Rails (0.36 kg, as noted in *Birds of North America* (1998) by the total avian mortality (200), total lost biomass for the incident was determined to be 72.0 kg.

4.3.3 West Champagne Bay Incident

4.3.3.1 Marsh Habitat

The Trustees and EMPCo worked cooperatively to assess injuries to habitat and determined that 4.5 acres of marsh habitat were injured by the incident. The total injured area was divided into two oiling categories to reflect varying degrees of oiling and expected recovery (Figure 4.3 above):

1) Area moderately oiled (cover or coat) by the discharge (1.8 acres);
2) Area lightly oiled (stain or heavy film) by the discharge (2.7 acres).

In developing estimates for initial service losses within marsh habitats, the Trustees and EMPCo used available data to determine the level of initial service losses of habitats resulting from the incident. It was assumed that prior to the incident marsh and mudflat habitats in the vicinity of the discharge were healthy and providing 100% ecological service flows. In addition, the Trustees and EMPCo assumed that the estimated initial service loss and recovery time in each oiled area would be related to the observed and agreed upon level of oiling. Table 4.3 shows the acreage, initial service loss, and recovery time for each oiling category.

Table 4.3 Acreage and Initial Service Loss at West Champagne Bay

Oiling Category	Acres Injured	Initial Service Loss	Recovery Time (months)
Moderately Oiled Marsh (Coat or Cover)	1.8	70%	24
Moderate/Lightly Oiled Marsh (Stain or Heavy Film)	2.7	40%	12
TOTAL	4.5		

4.3.3.2 Birds

The Trustees and EMPCo determined that 26 birds were oiled and died as a result of the West Champagne Bay incident. To account for other oiled birds that may not have been documented, the Trustees and EMPCo agreed that the number of dead birds should be multiplied by a site-specific constant to generate an estimate of total avian mortality. The “multiplier” used in this incident was 10, which the Trustees believed was a reasonable and protective assumption to account for factors such as birds sinking after being oiled, incomplete and limited search effort by field staff, and scavenging by predators. When the value of the multiplier (10) was multiplied by the number of observed oiled birds (26), a total of 260 birds were determined to have been injured from oil discharged during the incident.

Similar to the approach described for the Mendicant Island incident, the Trustees and EMPCo agreed to use the king rail as a surrogate species to represent the variety of birds documented as oiled during the incident. After multiplying the average weight of king rails (0.36 kg, as noted in The *Birds of North America* (American Ornithologist Union and the Academy of Natural Sciences of Philadelphia, 1998)) by the total avian mortality (260), total lost biomass for the incident was determined to be 93.6 kg.

4.3.4 Summary of Injury Quantification

The outputs of the debit-side of the HEA and trophic transfer analysis are provided in Table 4.4 for each incident. Lost ecological services are expressed in DSAYs by injury category. For marsh habitat, DSAYs represent ecological services related to saltmarsh. For the bird injury, DSAYs are presented in freshmarsh equivalents for the Lake Washington incident and saltmarsh equivalents for the Mendicant Island and West Champagne Bay incidents. These distinctions are related to the anticipated compensatory restoration actions to be undertaken for the injured resource (see Section 4.4 on scaling approach).

Table 4.4 Summary of Marsh and Avian Injury for the Incidents

Incident	Injury Category	Amount Injured	DSAYs
Lake Washington			
	Marsh Habitat	259.2 acres	9.1
	Birds	118 lesser scaup[1]	46.0[3]
Mendicant Island			
	Marsh Habitat	98.3 acres	11.6
	Birds	200 king rail[1]	11.4[2]
West Champagne Bay			
	Marsh Habitat	4.5 acres	1.2
	Birds	260 king rail[1]	14.2[2]

[1] The number of birds injured was estimated using a site-specific multiplier.
[2] DSAYs presented in saltmarsh equivalents.
[3] DSAYs presented in freshmarsh equivalents.

The total combined injury resulting from the Incidents is as follows and accounts for reductions in the entire flow of marsh habitat services and birds:

46.0 DSAYs (freshmarsh equivalents)
47.5 DSAYs (saltmarsh equivalents).

4.4 Scaling Approach

The HEA method (NOAA, 2006) was used to determine the amount of restoration needed to compensate for ecological service losses resulting from the Incidents. HEA scales the restoration project so that services provided through restoration are equated with the interim service losses resulting from an incident. To scale restoration benefits, HEA uses several project-specific factors including elapsed time from the onset of injury through restoration implementation, relative productivity of restored habitats (i.e., the proportional equivalence of ecological services provided by the compensatory restoration project relative to the baseline productivity of the injured habitat), time required for restored habitats to reach full function and project lifespan.

For service losses related to the lesser scaup injury, it was determined that the equivalent of 46.0 DSAYs of freshmarsh injury occurred as a result of the Lake Washington incident (Section 4.3.4). For the purposes of the credit-side of the HEA, the Trustees developed input parameters based on a crevasse-splay-type restoration project that would create freshmarsh in the delta along the Mississippi River modern Balize delta (Bird's-Foot Delta). Project lifespan was estimated at 30 years with services reaching full function at 15 years and then decreasing over the subsequent 15 years. Project benefits may very well have a longer duration but to be more protective, the Trustees used 30 years. Applying a discount rate of 3.0% per year (NOAA, 1999) and assuming project implementation in 2020, it was determined that **8.0 acres** of freshmarsh habitat creation would compensate for the injuries to lesser scaup. Table 4.5 presents the HEA assumptions, injury debits, and DSAYs of credit generated by the project.

Table 4.5: HEA Assumptions and DSAYs for Crevasse-Splay

HEA Assumptions			
Compensatory Restoration:			
Is compensatory restoration required?			Yes
Year compensatory project is completed			2020
Years to full maturity following restoration activities			15.00
Year compensatory project reaches maturity			2035
Functional form of maturity function			Bell-shaped
Relative productivity of restored to natural habitat			100.00%
Initial percent service level of compensatory restoration site			0.00%
Percent recovery of injured habitat			100.00%
Time horizon for service production of restored habitat (years)			30.00
Year restored habitat stops producing services			2050
Real discount rate per year			3.00%
	DSAYs		
Injury Debit ---------->	**46.0**		
Restoration Credit:		DSAYs/Ac	Acres
Freshmarsh----->	**46.0**	**5.79**	**8.0**

For service losses related to the king rail and saltmarsh habitat injury, it was determined that the equivalent of 47.5 DSAYs of saltmarsh habitat injury occurred as a result of the Mendicant Island and West Champagne Bay incidents (Section 4.3.4). For the purposes of the credit-side of the HEA, the Trustees developed input parameters based on a hydraulic dredge and fill type marsh creation project that would create saltmarsh habitat in the same hydrologic basin as the injury. Project lifespan was estimated at 15 years with services reaching full function at 5 years and then extending through year 15. The project benefits may very well have a longer duration but to be more protective, the Trustees used 15 years. Applying a discount rate of 3.0% per year (NOAA, 1999) and assuming project implementation in 2020, it was determined that **15.5 acres** of saltmarsh habitat creation would compensate for the injuries. Table 4.6 presents the HEA assumptions, injury debits, and DSAYs of credit generated by the project.

Table 4.6: HEA Assumptions and DSAYs for Marsh Creation

HEA Assumptions			
Compensatory Restoration:			
Is compensatory restoration required?			Yes
Year compensatory project is completed			2020
Years to full maturity following restoration activities			5.00
Year compensatory project reaches maturity			2025
Functional form of maturity function			Segmented-Linear
Relative productivity of restored to natural habitat			50.00%
Initial percent service level of compensatory restoration site			0.00%
Percent recovery of injured habitat			100.00%
Time horizon for service production of restored habitat (years)			15.00
Year restored habitat stops producing services			2035
Real discount rate per year			3.00%
	DSAYs		
Injury Debit ---------->	**47.5**		
Restoration Credit:		DSAYs/Ac	Acres
Saltmarsh----->	**47.5**	**3.07**	**15.5**

5.0 RESTORATION SELECTION

5.1 Restoration Approach

A major goal of OPA and OSPRA is to make the environment and public whole for injury to or loss of natural resources and services as a result of a discharge or substantial threat of a discharge of oil. The OPA and OSPRA regulations require that this goal be achieved by restoring injured natural resources to baseline conditions (i.e., primary restoration) and compensating for interim losses of ecological services that ensue during the period of recovery (i.e., compensatory restoration). For primary restoration, the Trustees and EMPCo considered both the natural recovery option and active primary restoration at the spill site. Upon completion of emergency response, containment and cleanup activities by EMPCo, the Trustees and EMPCo elected to forego active primary restoration and rely on natural recovery of the injured resources and services because actions to remove oil from sediments could have exacerbated the injury. For compensatory restoration, the OPA and OSPRA regulations clearly establish trustee responsibility to seek compensation for interim losses pending recovery of the natural resources if technically feasible, cost-effective alternatives exist to compensate for these losses. Since interim losses will accrue during the period of recovery and technically feasible, cost-effective alternatives exist to compensate for these losses, the Trustees and EMPCo elected to proceed with identifying a preferred compensatory restoration alternative.

In October 2016, the Trustees and EMPCo agreed to settle the NRDA damage claim for cash, in lieu of EMPCo implementing compensatory restoration. The cash settlement dollar amount developed by the Trustees and presented in Section 5.3 of this Draft DAPRP is predicated on two Trustee-implemented compensatory restoration projects, and includes future project implementation costs. The following sections summarize the process the Trustees followed to select a preferred restoration alternative and estimate costs for implementing a freshmarsh and saltmarsh creation project in the future.

5.2 Preferred Restoration Alternative

Restoration types were selected by the Trustees to streamline the process of evaluating and selecting a preferred restoration alternative. The selection of appropriate restoration types was accomplished by first identifying restoration types that had a strong nexus to the injured trust resources and services (Appendix C). As described in Section 4.2.4.1.5, *Restoration Type Selection Criteria*, of the Louisiana RRP Program FPEIS (NOAA et al., 2007), trustees use restoration type selection criteria to assist in determining which of the various restoration types with a strong nexus to the injured trust resources and services is most appropriate to restore injured trust resources and services. Although several restoration types were appropriate, the Trustees selected Creation/ Enhancement of Coastal Herbaceous Wetlands (C/E CHW) as the preferred restoration type for the following reasons. First, under the RRP Program C/E CHW is an appropriate restoration type for compensating for interim losses of

ecological services resulting from the Incidents. Second, C/E CHW is a proven, cost-effective, and successful restoration approach for increasing the types of natural resources and habitat that were injured as a result of the Incidents. And third, the Trustees had developed a method for estimating costs of creating freshmarsh habitat via a crevasse-splay project and saltmarsh habitat via a hydraulic dredge and fill project in Region 2 and therefore could develop a cash settlement dollar amount to present to EMPCo. Therefore, the Trustees' preferred restoration alternative is to create **8.0 acres** of fresh coastal herbaceous wetland habitat and **15.5 acres** of saline coastal herbaceous wetland habitat in Region 2. Two specific projects will be identified in the future by the Trustees and presented in a Draft Restoration Plan (DRP) that will be released for public review.

5.3 Estimation of Future Restoration Costs

This section identifies the estimated future costs of implementing the preferred restoration alternative described above. In estimating the costs of implementing generic coastal marsh creation projects, the Trustees have included all costs necessary to complete the restoration action in a manner appropriate to ensure long term viability or success. Costs associated with the Trustees implementing the preferred restoration alternative are the responsibility of EMPCo. All costs are included in the cash settlement dollar amount of **$2,014,500**. These implementation costs are in addition to past assessment costs incurred by the Trustees during Preassessment, Injury Assessment, and Restoration Planning, and include future costs related to: project planning (e.g., site selection, feasibility analyses, engineering and design, permitting, and conservation easements, if needed), project implementation (e.g., hydraulic dredging, cutter-head dredging, containment, vegetative plantings), monitoring, operations and maintenance, Trustee administrative and oversight costs, corrective actions, and contingencies.

<u>Generic Crevasse-Splay Project</u>

Table 5.1 presents a schedule of the Trustees' estimated costs for implementation of the project, including cost items (work) and estimated dollar amounts for planning, construction, monitoring, Trustee administrative and oversight, and contingencies.

Table 5.1: Estimated Costs of Crevasse-Splay Project

Cost Items	CHW (Freshmarsh)
	8.0 Acres
Planning	$54,500
Construction	$171,500
Monitoring	$34,500
Trustee Administrative and Oversight	$68,500
Contingency (25%)	$82,500
TOTAL	**$411,500**

General Hydraulic Dredge and Fill Project

Table 5.2 presents a schedule of the Trustees' estimated costs for implementation of the project, including cost items (work) and estimated dollar amounts for planning, construction, monitoring, Trustee administrative and oversight, and contingencies.

Table 5.2: Estimated Costs of Hydraulic Dredge and Fill Project

Cost Items	CHW (Saltmarsh)
	15.5 Acres
Planning	$85,000
Construction	$961,500
Monitoring	$78,500
Trustee Administrative and Oversight	$157,500
Contingency (25%)	$320,500
TOTAL	**$1,603,000**

Costs of future restoration actions have been developed using determined unit costs, information regarding costs of similar projects in coastal Louisiana, information solicited from potential contractors or through surveys of available contract services, or from persons with reliable knowledge or experience with regard to costs of particular restoration actions or components. In estimating such costs, all anticipated direct, indirect costs and overheads were included. In addition, the following cost factors have been included in estimating restoration costs consistent with the final restoration plan:

- Development of conceptual design, appropriate engineering specifications, feasibility studies, criteria and methods for use in monitoring project performance and success, and detailed project work plans for implementation and monitoring;

- Land rights costs, including but not limited to costs associated with title searches, title transfers, development of easements, conservation servitudes, or other form of deed/use restriction;

- Compliance with all other laws and procedures applicable to the implementation of selected restoration actions, including but not limited to conducting, meeting or providing for protected species consultations, coastal zone consistency determinations, biological surveys, cultural resource surveys, contaminants screening, materials disposal, landfill use, special land use or zoning requirements, essential fishery habitat consultations, "Section 404" and other federal, state or local permitting

requirements, environmental assessment or environmental impact statement preparation, etc.;
- Project construction costs, including but not limited to equipment use and materials acquisition, transportation and use, site burns, site treatments, modifications or re-contouring, planting material acquisition and use, acquisition and application of chemicals such as fertilizers, site markings, actions to restrict site access during or after construction, special logistical support, direct and indirect labor costs, administrative or contractor overheads, etc.;

- Trustee administrative and oversight costs, including but not limited to costs associated with internal decision making applicable to the implementation of all phases of project planning, construction and performance monitoring; activities of each Trustee agency involved in overseeing restoration implementation, including maintenance and performance monitoring, including but not limited to procurement and contracting costs, public notice or review processes, legal and technical activities or review, direct and indirect labor costs, all applicable administrative overhead rates, etc.

- Monitoring of restoration performance, including but not limited to site visits, data collection and analyses, preparation of monitoring reports and all other activities appropriate to document project performance relative to success criteria;

- Providing for mid-course corrections to address issues, problems or conditions affecting restoration performance.

5.4 Performance Measures and Monitoring

Project performance will be assessed by comparing quantitative monitoring results to predetermined performance standards that define the minimum physical or structural conditions deemed to represent normal and acceptable development of a coastal herbaceous wetland. Future project monitoring plans will be developed prior to or during implementation that will identify these performance standards and enable assessment of project goal achievement. Some potential performance metrics may include but are not limited to elevation, spatial extent, plant survival, and percent cover. In the event that performance standards are not achieved or monitoring suggests unsatisfactory progress toward meeting established performance standards, corrective actions may be implemented. Potential corrective actions may include but are not limited to replanting vegetation in areas that experienced dieback and implementing measure to control herbivory.

5.5 Proposed Action

As a basis for providing compensatory restoration for the Incidents, the Trustees propose using settlement funds of $2,014,500 paid by EMPCo to create at least 8.0 acres of freshmarsh habitat and 15.5 acres of saltmarsh habitat in RRP

Region 2. Costs associated with the Trustees implementing this preferred restoration alternative are the responsibility of EMPCo. All costs are included in the cash settlement dollar amount of $2,014,500. These implementation costs are in addition to past assessment costs incurred by the Trustees during Preassessment, Injury Assessment, and Restoration Planning.

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LIST OF PREPARERS

Louisiana Oil Spill Coordinator's Office (LOSCO)
Charles K. Armbruster
Gina Muhs Saizan
Robin Paulos
Susan Maddocks
Kelli Braud
Stephanie Morris

Louisiana Department of Wildlife and Fisheries (LDWF)
Jon Wiebe
Laura Carver
Steven Pearson

Louisiana Department of Environmental Quality (LDEQ)
Steph Braden

Louisiana Department of Natural Resources (LDNR)
Nick Lacroix
Josh Sylvest

Coastal Protection and Restoration Authority of Louisiana (CPRA)
Todd Folse

APPENDIX A: LIST OF ACRONYMS

AR	Administrative Record
C/E CHW	Creation/Enhancement of Coastal Herbaceous Wetland
CFR	Code of Federal Regulations
CPRA	Coastal Protection and Restoration Authority of Louisiana
DARP	Damage Assessment and Restoration Plan
DAPRP	Draft Damage Assessment and Preliminary Restoration Plan
DRP	Draft Restoration Plan
DSAYs	Discounted Service-Acre Years
EMPCo	ExxonMobil Pipeline Company
FPEIS	Final Programmatic Environmental Impact Statement
FRP	Final Restoration Plan
GAP	United States Geological Survey GAP Analysis Program
HEA	Habitat Equivalency Analysis
LAC	Louisiana Administrative Code
LAT	Lead Administrative Trustee
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LDWF	Louisiana Department of Wildlife and Fisheries
LOOP	Louisiana Offshore Oil Port
LOSCO	Louisiana Oil Spill Coordinator's Office, Department of Public Safety and Corrections
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent to Conduct Restoration Planning
NRDA	Natural Resource Damage Assessment
OPA	Oil Pollution Act of 1990
OSCF	Oil Spill Contingency Fund
OSLTF	Oil Spill Liability Trust Fund
OSPRA	Louisiana Oil Spill Prevention and Response Act of 1991
REA	Resource Equivalency Analysis
RP	Responsible Party
RRP Program	Regional Restoration Planning Program
SAV	Submerged Aquatic Vegetation
SCAT	Shoreline Cleanup Assessment Team
URL	Uniform Resource Locator
USACE	United States Army Corps of Engineers
USC	United States Code
USDOI	United States Department of the Interior
USFWS	United States Fish and Wildlife Service
WMA	Wildlife Management Area

APPENDIX B: ADMINISTRATIVE RECORD FOR THE LAKE WASHINGTON, MENDICANT ISLAND, AND WEST CHAMPAGNE BAY OIL SPILL INCIDENTS

Administrative Record Index

Lake Washington/ Mendicant Island/ West Champagne Bay (LWMIWCB)
NRDA Case
LA2003_0302_0716

1. Case File Index
- 1.1. Sign in / Sign out Sheet
- 1.2. Index of Administrative Record Contents

2. Case Administration, Laws, and Regulations
- 2.1. Oil Pollution Act of 1990 (OPA, 1990) [Link]
- 2.2. Louisiana Oil Spill Prevention and Response Act of 1991 [Link]
- 2.3. Oil Pollution Act Regulations [Link]
- 2.4. Oil Spill Prevention and Response Act Regulations [Link]

3. Legal Notices
- 3.1. Notice of Intent to Conduct Restoration Planning for Lake Washington
  - 3.1.1. Published in the State Register
  - 3.1.2. Published in the Baton Rouge Advocate
  - 3.1.3. Published in the Plaquemines Watchman and Gazette
  - 3.1.4. Published in the Times Picayune
- 3.2. Notice of Intent to Conduct Restoration Planning for Mendicant Island
  - 3.2.1. Published in the State Register
  - 3.2.2. Published in the Baton Rouge Advocate
  - 3.2.3. Published in the Times Picayune
  - 3.2.4. Published in the Houma Courier
- 3.3. Notice of Intent to Conduct Restoration Planning for West Champagne Bay
  - 3.3.1. Published in the State Register
  - 3.3.2. Published in the Baton Rouge Advocate
  - 3.3.3. Published in the Times Picayune
  - 3.3.4. Published in the Houma Courier

4. Response Phase Information
- 4.1. Lake Washington
  - 4.1.1. Response Notifications

4.1.1.1. National Response Center Incident Report Lake Washington: NRC # 638235
4.1.1.2. Louisiana State Police Incident Report Lake Washington: LSP # 03-01310
4.1.2. Response Information
4.1.2.1. Response Daily Status Report Updates 03/10/03 through 03/14/03
4.1.2.2. Wildlife
4.1.2.2.1. Tri State Bird Rescue and Research End of Day Reports 03/03/03 through 03/05/03
4.1.2.3. Maps
4.1.2.4. Photos / Jpg.'s
4.1.2.5. Entrix Ephemeral Data: Water Sampling/Analytical Report
4.1.2.6. NOAA/NOS/CO-OPS Water Level Station Data
4.1.2.7. SCAT Survey Report (Zone 1-West) 03/10/03
4.1.2.8. SCAT Observation Photos and Report
4.1.2.9. Letter to Benton Arcement (RP) from Roland Guidry (LOSCO) finalizing Emergency Response Actions 04/24/03

4.2. Mendicant Island
4.2.1. Response Notifications
4.2.1.1. National Response Center Incident Report Mendicant Island: NRC #706836
4.2.1.2. Louisiana State Police Incident Report Mendicant Island: LSP #03-08454
4.2.2. Response Information
4.2.2.1. Maps
4.2.2.2. Wildlife Rehab and Education End of Day Reports 12/03/03 through 12/09/03
4.2.2.3. Response Daily Status Reports 12/08/03 through 12/13/03 and 12/15/03 through 12/17/03
4.2.2.4. Photos / Jpg.'s
4.2.2.5. NOAA Site Visit Summary Reports 02/26/04 and 07/13/04
4.2.2.6. NOAA Resources at Risk for Barataria Bay
4.2.2.7. SCAT Observation Form -Team 1 12/07/03
4.2.2.8. Unauthorized Discharge Notification Report

4.3. West Champagne Bay

4.3.1. Response Notifications
- 4.3.1.1. National Response Center Incident Report West Champagne Bay: NRC #756262
- 4.3.1.2. Louisiana State Police Incident Report West Champagne Bay: LSP #05-02562

4.3.2. Response Information
- 4.3.2.1. SCAT Prep Meeting 04/27/05: Team Assignments/Cumulative Oiling Observation Maps with SCAT Sites and Locations/ Blank NRDA Preassessment Field Datasheet / Habitat Oiling Descriptors/ Waypoints and Locations of Photos
- 4.3.2.2. SCAT Datasheets 4/27/05 Teams 1-3
- 4.3.2.3. Maps
- 4.3.2.4. Incident Action Plans 04/22/05 through 05/02/05
- 4.3.2.5. Response Daily Status Reports 04/25/05 - 05/02/05
- 4.3.2.6. Response Resources 4/26/05 - 4/29/05
- 4.3.2.7. Wildlife
  - 4.3.2.7.1. Wildlife Status Report: Hazing Balloon Locations, Cannon Locations, Wildlife Hazing Implementation Plan
- 4.3.2.8. Photos / Jpg.'s
- 4.3.2.9. Letter to Patrick Doolan (RP) from Roland Guidry (LOSCO) Finalizing Emergency Response Actions 07/12/05

5. NRDA Preassessment and Injury Assessment Phase Information

5.1. Responsible Party Invitations and Acceptance Letters to Participate in NRDA Process
- 5.1.1. Invitation Letter to the Responsible Party to Participate in the Natural Resource Damage Assessment for the Lake Washington Incident 06/27/03
- 5.1.2. Response to Trustees' Invitation to Participate in the Natural Resource Damage Assessment for the Lake Washington Incident 07/07/03
- 5.1.3. Invitation Letter to the Responsible Party to Participate in the Natural Resource Damage Assessment for the Mendicant Island Incident 12/15/04
- 5.1.4. Response to Trustees' Invitation to Participate in the Natural Resource Damage Assessment for the Mendicant Island Incident 01/07/05

5.1.5. Invitation Letter to the Responsible Party to Participate in the Natural Resource Damage Assessment for the West Champagne Bay Incident 07/28/05
5.1.6. Response to Trustees' Invitation to Participate in the Natural Resource Damage Assessment for the West Champagne Bay Incident 08/03/05

5.2. Responsible Party and Trustee Correspondence
5.2.1. Lake Washington Meeting Agenda 04/25/03
5.2.2. Lake Washington Trustee Summary of 02/18/04 Meeting
5.2.3. Lake Washington Trustee Summary of 03/10/05 Meeting
5.2.4. Mendicant Island Trustee Summary of 03/10/05 Meeting
5.2.5. Lake Washington/ Mendicant Island/ West Champagne Bay Letter to Responsible Party Identifying Outstanding Issues 07/28/05
5.2.6. Lake Washington/ Mendicant Island/ West Champagne Bay Letter from Responsible Party Responding to Outstanding Issues 08/08/05
5.2.7. Lake Washington/ Mendicant Island/ West Champagne Bay Trustee Summary of 08/16/05 Meeting
5.2.8. Lake Washington/ Mendicant Island/ West Champagne Bay Trustee Summary of 03/24/06 Conference Call
5.2.9. Lake Washington/ Mendicant Island/ West Champagne Bay Trustee Summary of 11/17/06 Meeting
5.2.10. Lake Washington/ Mendicant Island/ West Champagne Bay Trustee Summary of 08/28/07 Meeting
5.2.11. Lake Washington/ Mendicant Island/ West Champagne Bay Trustee Summary of 05/06/09 Meeting
5.2.12. Lake Washington/ Mendicant Island/ West Champagne Bay Trustee Response to Responsible Party e-mail of 4/28/06

5.3. Shoreline
5.3.1. Final Oiling Maps, Associated Acreage Tables and Shape Files from ES^2
5.3.2. Lake Washington/ Mendicant Island/ West Champagne Bay CD w/GIS Data and Maps w/Oiling Acreages
5.3.3. Lake Washington Habitat Equivalency Analysis Debit Memo 03/24/05

5.4. Maps

5.5. Wildlife
5.5.1. Wildlife Rehab Oiled Bird Observations Mendicant Island and West Champagne Bay Total Oiled Birds Observed and Captured

5.5.2. Standing Biomass Converter/Trophic Transfer Biomass Converter and Summary

5.6. Lake Washington Recreational Loss Memo 06/11/03

5.7. Mendicant Island NRDA Photos / Jpg's

6. Restoration Planning

6.1. Lake Washington/ Mendicant Island/ West Champagne Bay Project Solicitation Letter with Recipients 2006

6.2. Lake Washington/ Mendicant Island/ West Champagne Bay Project Solicitation Memo to Public/ LOSCO News Flash 2010

6.3. Lake Washington/ Mendicant Island/ West Champagne Bay Trustee Site Visit Summaries:

6.3.1. Date of Visit 11/17/11

6.3.2. Date of Visit 06/13/13

6.4. Responsible Party and Trustee Correspondence

6.4.1. Lake Washington/ Mendicant Island/ West Champagne Bay Trustee Summary of 05/06/09 Meeting

6.4.2. Lake Washington/ Mendicant Island/ West Champagne Bay Responsible Party Request for Alternative Restoration 08/14/14

6.5. Lake Washington/ Mendicant Island/ West Champagne Bay Trustee Cash Settlement Offer 06/29/16

6.6. Lake Washington/ Mendicant Island/ West Champagne Bay Responsible Party Response to Cash Settlement Offer 10/04/16

7. Settlement

7.1. LWMIWCB Settlement Agreement - Pending

R1. Restoration Implementation - Pending

APPENDIX C: MATRIX OF COASTAL RESTORATION TYPES FOR POTENTIALLY INJURED RESOURCES

The following matrix conceptually demonstrates those restoration types that are found to be reasonable for restoring each of the "potentially injured trust resources and services." Checked boxes in these figures indicate that a restoration type is an appropriate restoration alternative for the corresponding "potentially injured trust resource or service." A summary of the analysis that the Trustees used to define appropriate restoration types for each of the "potentially injured trust resources and services" is provided in Sections 4.2.4 through 4.2.4.1.5 of the Louisiana RRP Program Final Programmatic Environmental Impact Statement (NOAA et al., 2007).

			POTENTIALLY INJURED RESOURCES/SERVICES								
		COASTAL	Herbaceous Wetlands	Forested Wetlands	Beach/Shoreline/ Streambed	Oyster Reefs (& other)	Water Column Org.	Birds	Wildlife	Recreational	Cultural
RESTORATION TYPES	C/E[1]	Coastal Herbaceous Wetlands	√	√		√	√	√	√	√	
		Coastal Forested Wetlands	√	√			√	√	√	√	
		Coastal Beach/Shoreline/Streambed			√		√	√	√	√	
		Coastal Oyster Reefs (& other)				√	√	√	√	√	
		Coastal Artificial Reefs				√	√	√	√	√	
		Coastal SAV	√			√	√	√	√	√	
	PP[2]	Coastal Herbaceous Wetlands	√	√		√	√	√	√	√	
		Coastal Forested Wetlands	√	√			√	√	√	√	
		Coastal Beach/Shoreline/Streambed			√		√	√	√	√	
	Ac/LP[3]	Coastal Herbaceous Wetlands	√	√		√	√	√	√	√	
		Coastal Forested Wetlands	√	√			√	√	√	√	
		Coastal Beach/Shoreline/Streambed			√		√	√	√	√	
		Coastal Oyster Reefs (& other)				√	√	√	√	√	
		Coastal SAV	√				√	√	√	√	
	S[4]	Coastal Water Column Org.					√			√	
		Coastal Oyster Reefs (& other)				√	√			√	
		Birds						√		√	
		Wildlife							√	√	
	PF[5]	Birds						√		√	
		Wildlife							√	√	
		Recreation								√	
		Cultural									√

(1) Creation/Enhancement
(2) Physical Protection of Habitat
(3) Acquisition/Legal Protection
(4) Stocking of Fauna
(5) Physical Protection of Fauna