Louisiana Trustee Implementation Group Final Restoration Plan/Environmental Assessment #2:

Provide and Enhance Recreational Opportunities

July 2018

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Acronyms

ADA	Americans with Disabilities Act
AQI	Air Quality Index
BLM	Bureau of Land Management
BMP	best management practice
BP	BP Exploration and Production
CAA	Clean Air Act
CAM II	Caminada Headland Beach and Dune Restoration Project
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNR	Coastal and Nongame Resources (Division of LDWF)
CPRA	Coastal Protection and Restoration Authority
CWA	Clean Water Act
CWPPRA	Coastal Wetlands Planning, Protection and Restoration Act
CZM Program	Coastal Zone Management Program
CZMA	Coastal Zone Management Act
DOC	U.S. Department of Commerce
DOI	United States Department of the Interior
DWH	Deepwater Horizon
EA	environmental assessment
E&D	engineering and design
EFH	Essential Fish Habitat
EO	Executive Order
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
Final PDARP/PEIS	Final Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement
Phase III ERP/PEIS	Final Programmatic and Phase III Early Restoration Plan and Early Restoration Programmatic Environmental Impact Statement
FMP	fishery management plan
FONSI	Finding of No Significant Impact
FR	Federal Register
ft/yr	feet per year
GHG	greenhouse gas
GMFMC	Gulf of Mexico Fishery Management Council
HAPC	habitat areas of particular concern
IPaC	USFWS Information for Planning and Consultation
LA CWCS	Louisiana Comprehensive Wildlife Conservation Strategy
LA TIG	Louisiana Trustee Implementation Group
LARP	Louisiana Artificial Reef Program

LCW Task Force	Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LDWF	Louisiana Department of Wildlife and Fisheries
LGS	Louisiana Geological Survey
LMFERSC	Louisiana Marine Fisheries Enhancement, Research, and Science Center
LNHP	Louisiana Department of Wildlife and Fisheries Natural Heritage Program
LOSCO	Louisiana Oil Spill Coordinator's Office
LSU AgCenter	Louisiana State University, Agricultural Center
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended
MBTA	Migratory Bird Treaty Act
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act of 1972
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Availability
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRDA	natural resource damage assessment
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O&M	operations and maintenance
OPA	Oil Pollution Act of 1990
PACWMA	Pointe-aux-Chenes Wildlife Management Area
PGP	Programmatic General Permit
PM_{10}	particulate matter 10
$PM_{2.5}$	particulate matter 2.5
ppt	part per thousand
RESTORE Act	Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act
ROD	Record of Decision
RP	restoration plan
SAFMC	South Atlantic Fishery Management Council
SAV	submerged aquatic vegetation
SCEC	Science Center and Educational Complex

SOP	standard operating procedure
TIG	Trustee Implementation Group
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USDA	U.S. Department of Agriculture
USDA NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
WMA	Wildlife Management Area

Executive Summary

On April 20, 2010, the Deepwater Horizon (DWH) mobile drilling unit exploded, caught fire, and eventually sank in the Gulf of Mexico, resulting in a massive release of oil and other substances from BP Exploration and Production's (BP) Macondo well and causing loss of life and extensive natural resource injuries. Initial efforts to cap the well following the explosion were unsuccessful, and for 87 days after the explosion, the well continuously and uncontrollably discharged oil and natural gas into the northern Gulf of Mexico. Approximately 3.19 million barrels (134 million gallons) of oil were released into the ocean (U.S. v. BP et al. 2015). Oil spread from the deep ocean to the surface and nearshore environment from Texas to Florida. The oil came into contact with and injured natural resources as diverse as deep-sea coral, fish and shellfish, productive wetland habitats, sandy beaches, birds, endangered sea turtles, and protected marine life. The oil spill prevented people from fishing, going to the beach, and enjoying typical recreational activities along the Gulf of Mexico. Extensive response actions, including cleanup activities and actions to try to prevent the oil from reaching sensitive resources, were undertaken to try to reduce harm to people and the environment. However, many of these response actions had collateral impacts on the environment and on natural resource services. The oil and other substances released from the well in combination with the extensive response actions together make up the DWH Oil Spill.

As an oil pollution incident, the DWH Oil Spill is subject to the provisions of the Oil Pollution Act (OPA) of 1990, which addresses preventing, responding to, and paying for oil pollution incidents in navigable waters, adjoining shorelines, and the exclusive economic zone of the United States.

Under the authority of OPA, a council of federal and state "Trustees" was established on behalf of the public to assess natural resource injuries resulting from the incident and work to make the environment and public whole for those injuries. As required under OPA, the Trustees conducted a natural resource damage assessment (NRDA) and prepared the *Final Programmatic Damage Assessment and Restoration Plan/Programmatic Environmental Impact Statement* (Final PDARP/PEIS; DWH Trustees 2016b).

The primary goal of OPA is to make the environment and public whole for injuries to natural resources and services resulting from an incident involving an oil discharge (or substantial threat of an oil discharge). Under OPA regulations, the natural resource injuries for which responsible parties are liable include injuries resulting from the oil discharge and those resulting from response actions or substantial threat of a discharge. OPA specifies that Trustees responsible for representing the public's interest (in this case, state and federal agencies) must be designated to act on behalf of the public to assess the injuries and to address those injuries. The DWH Oil Spill Trustees (the DWH Trustees) for the affected natural resources conducted a NRDA to:

- Assess the impacts of the DWH Oil Spill on natural resources in the Gulf of Mexico and the services those resources provide.

- Determine the type and amount of restoration needed to compensate the public for these impacts.

Following the assessment, the DWH Trustees determined that the injuries caused by the DWH Oil Spill could not be fully described at the level of a single species, a single habitat type, or a single region. Rather, the injuries affected such a wide array of linked resources over such an enormous area that the effects of the DWH Oil Spill must be described as constituting an ecosystem-level injury. Consequently, the DWH Trustees' preferred alternative for restoration planning employs a comprehensive, integrated ecosystem approach to best address these ecosystem-level injuries.

Given the broad ecological scope of the injuries, restoration planning requires a broad ecosystem perspective to restore the vast array of resources and services injured by the DWH Oil Spill. Thus, the DWH Trustees proposed a comprehensive, integrated ecosystem restoration plan with a portfolio of Restoration Types that addressed the diverse suite of injuries that occurred at both regional and local scales. The DWH Trustees identified the need for a comprehensive restoration plan at a programmatic level to guide and direct the massive restoration effort, based on the following five overarching goals:

- Restore and conserve habitat.
- Restore water quality.
- Replenish and protect living coastal and marine resources.
- Provide and enhance recreational opportunities.
- Provide for monitoring, adaptive management, and administrative oversight to support restoration implementation.

These five goals work both independently and together to restore injured resources and services.

Final Restoration Plan and Environmental Assessment

This document, the *Final Restoration Plan and Environmental Assessment #2: Provide and Enhance Recreational Opportunities* (RP/EA #2), was prepared by the Louisiana Trustee Implementation Group (LA TIG) pursuant to OPA and is consistent with the DWH Trustees' findings in the Final PDARP/PEIS. The LA TIG includes five Louisiana state trustee agencies and four federal trustee agencies: the Louisiana Coastal Protection and Restoration Authority (CPRA); the Louisiana Department of Natural Resources (LDNR); the Louisiana Department of Environmental Quality (LDEQ); the Louisiana Oil Spill Coordinator's Office (LOSCO); the Louisiana Department of Wildlife and Fisheries (LDWF); the United States Department of Commerce, represented by the National Oceanic and Atmospheric Administration (NOAA); the United States Department of the Interior (DOI), represented by the U.S. Fish and Wildlife Service (USFWS) and National Park Service (NPS); the U.S. Department of Agriculture (USDA); and the U.S. Environmental Protection Agency (EPA).

In accordance with 40 Code of Federal Regulations (CFR) § 1508.12, the LA TIG designated EPA as the lead federal agency responsible for National Environmental Policy Act (NEPA) compliance for this RP/EA #2. The federal and state agencies of the LA TIG are acting as cooperating agencies

for the purposes of compliance with NEPA in the development of this RP/EA #2. Each federal cooperating agency on the LA TIG intends to adopt the NEPA analyses in this RP/EA #2. In accordance with 40 CFR § 1506.3(a), each of the three federal cooperating agencies (DOI, NOAA, and USDA) participating on the LA TIG will review the RP/EA #2 for adequacy in meeting the standards set forth in its own NEPA implementing procedures and make a decision to adopt the analysis in the RP/EA #2. Adoption of the EA would be completed via signature on the relevant NEPA decision document.

Under the Consent Decree discussed in Section 1.1 of this RP/EA #2, the LA TIG has an allocation of $5 billion for restoration activities in the Louisiana Restoration Area, which includes Early Restoration projects approved prior to the settlement in 2016. Because of the significant injury to recreational use services as a result of the DWH oil spill, $60 million of these total funds are dedicated to the "Provide and Enhance Recreational Opportunities" Restoration Type in Louisiana. The 2014 *Final Programmatic and Phase III Early Restoration Plan and Early Restoration Programmatic Environmental Impact Statement* (Phase III ERP/PEIS; DWH Trustees 2014) originally allocated $22 million toward the Louisiana Marine Fisheries Enhancement, Research, and Science Center (LMFERSC). The LMFERSC project included two hatchery and outreach facilities (Calcasieu Parish and Plaquemines Parish), with the primary location near Lake Charles also featuring a visitor center and youth fishing pond. However, site issues arose during planning and development, which precluded the LA TIG from moving forward with the LMFERSC project. This plan re-allocates the $22 million in early restoration funds toward other projects that would restore lost recreational use in Louisiana, with a specific focus on enhancing recreational fishing opportunities.

This RP/EA #2 provides restoration for lost recreational use within Louisiana by evaluating alternatives that could compensate for a part of Louisiana's recreational fishing use injury. Louisiana Trustees have identified lost recreational fishing opportunities as the most significantly impacted recreational use in the state. As such, Louisiana's approach to restoring for lost recreational use in this RP/EA #2 emphasizes the creation and enhancement of recreational fishing infrastructure, enhanced recreational fishing access or opportunity, and educational and outreach components that promote utilization of the natural resources and encourage conservation and stewardship for them, consistent with the injuries caused by the DWH Oil Spill and fisheries-based objectives embodied in the original LMFERSC project.

In identifying the suite of alternatives considered in this RP/EA #2, the LA TIG took into account the OPA screening criteria, the Restoration Goals in the Final PDARP/PEIS, other criteria identified by the DWH Trustees, input from the public, and the current and future availability of funds under the DWH Oil Spill NRDA settlement payment schedule. The RP/EA #2 describes the screening process for 263 projects and sequential application of screening criteria used to identify the alternatives carried forward for detailed OPA/NEPA analysis as well as a No Action alternative.

The LA TIG published a Notice of Availability of the Draft Restoration Plan and Environmental Assessment #2: Provide and Enhance Recreational Opportunities (Draft RP/EA #2) in the Federal Register on December 20, 2017. The LA TIG hosted a public meeting on January 24, 2018, in New Orleans, and the public comment period for the Draft RP/EA #2 closed on February 2, 2018. The

Draft RP/EA #2 proposed four restoration project alternatives, evaluated in accordance with OPA and NEPA. In response to public comments received on the Draft RP/EA #2, the LA TIG prepared a *Draft Supplemental Restoration Plan and Environmental Assessment for the Elmer's Island Access Project Modification* (Supplemental RP/EA; CPRA 2018) to evaluate proposed changes to the Elmer's Island Access project. A Notice of Availability of the Supplemental RP/EA was published in the Federal Register on May 21, 2018. The LA TIG hosted a public meeting on May 22, 2018, in New Orleans, and the public comment period for the Supplemental RP/EA closed on June 20, 2018. The Federal Trustees of the LA TIG have evaluated the environmental consequences of the proposed alternatives and the findings indicate that no significant environmental impacts are anticipated within the context of NEPA.

The LA TIG considered the public comments received on both the Draft RP/EA #2, and Supplemental RP/EA, which informed the LA TIG's analyses and selection of the restoration projects in this RP/EA #2. A summary of the public comments received and the Trustees' responses to those comments are included in Section 7 of this RP/EA #2.

In this RP/EA #2 the LA TIG selects the following preferred alternatives for implementation:

- Elmer's Island Access – $6,000,000
- Statewide Artificial Reefs – $6,000,000
- Lake Charles Science Center and Educational Complex – $7,000,000
- Island Road Piers – $3,000,000

The total cost of the preferred alternatives selected in this RP/EA #2 is $22,000,000.

Section 1
Introduction

The LA TIG prepared this RP/EA #2: Provide and Enhance Recreational Opportunities to address lost recreational use opportunities in the State of Louisiana as a result of the DWH Oil Spill. This RP/EA #2 was prepared by the federal and state natural resource trustees for the LA TIG, which is responsible for restoring the natural resources and services within the Louisiana Restoration Area that were injured by the April 20, 2010 DWH Oil Spill and associated spill response efforts. The LA TIG includes five Louisiana state trustee agencies and four federal trustee agencies: CPRA, LDNR, LDEQ, LOSCO, LDWF, NOAA, DOI, USDA, and EPA.

The LA TIG has prepared this RP/EA #2 to inform the public about DWH NRDA restoration planning efforts and has received public comment on the proposed alternatives for engineering and design and construction (henceforth "implementation") in this RP/EA #2.

The purpose of restoration, as discussed in this document and detailed more fully in the Final PDARP/PEIS, is to make the environment and the public whole for injuries resulting from the incident by implementing restoration actions that return injured natural resources and services to baseline conditions and compensate for interim losses in accordance with OPA, NEPA, and associated NRDA regulations. The Final PDARP/PEIS and Record of Decision (ROD) can be found at http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan/.

1.1 Background and Summary of the Settlement

On April 4, 2016, the United States District Court for the Eastern District of Louisiana entered a Consent Decree resolving civil claims by the DWH Trustees against BP, arising from the DWH Oil Spill. This historic settlement resolves the Trustees' claims against BP for natural resources damages under OPA.

Under the Consent Decree, BP agreed to pay over a 15-year period a total of $8.1 billion in natural resource damages (which includes $1 billion that BP previously committed to pay for early restoration projects) and up to an additional $700 million (some of which is in the form of accrued interest) for adaptive management or to address injuries to natural resources that are presently unknown but may come to light in the future.

More details on the background of the DWH Oil Spill, the impact of the spill on the Gulf of Mexico ecosystem, and additional context for the settlement and allocation of funds can be found in Chapter 2 of the Final PDARP/PEIS. The Final PDARP/PEIS can be found at http://www.gulfspillrestoration.noaa.gov (DWH Trustees 2016).

1.2 DWH Oil Spill Trustees

The DWH Trustees are the government entities authorized under OPA to act as trustees on behalf of the public to assess the natural resource injuries resulting from the DWH Oil Spill and develop and implement a restoration plan to compensate for those injuries. DWH Trustees fulfill these

responsibilities by developing restoration plans, providing the public with a meaningful opportunity to suggest restoration projects and to review and comment on proposed plans, implementing and monitoring restoration projects, managing natural resource damage funds, and documenting trustee decisions through a public administrative record. The DWH Trustees are responsible for governance of restoration planning throughout the entire Gulf Coast. To work collaboratively on the NRDA, the DWH Trustees organized a Trustee Council composed of Designated Natural Resource Trustee Officials, or their alternates, for each of the DWH Trustee agencies. The following federal and state agencies are the designated DWH Trustees under OPA for the DWH Oil Spill:

- NOAA, on behalf of the U.S. Department of Commerce
- DOI, as represented by NPS, USFWS, and Bureau of Land Management
- EPA
- USDA
- The State of Alabama's Department of Conservation and Natural Resources and Geological Survey of Alabama
- The State of Florida's Department of Environmental Protection and Fish and Wildlife Conservation Commission
- The State of Louisiana's CPRA, LOSCO, LDEQ, LDWF, and LDNR
- The State of Mississippi's Department of Environmental Quality
- The State of Texas' Parks and Wildlife Department, General Land Office, and Commission on Environmental Quality

The DWH NRDA funds were distributed geographically to address the diverse suite of injuries that occurred at both regional and local scales. As specified in the Consent Decree and Final PDARP/PEIS, specific amounts of money were allocated to seven geographic areas: each of the five Gulf States (Texas, Louisiana, Mississippi, Alabama, and Florida), Regionwide, and the Open Ocean. The Louisiana Restoration Area includes coastal and nearshore areas within the geographic jurisdiction of the state of Louisiana. The funding distribution was based on the DWH Trustees understanding and evaluation of exposure and injury to natural resources and services, as well as their evaluation of where restoration spending for the various Restoration Types will be most beneficial within the ecosystem-level restoration portfolio.

1.3 Authorities and Regulations

1.3.1 OPA and NEPA Compliance

As an oil pollution incident, the DWH Oil Spill is subject to the provisions of OPA, 33 United States Code [U.S.C.] § 2701 et seq. A primary goal of OPA is to make the environment and public whole for injuries to natural resources and services resulting from an incident involving an oil discharge or substantial threat of an oil discharge. Under OPA, each party responsible for a vessel or facility

from which oil is discharged, or which poses the substantial threat of a discharge, is liable for, among other things, removal costs and damages for injury to, destruction of, loss, or loss of use of natural resources, including the reasonable cost of assessing the damage.

This process of injury assessment and restoration planning is referred to as NRDA. Under the authority of OPA, a council of federal and state trustees was established to assess natural resource injuries resulting from the incident and to work to make the environment and public whole for those injuries. NRDA is described under Section 1006 of OPA (33 U.S.C. § 2706 et seq.). Under the OPA NRDA regulations (15 CFR Part 990 et seq.), the NRDA process consists of three phases: (1) Preassessment; (2) Assessment and Restoration Planning; and (3) Restoration Implementation. The DWH Trustees are currently in the Assessment and Restoration Planning Phase, and the Restoration Implementation Phase of the NRDA. As part of the initiation of restoration implementation, this RP/EA #2 identifies potential alternatives, evaluates those alternatives under various criteria, and identifies a suite of proposed alternatives that would compensate the public for lost recreational use in Louisiana caused by the DWH Oil Spill.

Under the OPA regulations, federal trustees must comply with the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 et seq., and its regulations, 40 CFR § 1500 et seq., among others, when planning restoration projects. NEPA requires federal agencies to consider the potential environmental impacts of planned actions. NEPA provides a framework for federal agencies to determine if their proposed actions have significant environmental effects and related social and economic effects, consider these effects when choosing between alternatives, and inform and involve the public in the environmental analysis and decision-making process.

NEPA and its implementing regulations (40 CFR Parts 1500-1508, and agency-specific NEPA regulations) outline the responsibilities of federal agencies in the NEPA process. In this document, the LA TIG addresses these requirements by tiering from environmental analyses conducted in the Final PDARP/PEIS, evaluating existing analyses, and preparing environmental consequences analyses for projects as appropriate. See Chapter 4 of the PDARP/PEIS for more information on tiering and incorporation by reference under NEPA and how they apply to this RP/EA #2.

EPA is the lead federal Trustee for preparing this RP/EA #2 pursuant to NEPA. The federal and state agencies of the LA TIG are acting as cooperating agencies for the purposes of compliance with NEPA in the development of this RP/EA #2. Each federal cooperating agency on the LA TIG intends to adopt the NEPA analysis in this RP/EA #2. In accordance with 40 CFR § 1506.3(a), each of the three federal cooperating agencies (DOI, NOAA, and USDA) participating on the LA TIG will review the RP/EA #2 for adequacy in meeting the standards set forth in its own NEPA implementing procedures. Adoption of the EA would be completed via signature on the relevant NEPA decision document. There are no other cooperating federal, state, or local entities, or tribes.

More information about OPA and NEPA, as well as their application to DWH Oil Spill restoration planning, can be found in Chapters 5 and 6 of the Final PDARP/PEIS.

1.3.1.1 Standard Operating Procedures for DWH Trustees

Another document that guides restoration planning is the 2016 *Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill*

(DWH 2016d). The Trustee Council developed the standard operating procedures (SOPs) for administration, implementation, and long-term management of restoration under the Final PDARP/PEIS. The Trustee Council SOP documents the overall structure, roles, and decision-making responsibilities of the Trustee Council and provides the common procedures to be used by all trustee implementation groups (TIGs). The Trustee Council SOP addresses, among other issues, the following topics: decision-making and delegation of authority, funding, administrative procedures, project reporting, monitoring and adaptive management, consultation opportunities among the DWH Trustees, public participation, and the Administrative Record. The Trustee Council SOP (DWH Trustees 2016d) is available through the NOAA Restoration Portal, here: http://www.gulfspillrestoration.noaa.gov/sites/default/files/TC%20SOP%202.0%20with%20appendices.pdf. The Trustee Council SOP was developed and approved by consensus of the Trustee Council and may be amended as needed. The division of responsibilities among the Trustee Council, TIGs, and Individual Trustee Agencies is summarized in Table 7.2-1 of the Final PDARP/PEIS.

1.3.2 Final PDARP/PEIS Record of Decision

Given the potential magnitude and breadth of restoration for injuries resulting from the DWH Oil Spill, the DWH Trustees prepared a PDARP/PEIS under OPA and NEPA to analyze alternative approaches to implementing restoration and to consistently guide restoration decisions. Based on the DWH Trustees' thorough assessment of impacts to the Gulf's natural resources, a comprehensive, integrated ecosystem restoration approach for restoration implementation was proposed. On February 19, 2016, the DWH Trustee Council issued a Final PDARP/PEIS detailing a specific proposed plan to fund and implement restoration projects across the Gulf of Mexico region over the next 15 years. On March 29, 2016, in accordance with OPA and NEPA, the DWH Trustees published a Notice of Availability (NOA) of a ROD for the Final PDARP/PEIS in the Federal Register [FR] (81 FR 17438). Based on the DWH Trustees' injury determination established in the Final PDARP/PEIS, the ROD set forth the basis for the DWH Trustees' decision to select Alternative A: Comprehensive Integrated Ecosystem Alternative. The DWH Trustees' selection of Alternative A includes the funding allocations established in the Final PDARP/PEIS. More information about Alternative A can be found in Sections 5.5 and 5.10 of the Final PDARP/PEIS.

1.3.3 Relationship of the Final RP/EA #2 to the Final PDARP/PEIS

As a programmatic restoration plan, the Final PDARP/PEIS provides direction and guidance for identifying, evaluating, and selecting future restoration projects to be carried out by the TIGs (Section 5.10.4 and Chapter 7 of the Final PDARP/PEIS). The DWH Trustees elected to prepare a PEIS to support analysis of the environmental consequences of the selected Restoration Types, to consider the multiple related actions that may occur because of restoration planning efforts, and to allow for a better analysis of cumulative impacts of potential actions. The programmatic approach was taken to assist the TIGs in their development and evaluation and to assist the public in its review of future restoration projects.

For the Final PDARP/PEIS, the DWH Trustees developed a set of Restoration Types for inclusion in programmatic alternatives, consistent with the desire to seek a diverse set of projects providing benefits to a broad array of injured resources and services. Ultimately, this process resulted in the inclusion of 13 Restoration Types in 5 major Restoration Goals evaluated for

restoration (Final PDARP/PEIS). For this RP/EA #2, the LA TIG used the direction and the guidance of the Final PDARP/PEIS to consider and evaluate alternatives within the "Provide and Enhance Recreational Opportunities" Restoration Type.

Chapter 5 of the Final PDARP/PEIS analyzes different restoration approaches to address resource injuries for each Restoration Type. The proposed alternatives included in this RP/EA #2 are consistent with the following restoration approaches described for the "Provide and Enhance Recreational Opportunities" Restoration Type, as described in Section 5.5.14.2 of the Final PDARP/PEIS.

Enhance public access to natural resources for recreational use. This restoration approach focuses on creating new or improved access to natural resources for recreational purposes by enhancing existing or constructing new infrastructure. Providing or improving water access in publicly owned areas through the construction and operation of boat ramps, piers, or other infrastructure could also improve public access. Larger-scale infrastructure improvements such as a ferry service or the construction or improvement of roads and bridges could also serve to improve access to natural resources. Enhancing public access would also include targeted acquisition of land parcels to serve as public access points.

Enhance recreational experiences. This restoration approach focuses on enhancing the public's recreational experiences. The quality of activities such as swimming, boating, diving, bird watching, beach-going, camping, and fishing can vary depending on the appearance and functional condition of the surrounding environment in which they occur. A variety of restoration techniques could be used individually or in combination as potential restoration projects.

Promote environmental stewardship, education, and outreach. This restoration approach involves providing and enhancing recreational opportunities through environmental stewardship, education, and outreach activities. Multiple restoration techniques could be used individually, or in combination, as potential restoration projects.

Section 2 of this RP/EA #2 summarizes the screening process used to develop a reasonable range of proposed alternatives, which is consistent with the DWH Trustees' selected programmatic alternative in the Final PDARP/PEIS, the Consent Decree and OPA. The LA TIG also prepared a NEPA environmental consequences analysis for the reasonable range of proposed alternatives (Section 4 of this document), which "tiers" from the Final PDARP/PEIS programmatic NEPA analysis.

One of the objectives of the Final PDARP/PEIS was the ability to use it to "tier" the NEPA analysis in the subsequent restoration plans prepared by the TIGs (40 CFR 1502.20 and Final PDARP/EIS, Chapter 6). A tiered environmental analysis is a project-specific analysis that focuses on project-specific issues and summarizes or references (rather than repeats) the broader issues discussed in the PEIS. This RP/EA #2 is consistent with the Final PDARP/PEIS and ROD and provides NEPA analysis for each proposed alternative, tiering from the PEIS where applicable. For this RP/EA #2, the DWH Trustees considered the extent to which additional NEPA analyses may be necessary for the proposed alternatives that tier their NEPA analyses from the Final PDARP/PEIS. These considerations include whether the analyses of relevant conditions and environmental effects described in the Final PDARP/PEIS are still valid and whether project impacts have already been

fully analyzed in the Final PDARP/PEIS. The applicable sections of the Final PDARP/PEIS are incorporated by reference into this plan (40 CFR § 1502.21).

1.3.4 Summary of Injuries Addressed in this Final RP/EA #2

The DWH NRDA evaluated injury to natural resources and their services as a result of the DWH Oil Spill. A number of different resource categories were evaluated, including losses to recreational users. Impacts to recreational users occur when oil degrades the quality of a natural resource and impairs an individual's ability to interact with it. During the DWH Oil Spill, some beaches were closed, fishing areas and bay access was limited, recreational fishing was minimized, and camping and other recreational uses were also minimized due to oiling or cleanup activities. The oil spill affected recreation in the Gulf of Mexico as a result of people cancelling recreational trips; choosing alternate sites for recreation; modifying planned activities; and experiencing a reduction in the quality of their recreational activities (see Final PDARP/PEIS, Section 4.10.1). Both direct oiling and the expectation of oiling caused individuals to cancel planned recreational fishing trips to coastal areas.

The DWH injury assessment on lost recreational use covered two broad categories of recreation: shoreline use and boating. Shoreline use refers to recreational activities conducted by individuals at locations near beaches and other shoreline areas and includes swimming, sunbathing, surfing, walking, camping, kayaking, and fishing from the shore or shoreline structures (i.e., piers). It also includes fishing at sites that are considered coastal but are not directly on the beach. Specifically excluded from the shoreline use assessment are recreational boating, commercial activities, and oil spill response.

The second broad category, boating, includes individuals engaged in recreational boating activities that begin at sites providing access to salt water near the Gulf Coast. The term “sites” encompasses a wide variety of locations providing boat access to coastal waters, including marinas, unimproved launches, and private residences. Excluded from this category are non-recreational boating activities, including commercial fishing, law enforcement/safety, and oil spill response.

1.4 LA TIG Final RP/EA #2 for Recreational Use

The LA TIG prepared this RP/EA #2 in accordance with the Final PDARP/PEIS and ROD, OPA, and NEPA. This RP/EA #2 describes the DWH NRDA restoration planning process, considers alternatives to address a portion of the injuries to recreational fishing use caused by the DWH Oil Spill, and identifies from among those alternatives a suite of preferred alternatives that would compensate the public for lost recreational use in Louisiana caused by the DWH Oil Spill. In accordance with 40 CFR § 1508.16, the LA TIG designated EPA as the lead federal agency responsible for NEPA compliance for this RP/EA #2.

1.5 Purpose and Need

The LA TIG has undertaken this recreational use restoration planning effort to meet the purpose of restoring those natural resources and services injured as a result of the DWH Oil Spill. This RP/EA #2 falls within the scope of the purpose and need identified in the Final PDARP/PEIS. As described in Section 5.3 of the Final PDARP/PEIS, the five Trustee programmatic restoration

goals for restoration work independently and together to benefit injured resources and services. This RP/EA #2 focuses on the restoration of injuries to Louisiana's natural resources and services—in particular to Restoration Type: "Provide and Enhance Recreational Opportunities," using funds made available in Early Restoration and through the DWH Consent Decree (see Final PDARP/PEIS, Chapter 4).

For the purpose of restoring natural resources and services injured as a result of the DWH Oil Spill, the DWH Trustees need to address the associated recreational loss that occurred in Louisiana. The DWH Trustees propose to implement compensatory restoration projects that would provide the public with additional and enhanced recreational use services in Louisiana in a manner consistent with the Final PDARP/PEIS. Impacts to Louisiana from the DWH Oil Spill, including oiled shorelines, the closure of fishing and recreational areas and the cancellation of recreational trips, resulted in losses to the public's use of natural resource for outdoor recreation, such as fishing, boating, vacationing, beach-going, and other recreational activities.

Louisiana Trustees have identified lost recreational fishing opportunities as the most significantly impacted recreational use in the state. As such, Louisiana's approach to restoring for lost recreational use in this RP/EA #2 is multi-faceted and utilizes a combination of all recreational use restoration approaches described in the Final PDARP/PEIS, including enhance public access to natural resources for recreational use, enhance recreational experiences, and promote environmental stewardship, education, and outreach. These approaches are encompassed by all four of the proposed alternatives, including the creation of new and enhancement of existing recreational fishing infrastructure, enhanced recreational fishing access and opportunities, and the development of educational and outreach components to promote responsible utilization of natural resources. The proposed alternatives described in this RP/EA #2 are consistent with techniques to restore for the recreational use injuries caused by the DWH Oil Spill, while meeting fisheries-based objectives and also providing educational elements encompassed by the original LMFERSC Early Restoration project.

1.6 Proposed Action: LA TIG Final RP/EA #2 for Recreational Use

To address the programmatic and Restoration Type goals described above, the DWH Trustees propose to undertake the restoration planning and project implementation of the four projects identified as preferred alternatives in this RP/EA #2 to provide compensatory restoration of lost recreational fishing use in Louisiana, using funds made available in Early Restoration and through the DWH Consent Decree. Proposed alternatives are described briefly below and detailed in Section 3 of this plan. The LA TIG will consider additional recreational use projects in Louisiana, as well as projects to address Louisiana's other injury categories and Restoration Types, in subsequent restoration plans.

1.6.1 Alternatives Considered in the Plan

The LA TIG requested public input on project ideas to be considered as alternatives in this RP/EA #2, including via a May 17, 2017, notice posted at http://www.gulfspillrestoration.noaa.gov . The screening objectives and the screening process applied to all project suggestions received from the public are described in Section 2 of this RP/EA #2. Public involvement for this plan and how it

was used to develop proposed alternatives is discussed in Section 1.9 of this RP/EA #2. **Figure 1-1** shows the location of the alternatives.

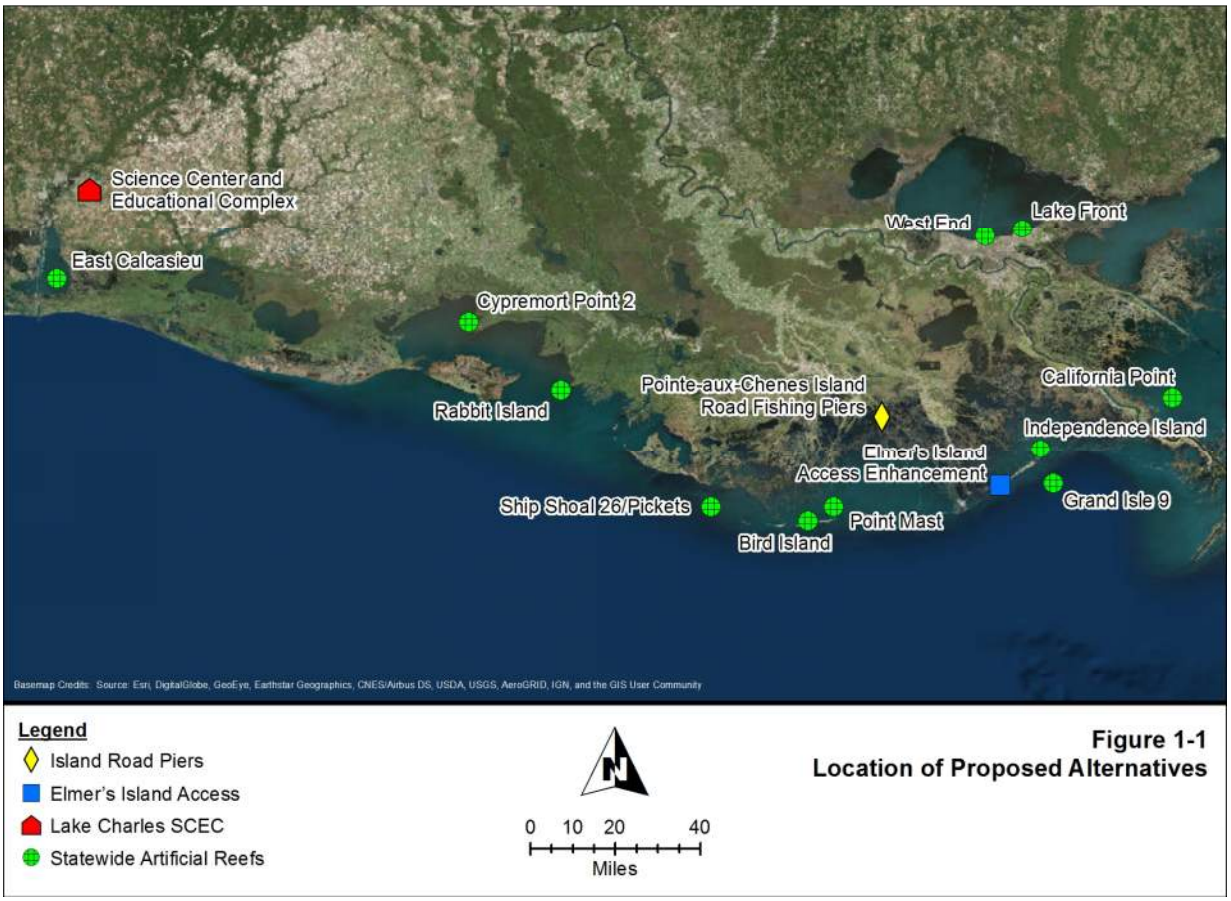

Figure 1-1
Location of Proposed Alternatives

1.6.2 Supplemental RP/EA for Elmer's Island Access Project Modification

During the public comment period for the Draft RP/EA #2, the LA TIG received more than 20 comment submissions from private citizens, businesses, federal, state, and local agencies, and non-government organizations. A summary of public comments is presented in Section 7 of this document. While comments on whole were favorable toward the Draft RP/EA #2, particular concerns were raised regarding the elevated lagoon boardwalk component of the proposed Elmer's Island Access project. As proposed, this feature originated near Elmer's Island Road, crossed the lagoon, and ran eastward approximately 0.75 mile, providing access to Caminada Beach. Several public comments voiced concern that the boardwalk would be a permanent obstruction across the lagoon, interrupting the natural landscape, disturbing habitat, and preventing access to the entire length of the lagoon for kiteboarding and kayaking. Other comments raised concern for the sustainability of an elevated boardwalk given the inevitability of hurricanes and tropical storms. It also was stated that previously existing elevated boardwalks in the area were not reconstructed because the posts, beams, and structural components led to accelerated erosion of the adjacent beach and dune. Other concerns included trash and debris removal with increased public access and the need for signage to increase environmental awareness and environmental stewardship. Public comments in support of the elevated boardwalk were enthusiastic about gaining access to the beach area and nearer to Caminada Pass

for recreational fishing because public driving on the beach was eliminated during construction, and after completion of the Caminada Headland Beach and Dune Restoration project (CAM II). Some commenters also suggested alternative boardwalk alignments for easier public access and a shorter walking distance to the beach, as well as suggested other means, such as a beach shuttle service, to assist the public in accessing the area for fishing and beach recreation.

Based on these public comments, the LA TIG decided to evaluate two additional boardwalk alignments of a behind-the-dune boardwalk and a beach shuttle service at Elmer's Island in the DWH Oil Spill LA TIG Supplemental RP/EA, herein incorporated by reference (http://www.gulfspillrestoration.noaa.gov/restoration-areas/louisiana). The additional boardwalk alignments included a boardwalk crossing the lagoon farther east than the original alignment and a boardwalk that would originate near an existing parking area and run parallel to the beach. Based on comparison of environmental impacts between the beach shuttle service and a behind-the-dune boardwalk, the beach shuttle service was selected as the preferred alternative.

The beach shuttle service would be contracted to a third-party and would provide a means of transportation along the 1.8-mile beachfront, which will remain closed to public vehicular traffic. For the first year, the shuttle service would ferry the public from the existing parking area east, toward Caminada Pass. After the first year, operation of the shuttle service would be evaluated to determine if the shuttle would service the beachfront westward of the existing parking lot or remain operational only east of the existing parking area. Three operations scenarios were considered, including a high coverage (maximum number of daily shuttles and shuttle season), moderate coverage, and low coverage. The high coverage operation scenario included 9,474 man-hours of operation year-round, the moderate coverage 8,483 man-hours of operation year-round, and the low coverage 7,262 man-hours of operation year-round. All three operations scenarios included a similar number of man-hours during the summer months (June–August). Monthly operation scenarios for the shuttle service are described further in Section 2 of the Supplemental RP/EA. While the shuttle service would not ferry people to the west from the existing parking area in the first year, this area may be traversed by shuttle vehicles for litter abatement and trash removal purposes.

For purposes of the Supplemental RP/EA, the high coverage operations scenario was used to analyze impacts associated with the proposed beach shuttle service alternative because it would have the greatest potential environmental impacts. All other features analyzed in the Draft RP/EA #2 that were proposed as part of the original Elmer's Island Access project, including the culvert installation, washout repair, boat launch, parking area, and observation deck, would remain unchanged, with the exception of the parking area and boat launch located at the original boardwalk origination point because these amenities were associated with the original boardwalk configuration, which is no longer proposed by the LA TIG.

The beach shuttle service would meet the purpose and need of this RP/EA #2, which allows the LA TIG to implement restoration projects that would provide the public with additional and enhanced recreational use services in Louisiana in a manner consistent with the Final PDARP/PEIS.

The LA TIG finds that the project change does not affect the LA TIG's proposed selection of the modified project under OPA. This analysis remains subject to the results of additional

consultations and reviews as required for compliance with all other laws (e.g., Endangered Species Act [ESA], Magnuson-Stevens Fishery Conservation and Management Act of 1976 [Magnuson-Stevens Act], and others), including consideration of any significant new circumstances or information presented as part of those processes.

1.7 Relationship to Other Plans, Policy, or Actions

1.7.1 Previous Restoration under DWH Early Restoration

Due to the magnitude of the DWH Oil Spill, the DWH Trustees began planning for and implementing Early Restoration projects with funding from BP before the oil spill's injury assessment was complete and prior to the entry of the Consent Decree. Early Restoration occurred in five separate phases, during which Early Restoration plans were prepared and associated NEPA compliance was completed. These actions are a subset of the extensive, continuing effort needed to address complete restoration of injuries to natural resources resulting from the DWH Oil Spill.

During Early Restoration, in June 2014, the DWH Trustees issued the Phase III ERP/PEIS, selecting, among a variety of other projects, the LMFERSC (Phase III ERP/PEIS, Chapter 9, Section 9.8). The LMFERSC was to establish state of the art facilities to responsibly develop aquaculture-based techniques for marine fishery management. The project included two hatchery and outreach facilities (Calcasieu Parish and Plaquemines Parish), with the primary location near Lake Charles also featuring a visitor center and youth fishing pond. The project locations had shared goals of fostering collaborative multidimensional research on marine sport fish and bait fish species; enhancing stakeholder involvement; and providing fisheries extension, outreach, and education to the public. However, site issues that arose during planning and development of the LMFERSC precluded the LA TIG from moving forward with the project as initially proposed. This plan considers re-allocating the $22 million in Early Restoration funding originally allocated to the LMFERSC project to other proposed alternatives evaluated within this RP/EA #2, and intended to provide and enhance recreational opportunities, with specific focus on recreational fishing opportunities.

1.7.2 Coordination with Other Gulf Restoration Programs

As discussed in Section 1.5.6 of the Final PDARP/PEIS, the LA TIG is committed to coordination with other Gulf of Mexico restoration programs to maximize the overall ecosystem impact of DWH NRDA restoration efforts. This coordination will ensure that funds are allocated for critical restoration projects across the affected regions of the Gulf of Mexico and within Louisiana.

During the course of the restoration planning process, the LA TIG has coordinated and will continue to coordinate with other DWH Oil Spill and Gulf of Mexico restoration programs, including the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States (RESTORE) programs and the National Fish and Wildlife Foundation Gulf Environmental Benefit Fund. In so doing, the LA TIG has reviewed the implementation of projects in other coastal restoration programs and is striving to develop synergies with those programs to ensure the most effective use of available funds for the maximum coastal benefit.

1.8 Public Involvement

Beginning in 2010, the DWH Trustees established websites to provide the public with information about injury and restoration processes and to solicit ideas for restoration projects.

Following a November 2016 notice, posted at http://www.gulfspillrestoration.noaa.gov, informing the public that the $22 in Early Restoration funding originally allocated to the LMFERSC project would need to be re-allocated, the LA TIG requested project ideas from the public. The project ideas submitted through the DWH Trustee Council website portal and Louisiana project portal were considered together with those gathered during all phases of Early Restoration, and the development of the Final PDARP/PEIS, and the public scoping conducted for this document.

On June 20, 2017, the LA TIG posted a Notice of Intent (NOI), informing the public that it was beginning to draft a restoration plan to address lost recreational opportunities caused by the DWH Oil Spill. Publication of the NOI did not solicit comments from the public. The DWH Trustees will provide a website link specific to this RP/EA #2 for public review and comment.

1.8.1 Public Review and Comment Opportunity

On December 20, 2017, the LA TIG released the Draft RP/EA #2 in the Federal and Louisiana Registers. Comments were accepted via an online public comment portal, in person, and U.S. Postal Service mail. The NOA also announced a public meeting scheduled for January 17, 2018, in Baton Rouge, Louisiana. However, due to icy conditions in Baton Rouge, the January 17 public meeting was canceled and rescheduled and held on January 24, 2018 in New Orleans. As a result, EPA published a second NOA in the Federal Register on January 26. The notice reopened the comment period through February 2, 2018 to allow the LA TIG to consider additional comments from the public, including those provided at the rescheduled January 24 public meeting. The Draft RP/EA #2 was made available for public review and comment for 45 days. The public comment period closed on February 2, 2018.

As described in Section 1.6.2, the Supplemental RP/EA was drafted based on public comments on the Draft RP/EA #2. This Supplemental RP/EA was made available for public review and comment for 30 days as specified in the public notice published on May 20, 2018. An additional public meeting, focusing specifically on the project modification as described in the Supplemental RP/EA, was held in New Orleans on May 22, 2018. The public comment period closed on June 20, 2018.

This Final RP/EA #2 was completed only after review, consideration, and response to public comments, and this Final RP/EA #2 has been modified in response to those comments in addition to incorporating the Supplemental RP/EA. Section 7 of this document provides a description of the comment analysis process, a summary of the public comments, and the LA TIG's responses to these comments.

1.8.2 Administrative Record

The DWH Trustees opened a publicly available Administrative Record for the NRDA for the DWH Oil Spill, including restoration planning activities, concurrently with publication of the 2010 NOI (pursuant to 15 CFR § 990.45). DOI is the lead federal Trustee for maintaining the Administrative

Record, which can be found at http://www.doi.gov/deepwaterhorizon/adminrecord. This administrative record site is also used by the LA TIG for DWH restoration planning.

Information about restoration project implementation is being provided to the public through the Administrative Record and other outreach efforts, including at http://www.gulfspillrestoration.noaa.gov.

1.9 Decisions to be Made

This document is intended to provide the public and decision makers with information and analysis on the LA TIG's proposal to proceed with the selection and implementation of the four proposed alternatives in this RP/EA #2. Upon finalizing this RP/EA #2, the LA TIG has determined that a Finding of No Significant Impact (FONSI) is appropriate. Decision to fund implementation of the projects is completed via LA TIG resolution.

1.10 Document Organization

Consistent with the proposed actions identified above, this RP/EA #2 is divided into the following sections:

- **Section 1** (Introduction and Planning Process): Introductory information and context for this document; background on the NRDA restoration planning process, summary of injuries to resources resulting from the DWH Oil Spill addressed in this RP/EA #2, and screening of alternatives to address those injuries;
- **Section 2** (Restoration Planning Process: Project Screening and Alternatives): Identifies and evaluates alternatives for compensating the public for the lost recreational fishing uses.
- **Section 3** (OPA Evaluation of Restoration Alternatives): Evaluates the suite of proposed alternatives for NRDA restoration.
- **Section 4** (NEPA Affected Environment and Environmental Consequences): Describes the affected environment and the environmental consequences for the suite of proposed alternatives evaluated in this RP/EA #2.
- **Section 5** (Compliance with Other Laws and Regulations): Identifies and describes other federal and state laws, in addition to the requirements of OPA and NEPA, that may apply to the proposed alternatives in this RP/EA #2.
- **Section 6** (Monitoring and Adaptive Management Plan and Best Management Practices): Presents monitoring and adaptive management requirements for DWH Oil Spill NRDA restoration projects.
- **Section 7** (Response to Public Comments): Provides a review of public comments received on the RP/EA #2.
- **Section 8** (List of Repositories): Presents a list of facilities that received copies of this RP/EA #2 for review by the public.

- **Section 9** (List of Preparers, Agencies, and Persons Consulted): Identifies individuals who substantively contributed to the development of this document.
- **Section 10** (Literature Cited): Lists sources cited in the preparation of this document.

1.11 Project Selection and Severability

In this RP/EA #2, the LA TIG selects four preferred restoration project alternatives with a total cost of approximately $22,000,000. As discussed in more detail in Section 2.1.4, the alternatives presented in this RP/EA #2 are independent of each other and were individually selected for implementation by the LA TIG.

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Section 2

Restoration Planning Process: *Project Screening and Alternatives*

This RP/EA #2 continues the restoration planning process that was started prior to the settlement of the DWH Oil Spill litigation. Previous steps taken in this process included assessing the injury from the DWH Oil Spill, developing restoration projects as part of the Early Restoration program undertaken jointly by the DWH Trustees and BP, and planning for programmatic restoration as part of the Final PDARP/PEIS (DWH Trustees 2016). Upon completion of the settlement with BP, the DWH Trustees created the LA TIG to implement comprehensive DWH restoration planning in Louisiana.

The focus of this RP/EA #2 is to "Provide and Enhance Recreational Opportunities." Louisiana suffered significant recreational use loss as a result of the DWH Oil Spill, including restricted and decreased access to recreational fishing opportunities, recreational camping activities, and outdoor recreational activities. Impacts from the DWH Oil Spill, including oiled shorelines, the closure of fishing and recreational areas, and the cancellation of recreational trips, resulted in losses to the public for use of natural resources for outdoor recreation, including fishing, boating, vacationing, camping, beach-going, and other recreational activities. These impacts affected South Louisiana, from the eastern portion of the State to the Texas-Louisiana border.

This RP/EA #2 tiers from the Final PDARP/PEIS, and the process outlined in this RP/EA #2 is consistent with the goal of providing and enhancing recreational opportunities. This section provides a discussion of the screening process used to develop the reasonable range of proposed alternatives in this RP/EA #2. Additional information regarding the Final PDARP/PEIS and Record of Decision, the relationship of this RP/EA #2 to the Final PDARP/PEIS, and a summary of the injuries addressed in this RP/EA #2 can be found in Section 1.3.

2.1 Project Universe

To begin the screening process, the LA TIG assembled an initial list of alternatives for the restoration of recreational use (i.e., Project Universe), which included the following sources:

- The DWH public comment portal established soon after the spill, allowing the public to submit projects for the DWH Trustee's consideration
- A similar web-based portal created in 2015 by the State of Louisiana (Louisiana Project Portal).
- Projects developed by the DWH Trustees for possible inclusion in the Early Restoration program
- Projects submitted in response to the LA TIG NOIs (November 23 to December 23, 2016 and May 16 to June 16, 2017)

- Projects identified by LDWF through a variety of means, including Office of Fisheries developed projects, Office of Wildlife developed projects on wildlife management areas (WMAs), proposals submitted to Wallop-Breaux Boating Access RFPs

After the removal of duplicates, the project universe included 263 alternatives that underwent screening as part of the restoration planning process. **Appendix A** contains a complete list of all alternatives considered for this RP/EA #2, along with project names, descriptions, locations, cost estimates, and submission source.

2.2 Screening of Alternatives

The goal of the LA TIG's screening process was to identify a set of proposed alternatives for this RP/EA #2 that provide a reasonable range of options that would compensate the public for Louisiana's lost recreational use caused by the DWH Oil Spill. The screening process was designed to identify proposed alternatives that provide recreational restoration and could be implemented with the $22 million in funds originally allocated to the LMFERSC Early Restoration project. The screening process also considered that proposed alternatives would satisfy the OPA criteria with no major negative environmental impacts under NEPA. The screening process included the following steps described below and illustrated on **Figure 2-1**.

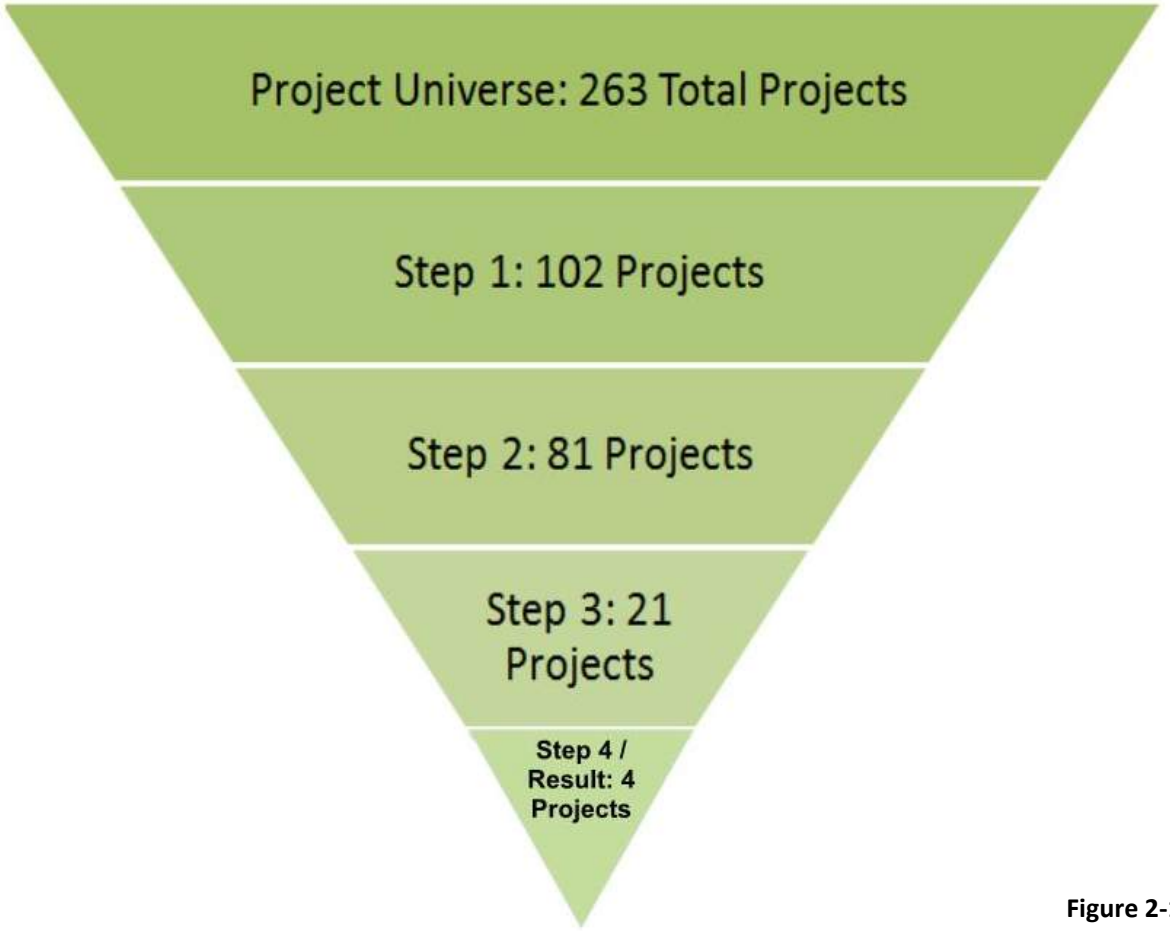


Figure 2-1
Graphical Summary of Recreational Use Alternative Screening Process

1. **Step #1:** Ensure consistency with "Provide and Enhance Recreational Opportunities" and the goals for this Restoration Type as defined in the Final PDARP/PEIS:

   - Increase recreational opportunities, such as fishing, beach-going, camping, and boating, with a combination of ecological restoration and creation of infrastructure, access, and use opportunities.
   - Use education and outreach to promote engagement in restoration and stewardship of natural resources, which could include education programs, social media, and print materials.

2. **Step #2:** Apply initial screening criteria:

   - Alternative is geographically located in Louisiana and is more appropriately conducted by the LA TIG than by the Regionwide, Open Ocean, or other TIG;
   - Alternative is more clearly aligned with the Restoration Type "Provide and Enhance Recreational Opportunities" and its associated goals than with another restoration type.
   - Alternative would help compensate for recreational fishing use services injured as a result of the DWH Oil Spill.

3. **Step #3:** Apply technical evaluation criteria:

   - Alternatives were evaluated by a cross-discipline panel of five LDWF biologists from both the Office of Fisheries and the Office of Wildlife in coordination with the LA TIG.
   - Panel evaluated each alternative based on 10 technical evaluation criteria to ensure a uniform, objective, and universal screening process (**Table 2-1**). The technical evaluation criteria were adapted from the Final PDARP/PEIS and OPA criteria and consider the same screening factors contained in the OPA criteria. Specifically, the technical evaluation criteria incorporate consideration of factors such as cost, nexus to recreational use injuries, implementation/permitting feasibility, and scope of benefits.
   - After the screening process, alternatives were graded according to the evaluation criteria applied to the available information for each project. Projects were then ranked into tiers (low, medium, or high) so that a reasonable subset of "Top Tier" alternatives could be identified and moved forward for additional consideration.

Table 2-1. Technical Evaluation Criteria and Descriptions Utilized in Step #3

Evaluation Criteria	Description
Final PDARP/PEIS Rec Use Appropriateness	Does the alternative address restoration of lost recreation use opportunities for the Louisiana public? Exceptional alternatives would provide for recreational opportunities (infrastructure, access, education) in heavily impacted areas.
Regional Connectivity/Spatial Distribution	Does the project fulfil a need in certain areas of coastal Louisiana? Factor in spatial relationship to other projects (including existing, planned, and/or other restoration).

Evaluation Criteria	Description
Leveraging with Matching Funds	Are there matching funds available/in place to increase the scope and beneficial impact of the project?
Partnerships	Are there partnerships available/in place to increase the scope and beneficial impact of the project?
Regional Planning Initiatives	Is the project part of a planning initiative/part of a larger plan?
Scope of Services/Impact	Does the project provide a valuable recreational use service for the Louisiana public? How many people stand to benefit from the project relatively (i.e., higher population density areas)?
Supporting Information/Level of Completeness	Does the project proposal have enough details to ensure complete understanding of project elements?
Permitting Feasibility/Completeness	Is it feasible that the necessary permits would be approved to develop the project? (i.e., Are there any issues or causes for concern?)
Land Rights	Have the land rights for the project been secured? If not secured, what is the likelihood that it can be accomplished (i.e., is the landowner known and/or part of the project partnerships)?
Long-Term Operations, Maintenance, and Monitoring	Are long-term operations, maintenance, and monitoring developed as part of the project? Higher scores would go to projects with a long-term plan in place.

4. **Step #4:** Apply additional screening considerations to the "Top Tier" alternatives, including, but not limited to:

   - Geographic distribution – While southeastern Louisiana was the most heavily oiled portion of the state, the injury of lost recreational use resulting from the DWH Oil Spill reverberated throughout coastal communities and impacted a substantial portion of the public, extending west to the Louisiana-Texas border. To prevent an overconcentration of projects in any one area and to maximize recreational opportunity for all coastal communities, the intent was to spread recreational use restoration across coastal Louisiana for greater accessibility to large population centers.
   - The inclusion of innovative approaches for restoring recreational resources and services through the utilization of multiple restoration techniques identified in the Final PDARP/PEIS (i.e., fisheries-based, recreational infrastructure, education and outreach, and habitat improvement).
   - The potential impact or synergy with other restoration activities in Louisiana, including long-term goals and objectives.
   - Viability of alternatives (e.g., land rights, permitting feasibility, implementation practicality), completeness (e.g., level of detail in project proposal/summary), and the relative likelihood of success.

- Retention of features from the original LMFERSC Early Restoration Project –that included recreational infrastructure, public access, and educational components.

2.2.1 Step #1: Ensure Consistency with "Provide and Enhance Recreational Opportunities" and the Goals for this Restoration Type

In Step #1, the LA TIG evaluated the 263 alternatives (**Appendix A**) for consistency with the "Provide and Enhance Recreational Opportunities" Restoration Type and its associated goals (as defined in the Final PDARP/PEIS). The majority of alternatives considered in this step included proposals from the DWH public comment portal (all projects submitted since the oil spill). Specifically, alternatives were included that identified the State of Louisiana as a project location and "human use" as the resource involved. Because of the broad nature and variety of submissions, it was determined that many of the alternatives represented activities other than "providing and enhancing recreational opportunities" and, as a result, were screened out in this step. Examples of the varying alternatives that were not carried forward to Step #2 included academic/research activities, monitoring/adaptive management activities, oil clean up specific activities, restoring offshore areas, seagrass restoration, open water fisheries restoration, bird restoration, shoreline stabilization, and bioremediation of estuaries and oil affected intertidal areas. Following evaluations conducted in Step #1, 102 alternatives were carried forward.

2.2.2 Step #2: Apply Initial Screening Criteria

In Step #2, the LA TIG applied the previously described initial screening criteria, to the 102 alternatives carried forward from Step #1. The LA TIG determined whether these 102 alternatives were clearly aligned with the "Provide and Enhance Recreational Opportunities" Restoration Type rather than another Restoration Type. Many of the alternatives that had a recreational and/or educational and outreach component were determined to be more appropriately aligned with another Restoration Type (**Appendix B, Table B-1**). For example, several of the educational/outreach projects were primarily focused on marine mammal conservation or related to human-dolphin interactions. The LA TIG determined that these projects were more clearly aligned with the Marine Mammals Restoration Type (as described in the Final PDARP/PEIS). Other alternatives, such as a proposed Gulf of Mexico Marine Sanctuary, were determined to be more appropriately considered by the Open Ocean TIG.

As mentioned previously, the majority of the recreational use loss as a result of the spill was to recreational fishing. In addition, this $22 million in Early Restoration funding was originally allocated to the LMFERSC, and the LA TIG desired that the proposed alternatives in this RP/EA #2 also sufficiently benefited recreational fishing use services. A number of alternatives were screened out because they would not provide sufficient benefits to recreational fishing use services. Examples of the alternatives that were screened out included proposals for recreational parks, general educational programs, habitat specific restoration projects, walking trails, and a wetlands plant nursery. It was determined that these alternatives would not help compensate for recreational fishing use services, consistent with the objectives of the original LMFERSC project and the recreational fishing use injuries sustained as a result of the oil spill.

2.2.3 Step #3: Apply Technical Evaluation Criteria

As a result of Step #2 screening criteria, 81 alternatives were carried forward. For Step #3, the previously described technical evaluation criteria (**Table 2-1**) adapted from the Final PDARP/PEIS and OPA criteria were applied to these 81 alternatives. The technical evaluation criteria incorporate consideration of factors such as cost and likelihood of success, nexus to recreational use injuries, implementation and permitting feasibility, and scope of benefits. The Step #3 evaluations resulted in a clear subset of alternatives that ranked in the upper quartile. These typically were alternatives that had clear, accurate and informative location descriptions, and included well defined and/or resolved land ownership rights. As such, the highest-ranked alternatives were located on State-owned properties or originated from project proposals submitted for Wallop-Breaux fishing access improvements in which case land rights and partnerships were identified and established by the submitting municipality. After the application of the technical evaluation criteria, 21 "Top Tier" alternatives (those projects with a screening result of "high") were carried forward to Step #4 (**Appendix B, Table B-2**).

2.2.4 Step #4: Apply Additional Screening Considerations to the "Top Tier" Alternatives

Although all of the alternatives evaluated in Step #4 would provide considerable benefits to restore for lost recreational use in Louisiana, only a limited number of alternatives can be prioritized for implementation at this time using the $22 million in reallocated funds from the LMFERSC Early Restoration project. The goal of Step #4 was to evaluate the 21 "Top Tier" alternatives and prioritize the most impactful alternatives that would enhance recreational use over the greatest geographical area in light of the funds available for reallocation (**Table 2-2**).

Important factors considered in Step #4 included the geographic distribution of alternative projects, the synergistic impacts with other restoration projects and activities in Louisiana, and utilization of all recreational use restoration approaches identified in the PDARP. Southeastern Louisiana was the most heavily oiled area of the State; however, the injury of lost recreational use resulting from the DWH Oil Spill reverberated throughout all coastal communities and impacted a substantial portion of the public statewide. Therefore, an adaptive approach was used to select a suite of projects that would spread recreational use restoration funds across coastal Louisiana, thereby maximizing accessibility for all coastal communities while avoiding an overconcentration of projects in any one area.

Also important was the retention of features and elements of the original LMFERSC Early Restoration project, including the general project location and proximity to the major population center in the southwestern portion of the state (i.e., Lake Charles). Specific elements of the original LMFERSC project that were considered in the evaluation of "Top Tier" alternatives included a visitor center focusing on fisheries themed public education, a dedicated public outreach venue, Americans with Disabilities Act (ADA)-accessible recreational fishing opportunities, and additional components supporting a diversity of extension and educational activities.

Furthermore, the viability of alternatives given the finite funds for reallocation ($22 Million) was taken into consideration, as was efforts to optimize project design to allow for the maximum number of projects to be efficiently implemented. A premium was placed on projects that could

be rolled out in a timely manner. To that end, the completeness of project plans and details were examined to account for the estimated timeframe for project implementation (i.e., identification of "shovel-ready" projects). Additionally, the inclusion of innovative approaches for restoring recreational resources and services through the utilization of multiple restoration techniques was prioritized.

As a result of Step #4 evaluations, 4 of the 21 alternatives were identified as highest priority based on the additional screening considerations described above. Initial cost estimates for the four alternatives exceeded the total amount of funds being reallocated, and as such it was thought that only three alternatives would be able to be carried forward for further detailed analysis in this plan. However, efficiencies identified through project optimization efforts (described in **Section 2.4**) and other considerations, including input from user groups, allowed for a readjustment of cost estimates and project budgets. Ultimately, this facilitated the inclusion of four alternatives in the reasonable range of proposed alternatives thereby maximizing the OPA benefits of this RP/EA #2. Moreover, as additional funds and resources become available, it is anticipated that alternatives not carried forward in this RP/EA #2 could be considered for future NRDA funding/restoration.

Table 2-2. Screening of "Top Tier" Alternatives

Project Name	Project Description	Screening Result
Belle Chasse	Walker Road boat launch facility in Belle Chase.	Not carried forward at this time in consideration of potential impact and synergies
Berwick	Improvements to Jessie Fontenot boat launch near Berwick.	Not carried forward at this time in consideration of geographic distribution, potential impact and synergies
Chitimacha	Construction of a new boat launch facility on Chitimacha property.	Not carried forward at this time in consideration of geographic distribution, potential impact and synergies
Elmer's Island Access	Suite of recreational access enhancement elements at Elmer's Island Wildlife Refuge.	Carried forward
Grand Isle LDWF Lab	Enhancement of fishing pier at the LDWF Fisheries Research Laboratory on Grand Isle to be used for group outreach and educational activities.	Not carried forward at this time in consideration of potential impact and synergies
Grand Isle Pier	Grand Isle fishing pier improvements, including additional parking, shelters, and ADA-accessible bathroom facilities for piers at both ends of Hwy 1 bridge.	Not carried forward at this time in consideration potential impacts and synergies
Hwy 90	Boat launch improvements to existing launch on Hwy 90 located near the St. Charles/Jefferson Parish line	Not carried forward at this time in consideration of geographic distribution, potential impact and synergies
Island Road Launch	Island Road boat launch renovation located on Pointe-aux-Chenes Wildlife Management Area (PACWMA). The current launch is in disrepair; this project would completely renovate and enhance this launch.	Not carried forward at this time in consideration of geographic distribution, potential impact and synergies, project completeness
Island Road Piers	Island Road is a small two-lane road connecting highway 665 to the Isle de Jean Charles - southern boundary of the Ensminger/Songe marsh management unit on PACWMA in Terrebonne	Carried forward

Project Name	Project Description	Screening Result
	Parish. This project would provide safe roadside parking in conjunction with public fishing piers.	
Lake Charles SCEC	The Science Center and Educational Complex (SCEC) would provide a visitor center, youth fishing pond, covered fishing pavilion, and other outdoor educational components on state-owned property in Lake Charles.	Carried forward
Montegut S1/S2 Access	PACWMA - Montegut Unit S1 (West) and S2 (East) access improvements; construct boat docks/fishing piers and walkway at water control structures to allow for safe fishing opportunities.	Not carried forward at this time in consideration of geographic distribution and project completeness
Pointe-aux-Chenes Fishing Piers	PACWMA fishing piers; this project would provide safe roadside parking in conjunction with public fishing piers.	Not carried forward at this time in consideration of geographic distribution and project completeness
Pass a Loutre WMA Access	Recreational access enhancements to the Pass a Loutre WMA.	Not carried forward at this time in consideration of project completeness, potential impact and synergies
Pass a Loutre WMA Campgrounds	Public campground improvements to the Pass a Loutre WMA.	Not carried forward at this time in consideration of project completeness, potential impact and synergies
Pirogue Launch	Montegut Pirogue Launch; Develop a launch for small vessels like pirogues and kayaks on the Montegut Management Unit of the WMA.	Not carried forward at this time in consideration of geographic distribution, potential impact and synergies, project completeness
Pirogue Pull-Overs	Create pirogue pull-overs for the limited access areas on Montegut and PAC units of the PACWMA.	Not carried forward at this time in consideration of geographic distribution, potential impact and synergies, project completeness
Port Sulphur	Civic Drive fishing pier and/or improvements to the makeshift boat launch in Port Sulfur	Not carried forward at this time in consideration of potential impact and synergies
Rockefeller Piers	Create new recreation and observation piers for birding, fishing, and crabbing opportunities at Rockefeller Refuge.	Not carried forward at this time in consideration of geographic distribution, project completeness, potential impact and synergies
Rockefeller Signage	Create signage for informational outreach display for recreational users of the Rockefeller Refuge.	Not carried forward at this time in consideration of geographic distribution, potential impact and synergies
Seawall Lights	Installation of light poles and safety lights along Reaches 4 and 5 of the south shore seawall, which would enhance night fishing opportunities for the south shore of Lake Pontchartrain.	Not carried forward at this time in consideration of geographic distribution, potential impact and synergies
Statewide Artificial Reefs	This proposed project would fund the enhancement of 11 existing multi-purpose artificial reef sites located across Louisiana's coastal basins to provide enhanced recreational opportunities for anglers throughout Louisiana.	Carried forward

2.3 Alternatives Considered but Not Carried Forward at This Time

The LA TIG considered a total of 263 project alternatives to compensate for lost recreational fishing use, consistent with the injuries caused by the DWH Oil Spill and original objectives embodied in the LMFERSC Early Restoration project. Through this screening process and the

sequential application of screening criteria, as described in Steps 1-4 above, 259 alternatives that were considered by the TIG were screened out and not carried forward for further detailed evaluation in this RP/EA #2. In addition to the information presented in Section 2, further information regarding the disposition of alternatives considered can be found in **Appendix B**. Although the scope of this RP/EA #2 focuses on reallocation of funds previously provided for the LMFERSC Early Restoration project, alternatives considered but not carried forward at this time could be considered by the LA TIG in future DWH Oil Spill NRDA restoration planning efforts.

2.4 Range of Proposed Alternatives

The screening process identified four Proposed Alternatives located in Louisiana to be carried forward for detailed OPA/NEPA analysis (refer to **Figure 1-1**). Per OPA 990.54(b), these are the preferred alternatives. A brief description of project highlights, congruency with Step #4 evaluation, and project optimization efforts is described below.

2.4.1 Elmer's Island Access

This project would improve the recreational access opportunities on the Elmer's Island Wildlife Refuge operated by LDWF. This area was heavily impacted by the DWH spill, and recreational access has been further restricted as the result of CAM II (i.e., driving on beach no longer allowed). A suite of different project elements, varying in scope and location, were considered in optimizing the proposed alternative. This included consideration of boat and kayak launches and locations, parking areas of various size and location, culvert siting, and a beach shuttle service. Consultations with local, state, and federal government, as well as stakeholders helped shape the project elements and long-term operational plan. This was the most highly ranked recreational fishing access project, as well as offering improved birding and other recreational opportunities. Estimated budget for this project is $6 Million, which would be allocated for final design and construction, as well as long-term operations, maintenance, and monitoring.

The Elmer's Island Access project evolved through the restoration planning process, based on public comments, as described in Section 1.6.2 of this RP/EA #2. Public comments expressing concerns about the original boardwalk feature prompted the development of the Supplemental RP/EA. In the Supplemental RP/EA, the LA TIG considered an alternative boardwalk alignment located behind the dune and a beach shuttle service, to address the public's concerns (see Supplemental RP/EA, Section 2). Based on the analysis of the original proposed boardwalk alignment, the behind-the-dune boardwalk alignment, and the beach shuttle service, the beach shuttle service now replaces the boardwalk as a feature in the LA TIG's preferred alternative. The Elmer's Island Access project preferred alternative includes the beach shuttle service, in addition to all other features described in the December 2017 Draft RP/EA #2, except for the parking area and kayak launch associated with the original boardwalk alignment.

2.4.2 Statewide Artificial Reefs

This project would enhance a series of 11 artificial reef sites across each of Louisiana's coastal basins, including some sites located in areas heavily impacted by the DWH spill. Initial project iterations considered enhancements to up to 15 existing reef sites as well as the possibility of adding new sites. However, process and cost efficiencies and site prioritization and optimization strategies were identified through adaptive resource management. Thereby, the final number of

reef sites for enhancement was settled upon at 11, based on cost considerations and on the current reef site permit status and thus ability to implement strategic enhancements in the most expedient of timeframes. This was the most highly ranked recreational fishing habitat enhancement project. In addition to providing habitat for a diversity of aquatic animals, artificial reef enhancement would provide widely distributed access opportunities across the Louisiana coast. Estimated budget for this project is $6 Million, which would be allocated for deployment of reef materials and monitoring of enhancement activities at inshore and nearshore artificial reef sites in each of Louisiana's coastal basins.

2.4.3 Lake Charles Science Center and Educational Complex (SCEC)

This project would retain many elements of the LMFERSC Early Restoration project, in the same general area of the state, but in a much more accessible location at a currently undeveloped site in the Lake Charles city limits. A Science Center open for public visitation would feature display aquaria, touch tank, and educational displays. The Educational Complex would feature a stocked and managed pond offering youth and ADA-accessible recreational fishing opportunities. Other project elements include integrated fisheries and wildlife educational and outreach features, along with a nature trail and hunter safety range. This was the most highly ranked educational and outreach focused restoration project, which also provides recreational access and collaborative extension opportunities. The original estimated budget for this project was $10 Million, but operational and design efficiencies were identified through project optimization analysis. This included consideration of facility layout of the pond and parking features, design elements of the visitor center and fishing pavilion, and the optimization of long-term operations and maintenance. This has resulted in a revised estimated cost of $7 Million, which would be allocated for final design and construction, as well as long-term operations, maintenance, and monitoring.

2.4.4 Island Road Piers

This project would develop a series of five road-side pullovers/parking areas with adjoining fishing piers to enhance fishing opportunities by creating safe recreational areas on the most heavily utilized WMA in the State. This was the most highly ranked recreational fishing access project on a WMA and has undergone preliminary design to ensure expedient implementation. This design analysis considered various locations, sizes and configurations of parking areas/piers along Island Road, as well as the life cycle costs associated with different construction materials. Estimated budget for this project is $3 Million, which would be allocated for final design and construction, as well as long-term operations, maintenance, and monitoring.

Detailed descriptions of the four Proposed Alternatives are included in Section 3.

Section 3

OPA Evaluation of Restoration Alternatives

According to the NRDA regulations under OPA, trustees are responsible for identifying a reasonable range of restoration alternatives (15 CFR § 990.53(a)(2)) that can be evaluated according to the OPA evaluation standards (15 CFR § 990.54). Section 2 describes the screening process adapted from the Final PDARP/PEIS and OPA NRDA regulatory criteria used to identify a reasonable range of alternatives for evaluation under OPA. The following sections describe considerations that the LA TIG included when performing the OPA evaluation of these alternatives. This evaluation process is informed by the OPA criteria found in 15 CFR 990.54(a), as well as the Final PDARP/PEIS and public comments, including those received for this RP/EA #2.

For each alternative, the OPA NRDA regulatory criteria are evaluated independently, and a determination is made on how well the alternative meets that element. The LA TIG applied each of the OPA NRDA regulatory criteria to the reasonable range of alternatives in this section to provide (1) a summary explanation of the types of questions and analysis raised under each of the OPA NRDA regulatory criteria, and (2) a narrative summary of each alternative's evaluation with respect to those criteria.

i. The cost to carry out the alternative. The analysis of the LA TIG addresses the following questions. Is there a description of the anticipated costs of the alternative? Are the costs of the alternative (including land acquisition, design, construction, management, monitoring, and maintenance) reasonable, appropriate, and comparable to other equivalent restoration alternatives?

ii. The extent to which each alternative is expected to meet the LA TIG's goals and objectives in returning the injured natural resources and services to baseline and/or compensating for interim losses. The LA TIG's analysis addresses the restoration alternative's nexus to the lost recreational fishing use injury as described in the Final PDARP/PEIS while also evaluating the nature, magnitude, and distribution of the recreational benefits expected to be provided to the public by each alternative. Each of the following components of this element are evaluated independently and qualitatively, where appropriate:

Nexus to Injury: Alternatives are evaluated on their ability to benefit individuals who visit Louisiana coastal areas for the primary purpose of engaging in recreational fishing.

Benefit to Injured Resources: Each of the following points capture elements necessary to evaluate the relative benefits of the restoration alternatives:

- **Component Benefits** – What are the anticipated recreational benefits of the alternative? What are the alternative attributes that are expected to increase or improve the recreational fishing experience? Examples of attributes that are expected to increase or improve recreational use experiences include:

  - Reductions in marine debris
  - New or improved access points (e.g., dune walkovers, fishing piers, parking)
  - Amenities (e.g., bathrooms, walking paths, birding areas)
  - Public education and stewardship opportunities related to Louisiana's fisheries and natural resources

- **Scope of Benefits** – What is the scope of the anticipated recreational benefits? What information is available on the level of current use at the alternative site and the beneficial impacts expected after implementation of the alternative (e.g., increases in visits to a site, number of individuals experiencing enhanced recreational values, changes in acreage of available recreational areas, number of new access points)? What is the timing of the anticipated benefits?
- **Public Access** – How will members of the public be able to access the benefits from the proposed alternative?
  - Can users be excluded from enjoying the benefits of an alternative? Do any potential exclusions disproportionately affect any demographic subset of the population?
- **Location** – Where is the alternative located? Considerations for siting restoration include:
  - Availability of substitutes (e.g., if there are fewer nearby available sites that provide similar recreational benefits, the alternative may convey a higher value)
  - Uniqueness of restoration (e.g., if the recreational amenities proposed are unique it may lead to more long-distance trips to the site and possibly result in a higher per-trip value)
- **Additional Benefit Considerations** – What is the magnitude of additional benefits from the alternative in comparison to the existing state of the resource?

iii. The likelihood of success of each alternative. Does the alternative propose restoration approaches or techniques that the LA TIG has previously executed successfully? Is the restoration approach or technique routinely used? How did these past experiences inform the development of the alternative so as to increase its likelihood of success? For novel or new techniques, has the LA TIG incorporated any measures to minimize risk? Has the LA TIG considered the uncertainties influencing success and any adaptive management approaches that would address those uncertainties?

iv. The 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. Does the restoration alternative have direct or indirect collateral environmental impacts (positive or negative)? Many of these considerations are covered in the "Affected Environment" and "Environmental Consequences" sections of this document (Section 4).

v. The extent to which each alternative benefits more than one natural resource and/or service. Although each alternative is funded exclusively from one Restoration Type allocation, the LA TIG considered the importance of multiple resource benefits by evaluating whether alternatives convey multiple ecosystem service benefits (in addition to recreational use) that make them more valuable to the public (e.g., non-use (ecological) values, storm-protection benefits, and habitat/resource improvements that may benefit ecological resources injured by the DWH Oil Spill).

vi. The effect of each alternative on public health and safety. The LA TIG considered whether there are any aspects of the alternative that could adversely affect public health and safety that cannot be mitigated.

For all of the proposed alternatives:

- *Best Management Practices* (BMPs) are discussed throughout Section 3 as relevant to avoiding adverse impacts to the physical, biological, and/or socioeconomic environment.
- *Monitoring and Adaptive Management* is presented in Section 6 and fully described in **Appendix E**.
- *Construction Schedule(s)* are included in this Section; however, estimated construction timeframes may be refined during final project design.

If the trustees conclude that two or more alternatives are equally preferable, the most cost-effective alternative must be chosen (15 CFR § 990.54(b)).

3.1 Elmer's Island Access

3.1.1 Project Description

This Proposed Alternative would fund a suite of recreational access enhancement activities on Elmer's Island. The cost for implementation of this Proposed Alternative is $6 million. As described in Sections 1.6.2 and 2.4.1, two non-preferred alternatives for the Elmer's Island Access project were also analyzed with respect to the OPA NRDA criteria—the original proposed Elmer's Island access project containing a lagoon-traversing boardwalk and another alternative with a behind-the-dune boardwalk alignment. The OPA evaluation for the project containing the original boardwalk alignment can be found in Section 3.1 of the December 2017 Draft RP/EA #2 and is herein incorporated by reference. The OPA evaluation for the project containing the behind-the-dune boardwalk alignment can be found in Section 3 of the Supplemental RP/EA and is herein incorporated by reference. As a result of the Deepwater Horizon oil spill and related response actions, the public's access to and enjoyment of the natural resources at the Elmer's Island Wildlife Refuge was denied or severely restricted. The OPA evaluation for both non-preferred boardwalk alignments (Supplemental EA Section 3) indicated that the infrastructure costs of the projects are well documented, reasonable, and appropriate. Both have a strong nexus to the recreational injury caused by the DWH Oil Spill and can reasonably be expected to provide benefits to the public over an extended timeframe. The boardwalk alignments would provide new and improved public access to resources that were injured by the DWH Oil Spill and have a high probability of success. Finally, public safety issues are not expected to be a concern. The OPA

evaluation for the LA TIG's preferred alternative, containing the beach shuttle service feature, is described below.

Current Status

Elmer's Island Wildlife Refuge, also referred to as Elmer's Island or simply Elmer's, has been owned and operated by LDWF since 2008. The management goals and primary objectives seek to strike a balance between natural ecological features and services, and the enjoyment of recreational opportunities for the public. The guiding document, where much of the following information was derived, is the *Elmer's Island Refuge Management Plan* (LDWF 2016) published by the LDWF and available online at the Department's website (www.wlf.la.gov). According to the plan, the overarching goals and objectives for the management of the Elmer's Island Wildlife Refuge include (1) providing access for outdoor activities, education, and recreational fishing opportunities; (2) encouraging and supporting research on the wildlife and fisheries resources at Elmer's Island;) restoring the habitat to benefit the native ecosystem; (4) engaging volunteers and educational organizations in projects on the refuge; (5) protecting endangered and threatened species through regulatory and habitat management; and (6) coordinating with adjacent landowners, local governments, and non-governmental organizations.

History

The Elmer's Island property was historically known as Goat Island but started being referred to as Elmer's Island in the 1970s based on the last name of the landowner. For more than 30 years Elmer's Island was operated as a commercial campground and primitive area, until the unexpected death of the landowner in 2002. This began an abrupt 6-year closure of the area to all public recreational users. In 2003, a House Concurrent Resolution was enrolled to "urge and request the governor and the commissioner of administration to take the necessary steps to enable the state of Louisiana to purchase Elmer's Island in Jefferson Parish." Attempts to purchase the property failed due to price dispute. In December 2008, the Governor of Louisiana declared the accreted land as state property and opened the beachfront as an LDWF Refuge, which at the time was only accessible by boat. The Louisiana Department of Transportation and Development repaired the access road (from damages sustained during Hurricanes Katrina and Gustav), and on July 3, 2009, LDWF opened the refuge to all visitors through the renovated beach access road. Since then, additional adjoining properties have been acquired and enrolled into the refuge.

Past Recreational Use

Elmer's Island is strategically located in a coastal area with high levels of tourism with both Grand Isle and Fourchon within a 5-mile radius of the refuge. These locations were identified as the most popular destinations for coastal tourism in Louisiana as reported in a 2003 survey report from Louisiana Sea Grant (Caffey et al. 2003). This survey was conducted after the landowner died and the privately run campground and beach access was abruptly closed. This report estimated the annual visitation to the Elmer's Island campground to be approximately 40,000 (based on former staff observations and the assumption of three people per car) from the years 1998-2002. The report suggested annual visitation of 60,000 people could be achieved with modest site improvements, which was part of the basis of public support motivating the State of Louisiana to grant ownership and operations to LDWF to ensure public access and utilization of this remarkable coastal landscape.

Elmer's Island is a destination site for visitors to the area, including anglers and other eco-tourists. The Elmer's Island property provides an area of beachfront and marsh that the public can access free of charge (anglers are required to possess relevant licenses) throughout the year (extreme weather excluded) during daylight hours (closed at night; no overnight camping allowed). After officially reopening in 2009, LDWF initial estimates of visitor use have been very high (approximately 100-200 vehicles on any given weekend day), and with beach driving allowed many visitors often chose to drive down to the eastern end of Elmer's Island to fish along the Caminada Pass beachfront. This public access property is regularly used for recreational fishing, bird watching, collaborative restoration projects, outdoor education programs, and many volunteer opportunities.

The DWH Oil Spill occurred less than 1 year after the grand re-opening of Elmer's Island Wildlife Refuge. This resulted in a complete closure of the refuge for over 1 year due to it being heavily impacted from persistent oiling, requiring intensive cleanup operations. Elmer's Island finally reopened to the public post-spill on May 25, 2011; however, there were additional intermittent and partial closures from September 2012 through February 2013. Elmer's Island is also the site of the recent CAM II, which was completed in 2016, with funding from National Fish and Wildlife Federation, Gulf Environmental Benefit Fund. During this project's construction phase, access to the western portion of the beach was closed beginning in April 2015, and then the eastern beach access was closed on August 2016. Upon completion of the CAM II project October 2016, public beach access has reopened to pedestrians from the main parking area, but public driving on the beachfront is not allowed by statutory authority. Access closures and more restrictive driving policies have likely resulted in the reduced recreational use of Elmer's Island noticed since reopening in late 2016, with an estimated maximum of 50 vehicles per day on a busy weekend compared to pre-spill usage estimates. However, there is no established baseline of recreational uses due to the variable nature of the property's history.

Enhanced Recreational Opportunities

The Proposed Alternative, Elmer's Island recreational access, would use $6 million of NRDA funding to enhance recreational opportunities on Elmer's Island by incorporating a suite of elements to improve upon existing access points, enhance the natural features of the Proposed Alternative's area through reconnected hydrology, and develop a solution for improved access for recreational fishing activities targeting the eastern portion of Elmer's Island adjacent to Caminada Pass (**Figure 3-1**). Additional alternatives to the project described below were considered during the screening of project alternatives. See Section 2.4 Range of Proposed Alternatives

Currently, the refuge is managed as a natural or primitive area, with very few amenities or facilities. Access to the beach from Highway 1 is provided through a crushed stone roadway, which is maintained by the LDWF; small boats are launched from natural areas that are not maintained. Protected species are managed so that the area can stay open to visitors all year round. This is accomplished by discouraging nesting activity along the pedestrian access corridors from the main parking area to the beach and by roping off dune nesting areas, thereby allowing beachfront access zones and recreational usage of the beach. The Elmer's Island Proposed Alternative would include development of final design specifications and implementation of the following features and scope of activities:

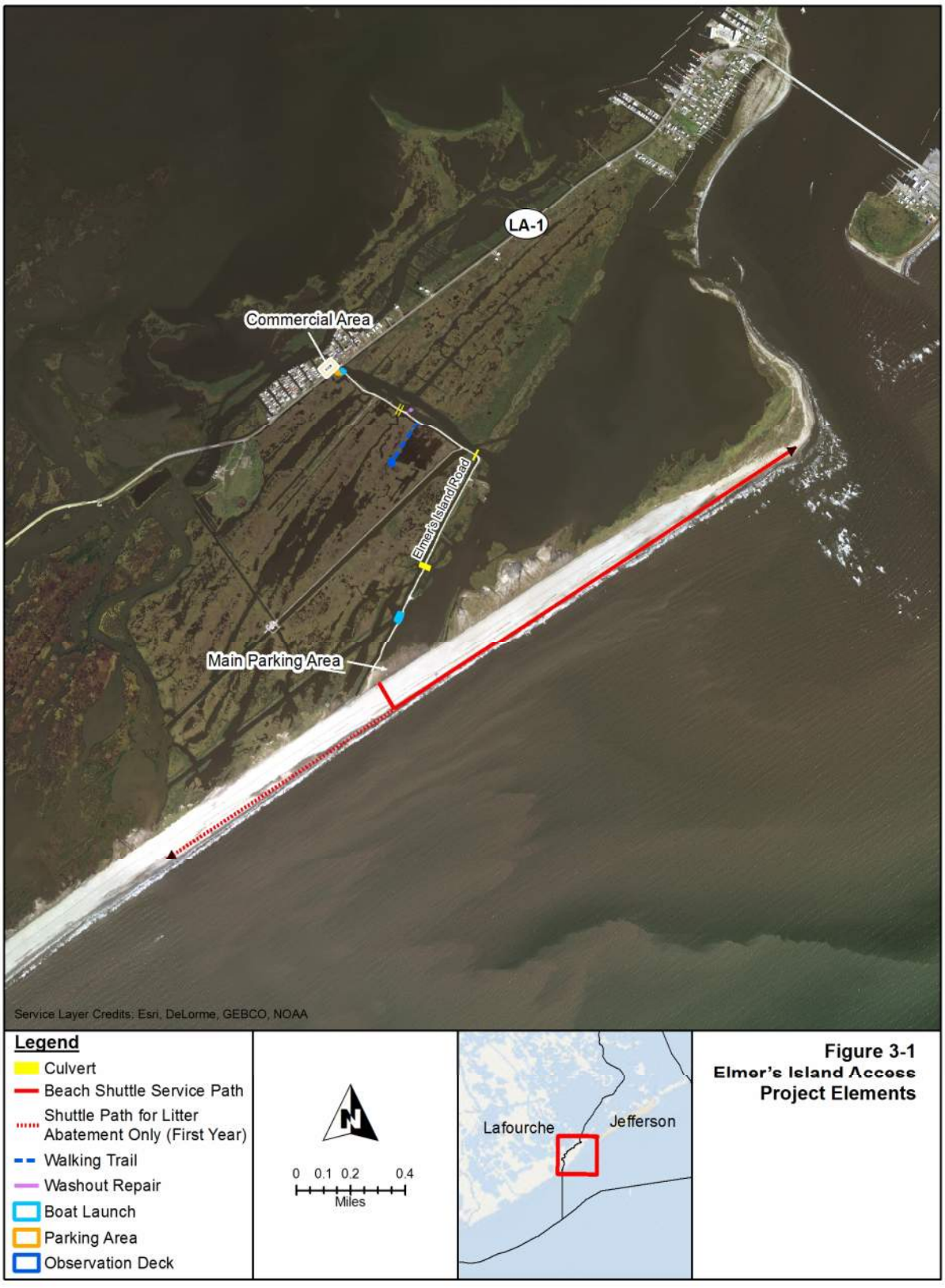


Figure 3-1
Elmer's Island Access Project Elements

- Cost to complete engineering and design (E&D) to allow for project construction
- Improvement of aquatic hydrology through the installation of culverts under the access road
- Enhancement of access features by improvements to a currently improvised parking area and small-boat launches
- Operation of a beach shuttle service to facilitate beach access points
- Repair of breach/washout location to allow foot traffic to additional fishing areas
- Improvements to dedicated birding area, including walking paths and observation area
- Outreach and educational materials to complement the Proposed Alternative
- Long-term (15 years) operational costs, including routine trash collection and removal
- Long-term (15 years) maintenance costs associated with project upkeep, including routine and emergency road repairs
- Long-term monitoring of recreational usage of Elmer's Island (pre- and post-Proposed Alternative)

As the managing authority for Elmer's Island Wildlife Refuge, LDWF would serve as the implementing agency for project elements described in this RP/EA #2. LDWF would oversee project activities, including final design, construction of project elements, operational and maintenance costs, and project monitoring. Identified project activities and features would be implemented using NRDA funds. However, as with the history of Elmer's Island future additional funding opportunities would be sought to further enhance recreational activities on the refuge. This Proposed Alternative would greatly enhance the utilization of Elmer's Island as a recreational area that offers access to renewable fish and wildlife resources and their supporting habitats, provides premier recreational fishing areas and inspirational educational experiences for the public.

Project Details

Improved aquatic hydrology. Areas of the marsh within the northwestern portion of the refuge have become impounded, partially due to the Elmer's Island access road acting as a barrier. This Proposed Alternative would install a series of culverts under the road to reconnect the lagoon to the back marsh, Bayou Thunder, and the Moreau watershed west of Elmer's Road. Installing culverts under the access road would restore the hydrology of the back-area marshes, provide fish and aquatic animal passage, as well as improve recreational fishing opportunities in those areas. The culverts would also improve dissolved oxygen levels in the water along the marsh, thereby decreasing fish kill occurrences.

Enhance access features. The marshes, canals and back bay area of Elmer's Island Wildlife Refuge could be better utilized by anglers and other user groups by adding improved parking and boat launches at multiple locations to improve access opportunities. This Proposed Alternative

would add material, such as crushed rock and/or sand, at strategic locations to create improved parking at one location and add material at the water's edge to create a gentle slope for launching boats or other small or non-motorized vessels at two locations.

Beach Shuttle Service. Public driving is no longer allowed on the beach at Elmer's Island, so for anglers that want to fish Caminada Pass, this meant they would have to tote all supplies over 1.5 miles from the main parking area. The Elmer's Island shuttle service would provide a means of transportation for up to 2.6-miles of beachfront, which would remain closed to public vehicular traffic. For the first year, the service would be to the Caminada Pass area along the easternmost portion of the beach (approximately 1.8 miles). After the first year, operation of the shuttle service would be evaluated to determine if the shuttle would service the beachfront westward of the existing parking lot (approximately 0.8 miles) or remain operational only east of the existing parking area. Visitation at Elmer's Island is highest during the summer months, between May and Labor Day. Peak holidays include Easter (outside of the summer season), Memorial Day, Fourth of July, and Labor Day. As stated in the Louisiana Administrative Code, Title 76, Elmer's Island is open for visitation from 30 minutes before sunrise to 30 minutes after sunset.

This shuttle service would be contracted to a third party through the state bidding process and each contract term would be for a maximum of 3 years. As such, each 3-year contract would provide the opportunity to employ an adaptive management strategy to routinely evaluate the effectiveness of the shuttle service and address any adverse environmental impacts. This would allow contracts to be flexible and adaptable so that the scope of future contracts would most efficiently use the available funds while balancing the service's effectiveness based on the number of visitors (as identified through utilization monitoring), public feedback, contract monitoring, and environmental impact. Facilities, storage, fueling and maintenance operations associated with the third-party contractor would all be located off-site, eliminating the need to evaluate any environmental consequences and/or impacts associated with these type features. A third party would also eliminate insurance requirements and liabilities for LDWF and the Refuge.

Washout Repair. This element of the Proposed Alternative would include repair to a breach in an offshoot of the Elmer's Island access road that connected to a small island along Gormley Canal that is a popular fishing location. Construction activities would use mixed aggregate (large limestone base with smaller rock on top) to develop a footpath to the island, and the final design may include a culvert to allow water flow and fish passage.

Birding Area. The most recent land acquisition on the refuge includes a 34.1-acre parcel that was owned by the Federal Aviation Administration (FAA), which included an FAA-maintained tower on the property. Once the FAA tower was removed, the land was sold to the Louisiana Wildlife and Fisheries Foundation and was subsequently donated to LDWF for refuge inclusion. This parcel within the refuge contains a unique landscape due to being surrounded by a berm, which keeps the interior marsh relatively fresher than the rest of the refuge. This makes this area a popular location for bird-watching. This element of the Proposed Alternative includes improvements to the area, including enhancement of a walking path with crushed rock and the creation of an observation deck/platform for birders and nature photographers.

Outreach and Education. As a primitive coastal headland, Elmer's Island offers unique opportunities for collaborative educational and outreach activities. Throughout its existence,

Elmer's Island has fostered and facilitated partnerships between LDWF, other state and federal agencies, conservation groups and other non-governmental organizations, and countless volunteers, including school groups of all ages. For this element of the Proposed Alternative, signage and other educational materials would be posted at strategic areas of the refuge to enhance recreational experiences through increased understanding of the valuable habitats.

Operational Costs. One of the major issues on Elmer's Island is the buildup of trash and other marine debris. Litter and marine debris removal efforts are currently organized through LDWF in conjunction with various organizations utilizing volunteer effort. Although this provides some temporary relief and public education on the issues, litter and marine debris continue to be a problem. Litter is an eyesore along the beach and can lead to entanglement issues and ingestion of debris by wildlife. Continued and routine removal is needed to maintain the refuge for visitors and for wildlife, and as such, this Proposed Alternative includes the long-term (15 years) operational costs, including the development of strategy to effectively manage the problem. Tentatively, LDWF proposes a routine weekly clean up during the summer months and monthly organized efforts during the "off-season" (October–April). While the shuttle service will not ferry people to the west of the parking area for the first year, shuttle vehicles may be used for litter abatement and trash removal services.

Maintenance Costs. The 1.5-mile access road at Elmer's Island Wildlife Refuge is currently maintained as needed by LDWF through collaborative efforts. Maintenance and emergency repairs are regularly required to provide public access to the refuge. Damages to the road can be caused by excessive rainfall, vehicular wear and tear, and tropical weather events. In 2012, damages that occurred due to the passing of Hurricane Isaac closed off all vehicular traffic to the beach; these damages were repaired as an emergency measure for continued oil spill abatement to provide access for the U.S. Coast Guard (USCG) and other associated workers. Routine maintenance such as grading, adding limestone, and clearing drainage areas is required for continued operation of the road. This element of the Proposed Alternative would include a maintenance plan and budget for long-term (15 years) maintenance needs to the access road and other Proposed Alternative features.

Monitoring Activities. The Proposed Alternative would include monitoring activities to ensure project success. Implementation monitoring would ensure the Proposed Alternative, following final design, is properly constructed to meet the desired goals of this RP/EA #2. Regularly scheduled monitoring of all elements within this Proposed Alternative would be conducted to ensure public safety.

Construction Schedule. Project implementation would include final design and permitting, as well as construction activities. It is estimated that final design would take approximately 10 months and permitting efforts would run concurrently. It is estimated that construction of project elements would take approximately 16 months; however, some elements may need to be strategically implemented at certain times of the year to avoid impacts to natural resources, as described in the best management practices. These are preliminary estimates, and efforts would be made to streamline these processes to implement project elements in the timeliest manner possible. Furthermore, a portion of project funds would be used for long-term maintenance as described above.

3.1.2 OPA Evaluation

The cost to implement the alternative. The cost to implement the Elmer's Island Proposed Alternative for recreational enhancements are reasonable, appropriate, and comparable to other equivalent restoration alternatives. The proposed cost of the Elmer's Island recreational access enhancement is approximately $6.0 million (**Table 3-1**). No land acquisition costs are associated with the Proposed Alternative because the state already owns the property. The estimated construction costs represent the best estimates of the designers and are comparable with the costs of similar projects.

Table 3-1. Estimated Cost for Elmer's Island Access

Description	Estimated Cost
Final Engineering and Design	$270,000
Construction/Operation of Project Elements	$3,335,000
Contingency (~12%)	$450,000
Operations and Maintenance (15 years)	$1,875,000
Monitoring and Adaptive Management	$70,000
Total	***$6,000,000***

All work would be awarded in compliance with Louisiana's public bid laws and regulations, ensuring that the project is constructed at current market rates. Operation and maintenance costs (15 years), for the public access features would be funded per costs included in **Table 3-1**. Projections of operating costs, utilization, were based on other similar projects managed by LDWF.

The extent to which each alternative is expected to meet the LA TIG's goals and objectives in returning the injured natural resources and services to baseline and/or compensating for interim losses.

Nexus to Injury. The Elmer's Island Proposed Alternative has a strong nexus to the DWH recreational injury. As mentioned previously, the majority of the recreational use loss in Louisiana, as a result of the spill, was to recreational fishing. During the spill, the island received extensive oil impacts that limited recreational fishing. The Proposed Alternative is designed to enhance recreational fishing experiences, both by increasing visitation and enhancing the quality of future recreational visits to the area. As such, the Proposed Alternative's goal of creating and enhancing visitor access to recreational fishing at Elmer's Island Wildlife Refuge, has a strong nexus to the public's lost recreational fishing. The recreational opportunities that would be created by this Proposed Alternative are the same shoreline uses that were lost due to the DWH Oil Spill (i.e., lost user-days of fishing, wildlife viewing). Visitors to Elmer's Island Wildlife Refuge, the same user population that the DWH Oil Spill affected, would benefit from this Proposed Alternative. The Proposed Alternative represents "in-place, in-kind" restoration and is fully consistent with OPA objectives for compensatory restoration.

Benefit to Injured Resources

- *Component Benefits:* The Proposed Alternative's location and amenities are within the geographical footprint of the DWH injury. The Elmer's Island Wildlife Refuge recreational amenities are designed to be used by recreational fisherman, birdwatchers and to

aid/enhance their ability to access and enjoy fishing, wildlife viewing and natural resources educational opportunities within the refuge. Adding educational signage is expected to increase environmental awareness and promote environmental stewardship.

- *Scope of Benefits:* The scope of benefits for the Elmer's Island Wildlife Refuge Proposed Alternative would be a direct function of capacity utilization along the access road, designated parking areas, birding areas, etc.

- *Public Access:* The recreational benefits of this Proposed Alternative would be broadly available to the public. However, because of a lack of public transportation in the area, benefits would likely accrue primarily to individuals who own vehicles and have sufficient disposable income to drive to the site. No users would be actively excluded by the Proposed Alternative. During the peak summer season, parking capacity and crowding would limit the total benefits available. The proposed features would greatly improve the parking capacity that currently exists at the island.

- *Location:* Elmer's Island Wildlife Refuge has limited public shore fishing opportunities in an area where recreational fishing is a popular activity. This implies a high marginal value for this Proposed Alternative. The Proposed Alternative is close to Grand Isle, a highly visited tourist destination and would be available to a large potential visitor/recreational fishing population.

- *Additional Benefit Considerations:* Given experience at Elmer's Island Wildlife Refuge, it is expected that there would be sufficient demand for recreational fishing and wildlife viewing at the site, and that it would operate at full capacity during at least part of the year.

The likelihood of success of each alternative. The Proposed Alternative's goal of enhancing public recreational fishing and enjoyment of coastal areas at Elmer's Island Wildlife Refuge has a high likelihood of success. No land acquisition is required, and LDWF has successfully implemented similar recreational projects as part of its day-to-day natural resource management responsibilities at other state-owned properties within coastal Louisiana.

The extent to which each alternative would prevent future injury as a result of the incident and avoid collateral injury as a result of implementing the alternative. The Elmer's Island Access Proposed Alternative is not expected to play a role in preventing future injury from the spill. The Final PDARP/PEIS indicates that recreational uses have recovered (DWH Trustees 2016). The purpose of the Proposed Alternative is only to provide compensatory restoration for losses that occurred between April 2010 and November 2011 after which the Final PDARP/PEIS studies concluded that recreational use returned to baseline levels.

Implementation of the Proposed Alternative is not expected to cause any net collateral damage to the environment. Siting, design and construction/operation of recreational features would be conducted in a manner that would avoid impacts to existing environmental resources to the maximum extent practicable. Constructing these features adjacent to or near to the existing access road would further minimize impacts. In addition, installing culverts as a key component of proposed repairs to the Refuge access road would improve hydrologic flow and connectivity to adjacent area marshes.

The extent to which each alternative benefits more than one natural resource and/or service. The primary NRDA benefit of this Proposed Alternative would be to provide and enhance recreational fishing use services. Benefits would also be provided through the addition of new or enhanced wildlife viewing opportunities at the site. Educational signage would be expected to lead to greater understanding and awareness of coastal Louisiana natural resources.

The effect of each alternative on public health and safety. Adverse impacts on public health and safety are not expected from the Proposed Alternative. No changes to historic parking and traffic patterns are anticipated. Public safety would be improved by having designated parking areas and improved launch areas. Routine litter and marine debris removal would also serve to help minimize public health impacts.

Summary Project Evaluation. The OPA evaluation indicates that the infrastructure costs of the Proposed Alternative are well documented, reasonable, and appropriate. The Proposed Alternative has a strong nexus to the recreational injury caused by the DWH Oil Spill and can reasonably be expected to provide benefits to the public over an extended timeframe. The Proposed Alternative would provide new and improved public access to resources that were injured by the DWH Oil Spill and has a high probability of success. Finally, public safety issues are not expected to be a concern.

3.2 Statewide Artificial Reefs

3.2.1 Project Description

This Proposed Alternative would fund the enhancement of 11 existing artificial reef sites to provide enhanced recreational opportunities for anglers throughout Louisiana. The cost for implementation of this Proposed Alternative is $6 million.

Current Status

The Louisiana Artificial Reef Program (LARP) has developed well over 100 artificial reef sites spanning Louisiana's estuarine, coastal, and offshore waters. The majority of reef sites are in offshore waters; however, coastal and inshore reef sites tend to be more heavily utilized and provide more abundant recreational opportunities due to increased accessibility because they are located closer to shore. Inshore reefs are those artificial reefs developed solely in Louisiana state waters between the Louisiana Intracoastal Waterway and the Louisiana coastline and within Lake Pontchartrain. Nearshore reefs are those artificial reefs developed in either state or federal waters between the coastline of Louisiana and the 100-foot depth contour. There are over 30 established inshore reef sites in the LARP and 6 existing nearshore reef sites.

History

The LARP was authorized by the Louisiana Fishing Enhancement Act of 1986 and enacted in 1987 with the publishing of the *Louisiana Artificial Reef Plan*. This state legislation was a by-product of the National Fishing Enhancement Act of 1984, which developed the framework for individual states to develop artificial reef programs. The result of these efforts is commonly called Rigs to Reefs, which refers to the concept of repurposing decommissioned oil and gas structures as reefs to prolong the ecological services of these materials. Funds generated by the program are used for a variety of purposes, including creation of new reefs, enhancement of existing reef sites, reef

monitoring, and for other program operations. As part of the adaptive management of the LARP, an *Inshore and Nearshore Artificial Reef Plan* was developed in 2015 as a supplement to the original plan and serves as a guide to improve the reef development process in these waters.

Past Recreational Use

Inshore and nearshore artificial reef sites are typically in areas of high use by multiple user groups and are extremely popular with recreational anglers. These reef sites can be used by large numbers of anglers due to relatively short travel distances from popular marinas and boat launches. The convenient access opportunities provide options to stay closer to shore during inclement weather conditions. Some artificial reef sites are also developed in association with fishing piers. Local fishing clubs, charter operations, and conservation associations continue to express interest in the development of inshore and nearshore reefs. Projected benefits are enhanced fishing opportunities and multi-trophic ecological services of the artificial reefs.

Enhanced Recreational Opportunities

This Proposed Alternative would utilize $6 million of NRDA funds to enhance 11 existing coastal reef sites (9 inshore and 2 nearshore) by adding new reef material to increase the habitat complexity of the reef complex while providing increased recreational fishing opportunities to the public. The development of these reef enhancements is guided by the Louisiana *Inshore and Nearshore Artificial Reef Plan* (LDWF 2015), which is implemented through the LDWF under the oversight of the Louisiana Artificial Reef Council (R. S. 56: 639). The reef sites for enhancement are all established reef sites and were approved by the Council for expansion (inshore planning areas) to facilitate enhancement opportunities. **Table 3-2** summarizes locations and physical properties of the 11 artificial reef sites and **Figure 3-2** shows their relative locations. Additional alternatives to the project described below were considered during the screening of project alternatives. See Section 2.4 Range of Proposed Alternatives.

Sufficient water depth was considered in order to accommodate the material being deployed while meeting USCG navigational clearance requirements over the artificial reefs upon completion. The navigational clearance and marking requirements of each artificial reef is based on factors evaluated by the USCG and determined on a case by case basis. The combination of water depth, clearance, and USCG marking requirements would determine the maximum profile available for reef enhancement. Inshore reefs are typically constructed with low profile materials to meet a minimum 6-foot clearance at mean lower low water (MLLW); however, the overall objective of reef designs is to maximize habitat complexity and thus ecological value of reef elements.

Table 3-2. Summary of Artificial Reefs: Locations and Physical Properties

Artificial Reef/Type	Location	Reef Area (acres)	Water Depth (ft)	Substrate Type	Existing Reef Material	Permit Information
East Calcasieu	Calcasieu Lake, Cameron Parish, appx 9 miles southeast of Hackberry	87	8	Mud	Concrete pilings and crushed concrete	Expires March 6, 2022
Cypremort Point 2	Vermilion Bay, St. Mary Parish, appx. 1.5 miles	50	7	Mud	Crushed concrete	

Artificial Reef/Type	Location	Reef Area (acres)	Water Depth (ft)	Substrate Type	Existing Reef Material	Permit Information
	northwest of Cypremort Point State Park					Expires May 8, 2022
Rabbit Island	Cote Blanche Bay, Terrebonne Parish, appx. 5 miles southwest of Burns Point Park	50	10	Mud	Shell	Expires May 25, 2022
Ship Shoal 26-Pickets	Gulf of Mexico, Terrebonne Parish, appx. 22 miles southwest of Cocodrie	187	9	Mud	Limestone	Expires April 30, 2022
Bird Island	Terrebonne Parish, appx. 14 miles southwest of Cocodrie	69	9	Mud	Limestone	Expires June 21, 2022
Point Mast	Lake Pelto, Terrebonne Parish, appx. 20 miles south of Dulac	50	9	Mud	Limestone	Expires July 18, 2022
West End	Lake Pontchartrain, Orleans Parish, less than 1 mile south of the future West End boat launch	10	10	Mud	Crushed concrete and limestone	Expires March 25, 2021
Lake Front	Lake Pontchartrain, Orleans Parish, appx. 5 miles northeast of New Orleans	4	13	Mud	Limestone	Expires September 26, 2022
Independence Island	Barataria Bay, Jefferson Parish, appx. 6 miles northeast of Grand Isle	50	9	Mud	Limestone	Expires August 31, 2018; Extension has been requested
Grand Isle 9	Gulf of Mexico, appx. 7 miles southeast of Grand Isle	665	50	Mud/sand	Oil/gas structures	Expires December 31, 2022
California Point	Breton Sound, Plaquemines Parish, appx. 13 miles east of Port Sulfur	50	10	Mud	Crushed concrete	Expires May 31, 2020

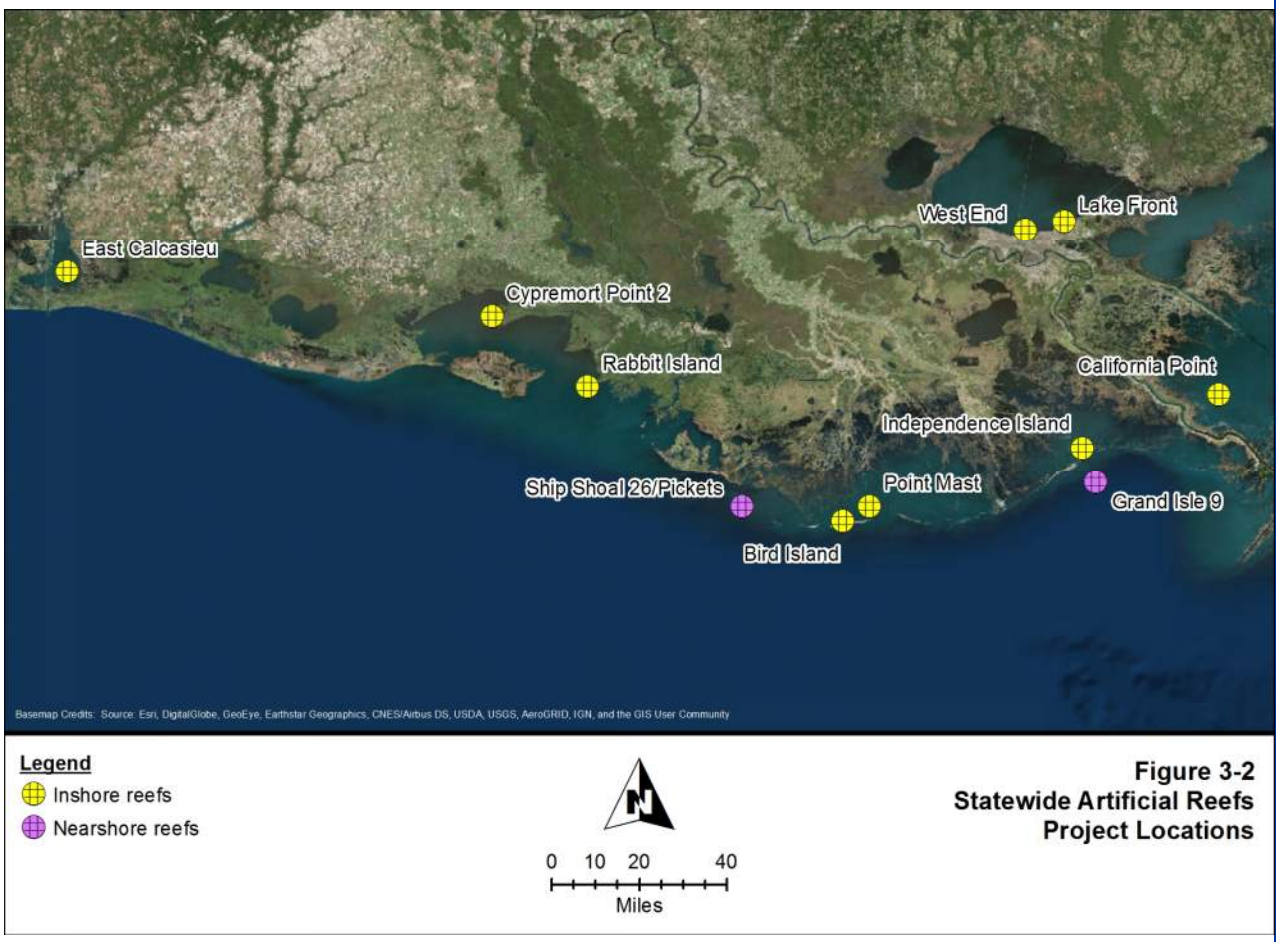


Figure 3-2
Statewide Artificial Reefs Project Locations

Federal and state permits have been received for all of the reef sites proposed for enhancement (**Table 3-2**). Therefore, this Proposed Alternative represents an essentially shovel ready project. NRDA funds would be used to deploy new reef material at each of the 11 reef sites located statewide. Additional project partners and matching project funds are being sought to increase the project scope of each of the reef enhancement projects. A portion of the NRDA funds (approximately $50,000 per reef site) would be used to supplement long-term (15 years) monitoring activities planned by LDWF for the enhanced reef sites.

Operational Costs. The majority of funds would be used for the enhancement of reef sites by the addition of reef material, and as such there are no long-term operational costs associated with this project. All construction work will be awarded in compliance with Louisiana's public bid laws and regulations, ensuring that the project is constructed at current market rates.

Maintenance Costs. The majority of funds would be used for the enhancement of reef sites by the addition of reef material, and as such there are no long-term maintenance costs associated with this project. However, these reef sites may be further enhanced over time by the LARP though other funding mechanisms.

Monitoring Activities. Monitoring of this Proposed Alternative would be multi-faceted and integrated with the operations of the LARP as administered through the LDWF. Monitoring would

include all reef deployment activities, post-deployment biological and environmental monitoring, and human dimensions surveys.

Post-deployment artificial reef monitoring is conducted to evaluate reef performance over time, with three main objectives: (1) determine presence/absence of aquatic animals, plants, invertebrates, and fish; (2) measure subsidence or reef materials and water quality parameters over time; and (3) conduct human dimensions surveys (combining efforts of the LDWF Socioeconomic Section and Fisheries LA CREEL monitoring system) to assess utilization, awareness, and economic impact. Information obtained through monitoring would help to evaluate the performance of reef sites and individual components, improve the management of existing reef sites, and help guide the program to aid in future reef design and site selection. LDWF would oversee monitoring activities for this Proposed Alternative through a combination of funding sources. Additional funding for monitoring activities beyond NRDA would be coordinated by LDWF through either the Louisiana Artificial Reef Trust Fund or other Department funding streams.

Construction Schedule. The permits for these reef site enhancements have already been obtained. As such, this restoration project could be implemented immediately if selected in the Final RP/EA #2. A 30-day notice is required prior to the start of construction activities, so implementation could begin shortly after construction contracts are in place through the LARP. It is anticipated that reef site enhancements would be completed within 6 months of notice to proceed; however, the exact timeframe may be impacted by weather and other factors.

3.2.2 OPA Evaluation

The cost to implement the alternative. The costs to implement the Proposed Alternative for enhancement of Statewide Artificial Reefs are reasonable, appropriate, and comparable to other equivalent restoration alternatives. The proposed cost of the NRDA-funded portion of the artificial reefs is $6.0 million (**Table 3-3**). No land acquisition costs are associated with the Proposed Alternative because the state already owns the property. The estimated construction costs represent the best estimates of the designers and are comparable with the costs of similar projects based on previous artificial reefs LDWF has constructed and maintained. Generally, based on as-builts, inshore reefs would cost approximately $400,000 each to construct, and nearshore reefs cost approximately $750,000 each to construct. Proportionally, $550,000 of the total NRDA funding for this Proposed Alternative would be allocated as a dedicated portion for the overall long-term monitoring and adaptive management of the proposed reef site enhancements. There are many opportunities to partner these NRDA funds with LDWF and Artificial Reef Program funds, along with other possible collaborations to increase the scope of the constructed project magnitude (e.g., with potential matching funds) and the monitoring activities for this Proposed Alternative.

Table 3-3. Estimated Cost for Statewide Artificial Reefs

Description	Estimated Cost
Construction of Project Elements	$5,450,000
Inland Reef Sites (8 sites at $400,000 each)	*$3,200,000*
Coastal Reef Sites (3 sites at $750,000 each))	*$2,250,000*
Contingency, Operations, and Maintenance	*$545,000 (10% of total construction costs)*
Monitoring and Adaptive Management	$550,000
Total	***$6,000,000***

All work will be awarded in compliance with Louisiana's public bid laws and regulations, ensuring that the project is constructed at current market rates. General operating budgets are presented based on reef location, and the anticipated relative deployment costs. As part of the Proposed Alternative for reef enhancement, the LARP would implement each project as part of an adaptive management process that maximizes the project scope and impact (i.e., amount of reef material deployed), within the estimated budget parameters. As such, there is a built-in 10% contingency associated with each reef site to allow for implementation flexibility. Any cost savings realized for the reef enhancement activities would be utilized in the monitoring and adaptive management portion of the project. Oversight of project implementation would be incurred as a shared cost with LDWF/LARP, as would aspects of the long-term monitoring and adaptive management of these projects. Projection of monitoring costs, were based on other similar artificial reef projects managed by LDWF. However, any additional costs required for monitoring would be incurred as shared project costs by LDWF/LARP.

The extent to which each alternative is expected to meet the LA TIG's goals and objectives in returning the injured natural resources and services to baseline and/or compensating for interim losses.

Nexus to Injury. The Proposed Alternative for enhancement of Statewide Artificial Reefs has a strong nexus to the DWH recreational injury. As mentioned previously, the majority of the recreational use loss in Louisiana, as a result of the spill, was to recreational fishing. The recreational use loss in Louisiana caused by the DWH Oil Spill, the recreational assessment, discussed in the Final PDARP/PEIS, focused on the loss of recreational fishing. During the spill, surrounding water bodies received extensive oil impacts. The Proposed Alternative is designed to enhance recreational fishing experiences, both by increasing visitation and enhancing the quality of all future recreational visits to the area. As such, the Proposed Alternative's goal is creating and enhancing visitor access to recreational fishing at the artificial reef sites. The recreational opportunities that would be created by this Proposed Alternative are the same uses that were lost due to the DWH Oil Spill (i.e., lost user-days of fishing). Recreational fishermen, the same user population that the DWH Oil Spill affected, would benefit from this Proposed Alternative. The Proposed Alternative represents "in-place, in-kind" restoration and is fully consistent with OPA objectives for compensatory restoration.

Benefit to Injured Resources

- C*omponent Benefits:* The Proposed Alternative's location and amenities are within the geographical footprint of the DWH injury. The artificial reefs are designed to be used by

recreational fisherman and aid/enhance their ability to access fishing locations. The proposed artificial reef material is expected to serve the public for at least several decades.

- *Scope of Benefits:* The scope of benefits for the Proposed Alternative would be a direct function of capacity utilization of reef sites.
- *Public Access:* The recreational benefits of this Proposed Alternative would be broadly available to the public. No users would be actively excluded by the Proposed Alternative.
- *Location:* The reef locations are strategically selected to maximize recreational access opportunities. Artificial reef sites include shoreline/pier accessible, and those accessible by boat in both inshore and nearshore waters. This implies a high marginal value for this Proposed Alternative. The Proposed Alternative is within close proximity to multiple parks and/or area boat launches, near to surrounding communities, and would be available to a large potential visitor/recreational fishing population.
- *Additional Benefit Considerations:* Given experience with recreational fishing areas, it is expected that there would be sufficient demand for both inshore and nearshore fishing at the reef sites.

The likelihood of success of each alternative. The Proposed Alternative's goal of enhancing public recreational fishing and enjoyment of coastal areas has a high likelihood of success. No land acquisition is required, and LDWF has successfully implemented similar reef projects within coastal Louisiana. In addition, each reef site is currently permitted.

The extent to which each alternative would prevent future injury as a result of the incident and avoid collateral injury as a result of implementing the alternative. The Proposed Alternative is not expected to play a role in preventing future injury from the spill. The Final PDARP/PEIS indicates that recreational uses have recovered to pre-spill levels (DWH Trustees 2016). The purpose of the Proposed Alternative is only to provide compensatory restoration for losses that occurred between April 2010 and November 2011 after which the Final PDARP/PEIS studies concluded that recreational use returned to baseline levels. Implementation of the Proposed Alternative is not expected to cause any net collateral damage to the environment. The reefs would be constructed underwater and would comply with all federal and state permits and USCG compliance requirements.

The extent to which each alternative benefits more than one natural resource and/or service. The primary NRDA benefit of this Proposed Alternative would be to provide and enhance recreational fishing, and it has the added benefit of enhancing habitat.

The effect of each alternative on public health and safety. Adverse impacts on public health and safety are not expected from this Proposed Alternative. Constructed reefs would comply with all USCG requirements to help ensure public safety.

Summary Project Evaluation. The OPA evaluation indicates that the infrastructure costs of the Proposed Alternative are well documented, reasonable, and appropriate. The Proposed Alternative has a strong nexus to the recreational injury caused by the DWH Oil Spill and can reasonably be expected to provide benefits to the public over an extended timeframe. The

Proposed Alternative would provide new and improved public access to resources that were injured by the DWH Oil Spill and has a high probability of success. Finally, public safety issues are not expected to be a concern

3.3 Lake Charles SCEC

3.3.1 Project Description

This Proposed Alternative would fund the development of a public science center and educational complex in Lake Charles. The cost for implementation of this Proposed Alternative is $7 million.

Current Status

The Lake Charles SCEC would be developed on state-owned property adjacent to the site of a future planned LDWF Region 5 office facility in Lake Charles, as shown on **Figure 3-3**. The Lake Charles SCEC Proposed Alternative is a stand-alone project that is not dependent on the planned LDWF office and no NRDA Restoration funds would be used for the office facility. Final design plans for the Lake Charles SCEC would be developed using NRDA funds, which would need to be completed prior to construction activities. While the Lake Charles SCEC and the office facilities are distinct and separately funded projects, siting the Lake Charles SCEC in the proposed manner would offer potential synergies, including connecting the public to the biologists and managers in one centralized location.

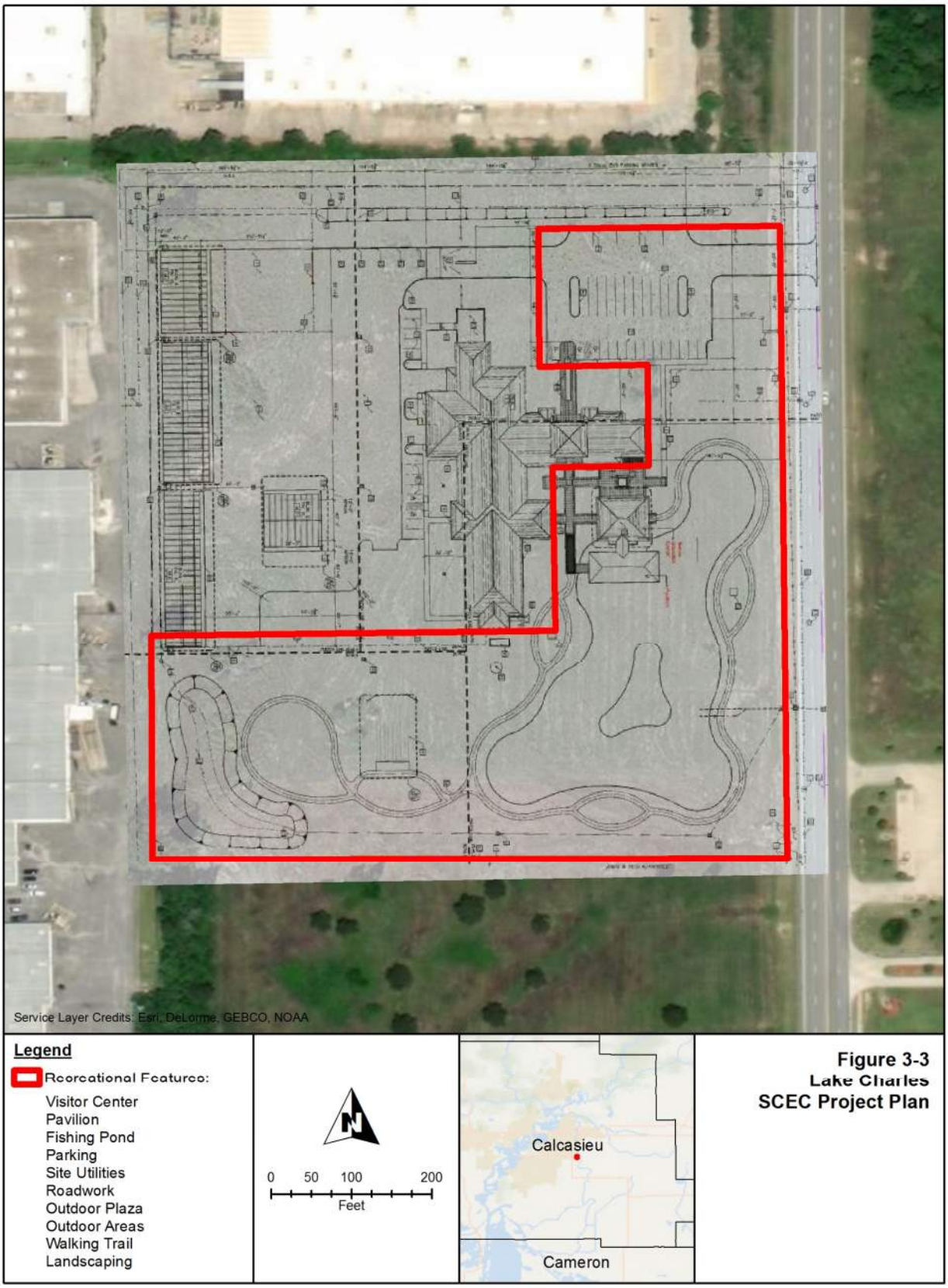
History

The existing LDWF office in Lake Charles, located at the base of the I-10 bridge is both aged and undersized. In 2009, BP donated a 10-acre tract of land to LDWF for the intended purpose of building a new office facility. Subsequently, preliminary and final design plans for the office facility have been completed, but funding has not yet been allocated. Once completed, the office facility would house LDWF Fisheries, Wildlife, and Enforcement staff, including members of the education and outreach sections.

The original LMFERSC Early Restoration project envisioned a facility in southwestern Louisiana, to serve as a dedicated venue for fisheries education and outreach activities. This Proposed Alternative re-incorporates many of the original LMFERSC project elements to restore for lost recreational opportunities.

Enhanced Recreational Opportunities

The Lake Charles SCEC Proposed Alternative would use $7 million of NRDA Restoration funds to construct, operate, and maintain a venue to provide public education and outreach on a variety of recreational activities. The mission of the Lake Charles SCEC would be to enhance stakeholder involvement by providing fisheries extension, access, outreach, and education to the public. The public visitation and outreach components of the center would provide dedicated indoor and outdoor spaces for public education on fisheries management activities and restoration programs. Outdoor elements of the Proposed Alternative would provide additional possibilities for public education, along with opportunities to appreciate and enjoy nature. Additional alternatives to the project described below were considered during the screening of project alternatives. See Section 2.4 Range of Proposed Alternatives.


Service Layer Credits: Esri, DeLorme, GEBCO, NOAA
Legend
Recreational Features:
Visitor Center
Pavilion
Fishing Pond
Parking
Site Utilities
Roadwork
Outdoor Plaza
Outdoor Areas
Walking Trail
Landscaping
N
0 50 100 200
Feet
Calcasieu
Cameron
Figure 3-3
Lake Charles
SCEC Project Plan

The Lake Charles SCEC Proposed Alternative would include development of the final design specifications, and implementation of the following features and scope of activities:

- Visitor Science Center building, which would feature display aquaria showcasing Louisiana's diverse aquatic habitats, an aquatic animal touch tank exhibit, interactive educational displays, welcome desk for visitor sign-in and outreach materials, and public restrooms;
- Covered outdoor pavilion positioned over the fishing pond to provide ADA-compliant youth fishing opportunities, and other outreach activities; and
- Outdoor Educational Complex featuring a youth/outreach fishing pond, nature trail, educational signage, natural landscaping, outdoor plaza and sidewalks, other outdoor educational areas, including hunter safety range, visitor parking, site utilities, and roadwork.

Construction of the Lake Charles SCEC may include a small water supply well to provide freshwater for the fishing pond and the visitor center tank systems. Exact design specification would be determined in the final design process. The pond would be managed by LDWF to showcase native populations and educate the public about fisheries management topics. The pond would be managed by LDWF staff and would be stocked through the LDWF Hatchery Program.

The LDWF would provide staffing to undertake operation and maintenance of this facility. However, the implementation of the Lake Charles SCEC would be a collaborative undertaking using volunteers to facilitate activities throughout its operational life. The NRDA funding would be applied to develop the final design, all permitting and construction activities, implementation monitoring, a portion of the operating and maintenance costs for the Lake Charles SCEC, and for long-term utilization monitoring of the Proposed Alternative in the form of visitor logs and surveys. (See **Appendix E** for more detail).

Operational Costs. A portion of project funds would be utilized for long-term operations of the SCEC (see **Table 3-4**), which would provide primarily for the visitor center functions (e.g., electricity and water filtration for the display aquaria, educational displays, outreach activities).

Maintenance Costs. A portion of project funds would also be utilized for maintenance of project elements, including any repairs needed over time.

Monitoring Activities. Monitoring would be conducted for this project in regard to ensuring the project is constructed as designed. Additionally, utilization monitoring would be conducted through visitor center sign-in, a log of outreach activities and events, as well as user satisfaction surveys.

Construction Schedule. Project implementation would include final design and permitting, as well as construction activities. It is estimated that final design would take approximately 10 months, and permitting efforts would run concurrently. It is estimated that construction of project elements would take approximately 14 months; however, efforts would be made to streamline these processes to expedite project implementation.

3.3.2 OPA Evaluation

The cost to implement the alternative. The costs to implement the Lake Charles SCEC Proposed Alternative are reasonable, appropriate, and comparable to other equivalent restoration alternatives. The proposed cost of the Lake Charles SCEC Proposed Alternative is approximately $7.0 million (**Table 3-4**). No land acquisition costs are associated with the Proposed Alternative because the state already owns the property. The estimated construction costs represent the best estimates of the designers and are comparable with the costs of similar projects.

Table 3-4. Estimated Cost for Lake Charles SCEC

Description	Estimated Cost
Final Engineering and Design	$450,000
Construction of Project Elements	$4,800,000
Contingency (~15%)	$787,500
Operations and Maintenance (15 years)	$750,000
Monitoring and Adaptive Management (15 years)	$212,500
Total	***$7,000,000***

All work will be awarded in compliance with Louisiana's public bid laws and regulations, ensuring that the project is constructed at current market rates. Operation and maintenance (O&M) costs for the center would be funded using an allocation of the $7 million and would include such activities as Lake Charles SCEC building and infrastructure maintenance, pond and natural area maintenance. Projection of O&M costs, were based on other similar facilities managed by LDWF.

The extent to which each alternative is expected to meet the LA TIG's goals and objectives in returning the injured natural resources and services to baseline and/or compensating for interim losses.

Nexus to Injury. The Lake Charles SCEC Proposed Alternative has a strong nexus to the DWH recreational injury. As mentioned previously, the majority of the recreational use loss in Louisiana, as a result of the spill, was to recreational fishing. The recreational use loss in Louisiana caused by the DWH Oil Spill, the recreational assessment, discussed in the Final PDARP/PEIS, focused on the loss of recreational fishing. During the spill, surrounding water bodies received extensive oil impacts. The Proposed Alternative is designed to enhance public education and outreach regarding fisheries management and restoration, both by increasing visitation and enhancing the quality of future recreational visits to the area. The educational and outreach opportunities that would be created by this Proposed Alternative are uses that were lost due to the DWH Oil Spill. Recreational fishermen of all ages, the same user population that the DWH Oil Spill affected, would benefit from this Proposed Alternative. The Proposed Alternative represents "in-place, in-kind" restoration and is fully consistent with OPA objectives for compensatory restoration.

Benefit to Injured Resources

- *Component Benefits:* The Proposed Alternative's location and amenities are within the geographical footprint of the DWH injury. The Lake Charles SCEC is designed to be used by

the public and to aid/enhance their knowledge of fisheries and restoration. The proposed SCEC is expected to serve the public for at least several decades.

- *Public Access:* The recreational benefits of this Proposed Alternative would be broadly available to the public at no cost and would serve as a dedicated venue for a variety of outreach activities. The Lake Charles SCEC Proposed Alternative would be open to the public at no charge during weekly business hours and would also be available for other scheduled outreach and educational events.

- *Location:* The SCEC location is within the city limits of Lake Charles, and in proximity to multiple schools and other public venues, thus would be available to a large potential visitor population.

- *Additional Benefit Considerations:* As previously mentioned, $22 million dollars in early restoration money was originally allocated to LDWF for the LMFERSC. The Lake Charles SCEC Proposed Alternative incorporates many of the same types of educational features and associated outdoor amenities as contained in the original project, and thus is appropriate for implementation.

The likelihood of success of each alternative. The Proposed Alternative's goal of enhancing public education and outreach has a high likelihood of success. No land acquisition is required. The designs for the Lake Charles SCEC are technically feasible and based on proven techniques and established methods used in other research center projects. Knowledge gained from advance design work and other analysis that was done for the LMFERSC can be used for the Lake Charles SCEC and would be helpful in ensuring the success of the project. Final E&D would still need to be conducted prior to project construction and implementation.

The extent to which each alternative would prevent future injury as a result of the incident and avoid collateral injury as a result of implementing the alternative. The Lake Charles SCEC Proposed Alternative is not expected to play a role in preventing future injury from the spill. The Final PDARP/PEIS indicates that recreational uses have recovered to pre-spill levels (DWH Trustees 2016a). The purpose of the Proposed Alternative is only to provide compensatory restoration for losses that occurred between April 2010 and November 2011 after which the Final PDARP/PEIS studies concluded that recreational use returned to baseline levels. Implementation of the Proposed Alternative is not expected to cause any net collateral damage to the environment.

The extent to which each alternative benefits more than one natural resource and/or service. The primary NRDA benefit of this Proposed Alternative would be to provide and enhance public education and appreciation of fisheries management and restoration programs. Education related to fisheries management and restoration has potential to broadly benefit appreciation and stewardship of Gulf aquatic resources.

The effect of each alternative on public health and safety. Adverse impacts on public health and safety are not expected from the Proposed Alternative. Elements of the Proposed Alternative would be designed for consideration and consistency with ADA standards.

Summary Project Evaluation. The OPA evaluation indicates that the infrastructure costs of the Proposed Alternative are well documented, reasonable, and appropriate. The Proposed Alternative has a strong nexus to the recreational injury caused by the DWH Oil Spill and can reasonably be expected to provide benefits to the public over an extended timeframe. The Proposed Alternative would provide new and improved public access to educational resources, providing the public opportunities to appreciate trust resources that were injured by the DWH Oil Spill and it has a high probability of success. Finally, public safety issues are not expected to be a concern.

3.4 Island Road Piers

3.4.1 Project Description

This Proposed Alternative would fund the construction of five small parking lots, or vehicle pull overs, with adjoining fishing piers along Island Road located in PACWMA. The cost for implementation of this Proposed Alternative is $3 million.

Current Status

The PACWMA is owned and operated by the LDWF Coastal and Nongame Resources Division (CNR) and managed through the PACWMA Management Plan (Baker et al. 2012). In its entirety, PACWMA includes over 35,000 acres of publicly accessible land and waterways that span across Terrebonne and Lafourche Parishes. There are two management objectives for PACWMA: (1) provide for the conservation and management of all wildlife resources within the area and (2) provide opportunities for scientific research, environmental education, and wildlife-oriented recreation, including fishing, hunting, trapping, camping, bird watching, nature photography, and other forms of outdoor recreation.

The PACWMA is located approximately 15 miles southeast of Houma, in southern Terrebonne and Lafourche Parishes between the towns of Galiano and Montegut (**Figure 3-4** and **Figure 3-5**). Approximately 40% of PACWMA is actively managed by manipulation of four management units. These units are controlled by levees and various styles of water control structures and are often bounded by man-made features like roads. Management practices offer benefits to a vast assortment of estuarine species, with reciprocal services satisfying diverse recreational uses.

Island Road is a small two-lane road connecting Highway 665 to Isle de Jean Charles and is the southernmost boundary of the Ensminger/Songe marsh management unit on the Terrebonne Parish portion of the PACWMA. This road is a popular roadside fishing destination, particularly around the water control structure.

History

While not directly impacted by oil from the DWH spill, the PACWMA was closed for an extended period of time because of public safety concerns and to support response activities. The injury to lost recreational use resulting from the oil spill is applicable to the area and users of PACWMA.

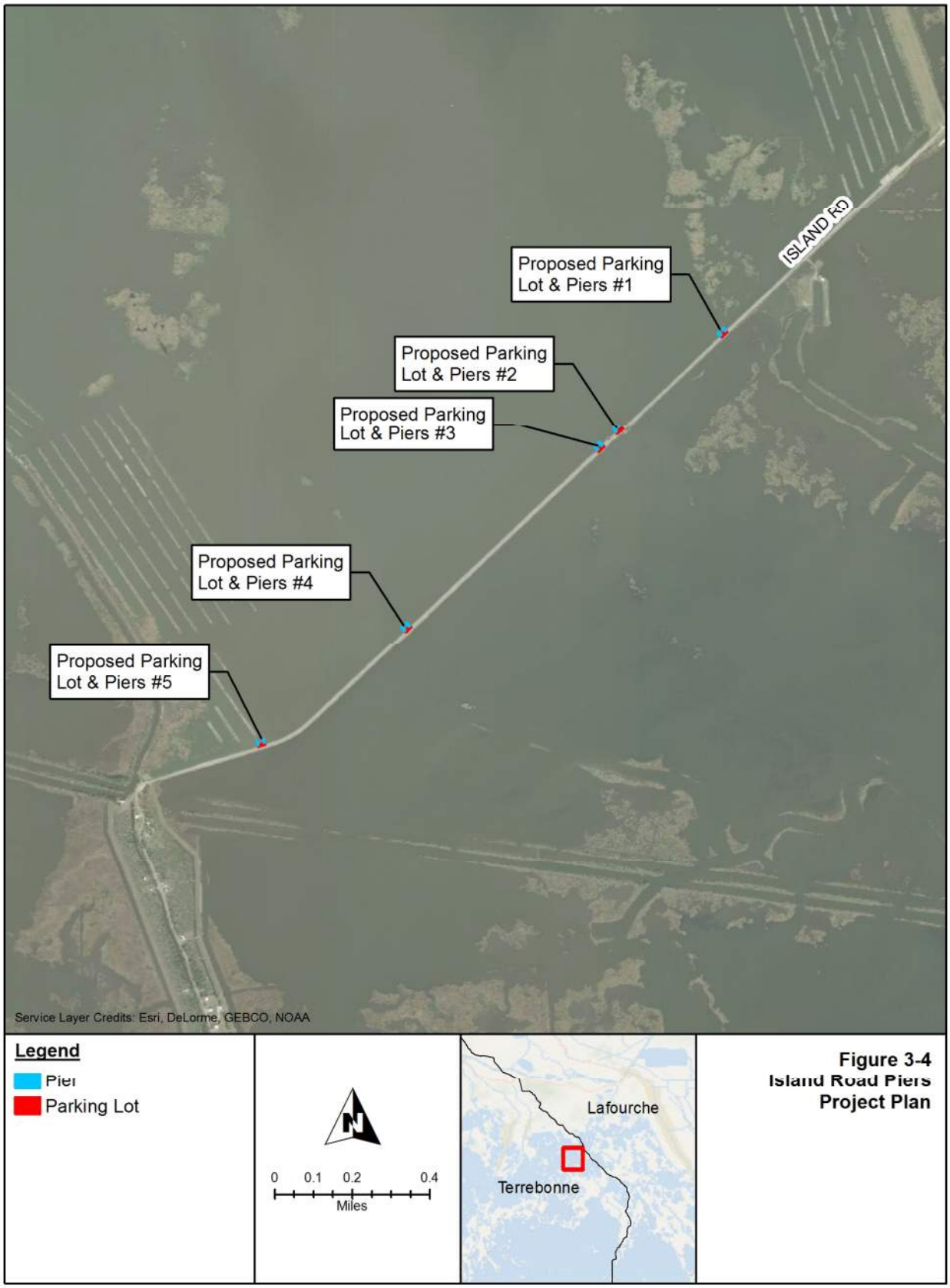


Figure 3-4
Island Road Piers
Project Plan

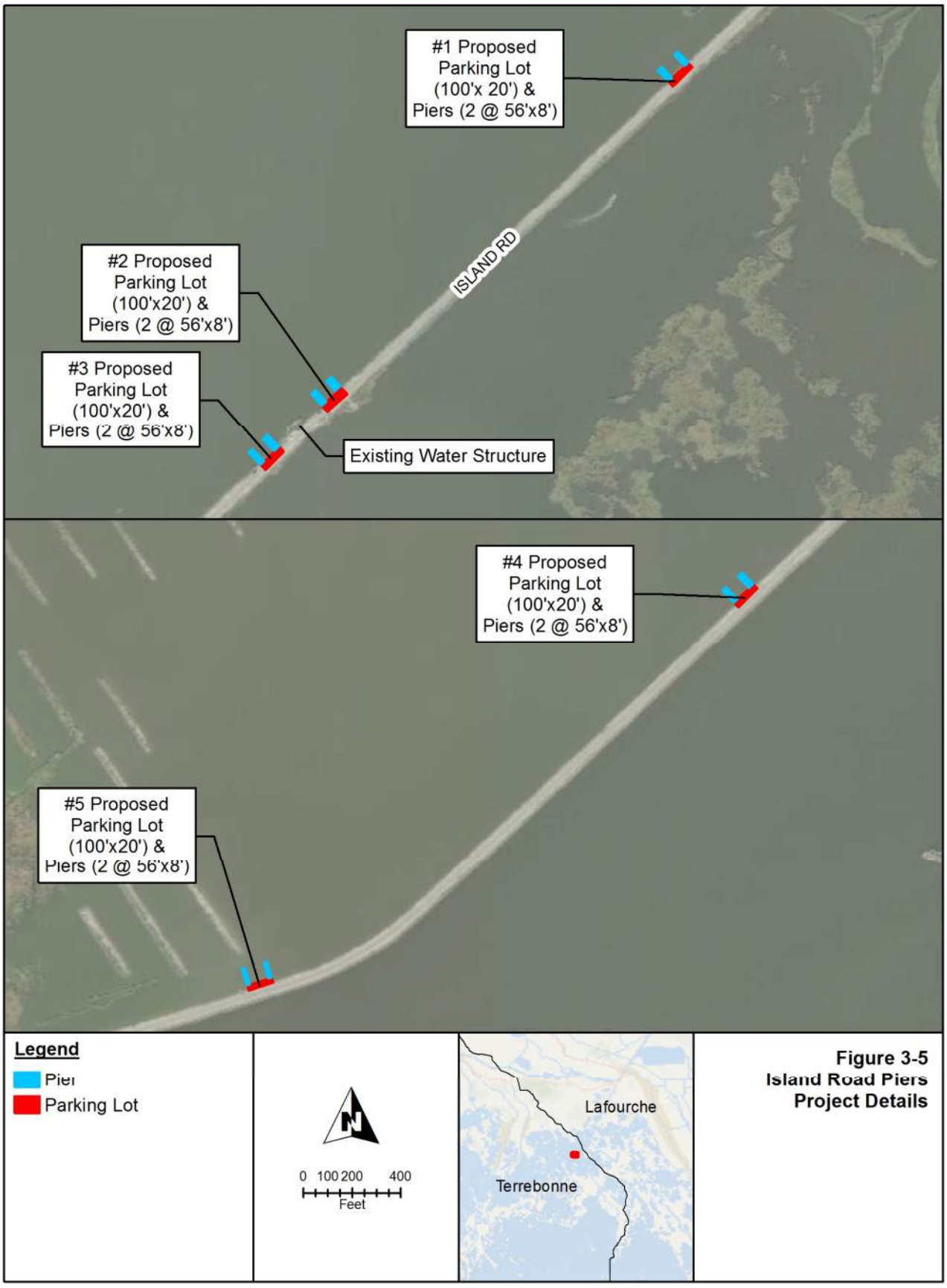


Figure 3-5
Island Road Piers
Project Details

Past Recreational Use

Island Road is highly utilized by the public for recreational fishing; however, conditions are currently unsafe due to the narrow road and minimal shoulder.

Pointe-aux-Chenes is the most heavily utilized WMA in Louisiana, serving roughly 25,000-40,000 recreational users annually. While no specific measurements of Island Road recreational usage have been undertaken, it is assuredly dominated by fishing, crabbing, and cast-netting activities. The recreational usage of the entire PACWMA is approximately 75% for fishing/crabbing, 20% for hunting, and 5% for birding. This Proposed Alternative would enhance recreational opportunities along Island Road in PACWMA, while greatly improving the safety of recreational users by reducing the hazards created by vehicles parked directly along the road.

Enhanced Recreational Opportunities

This Proposed Alternative would utilize $3 million from NRDA to fund the construction of five small parking lots with adjoining fishing piers along Island Road (**Figure 3-4**). Elements of the Proposed Alternative would primarily provide for enhanced recreational fishing and crabbing opportunities, yet it would also offer infrastructure for non-consumptive activities like birding, photography, and nature watching. Additional alternatives to the project described below were considered during the screening of project alternatives. See Section 2.4 Range of Proposed Alternatives.

The Proposed Alternative, Island Road Fishing Piers, would include the development of the final design specifications, construction, and implementation of the following features and scope of activities:

- Five vehicle pull-overs
  - 124 feet x 25 feet
  - Sheet pile walls to reinforce parking areas adjacent to roadway
  - Filled areas utilizing dirt and/or limestone
- Paired fishing piers at each vehicle pull-over
  - 56 feet in length and 8 feet wide
  - Fiberglass grating suspended from wooden pilings and frame
- Long-term (15 years) operations and maintenance, including the development and distribution of outreach materials and trash collection/removal services
- Long-term monitoring activities to oversee project implementation and assess recreational usage of the Proposed Alternative

The LDWF CNR division has built a number of docks and piers at our Coastal WMAs and Refuges. These types of projects are in high demand by the public and always well received and used by the public at large. LDWF has built a variety of styles of docks over the years and has found that fiberglass grating over a timber frame is, to date, the best design. This design is cost effective, as compared to concrete and steel, and also has low maintenance costs as compared to timber decking and steel members in a high salinity, high energy environment.

In addition to final design and project construction, a portion of the total NRDA funds for this Proposed Alternative would go toward operations (including the development and distribution of outreach materials), maintenance (including trash collection and removal), and monitoring activities. Recreational use would be monitored with randomized visual count surveys, which would begin as early as possible to establish a pre-Restoration baseline and continue over time. Any additional operations, maintenance, and monitoring costs required above the NRDA funds would be incurred by LDWF through its various operational funding streams.

Operational Costs. The majority of funds for this project would be used for construction activities; however, a portion would be retained for long-term operational costs, including trash collection and removal.

Maintenance Costs. A portion of project funds would be utilized for associated maintenance costs, including any repairs needed over time.

Monitoring Activities. Monitoring would include ensuring the project is constructed as designed, as well as monitoring the utilization of project elements by the public. Utilization monitoring would be conducted by PACWMA staff, as well as through joint efforts with the LDWF fisheries monitoring program (i.e., when LA CREEL angler surveys are conducted in this area).

Construction Schedule. Preliminary design has been undertaken and state and federal permits have been received. Project costs include final design and construction activities. It is estimated that final design would take approximately 75 days, and construction would take approximately 180 days.

3.4.2 OPA Evaluation

The cost to implement the alternative. The cost to implement the Proposed Alternative, Island Road Fishing Piers is reasonable, appropriate, and comparable to other equivalent restoration alternatives. The proposed cost of the NRDA-funded portion of the Proposed Alternative is $3.0 million (**Table 3-5**). The Proposed Alternative has gone through a preliminary design process, and further E&D is needed for project implementation. No land acquisition costs are associated with the Proposed Alternative because the state already has long-term established leases for the associated property and has received approval from the property owners supporting the Proposed Alternative. The estimated construction costs represent the best estimates of the designers and are comparable with the costs of similar projects.

Table 3-5. Estimated Cost for Island Road Piers

Description	Estimated Cost
Final Engineering and Design	$260,000
Construction of Project Elements	$2,000,000
Contingency (~15%)	$339,000
Operations and Maintenance	$380,000
Monitoring and Adaptive Management	$21,000
Total	***$3,000,000***

All work will be awarded in compliance with Louisiana's public bid laws and regulations, ensuring that the project is constructed at current market rates. Projections of operating costs, and utilization, were based on other similar projects within WMAs managed by LDWF.

The extent to which each alternative is expected to meet the LA TIG's goals and objectives in returning the injured natural resources and services to baseline and/or compensating for interim losses.

Nexus to Injury. The Proposed Alternative for Island Road Fishing Piers has a strong nexus to the DWH recreational injury. As mentioned previously, the majority of the recreational use loss in Louisiana, as a result of the spill, was to recreational fishing. The recreational assessment, discussed in the Final PDARP/PEIS, focused on the loss of recreational fishing. During the spill, the PACWMA was impacted extensively, not directly by oil, but rather through extended closures. This Proposed Alternative is designed to enhance recreational fishing experiences, both by increasing visitation and enhancing the quality of future recreational visits to the area. As such, this Proposed Alternative's goal of creating and enhancing visitor access to recreational fishing at PACWMA, has a strong nexus to the public's lost recreational fishing. The recreational opportunities that would be created by this Proposed Alternative are the same shoreline uses that were lost due to the DWH Oil Spill (i.e., lost user-days of fishing, wildlife viewing). Visitors to the coastal pier, the same user population that the DWH Oil Spill affected, would benefit from this Proposed Alternative. This Proposed Alternative represents "in-place, in-kind" restoration and is fully consistent with OPA objectives for compensatory restoration.

Benefit to Injured Resources

- *Component Benefits:* This Proposed Alternative's location and amenities are within the geographical footprint of the DWH injury. The Proposed Alternative's parking areas and fishing pier elements are designed to be used by recreational fisherman and aid/enhance their ability to access and interact with natural resources along the Island Road.

- *Scope of Benefits:* The scope of benefits for the Proposed Alternative's pull-overs and fishing piers would be a direct function of capacity utilization at the piers and would be measured as part of the project monitoring plan.

- *Public Access:* The recreational benefits of this Proposed Alternative would be broadly available to the public. However, because of a lack of public transportation in the area, benefits would likely accrue primarily to individuals who own vehicles and have sufficient disposable income to drive to the site. No users would be actively excluded by the Proposed Alternative. During the peak summer season, parking capacity and crowding would limit the total benefits available.

- *Location:* The PACWMA has limited public pier-fishing opportunities in an area where recreational fishing is a popular activity. This implies a high marginal value for this Proposed Alternative. The Proposed Alternative is within proximity to multiple communities, and less than 0.5-hour drive of Houma, LA, and would be available to a large potential visitor/recreational fishing population.

- *Additional Benefit Considerations:* Given experience along the Island Road prior to 2014, it is expected that there would be sufficient demand for pier-fishing and pier-based wildlife viewing at the site, and that it would operate at full capacity during at least part of the year.

The likelihood of success of each alternative. This Proposed Alternative's goal of enhancing public recreational fishing and enjoyment of coastal areas within the PACWMA has a high likelihood of success. No land acquisition is required, and LDWF has successfully implemented similar recreational pier projects as part of its day-to-day natural resource management responsibilities on this WMA and at other state-owned properties within coastal Louisiana.

The extent to which each alternative would and avoid collateral injury as a result of implementing the alternative. The Proposed Alternative is not expected to play a role in preventing future injury from the spill. The Final PDARP/PEIS indicates that recreational uses have recovered to pre-spill levels (DWH Trustees 2016a). The purpose of the Proposed Alternative is only to provide compensatory restoration for losses that occurred between April 2010 and November 2011 after which the Final PDARP/PEIS studies concluded that recreational use returned to baseline levels. Implementation of the Proposed Alternative is not expected to cause any net collateral damage to the environment. The pull-over areas would be constructed adjacent to the Island Road atop existing rock revetment, and the piers would be built into open water.

The extent to which each alternative benefits more than one natural resource and/or service. The primary NRDA benefit of this Proposed Alternative would be to provide and enhance recreational fishing.

The effect of each alternative on public health and safety. Adverse impacts on public health and safety are not expected from the Proposed Alternative. In fact, public health and safety are expected to be beneficially impacted. Currently, people park dangerously and precariously on the side of the narrow Island Road to fish. By providing specific area to park and fish, the risk of personal or automobile accidents would be greatly reduced. To minimize public health impacts, the LDWF PACWMA staff would provide routine trash collection and removal services near the pull-overs and piers. No changes to historic parking and traffic patterns are anticipated. The Proposed Alternative would result in ADA-accessibility to the piers.

Summary Project Evaluation. The OPA evaluation indicates that the infrastructure costs of the Proposed Alternative are well documented, reasonable, and appropriate. This Proposed Alternative has a strong nexus to the recreational injury caused by the DWH Oil Spill and can reasonably be expected to provide benefits to the public over an extended timeframe. This Proposed Alternative would provide new and improved public access to trust resources that were injured by the DWH Oil Spill and has a high probability of success. Finally, public safety issues are not expected to be a concern.

3.5 Natural Recovery/No Action Alternative

OPA regulations require that "[t]rustees must consider a natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (40 CFR § 990.53[b][2]). Under this alternative, the LA TIG would undertake no

additional restoration to accelerate recovery of injured recreational resources or to compensate for lost services.

According to Section 4.10.4 of the Final PDARP/PEIS recreational injury assessment (page 4-667), the recreational use injury began in May 2010 and lasted through November 2011. The entire recreational use injury quantified in the Final PDARP/PEIS represents interim loss that occurred during this period. The Final PDARP/PEIS (Section 5.8.2, page 5-92) notes that interim losses of natural resources would not be compensated under a natural recovery/no action alternative. For these reasons, the LA TIG rejects the natural recovery/no action alternative as a viable means of compensating the public for the lost recreational use injury caused by the DWH Oil Spill.

3.6 OPA Evaluation Conclusions

The LA TIG has completed its OPA evaluation of the following four Proposed Alternatives, including the two non-preferred alternative elements of Elmer's Island Access, that best meet the objectives of the LA TIG, at this time:

- Elmer's Island Access
- Statewide Artificial Reefs
- Lake Charles SCEC
- Island Road Piers

The OPA analysis indicates that each of these four Proposed Alternatives would provide recreational benefits with a strong nexus to the recreational fisheries injuries caused by the DWH spill. The Proposed Alternatives all occur in areas that were either directly oiled by the spill, were the location of response activities, or are in proximity to these areas. Recreational benefits accrue from improved public access and infrastructure associated with recreational fishing locations. These benefits would be broadly available to the public over an extended timeframe.

Although the focus of the Proposed Alternatives included in this RP/EA #2 is recreational fishing, these Proposed Alternatives would also benefit other natural resources and services. Infrastructure would be designed and implemented to manage public access in ways that would minimize impacts to valuable habitats and species. These approaches would also ensure that any collateral damage to the environment is minor and mitigated. Furthermore, no adverse impacts to public health are anticipated from any of the four Proposed Alternatives.

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Section 4

NEPA Affected Environment and Environmental Consequences

4.1 Introduction

This section describes the affected environment and an analysis of the environmental consequences of the following preferred alternatives: Elmer's Island Access, as modified, Statewide Artificial Reefs, Lake Charles SCEC, and Island Road Piers. An analysis of the affected environment and environmental consequences of two non-preferred Elmer's Island Access alternatives—the original proposed Elmer's Island Access project containing a lagoon-traversing boardwalk and another alternative with a behind-the-dune boardwalk alignment—was also conducted and can be found in Section 4.4 of the December 2017 Draft RP/EA #2 and Section 4 of the Supplemental RP/EA, respectively. This analysis is herein incorporated by reference and summarized in **Table 4-18** (Section 4.9) of this RP/EA #2.

4.2 Environmental Setting

Three of the four Proposed Alternatives, Elmer's Island Access, Statewide Artificial Reefs, and Island Road Piers are located along the Louisiana Gulf Coast while the fourth project is located in Lake Charles, Louisiana. The northern Gulf of Mexico comprises a vast regional ecosystem—an interactive, interdependent network of organisms (from microbes to plants to animals) and their chemical, biological, and physical environment. Ranging from the coastline itself, to its bays and estuaries, expansive continental shelf, and vast open ocean and deep sea, the northern Gulf of Mexico ecosystem contains some of the nation's most diverse and productive natural resources, as described in detail in Chapter 3 of the Final PDARP/PEIS, which is incorporated by reference here.

The Lake Charles SCEC is located in a residential and commercial area within the city limits of Lake Charles, Louisiana. This area is less connected to the greater south Louisiana and Gulf of Mexico ecosystem.

Focusing in on the State of Louisiana, which also has a diverse set of ecosystems, the following sections describe the existing conditions for each of the resources potentially affected by the restoration actions proposed in this plan, which are located in multiple parishes. Where applicable, site-specific information is provided for each Proposed Alternative. However, if the conditions are the same for all Proposed Alternative sites (e.g., air quality), then the resource is discussed at the parish level.

4.3 Environmental Consequences

Under NEPA, federal agencies must consider the environmental effects of their actions that include, among others, impacts on social, cultural, and economic resources, as well as natural

resources. The alternatives addressed in this section are proposed under OPA and thus meet the level of federal agency involvement to require review.

In order to determine whether an action has the potential to result in significant impacts, the context and intensity of the action must be considered. Context refers to area of impacts (local, statewide, etc.) and their duration (e.g., whether they are short- or long-term impacts). Intensity refers to the severity of impact and could include the timing of the action (e.g., more intense impacts would occur during critical periods like high visitation or wildlife breeding/rearing, etc.). Intensity is also described in terms of whether the impact would be beneficial or adverse. For purposes of this document, impacts are characterized as minor, moderate or major, and temporary or long-term. Impacts were assessed in accordance with the guidelines in the Final PDARP/PEIS Table 6.3-2 included in **Appendix C**.

The analysis of beneficial impacts focuses on the duration (short- or long-term), without attempting to specify the intensity of the benefit. The definition of these characterizations is consistent with that used in the Final PDARP/PEIS.

"Adverse" is used in this section only to describe the federal Trustees' evaluation under NEPA. That term is defined and applied differently in consultations conducted pursuant to ESA and other protected resource statutes. Accordingly, in the protected species sections below, there may be adverse impacts identified under NEPA; however, this does not necessarily mean that an action would be likely to adversely affect the same species under protected resources statutes. The results of any completed protected resource consultations are included in the Administrative Record.

This Environmental Consequences Section analyzes the beneficial and adverse impacts that would result from the implementation of any of the alternatives considered in this RP/EA #2. The resource categories presented in this chapter correspond to the descriptions of existing conditions in Chapter 3, Affected Environment of the Final PDARP/PEIS. Each of the Proposed Alternative and the No Action Alternative are evaluated against each resource category.

4.4 Elmer's Island Access

The Elmer's Island Access project has been modified in response to public comments as described in Section 1.6.2. This section describes the affected environment and an analysis of the environmental consequences of the preferred Elmer's Island Access alternative (modified to replace the proposed boardwalk with a beach shuttle service feature). An analysis of the affected environment and environmental consequences of two non-preferred Elmer's Island Access alternatives—the original proposed Elmer's Island Access project containing a lagoon-traversing boardwalk and another alternative with a behind-the-dune boardwalk alignment, was also conducted and can be found in Section 4.4 of the December 2017 Draft RP/EA #2 and Section 4 of the Supplemental RP/EA, respectively. This analysis is herein incorporated by reference and summarized in **Table 4-18** (Section 4.9) of this RP/EA #2.

4.4.1 Physical Environment

4.4.1.1 Geology and Substrates

4.4.1.1.1 Affected Environment

The Elmer's Island Access site, located where Barataria Estuary meets the Gulf of Mexico, includes interior wetlands and adjoining seashore. Elmer's Island geology is characterized by Holocene beach sand, comprised of sand and shelly sand being reworked along the distal edge of the Caminada–Moreau deltaic headland in the southern Lafourche delta lobe of the Mississippi River. This area is detached from the headland on the west and east to form the Timbalier and Isles Dernieres barrier-island chains and Grand Isle (Louisiana Geological Survey [LGS] 2011). Surface soil in the area has been classified by USDA Natural Resources Conservation Service (USDA NRCS) as predominantly Scatlake muck and Felicity loamy fine sand (USDA NRCS 2017). The substrates present along the shorelines comprise stable slopes containing loamy fine sand and beach sediment (Felicity loamy fine sand), while substrates in the submerged offshore portions include soft muck and clay (Scatlake muck). These soil types are relatively flat, poorly drained, and classified as having negligible runoff. The site includes undeveloped coastal land accessed by dirt and gravel roads for recreational activities as well as restoration and research projects. Timber pilings and other remnants of a dilapidated campground are located in the southwestern corner of the project site. The current and historical uses of Elmer's Island have disturbed the soils, as roads and "makeshift" boat launches contribute to erosion. The geography is highly dynamic and greatly affected by weather events. Over the last 100 years the Caminada Headland area, inclusive of Elmer's Island, has experienced significant shoreline erosion and loss, averaging 35 feet per year (ft/yr), to marsh, beach, wetland, and dune habitats as a result of storm overtopping and breaching, saltwater intrusion, wind and wave induced erosion, sea-level rise, and subsidence (CPRA 2017).

4.4.1.1.2 Environmental Consequences

Proposed Alternative

Aspects of the Proposed Alternative that have environmental consequences for the geology and substrates include road maintenance; culvert installation; repairs to a washout area; and construction of parking areas, boat launches, operation of a shuttle service, and a bird watching area.

In-water work is expected due to the construction of boat launches and the washout repair. In-water work associated with boat launches and washout repair is expected to be relatively minor and primarily consists of the placement of sand and crushed stone. Repairs to the washout area may include placing of a culvert and mixed aggregate in water at the breach location.

The proposed shuttle service would operate in the intertidal zone – the "wet sand" area above water at low tide and occasionally under water at high tide. The shuttle would include vehicle traffic along the intertidal wet sand area of the beach. Therefore, impacts to geology and substrates include long-term moderate adverse impacts due to increased vehicle access and foot traffic contributing to compaction/rutting along beach areas, vehicle-induced seaward displacement of sand, and the potential for increased beach erosion as a result. Additional long-term moderate adverse impacts include potential impacts to dunes from increased recreational

use from access points and/or creation of social trails. This increased use could lead to reduction in dune stability (lowered height, reduced vegetation, weakened low points).

Digging would occur in the terrestrial environment to auger holes and/or excavate for foundations for an observation deck/platform in the birding area and the installation of culverts. Additional ground disturbances and surficial digging would be associated with construction of the parking areas, boat launches, and demolition of the campground building remnants. The depth of disturbances depends on final design for the observation deck/platform and culverts, but for the parking areas and launches, depth is expected to be less than 6 inches. The depth of disturbance for the building demolition depends on the depth of the building foundation but is expected to be less than 2 feet. Road maintenance planned for the existing 1.5-mile-long access road would include no additional disturbances to areas already used as access roads.

Construction equipment and materials for staging have not been identified but likely would be located on site at the proposed parking areas or on previously disturbed sites. Although the observation deck/platform, parking areas, launches, and road improvements would impact soils, these improvements would direct and condense foot and vehicle traffic into designated areas, minimizing adverse impacts to the overall site.

Specific measures would be implemented during construction to minimize erosion and overall soil impacts. To the extent possible, the project would use the existing development footprints and disturbed areas (e.g., parking areas). These would include following established BMPs for construction activities such as the implementation of an erosion control and stormwater management plan, the installation of sediment traps prior to commencement of construction activities, and ongoing construction monitoring to ensure compliance. Any in-water work, such as construction of pilings, culverts, and launches, would be performed behind silt curtains to isolate construction impacts.

Short- and long-term minor disturbances to terrestrial soils and substrates would occur on site due to construction and site preparation activities. However, the impacts would be localized to several small areas across the project site and impacts would be offset by improvements that condense foot and vehicle traffic.

Specific BMPs that could be implemented to minimize potential impacts to geology and substrates from the operation of the shuttle service are described in **Appendix E** and include restricting shuttle traffic to the intertidal wet sand area of the beach, shuttle vehicle weight limits, tire restrictions, and speed limits.

No Action Alternative

Under the No Action Alternative, the Elmer's Island Access project would not be implemented. Construction and site preparation activities, such as pile installation, excavating, grading, and leveling activities, would not occur and the shuttle service would not operate; therefore, no additional adverse or beneficial impacts to geology and substrates would be expected. The conditions at the project site would remain the same as described in the Affected Environment section above.

4.4.1.2 Hydrology and Water Quality

4.4.1.2.1 Affected Environment

Elmer's Island is located in Barataria Basin, Jefferson Parish, Louisiana. The entire basin is approximately 1,565,000 acres (Coastal Wetlands Planning, Protection and Restoration Act [CWPPRA] 2017). Freshwater inputs to the basin are primarily rainfall as the construction of levees along the Mississippi River have prevented freshwater and sediment inputs to the basin (CWPPRA 2017). Previous Water Quality Inventory Reports by LDEQ have listed suspected sources of water quality problems as crop production, pastureland, urban runoff, septic tanks, minor industrial point sources, petroleum activities, highway and maintenance runoff, hydromodification, and dredging (Louisiana Comprehensive Wildlife Conservation Strategy [LA CWCS] 2005). Based on the Final 2016 Louisiana Water Quality Integrated Report (LDEQ 2016), Barataria Bay (subsegment LA021101_00), which includes Caminada Bay and the project area, is listed as fully supporting the designated use for primary contact recreation, secondary contact recreation, fish and wildlife propagation, and oyster propagation. Also included is subsegment LA021102 (Barataria Basin Coastal Bays and Gulf Waters), which is listed as not supporting the designated use for fish and wildlife propagation with suspected causes of impairment such as mercury in fish. Elmer's Island is located within the Federal Emergency Management Agency (FEMA) designated Flood Zone VE, which is subject to inundation by the 1%- annual-chance flood event, with additional hazards due to storm-induced velocity wave action (FEMA Map Number 22051CO225 E 1995).

4.4.1.2.2 Environmental Consequences

Proposed Alternative

Work in federally jurisdictional wetlands or other waters of the United States would require permits from the U.S. Army Corps of Engineers (USACE) as required by Section 404 of the Clean Water Act (CWA) and/or Sections 9 and 10 of the Rivers and Harbors Act of 1899. Coordination and permitting with USACE would occur prior to construction. Additionally, prior to construction, state permits would be obtained as necessary, including Section 401 Water Quality Certification and Section 402 National Pollutant Discharge Elimination System (NPDES) permits.

Pollution prevention plans would be prepared as necessary, in conjunction with the NPDES permitting process prior to construction. These plans would include all specifications and BMPs necessary for control of erosion and sedimentation due to construction-related activities. The construction BMPs, in addition to other avoidance and mitigation measures as required by state and federal regulatory agencies, would minimize water quality and hydrology impacts.

The primary impacts to water quality and hydrology would be through the short-term, localized effects of construction of the Proposed Alternative, including potential erosion and sedimentation. The Proposed Alternative includes in-water work such as the construction of boat launches, installation of culverts, and repair of a washed-out road. The installation of new culverts under an existing access road would improve water quality and the hydrologic connection within the back bay area and wetlands of Elmer's Island by restoring the natural historic connection. This connection would also improve dissolved oxygen levels in the back bay area. Therefore, the Proposed Alternative would have short-term minor adverse impacts on localized water quality associated with construction in addition to possible long-term minor

adverse impacts due to the small increase in impervious surface. However, there would also be long-term moderate beneficial effects on water quality and hydrology of Elmer's Island estuarine waters. Evaluation of potential impacts to stormwater and pollutant loads will be further evaluated during the E&D phase.

Operation of the shuttle service would not result in significant changes to local hydrology. However, vehicular traffic could result in water quality impacts. Adverse impacts would include rutting during shuttle operation, and potential contamination due to fluid/fuel leaks from shuttle service vehicles. Therefore, the environmental consequences to water quality include short- and long-term, minor adverse impacts.

Specific BMPs that could be implemented to minimize potential impacts to hydrology from the operation of the shuttle service are described in **Appendix E** and include using multi-passenger vehicles to minimize the number of shuttles and trips.

No Action Alternative

Under the No Action Alternative, construction of the in-water features would not occur along with the associated grading, leveling, and paving of the parking lots and boat launches. In addition, the shuttle service would not operate. Water quality would be adversely impacted compared to the Proposed Alternative as the No Action Alternative would not include trash management, repair of the road washout, and installation of the new culverts would not occur. Therefore, the natural flow of water and natural mixing that historically occurred in this area would continue to be impeded. The No Action Alternative would result in fewer short-term minor adverse impacts to localized water quality and hydrology but would result in more long-term minor adverse impacts compared to the Proposed Alternative.

4.4.1.3 Air Quality

4.4.1.3.1 Affected Environment

The EPA defines ambient air in 40 CFR Part 50 as "that portion of the atmosphere, external to buildings, to which the general public has access." In compliance with the 1970 Clean Air Act (CAA) and the 1977 and 1990 CAA Amendments, EPA promulgated National Ambient Air Quality Standards (NAAQS). The NAAQS include primary standards that set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. To date, EPA has issued NAAQS for seven criteria pollutants: ozone, particles with a diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$), particles with a diameter less than or equal to a nominal 10 micrometers (PM_{10}), sulfur dioxide, lead, carbon monoxide, and nitrogen dioxide.

The Air Quality Index (AQI) monitoring program was developed from the NAAQS baseline standards. According to EPA, AQIs of under 50 are considered good air quality. As AQIs advance beyond 50, air quality begins to get worse, and AQIs of over 300 are classified as hazardous (USEPA 2016)

Greenhouse gasses (GHGs) are chemical compounds found in the Earth's atmosphere that absorb and trap infrared radiation as heat. The principal GHGs emitted into the atmosphere through human activities are carbon dioxide, methane, nitrous oxide, and fluorinated gases.

Jefferson Parish is listed as in attainment for all NAAQS pollution metrics (i.e., it complies with all air quality standards). Jefferson Parish has overall good air quality (USEPA 2017). For the past 5 years (2012 to 2016), Jefferson Parish maintained an average AQI of 43 (USEPA 2017), which is below the poor air quality threshold of 50.

4.4.1.3.2 Environmental Consequences

Proposed Alternative

Implementation of this project component could include use of construction equipment such as bulldozers, trucks, backhoes, tractor trailers, cranes, small barges with crane, small excavators, fork lifts, roller, generators, small trucks, and hand tools. During construction activities impacts to air quality would occur from exhaust of gasoline- and diesel-powered construction vehicles and equipment. Most impacts to air quality are expected to be localized and occur only during active construction activities.

Engine exhaust from bulldozers, excavators, trucks, backhoes and other vehicles would contribute to an increase in criteria pollutants, GHGs, and other air pollutants. However, because of the small-scale and short duration of the construction portion of the project, predicted emissions would be short-term and minor and would not require a detailed assessment. Long-term, ongoing impacts include a slight increase in emissions due to the increase in recreational use of the site; however, based on the current and anticipated number of visitors per year, the increase is expected to be minimal.

Emission reduction measures to mitigate for air quality impacts caused by construction activities could include the use of ultra-low sulfur diesel fuel in off-road construction equipment, limiting unnecessary idling time of diesel-powered engines, controlling dust related to construction site activities, and covering trucks hauling loose materials.

Short-term adverse impacts to air quality would be minor, local, and temporary, only occurring during active construction activities.

The operation of the shuttle service would include continued use of vehicular shuttles along the beach. The environmental consequences to air quality and greenhouse gas (GHG) emissions include long-term, minor adverse impacts associated with intermittent emissions during shuttle operation along the beach. Engine exhaust from the shuttles would contribute to an increase in criteria pollutants, GHG emissions, and other air pollutants. However, vehicles would comply with EPA exhaust emission standards. BMPs that could be implemented are described in **Appendix E** and include emission reduction measures to mitigate for air quality impacts associated with the shuttle service. BMPs could also include using multi-passenger vehicles to minimize the number of shuttles and trips. Given the low number of vehicles in operation, intermittent use, compliance with emission standards, and implementation of BMPs, the Proposed Alternative would have a long-term, minor adverse impact on air quality and GHG emissions.

No Action Alternative

Under the No Action Alternative, construction activities associated with the Elmer's Island Access project would not be implemented and the shuttle service would not operate. Therefore, no

additional adverse or beneficial impacts to air quality would be expected. The conditions at the project site would remain the same as described in the Affected Environment section above.

4.4.1.4 Noise

4.4.1.4.1 Affected Environment

Under most conditions, the ambient (background) noises at Elmer's Island are from waves, wind, and wildlife, especially birds. Vehicular traffic, watercraft traffic, and recreational activities influence noise levels at the project site. Human activities from homes and camps located on Highway 1 near the refuge entrance and vehicle traffic on Highway 1 also contribute noise near the far west side of the project area. The level of noise in the project areas vary, depending on the season, time of day, number and types of noise sources, and distance from the noise source.

The Elmer's Island Wildlife Refuge property provides an area of beachfront and marsh that the public can access via a gravel road between sunrise and sunset. This access is regularly used for recreational fishing, bird watching, restoration projects, outdoor education programs, and volunteer opportunities, which contribute to minor vehicle and traffic noise during daylight hours. Historically, driving on the beach was allowed, but due to the current Louisiana state law prohibiting driving on an integrated coastal protection project, future vehicular access would be limited to the operation of the shuttle service and to emergency or official vehicles.

4.4.1.4.2 Environmental Consequences

Proposed Alternative

The project components would generate construction noise associated with equipment during demolition of the existing structure, observation deck/platform, parking lots, boat launches, road maintenance, culvert installation, signs, and other amenities. Construction activities for the Proposed Alternative would include mobilizing equipment, preparing the sites, pile installation, placing foundations, grading, and fill placement. Implementation of the project would include transportation of construction materials to the project area, which may include trucks or other types of transportation that would contribute to short-term noise disturbances.

Human communities on Highway 1 near the entrance to the project site may be affected by noise during construction of the parking area and boat launch near the entrance. These activities are expected to be short-term and primarily consist of placing fill. Wildlife in and around the project area may be sensitive to changes in noise sources or levels due to project construction. Construction equipment (e.g., generators, pile installation equipment) noise is known to disturb fish, marine mammals, and shorebirds. Conservation measures for marine mammals from noise are discussed in the Biological Environment section. Construction noise can also be a nuisance to residents living or recreating on the shorelines adjacent to project construction activities. Construction activities at the site would result in short-term, moderate, adverse impacts to noise at the site and in the immediate vicinity.

Mitigation measures that serve to limit noise impacts to humans from construction activities include limiting activity at project sites to daytime hours, limiting truck traffic ingress/egress to the site to daytime hours, promoting awareness that producing prominent discrete tones and periodic noises (e.g., excessive dump truck gate banging) should be avoided as much as possible, and requiring that work crews seek pre-approval for any weekend activities or activities outside

of daytime hours. The timing of in-water noise-producing activities could be planned to minimize disturbances to marine life. Because construction noise is temporary, any adverse impacts to the human and marine environment during construction activities would be short-term adverse and minor. Standard practices, such as muffle units for generators, would be implemented during construction operations to mitigate noise impacts.

Once the improvements are constructed, visitors may cause some noise associated with parking and recreating. These noises could be slightly more disturbing to any resting or roosting birds that may use the site compared to baseline conditions although the site's proximity to waterway traffic may render these increases negligible. Overall, long-term noise impacts at this project from personal vehicle use, boating, fishing, and other recreational activities would likely be minor and adverse.

The shuttle service would include recurring, intermittent noise associated with vehicular shuttles driving along the beach. These vehicular noises, while not continuous and likely limited to one or two vehicles in operation at once, would occur in a setting devoid of similar noises. Therefore, the environmental consequences include long-term, minor adverse noise impacts due to intermittent shuttle operations and increase in recreational activities.

Specific BMPs that could be implemented to minimize potential impacts to noise from the operation of the shuttle service are described in **Appendix E** and include using multi-passenger vehicles to minimize the number of shuttles and trips.

No Action Alternative

Under the No Action Alternative, the Elmer's Island Access Proposed Alternative would not be implemented, construction activities would not occur, the shuttle service would not operate, and recreation improvements would not be added to the site. Therefore, no additional adverse or beneficial impacts to noise would be expected. The conditions at the project site would remain the same as described in the Affected Environment section above.

4.4.2 Biological Environment

4.4.2.1 Habitats

4.4.2.1.1 Affected Environment

Elmer's Island is located in the Barataria Basin (Jefferson Parish, Louisiana) within the larger deltaic coastal marshes and barrier islands ecoregion, which is dominated by brackish and saline marshes, at the southern extent of the Mississippi alluvial plain (Daigle et al. 2006). Caminada Bay is north of Elmer's Island, and several channels/bayous dissect the island and connect to Caminada Bay. Though commonly referred to as an "island," Elmer's is a 1,160-acre tract of coastal land comprised of interior wetlands and adjoining seashore. Since 2008, Elmer's Island has been managed as an LDWF refuge. Saltwater marsh, coastal dunes, and beaches are the prevalent ecologic features in the area. The refuge property includes a tidal zone, an intertidal zone, natural and restored dunes, and an expanse of open area leading to a back bay, which is surrounded by mangrove and saltwater marsh habitat. Freshwater inputs to the basin are primarily rainfall as the construction of levees along the Mississippi River has prevented freshwater and sediment inputs to the basin.

Land use within the project area is largely recreational use of undeveloped marshes and beaches. Some of the waterways have been straightened, channelized, and/or maintained for navigation. Immediately north of the project area is a small residential community along Highway 1. The larger communities of Grand Isle and Port Fourchon are approximately 2 miles to the east and 10 miles to the west, respectively.

The geography and geology at Elmer's Island is dynamic. Extensive organic deposits lie mainly below sea level in permanently flooded settings, resulting in the development of mucky surfaced Histosols. Sediments of silts, clays, and peats contain large amounts of methane, oil, and hydrogen sulfide gas (Daigle et al. 2006). Inorganic sediments are soft and have high water contents and will shrink dramatically upon draining. Elevations within the project area range largely from 0 to 3 feet above mean sea level (MSL), with some small elevated dunes and natural levees extending up to 5 feet above MSL. A detailed discussion on geology is provided in Section 4.4.1.1 Geology and Substrates and includes discussion on the severity of land loss and erosion, which averages 35 ft/yr.

Wetland and open water habitats dominate the project area. Hydrology on the island is dynamic, with erosion and accretion witnessed with every storm or weather event (LDWF 2016). Recent land formation on the eastern end of Elmer's Island is closing off the historic path of water flow from the interior bay to the Gulf of Mexico, forcing high water from storm events over and through the system, creating breaches or over-wash areas. According to National Wetlands Inventory (NWI) mapping, the open waters of the back bay and open water channels are best classified as subtidal, polyhaline estuarine waters. The saltwater marsh habitats are best classified as estuarine intertidal emergent wetland systems with a regularly flooded water regime and polyhaline water chemistry. Higher-elevation marshes are irregularly flooded by the tides (USFWS NWI 2017). The project area supports marsh vegetation tolerant of brackish or saline water, including smooth cordgrass (*Spartina alterniflora*), saltmeadow cordgrass (*Spartina patens*), black needlerush (*Juncus roemerianus*), coastal saltgrass (*Distichlis spicata*), and salt wort (*Batis maritima*). This community is often totally dominated by smooth cordgrass and provides highly productive nursery areas for shrimp, crabs, and fish.

Black mangrove (*Avicennia germinans*) is widely distributed in areas surrounding the back bay, occupying 3 to 7 acres in and directly adjacent to the project area. Although sometimes termed a swamp, the physiognomy of the mangrove community in Louisiana more closely resembles a shrub thicket. The coastal region of Louisiana delimits the northern range of this community due to mangrove's inability to tolerate temperatures much below freezing (Louisiana Department of Wildlife and Fisheries Natural Heritage Program [LNHP] 2009). Other characteristic vegetation besides black mangrove is smooth cordgrass. Salt marshes and mangrove habitats are integral parts of the Louisiana barrier island system. The mangrove habitats have several important ecological functions: extensive root systems stabilize the shoreline and reduce erosion; the cover and food they provide create excellent nursery areas for fish and shellfish; the community improves surrounding water quality by filtering nutrients and suspended sediments; and many colonial waterbirds use mangroves as nesting areas.

Neither a benthic survey nor a submerged aquatic vegetation survey have been conducted for the project area. However, LDWF Elmer's Island Wildlife Refuge biologists indicate that no seagrasses

or other marine vegetation are present within the refuge. Likewise, corals are not located in the shallow estuarine waters within or directly adjacent to the Elmer's Island project area. The intertidal zone (i.e., the "wet sand" area above water at low tide and occasionally under water at high tide) provides important foraging habitat for breeding shorebirds, such as Wilson's plover and least tern, and overwintering shorebirds, including the federally threatened piping plover and red knot. Invertebrates such as crabs and clams also inhabit the intertidal zone.

Uplands are primarily restricted to beach and dune grassland and shrub habitats and elevated gravel roadbeds that are vegetated by weedy grasses and forbs. Coastal dune grasslands occur on beach dunes and elevated ridges above intertidal beaches and are dominated by salt spray tolerant grasses and forbs, which may include saltmeadow cordgrass, seaoats (*Uniola paniculata*), bitter panicgrass (*Panicum amarum*), coastal saltgrass, jointgrass (*Paspalum vaginatum*), purple sandgrass (*Triplasis purpurea*), sandburs (*Cenchrus* spp.), salt wort, and morning glory (*Ipomea* spp.), among others. Vegetative cover ranges from sparse to fairly dense, and frequent storm over-wash and sand deposition frequently alter the composition of this community.

Coastal dune shrub thickets form if dunes remain stable enough to allow woody vegetation to establish. While these habitats are rare on Elmer's Island, coastal dune shrub thickets are present on beach ridges and consist of salt-tolerant shrubs, including wax myrtle (*Morella cerifera*), yaupon (*Ilex vomitoria*), marsh elder (*Iva* spp.), saltbush (*Baccharis halimifolia*), and a few others. The shrubs are often covered with a dense growth of lichens and vines. The community can be destroyed naturally by dune migration or erosion and replaced by dune grasslands. Live oak (*Quercus virginiana*) barrier island upland communities are found on nearby Grand Isle, and an occasional live oak may be found on low ridges or knolls (LNHP 2009).

Based on the Final 2016 Louisiana Water Quality Integrated Report (LDEQ 2016), Barataria Bay, which includes Caminada Bay and the project area, is listed as fully supporting the designated use for fish and wildlife propagation and oyster propagation. A detailed discussion of water quality is provided in Section 4.4.1.2 Hydrology and Water Quality. Elmer's Island habitats support a wide variety of wildlife, particularly a large diversity of birds. More than 170 species of birds are believed to use Elmer's Island and the surrounding beach and marsh during some point in their life cycle; almost 40 of these species are listed as bird species of conservation concern in Louisiana. Additionally, seven species of reptile and nine species of mammals have been observed at Elmer's Island. A detailed discussion of wildlife is provided in Section 4.4.2.2 Wildlife Species, and a detailed discussion of aquatic fauna and their habitats is provided in Section 4.4.2.3 Marine and Estuarine Fauna, Essential Fish Habitat, and Managed Fish Species. Piping plovers (*Charadrius melodus*), which are federally listed as threatened, forage on Louisiana's beaches, including Elmer's Island, up to 9 months out of the year. Red knots (*Calidris canutus rufa*), also listed as threatened, use Elmer's Island as a stopover point during their long migratory route. A detailed discussion of protected species is provided in Section 4.4.2.4 Protected Species.

4.4.2.1.2 Environmental Consequences

Proposed Alternative

The Elmer's Island Wildlife Refuge property provides an area of beachfront and marsh that the public can access. This access is regularly used for recreational fishing, bird watching, restoration projects, outdoor education programs and volunteer opportunities. Elmer's Island is strategically

located in a coastal area with high levels of tourism with both Grand Isle and Port Fourchon within a 5-mile radius; these locations were identified as the most popular destinations for coastal tourism in Louisiana (Caffey et al. 2003). This project would enhance the utilization of Elmer's Island as a recreational area that offers access to renewable fish and wildlife resources and their supporting habitats, a recreational fishing area, and an educational experience for the public.

The Proposed Alternative features under consideration include primarily upland-based items such as road maintenance, litter and debris removal, the operation of the shuttle service within the intertidal zone, and new parking areas. Some in-water work is also proposed such as the construction of boat launches, installation of culverts, and repair of a washed-out road. Most of these proposed features would be constructed on or along existing roads and other areas that were previously disturbed. Thus, few of the proposed features would occur in undisturbed natural upland, wetland, or aquatic habitats. The primary impacts to the environment would be through the temporary effects of construction, including potential erosion and sedimentation and the long-term effects of operating of the shuttle service within the intertidal zone.

Recreational project features would be constructed adjacent to or near the existing access roads and would be designed and constructed with a primary focus on minimization of in-water disturbance and water bottom impacts. The operation of the shuttle service is the most significant activity proposed for shorelines and intertidal zone habitats. Habitats disturbed by the shuttle service include the intertidal zone and the wrack line, where breeding and overwintering shorebirds forage. The shuttle service would include recurring, minor impacts to intertidal wet sand habitats on the beach due. This includes vehicle-induced seaward displacement of sand and the potential for increased beach erosion as a result. The shuttle service would result in greater impacts to these habitats from noise/vibration, compaction/rutting, and potential small petroleum/vehicle fluid spills. There also would be impacts from increased foot traffic and public use (trampling, trash, etc.). These impacts would increase during the summer season when the shuttle service would run more frequently. Therefore, the environmental consequences to habitats include short- and long-term, minor to moderate adverse impacts.

In-water work associated with boat launches and washout repair is expected to be relatively minor and primarily consists of placing sand and crushed stone. Parking areas are proposed near the launches. The boat launches would be part of the Elmer's Island Wildlife Refuge, available to the public, and maintained by LDWF. No marinas or boat slips are proposed. The creation of small boat launches would permanently impact the shoreline area where the ramp is placed and is likely to increase impacts to nearby shoreline and open water areas due to increased human activities (e.g., boat traffic, litter). While these impacts would affect habitats in localized areas, the footprints of the ramps are small, and temporary disturbances are expected to be limited in scope and duration. Because of management as a wildlife refuge, temporarily disturbed habitats would likely be routinely monitored and would recover quickly (either naturally or through active management), and wildlife would likely use plentiful suitable habitats nearby. Therefore, the boat launches are not expected to have adverse effects on habitats.

One of the primary project goals is to promote recreational fishing. Therefore, an increase in fishing pressure would result in an increase in the use and potential loss of hook and line gear

and small, personal crab pots. However, parking capacity and the absence of boat docks or marinas at the refuge would limit the total number of visitors, thereby putting an upper limit on the magnitude of fishing pressure. The use of trawl gear or gillnets within the project area is not expected. While recreational fishing would increase from current levels, it is not expected to have significant adverse effects on habitats.

Certain project elements (e.g., culverts) are expected to improve wetland, estuarine, and marine aquatic habitat. The installation of new culverts under the existing access road would improve water quality and the hydrologic connection within the backwaters and wetlands of Elmer's Island by restoring the natural historic connection. Therefore, this would likely have a beneficial effect on sensitive habitats in the area, particularly, cordgrass marshes and mangroves. Benefits include a more natural water regime and increased circulation of nutrients and sediments. The Proposed Alternative would have some minor short-term adverse impacts associated with construction but also some long-term beneficial effects on water quality and wildlife habitat of Elmer's Island.

Potential impacts to habitats would be considered and avoided or minimized to the extent practicable during design and construction. This includes consideration for locating project elements outside of sensitive habitats. When impacts cannot be avoided, best practices should minimize the magnitude and duration of impacts to habitats. Signage, fencing, or landscaping can be used to focus foot and boat traffic to certain areas, thereby limiting shoreline and nearshore disturbances. Trash management would include a centralized dumpster repository, as well as routine trash collection efforts. Best practices during construction are likely to include protective fencing of sensitive habitats and staging equipment in previously disturbed areas. They are also likely to include standard erosion and sediment control measures (e.g., silt fence) to protect water quality and aquatic habitats from impacts resulting from construction stormwater and sediment runoff. Unavoidable impacts to jurisdictional wetlands and waters would be mitigated, consistent with any such requirements contained in the Section 404 permit. Overall, impacts from construction may result in short-term minor adverse impacts. However, there would also be long-term moderate beneficial effects on wetland and estuarine habitats.

Specific BMPs that could be implemented to minimize potential impacts to habitats from the operation of the shuttle service are described in **Appendix E**. These habitat related BMPs could include restricting vehicular traffic to the area on or adjacent to the wet sand, weight limits, tire restrictions, and speed limits to minimize impacts to habitats. Additionally, impacts to habitats could be minimized by using multi-passenger vehicles to reduce the number of shuttles and trips.

No Action Alternative

Under the No Action Alternative, the Elmer's Island Access project would not be implemented, construction activities would not occur, the shuttle service would not operate, and recreation and habitat improvements would not be added to the site. Therefore, no additional adverse or beneficial impacts to habitats would be expected. The conditions at the project site would remain largely the same as described in the Affected Environment section above.

While construction of project features in upland, wetland, and open water habitats would not occur nor would the associated amenities (e.g., boat launches and parking lots) and increase in public use. Under the No Action Alternative, there would be no expanded litter and debris

removal nor repair of the road washout. This may adversely affect habitats compared to the Proposed Alternative. Additionally, the installation of the new culverts would not occur; therefore, the natural flow of water and mixing that historically occurred in this area would continue to be impeded. As such, the No Action Alternative would likely result in fewer short-term minor adverse impacts to localized habitats but would result in more long-term moderate adverse impacts to habitats, particularly wetland, and open water habitats, compared to the Proposed Alternative. Because the shuttle service would not operate, the No Action Alternative would likely result in fewer impacts to the intertidal zone habitats, compared to the Proposed Alternative.

4.4.2.2 Wildlife Species (including birds)

4.4.2.2.1 Affected Environment

Elmer's Island Wildlife Refuge is owned and operated by LDWF and is operated under a management plan (LDWF 2016; LDWF 2017a). Elmer's Island contains many types of habitats, which support a diversity of wildlife with over 170 species of birds use Elmer's Island and the surrounding beach, intertidal, and marsh habitats (LDWF 2016). Wildlife species observed at Elmer's Island are presented in **Table 4-1** (LDWF 2016).

Table 4-1. Wildlife Species Observed at Elmer's Island

Common Name	Scientific Name
Birds	
seaside sparrow	*Ammodramus maritimus*
Nelson's sparrow	*Ammodramus nelsoni*
northern pintail	*Anas acuta*
mottled duck	*Anas fulvigula*
short-eared owl	*Asio flammeus*
lesser scaup	*Aythya affinis*
Redhead	*Aythya americana*
Canvasback	*Aythya valisineria*
upland sandpiper	*Bartramia longicauda*
American bittern	*Botaurus lentiginosus*
Dunlin	*Calidris alpina*
red knot	*Calidris canutus*
buff-breasted sandpiper	*Calidris subruficollis*
snowy plover	*Charadrius alexandrinus*
piping plover	*Charadrius melodus*
Wilson's plover	*Charadrius wilsonia*
marsh wren	*Cistothorus palustris*
sedge wren	*Cistothorus platensis*
reddish egret	*Egretta rufescens*
swallow-tailed kite	*Elanoides forficatus*
peregrine falcon	*Falco peregrinus*
gull-billed tern	*Gelochelidon nilotica*
American oystercatcher	*Haematopus palliatus*
bald eagle	*Haliaeetus leucocephalus*

Common Name	Scientific Name
Caspian tern	*Hydroprogne caspia*
least bittern	*Ixobrychus exilis*
loggerhead shrike	*Lanius ludovicianus*
short-billed dowitcher	*Limnodromus griseus*
marbled godwit	*Limosa fedoa*
long-billed curlew	*Numenius americanus*
Osprey	*Pandion haliaetus*
painted bunting	*Passerina ciris*
brown pelican	*Pelecanus occidentalis*
roseate spoonbill	*Platalea ajaja*
glossy ibis	*Plegadis falcinellus*
king rail	*Rallus elegans*
clapper rail	*Rallus longirostris*
black skimmer	*Rynchops niger*
Forster's tern	*Sterna forsteri*
common tern	*Sterna hirundo*
coastal least tern	*Sternula antillarum*
interior least tern	*Sternula antillarum*
royal tern	*Thalasseus maximus*
sandwich tern	*Thalasseus sandvicensis*
Mammals	
Coyote	*Canis latrans*
Hispid cotton rat	*Sigmodon hispidus*
marsh rice rat	*Oryzomys palustris*
house mouse	*Mus musculus*
Norway rat	*Rattus norvegicus*
eastern cottontail rabbit	*Sylvilagus floridanus*
feral hog	*Sus scrofa*
Nutria	*Myocastor coypus*
bottlenose dolphin	*Tursiops truncatus*
Reptiles	
diamond-backed terrapin	*Malaclemys terrapin*
saltmarsh watersnake	*Nerodia clarkii*
hawksbill sea turtle	*Eretmochelys imbricate*
leatherback sea turtle	*Dermochelys coriacea*
loggerhead sea turtle	*Caretta caretta*
Kemp's Ridley sea turtle	*Lepidochelys kempii*
green sea turtle	*Chelonia mydas*

4.4.2.2.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would include long-term impacts to intertidal wet sand habitats on the beach due to vehicular traffic and increased public use (trash, trampling, etc.), which could impact the wildlife species that use these habitats. More than 170 species of birds are believed to use Elmer's Island and the surrounding beach and marsh during some point in their life cycle. Almost

40 of these species are listed as bird species of conservation concern in Louisiana. Common nesting species include clapper rail, least tern, seaside sparrow, and Wilson's plover. Wintering birds include dunlin, sedge wren, snowy plover, and short-billed dowitcher. All of these species are protected under the Migratory Bird Treaty Act of 1918. Threatened and endangered species protected by the Endangered Species Act are discussed in Section 4.4.2.4 Protected Species.

A breeding population of diamondback terrapins has been documented on and around Elmer's Island. Terrapin nesting begins in May and continues until late July. The female terrapin leaves the marsh waters and comes ashore to nest at the sandy edges of marshes and dunes. The nest incubates in the sand without any further parental care. After 60 to 120 days, hatchling terrapins emerge and head toward the nearest body of water. Hibernation generally occurs within and below the intertidal zone of the salt marsh, singly or in groups, and lasts from November through March. Threats affecting this species include commercial take, collection for the pet trade, habitat loss, nest disturbance, and mortality due to derelict crab traps (LDWF 2016).

The intertidal habitats and wrack (i.e., debris line) are highly dynamic and unstable but provide important foraging habitat for wintering and breeding shorebirds. Some inhabitants of intertidal habitats are somewhat adapted to disturbance, while others are disturbed by activities within this intertidal zone. Wildlife species such as birds may be flushed more frequently from foraging and nearby nesting areas due to the shuttle service. Newly hatched chicks may also be at risk as they are hard to see and may not avoid danger. Impacts from the Proposed Action could also have the potential to impact abundance, species richness, habitat, behavior, and energy use by breeding and overwintering shorebirds and prey species in the wrack and littoral zone (Forgues 2010; Tarr et al. 2010; Burger and Gochfeld 1991; Cestari 2015; Schlacher et al. 2013). Repeated flushing of shorebirds in response to disturbance may cause birds to expend energy on short flights and limit energy necessary for migration and/or breeding (Nudds and Bryant 2000; Lafferty 2001). Schlacher et al. (2013) found that off-road vehicles displaced birds from their preferred feeding and roosting sites and, in some cases, birds were killed by direct strikes. Because shorebird chicks are camouflaged to avoid predation, they are difficult to avoid when driving on the beach.

Several studies have shown that vehicle access has minimal impacts on invertebrates that occupy the intertidal zone (Leatherman and Godfrey 1979; Godfrey et al. 1980). Samples taken inside and outside vehicle tracks showed that crab and clam species were not damaged and could be protected by burrows as shallow as 5 cm (Wolcott and Wolcott 1984). Van der Merwe and Van der Merwe (1991) found no significant differences between damage to intertidal, macrofaunal species at low-intensity use (5 passes/day) versus high-intensity use (50 passes/day), which is at rates higher than the Proposed Alternative. This study concluded that the intertidal animals appeared to be safe from damage by vehicles provided they were buried and the sand was reasonably compact (Van der Merwe and Van der Merwe 1991). The New Zealand Department of Conservation recommended that impacts to intertidal fauna could generally be avoided by driving on wet, compacted sand, seaward of the drift/wrack line during daylight hours (Stephenson 1999). Despite these findings, more recent studies have documented that crushing of crabs and other invertebrates can occur as the result of driving on beaches (Moss and McPhee 2006; Schlacher et al. 2007; Schlacher et al. 2008; Knisley and Hill 1990 as cited in Knisley 2009).

Therefore, because the proposed shuttle service would be restricted to within or adjacent to the intertidal wet sand area of the beach, the environmental consequences include short- and long-term, minor impacts to bird species that forage in wrack and in the intertidal zone in addition to long-term, minor adverse impacts to animals (e.g., crabs or clams) that occupy the intertidal zone. Additionally, there could be minor, adverse impacts to a small number of diamondback terrapins that may be present on the Gulf side of the island.

Most of the other Proposed Alternative features would have a small footprint of both in-water work and upland work. Therefore, the potential impacts to wildlife under the Proposed Alternative are minimal. Additionally, most of the upland features would mainly occur on existing roads and berms that do not provide optimal wildlife habitat. Therefore, the potential impacts to wildlife are primarily through short-term impacts associated with construction activities.

There are existing protections and ongoing mitigation measures implemented by LDWF at Elmer's Island to protect migratory birds. As stated in the Elmer's Island Management Plan, "LDWF will close an area of the refuge during nesting season, April 15th to September 1st. The closed area will prohibit pedestrian traffic. Signage in the closed area will alert pedestrians to be alert for nesting birds. An area with a radius of at least 100 feet will be posted around nests." Impact on nesting shorebirds during construction activities could be avoided by timing the construction during non-nesting months, or by preventing nesting in areas of construction. In the past, LDWF has prevented pedestrians and vehicular access into nesting areas through signage, ropes and enforcement presence.

As previously discussed, the Proposed Alternative could include BMPs necessary for control of erosion and sedimentation due to construction-related activities. Therefore, any potential short-term adverse impacts to wildlife could be minimal. BMPs that could be implemented to minimize impacts associated with the shuttle service to wildlife are included in **Appendix E** and include restricting the vehicular traffic to on or adjacent to the intertidal wet sand area of the beach, avoiding the wrack line when possible, weight limits, tire restrictions, limited hours, restrictions during certain times of year and for certain weather conditions, and speed limits.

No Action Alternative

Under the No Action Alternative, there would be no direct impacts to wildlife. However, there would be no future trash management, which could adversely affect wildlife populations through entrapment and habitat degradation. Additionally, under the No Action Alternative, the installation of the new culverts would not occur. Therefore, the natural flow of water and natural mixing that historically occurred in this area would continue to be impeded. This would cause dissolved oxygen levels to remain low, which could result in fish kills. Thus, the No Action Alternative could reduce forage opportunities for predatory wildlife. The No Action Alternative would result in long-term moderate adverse impacts to wetland and open water dependent wildlife. The No Action Alternative would likely result in fewer long-term moderate adverse impacts to wildlife dependent on foraging within the intertidal zone as the result of shuttle service operation, compared to the Proposed Alternative.

4.4.2.3 Marine & Estuarine Fauna, Essential Fish Habitat, & Managed Fish Species

4.4.2.3.1 Affected Environment

Marine and estuarine aquatic fauna and fishery resources are institutionally significant because of the Fish and Wildlife Coordination Act of 1958, as amended; the ESA of 1973; Magnuson-Stevens Act; the Magnuson-Stevens Act Reauthorization of 2006; the Coastal Zone Management Act (CZMA); and the Estuary Protection Act. Marine and estuarine aquatic fauna and fishery resources are technically significant because:

- They are a critical element of many valuable estuarine and marine habitats.
- They are indicators of the health of various estuarine and marine habitats.
- Many species are commercially important.

Fishery resources are publicly significant because of the high priority placed on their aesthetic, recreational, and commercial value.

Habitat is the foundation for the commercial and recreational saltwater fishing industries that provided more than 1.6 million full- and part-time jobs and over $200 billion in economic activity across the United States in 2015. The estuarine-dependent Louisiana fishery alone is an $875 million industry. Aquatic fauna requires healthy surroundings to survive and reproduce. EFH includes all types of aquatic habitat—wetlands, coral reefs, seagrasses, and mangroves—where fish spawn, breed, feed, or grow to maturity. In the Magnuson-Stevens Act, Congress defined EFH as "*...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity*." EFH also protects other aquatic fauna, including benthic invertebrates and unmanaged fish species, under the umbrella of the managed fish species.

In coordination with National Marine Fisheries Service (NMFS), three fishery management councils—the Gulf of Mexico, South Atlantic, and U.S. Caribbean—are responsible for identifying EFH and habitat areas of particular concern (HAPC) for federally managed species in the southeast United States. In addition to local, resident species, highly migratory species, such as tunas, billfish, and sharks, are managed by NMFS and have EFH designations in areas of the Southeast Region.

Within the area encompassed by the Southeast Region, EFH has been identified for hundreds of marine species covered by fishery management plans, under the auspices of the three fishery management councils, and for highly migratory species. Federal action agencies that fund, permit, or carry out activities in the Southeast Region that may adversely affect EFH are required to consult with the Habitat Conservation Division regarding the potential impacts of their actions on EFH and are required to respond to NMFS recommendations for protecting and conserving EFH. Additionally, NMFS may also include measures to minimize the adverse effects of certain fishing gear and fishing activities on EFH.

The water bodies and wetlands in the project area provide essential nursery and foraging habitats supportive of a variety of aquatic fauna, including economically important estuarine and saltwater species. Historically, shrimp generate the largest share of this income followed by oysters (*Crassostrea virginica*), menhaden (*Brevoortia patronus*), blue crab (*Callinectes sapidus*), and striped mullet (*Mugil cephalus*) (Louisiana Coastal Wetlands Conservation and Restoration

Task Force and the Wetlands Conservation and Restoration Authority [LCW Task Force] 1998). The menhaden purse-seine fishery handles the largest volume of the catch, and shrimp and menhaden boats can be observed fishing on the Gulf side of Elmer's Island. In addition, there are important recreational fisheries for the species listed above and estuarine-marine spotted seatrout (*Cynoscion nebulosus*), sand seatrout (*Cynoscion arenarius*), black drum (*Pogonias cromis*), pompano (*Trachinotus carolinus*), and southern flounder (*Paralichthys lethostigma*). LDWF collects information on the fish resources near Elmer's Island through various sampling gears and creel surveys. **Table 4-2** shows the common species captured on the beach side of Elmer's Island.

Table 4-2. Elmer's Island (beach side) Documented Fisheries Resources by Gear Type (LDWF 2016)

Scientific Name	Common Name
Gillnet	
Brevoortia patronus	Gulf menhaden
Ariopsis felis	sea catfish
Scomberomorus maculatus	Spanish mackerel
Cynoscion nebulosus	spotted seatrout
Leiostomus xanthurus	Spot
Harengula jaguana	scaled sardine
Callinectes sapidus	blue crab
Pomatomus saltatrix	Bluefish
Bagre marinus	gafftopsail catfish
Elops saurus	ladyfish
Cynoscion arenarius	sand seatrout
Caranx hippos	crevalle jack
Peprilus paru	harvestfish
Menticirrhus americanus	southern kingfish
Litopenaeus setiferus	white shrimp
Menticirrhus littoralis	Gulf kingfish
Chloroscombrus chrysurus	Atlantic bumper
Mugil cephalus	striped mullet
Micropogonias undulatus	Atlantic croaker
Seine	
Anchoa mitchilli	bay anchovy
Palaemonetes spp.	grass shrimp spp.
Micropogonias undulatus	Atlantic croaker
Brevoortia patronus	Gulf menhaden
Mugil cephalus	striped mullet
Sardinella aurita	Spanish sardine
Trachinotus carolinus	Florida pompano
Harengula jaguana	scaled sardine
Anchoa hepsetus	striped anchovy
Menticirrhus americanus	southern kingfish
Litopenaeus setiferus	white shrimp
Anchoa lyolepis	dusky anchovy
Callinectes sapidus	blue crab
Larimus fasciatus	banded drum

Scientific Name	Common Name
Farfantepenaeus aztecus	brown shrimp
Menidia beryllina	inland silverside
Menticirrhus littoralis	Gulf kingfish
Callinectes similis	lesser blue crab
Membras martinica	rough silverside
Urophycis cirrata	gulf hake
Creel surveys	
Callinectes sapidus	blue crab
Cynoscion nebulosus	spotted seatrout
Cynoscion arenarius	sand seatrout
Menticirrhus littoralis	gulf kingfish
Ariopsis felis	sea catfish
Sciaenops ocellatus	red drum
Bagre marinus	gafftopsail catfish
Paralichthys lethostigma	southern flounder
Pogonias cromis	black drum
Scomberomorus maculatus	spanish mackerel

NMFS has delineated EFH for federally managed species in coastal Louisiana (NMFS 2017a). At Elmer's Island, EFH has been designated in the nearshore and estuarine open water and wetland habitats for the following resources:

- Coastal migratory pelagic resources (see **Table 4-3** for species)
- Red drum (*Sciaenops ocellatus*)
- Reef fish (see **Table 4-3** for species)
- Shrimp (see **Table 4-3** for species)

EFH for each managed fishery within the project area is described below:

Red drum fishery management plan (FMP) – EFH for red drum consists of all estuaries, including those extending from Vermilion Bay, Louisiana, to the eastern edge of Mobile Bay, Alabama, out to depths of 25 fathoms; Crystal River, Florida, to Naples, Florida, between depths of 5 and 10 fathoms; and Cape Sable, Florida, to the boundary between the areas covered by the Gulf of Mexico Fishery Management Council (GMFMC) and the South Atlantic Fishery Management Council (SAFMC) between depths of 5 and 10 fathoms.

Table 4-3. Species with Gulf of Mexico Council EFH Designations in the Elmer's Island Project Area (NMFS 2017a)

GULF COUNCIL	
COASTAL MIGRATORY PELAGICS	
king mackerel	*Scomberomorus cavalla*
Spanish mackerel	*Scomberomorus maculates*
Cobia	*Rachycentron canadum*
RED DRUM	
red drum	*Sciaenops ocellatus*
REEF FISH	
queen snapper	*Etelis oculatus*
mutton snapper	*Lutjanus analis*
blackfin snapper	*Lutjanus buccanelia*
red snapper	*Lutjanus campechanus*
cubera snapper	*Lutjanus cyanopterus*
gray (mangrove) snapper	*Lutjanus griseus*
lane snapper	*Lutjanus synagris*
silk snapper	*Lutjanus vivanus*
yellowtail snapper	*Ocyurus chrysurus*
Winchman	*Pristipomoides aquilonaris*
vermilion snapper	*Rhomboplites aurorubens*
speckled hind	*Epinephelus drummondhayi*
yellowedge grouper	*Epinephelus flavolimbatus*
goliath grouper	*Epinephelus itajara*
red grouper	*Epinephelus morio*
warsaw grouper	*Epinephelus nigritus*
snowy grouper	*Epinephelus niveatus*
Nassau grouper	*Epinephelus striatus*
black grouper	*Mycteroperca bonaci*
yellowmouth grouper	*Mycteroperca interstitialis*
Gag	*Mycteroperca microlepis*
yellowfin grouper	*Mycteroperca venenosa*
Scamp	*Mycteroperca phenax*
goldface tilefish	*Caulolatilus crysops*
blueline tilefish	*Caulolatilus microps*
Tilefish	*Lopholatilus chamaeleonticeps*
greater amberjack	*Seriola dumerili*
lesser amberjack	*Seriola fasciata*
almaco jack	*Seriola rivoliana*
banded rudderfish	*Seriola zonata*
gray triggerfish	*Balistes capriscus*
Hogfish	*Lachnolaimus maximus*
SHRIMP	
brown shrimp	*Farfantepenaeus aztecus*
white shrimp	*Litopenaeus setiferus*
pink shrimp	*Farfantepenaeus duorarum*
royal red shrimp	*Hymenopenaeus robustus*

Reef fish and coastal migratory pelagics FMPs – EFH for reef fish and coastal migratory pelagic species includes all Gulf of Mexico estuaries from the U.S./Mexico border to the boundary between the areas covered by GMFMC and SAFMC from estuarine waters out to depths of 100 fathoms.

Shrimp FMP – EFH for shrimp includes all Gulf of Mexico estuaries from the U.S./Mexico border to Fort Walton Beach, Florida, from estuarine waters out to depths of 100 fathoms; Grand Isle, Louisiana, to Pensacola Bay, Florida, between depths of 100 and 325 fathoms; and Pensacola Bay, Florida, to the boundary between the areas covered by GMFMC and SAFMC out to depths of 35 fathoms, with the exception of waters extending from Crystal River, Florida, to Naples, Florida, between depths of 10 and 25 fathoms and in Florida Bay between depths of 5 and 10 fathoms.

The 2005 Generic EFH Fishery Management Plan Amendment http://sero.nmfs.noaa.gov/habitat_conservation/documents/final3_efh_amendment.pdf should be consulted for additional detailed information on habitats identified as EFH and HAPC. The seasonal and year-round locations of designated EFH for the managed fisheries are available on the NMFS website (http://sero.nmfs.noaa.gov/habitat_conservation/index.html), and both inshore and offshore species abundance maps are available on the NMFS EFH website (www.habitat.noaa.gov/protection/efh/efhmapper/).

In addition to commercially and recreationally important aquatic fauna, Elmer's Island supports a large diversity of benthic and open water invertebrates. In saltmarsh habitats at Elmer's Island, a total of six mollusks, including ribbed (*Geukensia demissa*) and hooked mussels (*Ischadium recurvum*), and five crabs, including Gulf Stone crab (*Menippe adina*) and mud crabs (*Panopeus herbstii*; *Rithropanopeus harrisii*), have been observed. In subtidal and intertidal habitats, a total of 1 sponge, 1 bryozoan, 6 jellyfish, 5 polychaete worms, 25 mollusks, 4 crabs, 4 shrimp, and 2 barnacle species have been observed. Additional details on the aquatic fauna found at Elmer's Island can be found in the *Elmer's Island Refuge Management Plan* (LDWF 2016).

4.4.2.3.2 Environmental Consequences

Proposed Alternative

The Elmer's Island Wildlife Refuge property provides an area of beachfront and marsh that the public can access. This access is regularly used for recreational fishing, bird watching, restoration projects, outdoor education programs, and volunteer opportunities. Elmer's Island is strategically located in a coastal area with high levels of tourism with Grand Isle and Port Fourchon within a 5-mile radius; these locations were identified as the most popular destinations for coastal tourism in Louisiana (Caffey et al. 2003).

The Proposed Alternative features under consideration include primarily upland based components, as previously discussed. Most of these features would be constructed on and along existing roads and other areas that were previously disturbed. Thus, few of the proposed features would occur on undisturbed natural upland, wetland, or aquatic habitats. The primary impacts to the environment would be through the temporary effects of construction, including potential erosion and sedimentation.

Recreational project features would be constructed adjacent to or near the existing access road, and the fishing piers would be designed and constructed with a primary focus on minimization of in-water disturbance and water bottom impacts.

In-water work associated with boat launches and washout repair is expected to be relatively minor and primarily consists of placing sand and crushed stone. Parking areas are proposed near the launches. The creation of small boat launches would permanently impact the shoreline area

where the ramp is placed and is likely to increase impacts to nearby shoreline and open water areas due to increased human activities (e.g., boat traffic, litter). While these impacts may affect aquatic fauna, fisheries, and EFH in localized areas, the footprints of the ramps are small, and temporary disturbances are expected to be limited in scope and duration. Temporarily disturbed aquatic fauna would likely find refuge in plentiful suitable habitats nearby. Therefore, the boat launches are not expected to have significant adverse effects on aquatic fauna, local fisheries, or designated EFH.

One of the primary project goals is to promote recreational fishing. Therefore, an increase in fishing pressure would result in an increase in the use and potential loss of hook and line gear and potentially small, personal crab pots. However, parking capacity, crowding, and the absence of boat docks or marinas would limit the total number of visitors, thereby putting an upper limit on the magnitude of fishing pressure. The use of trawl gear or gillnets within the project area is not expected. While recreational fishing would increase from current levels, it is not expected to have significant adverse effects on local fisheries or designated EFH.

Certain project elements (e.g., culverts) are expected to improve estuarine and marine aquatic habitat, as previously discussed. The culvert installation would likely have a long-term moderate beneficial effect on fish and wildlife species in the area. In summary, the Proposed Alternative would have some short-term minor adverse impacts associated with construction but also some long-term moderate beneficial effects on water quality and wildlife habitat of Elmer's Island estuarine waters.

Potential impacts to estuarine and aquatic fauna, managed fisheries, and EFH would be considered and avoided or minimized to the extent practicable during design and construction. When impacts cannot be avoided, best practices would minimize the magnitude and duration of impacts to aquatic fauna, EFH, and managed species. Signage, fencing, or landscaping could be used to focus foot and boat traffic to certain areas, thereby limiting shoreline and nearshore disturbances. Trash management would be provided at boat launches to minimize littering. Best practices during construction would likely include time-of-year restrictions for any in-water work to avoid and minimize impacts to protected and managed species when they are expected to be present or when most vulnerable. They would also likely include standard erosion and sediment control measures (e.g., silt fence) to protect water quality and aquatic habitats from impacts resulting from construction and sediment runoff. Unavoidable impacts to jurisdictional wetlands and waters would be mitigated, consistent with any such requirements contained in the Section 404 permit. EFH consultation guidance documents (NMFS 2017b) on the NMFS webpage provide additional best practices to avoid or limit project impacts to EFH: www.habitat.noaa.gov/protection/efh/consultations.html. Specific BMPs for the protection of EFH will be identified and selected based on project elements and chosen construction methods during the final engineering design.

The Proposed Alternative would include temporary, minor impacts to intertidal wet sand habitats on the beach due to the shuttle service operation, which could impact marine fauna in the surf zone. Additionally, there would be long-term, minor adverse impacts due to increased access by the public (e.g., fishing pressure, discarded fishing gear, trash, etc.). Minor fluid/fuel leaks from shuttle service vehicles could also have short- and long-term, minor adverse impacts on marine

fauna in the intertidal zone. As discussed earlier, studies have shown that vehicle access has minimal impacts on some species that occupy the intertidal zone. However, more recent studies indicate some invertebrates may be crushed by vehicular traffic. Therefore, because the proposed shuttle service will be restricted to on or adjacent to the intertidal wet sand area of the beach, the environmental consequences to marine and estuarine fauna would be short- and long-term, minor adverse impacts. These impacts would primarily be associated with increased human use and vehicular fluid/fuel leaks.

BMPs that could be implemented to minimize impacts associated with the shuttle service are described in **Appendix E** and include restricting the vehicular traffic to the intertidal wet sand area of the beach, weight limits, tire restrictions, and speed limits. Additionally, impacts could be minimized by using multi-passenger vehicles to minimize the number of shuttles and trips.

No Action Alternative

Under the No Action Alternative, the Elmer's Island Access project would not be implemented, construction activities would not occur, the shuttle service would not operate, and recreation and habitat improvements would not be added to the site. Therefore, no additional adverse or beneficial impacts to aquatic fauna, EFH, or managed fisheries would be expected. The conditions at the project site would remain largely the same as described in the Affected Environment section above.

While construction of project features in upland, wetland, and open water habitats would not occur, nor would the associated amenities (e.g., boat launches and parking lots) and increase in public use. Under the No Action Alternative, beneficial impacts from expanded litter and debris removal, and installation of new culverts, as previously discussed, would not occur. As such, the No Action Alternative would likely result in fewer short- and long-term impacts to localized populations of aquatic fauna and their habitats compared to the Proposed Alternative.

4.4.2.4 Protected Species

4.4.2.4.1 Affected Environment

Protected species include wildlife and plant species that have regulatory protections that prevent the harm or harassment of these species. ESA of 1973 (16 U.S.C. § 1531–1543) protects all federally listed threatened and endangered species and designated critical habitat of such species occurring both in the United States and abroad. Section 7 of the ESA requires that federal agencies ensure that any action authorized, funded, or carried out by an agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. The USFWS and NMFS are the primary regulatory agencies responsible for ESA compliance. Additionally, protected species also include marine mammals that are protected under the Marine Mammal Protection Act of 1972 (MMPA) and migratory birds that are protected under the Migratory Bird Treaty Act (MBTA). LNHP maintains a database with the known locations of federally listed threatened and endangered species as well as a list of state species of special concern. State species of special concern are not afforded legal protection as are federally listed threatened and endangered species.

A list of federally threatened and endangered species and other species of special concern with the potential to occur within the project area was developed based on the USFWS Information for

Planning and Consultation (IPaC) resource list for the project area and is included as **Table 4-4** (USFWS 2017b).

Table 4-4. Endangered Species Act Protected Species with the Potential to Occur within the Proposed Alternative Area

Common Name	Scientific Name	Status	Observed in Elmer's Island Wildlife Refuge[1,2]
West Indian manatee	*Trichechus manatus*	Threatened	No
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	Yes
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	Yes
Loggerhead sea turtle	*Caretta caretta*	Threatened	Yes
Kemp's Ridley sea turtle	*Lepidochelys kempii*	Endangered	Yes
Piping plover	*Charadrius melodus*	Threatened	Yes
Red knot	*Calidris canutus rufa*	Threatened	Yes
Atlantic (Gulf) sturgeon	*Acipenser oxyrinchus desotoi*	Threatened	No
Pallid sturgeon	*Scaphirhynchus albus*	Endangered	No

[1]Based on *Elmer's Island Refuge Management Plan* and personal communication with LDWF staff.
[2]Sea turtles have only been observed in the waters in and around Elmer's Island. No nests have been observed.

Some of the protected species with the potential to occur within the project area have been observed within Elmer's Island Wildlife Refuge. Both the piping plover and red knot have been observed overwintering at Elmer's Island, primarily on the beach where they use the intertidal zone as a foraging area. CAM II, completed in 2017, restored approximately 13 miles of beach and dune complex, which has also restored suitable habitat for shorebirds such as the piping plover. Protected sea turtles, such as hawksbill sea turtle, leatherback sea turtle, loggerhead sea turtle, and Kemp's Ridley sea turtle, have been observed in the beachside waters of Elmer's Island. However, no sea turtles have been observed in the back bay area or canals within the back bay wetlands where the Proposed Alternative features would be constructed. Sea turtles have not been found to nest on the beach at Elmer's Island. In 2015, false crawls, where sea turtles emerge on the beach but re-enter the water without laying eggs, were observed at the beach.

Bottlenose dolphins, which are protected under the MMPA, are frequently observed in the beachside waters of Elmer's Island but are rarely observed in the back bay area. West Indian manatee has not been observed at Elmer's Island. No seagrass beds or other preferred West Indian manatee habitats are present at Elmer's Island. Therefore, West Indian manatees are not likely to be present within the project areas.

Neither the Gulf sturgeon nor the pallid sturgeon have been observed within Elmer's Island. Additionally, the Proposed Alternative area is outside of the known range of the pallid and Gulf sturgeon. The pallid sturgeon is present in the Mississippi and Atchafalaya rivers, whereas the Gulf sturgeon is present in river and nearshore waters east of the Mississippi River delta.

A portion of Elmer's Island is listed as critical habitat (wintering habitat) for the piping plover. The Federal Register (Vol. 66 No. 132 Section 36074) lists critical habitat unit LA-5 for piping plover, which contains all of Elmer's Island peninsula from where the primary constituent elements occur to the mean lower low water. Primary constituent elements for the piping plover

wintering habitat are defined in the Federal Register as "those habitat components that are essential for the primary biological needs of foraging, sheltering, and roosting, and only those areas, containing these primary constituent elements within the designated boundaries are considered critical habitat." Therefore, most of the Proposed Alternative features contain critical habitat as the shuttle would run through the intertidal zone where one primary constituent element (i.e., foraging habitat) for piping plovers occurs.

4.4.2.4.2 Environmental Consequences

Proposed Alternative

Pre-consultation technical assistance with NMFS and USFWS would continue to occur for the Proposed Alternative related to potential impacts to protected species in accordance with Section 7 of the ESA. Any avoidance or conservation measures recommended would be evaluated and incorporated into the final design. Potential effects on protected species and critical habitat and conservation measures for aquatic and terrestrial protected species are discussed below. All required consultations would be completed prior to project implementation.

Protected Aquatic Species

The Proposed Alternative features would have a small footprint of in-water work all in the back bay area. This in-water work does not occur in habitat that is optimal for the protected species that may occur at Elmer's Island. Furthermore, sea turtles and West Indian manatee have not been observed in the back bay area at Elmer's Island where the proposed project features are located. Loggerhead sea turtle nesting activity has been recently noted on Grand Isle Beach (less than 1 mile east of Elmer's Island) and on Elmer's Island. The activity observed on Elmer's Island has been limited to false crawls that did not result in active nests, but it is plausible that sea turtles may eventually use Elmer's Island as a nesting area. If this occurs, nests will be protected and monitored. Interfering with a nesting sea turtle or disturbing a nest constitutes a violation of both state and federal laws. Management of sea turtles would be consistent with the Elmer's Island Refuge Management Plan (LDWF 2016).

Bottlenose dolphins are rarely observed in the back bay area. The protected aquatic species are mobile and would likely exit any construction areas to avoid direct impacts. Additionally, for any in-water work, the Proposed Alternative would implement measures from NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions* (2006), NMFS's *Vessel Strike Avoidance Measures and Reporting for Mariners* (2008), NMFS's *Measures for Reducing Entrapment Risk to Protected Species* (2012), and USFWS and USACE's *Standard Manatee Conditions for In-water Work* (2011).

Pollution prevention plans would be prepared in conjunction with the NPDES permitting process prior to construction of the chosen alternative. These plans would include all specifications and BMPs necessary for control of erosion and sedimentation during construction. The construction BMPs, in addition to other avoidance and mitigation measures as required by state and federal regulatory agencies, would minimize water quality impacts that could affect aquatic habitat. Therefore, these measures would minimize short-term minor adverse effect to aquatic habitats that may be used by protected aquatic species. Because protected aquatic species are either not likely to occur in the Proposed Alternative area or because conservation measures will be implemented, no adverse impacts to protected aquatic species are anticipated.

Protected Terrestrial Species

Most of the proposed construction work in uplands would be located on existing roads and berms in the back bay area that are not suitable habitat for piping plover or red knot. It is anticipated that there would be little impact to habitat used by terrestrial protected species, including the piping plover and red knot. During construction, piping plover and red knot would likely move to more undisturbed habitat farther down the beach. Once temporary impacts from construction are completed, these shorebirds would once again use suitable habitat in the Proposed Alternative area.

Both BMPs and conservation measures could be implemented to avoid and minimize impacts to the red knot and piping plover. USFWS provided Conservation Measures for Fish and Wildlife Resources in the Solicitation of Views for the Proposed Alternative dated October 5, 2017. These conservation measures could be followed during construction to avoid impacts to protected species such as the red knot and piping plover. Additionally, all individuals working on the Proposed Alternative construction would be provided with information in support of general awareness of piping plover and red knot presence and means to avoid birds and their critical or otherwise important habitats. The proposed construction work would avoid working in designated critical habitat when piping plovers are present or important wintering sites for red knots when they are present to the maximum extent practicable. If work must be conducted when these species are present, construction workers would avoid working near concentrations of individuals or post avoidance areas to minimize disturbance.

The Proposed Alternative would include vehicular traffic in the intertidal area used as overwintering foraging habitat for the piping plover and red knot. The overwintering period when piping plovers are present on Elmer's Island can be from late July through mid-May. The shuttle service would be operated less frequently from December through February. However, it would be more frequently used from July through November and March through May. In addition to disrupting the wrack and intertidal foraging area habitats, the Proposed Alternative would also afford the public easier and more extensive access to the entire island than exists currently, which would likely have greater adverse impacts on piping plovers and red knots from increased public use and disturbance. Impacts from the Proposed Alternative could have the potential to affect overwintering and nesting shorebirds in various ways. All shorebirds are protected under the Migratory Bird Treaty Act, and the piping plover and red knot are also protected under the Endangered Species Act. Impacts include more frequent flushing of foraging birds, decrease in abundance and species richness of shorebirds and/or prey, alteration of foraging habitats, changes in behavior, higher energy expenditure by breeding, migrating, and overwintering shorebirds, alteration of prey species in the wrack and littoral zone, and potential mortality of camouflaged chicks. Therefore, with the implementation of the BMPs listed below, this alternative would have short- and long-term minor adverse impacts to overwintering and breeding shorebirds, overwintering and foraging piping plovers, and, to a lesser extent, migratory red knots.

Critical Habitat

Elmer's Island is within a federally designated Critical Habitat (Unit LA-5) for piping plovers. Consultation with the USFWS is necessary, as the shuttle would be running within foraging habitats (i.e., one of the primary constituent elements for piping plover wintering habitat

locations in LA-5) for wintering piping plovers within federally designated piping plover Critical Habitat (Unit LA-5) on Elmer's Island. Foraging habitat is one of the primary constituent elements for piping plover wintering habitat locations in LA-5. Because of its status as a listed species, harassment or disturbing piping plovers constitutes a violation of both state and federal laws.

BMPs that could be implemented to minimize impacts to protected species (including piping plover, red knot, and shorebirds protected under the Migratory Bird Treaty Act) are described in **Appendix E** and include restricting the vehicular traffic to the intertidal wet sand area of the beach, weight limits, tire restrictions, and speed limits. Other BMPs could include requirements preventing intentional disturbance of nesting birds, nesting sea turtles, or other wildlife. Additionally, impacts could be minimized by using multi-passenger vehicles to minimize the number of shuttles and trips.

All shuttle operators and employees would be trained in BMPs as a condition of the contract, including knowledge of potential protected species that may occur on Elmer's Island. LDWF would continue to follow the Elmer's Island Refuge Management Plan to protect nesting shorebirds (LDWF 2016). Signage could be posted to inform the public of environmental issues and would include contact information (i.e., telephone numbers) to report any issues. Management actions used to protect nesting shorebirds include the following: monitoring, posting signage and roping off colonies, using decoys and least tern call playback to encourage nesting in remote areas, and educating or providing outreach to visitors. LDWF would monitor and take actions during the nesting season, April 15 to September 1. The posted areas would alert the public to the nesting birds, inform them of their protected status, and provide a telephone number for reporting violations to LDWF. Weekly monitoring of birds during any construction and/or sensitive periods (e.g., nesting and overwintering) will also be completed under the oversight of LDWF.

No Action Alternative

Protected Aquatic Species

Under the No Action Alternative, there would be no direct impacts to protected aquatic species from construction activities or the operation of the shuttle service. However, some adverse indirect impacts to aquatic protected species would occur because of water quality and habitat impacts. Additionally, under the No Action Alternative, there would be no litter and debris removal or repair of the road washout, which would adversely affect water quality and protected aquatic species compared to the Proposed Alternative. Therefore, the No Action Alternative would result in fewer short-term impacts to protected aquatic species but would result in more long-term adverse impacts compared to the Proposed Alternative.

Protected Terrestrial Species

Under the No Action Alternative, there would be no direct impacts to protected terrestrial species due to construction activities or the operation of the shuttle service. However, under the No Action Alternative, there would be no litter and debris removal, which would adversely affect water quality and protected species compared to the Proposed Alternative. Therefore, the No Action Alternative would result in fewer short- and long-term impacts to protected terrestrial species compared to the Proposed Alternative.

Critical Habitat

Under the No Action Alternative, there would be no direct impacts to critical habitat. However, there would be no litter and debris removal, which could adversely affect critical habitat quality.

4.4.3 Socioeconomic Environment

4.4.3.1 Socioeconomics and Environmental Justice

4.4.3.1.1 Affected Environment

The Proposed Alternative project area is located within Jefferson Parish, Louisiana, home to 9.4% of Louisiana's population. As demonstrated in **Table 4-5** Jefferson Parish has a minority population of nearly 46%, greater than that of Louisiana and the United States. However, the proposed project site is located in a census tract that is home to a population of just under 1,900 individuals, of whom 0.5% identify as a racial or ethnic minority. The population within Jefferson Parish is older than in Louisiana and the United States, and the population within the project site's census tract is significantly older than even Jefferson Parish (the median age being 5 years older than the parish overall). Though, Jefferson Parish has a greater median household income and lower poverty rate than Louisiana, the census tract has a considerably lower median household income and higher poverty rate—nearly 23% of the tract's population lives below the poverty level ($18,871 for a family of three [U.S. Census Bureau 2017]). Nearly double and triple the proportion of the population in the census tract did not graduate high school compared to Jefferson Parish and United States overall, respectively.

4.4.3.1.2 Environmental Consequences

Proposed Alternative

Per Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, Section 1-101, for environmental justice to be a concern, the Proposed Alternative would have a "disproportionately high and adverse" effect on a minority or low-income population. Though the community within the immediate vicinity of the proposed project area is disproportionately more low-income than elsewhere in the state, the Proposed Alternative is not anticipated to have a significant adverse impact on the residents of the area.

Table 4-5. Demographic Data for the Proposed Alternative Area

	Census Tract 279.02 (includes project site)	Jefferson Parish as a whole	Louisiana as a whole	United States as a whole
Total Population	1,891	435,092	4,625,253	316,515,021
Total Minority Population[1]	0.5%	45.6%	40.5%	37.7%
Population Under the Age of 5	4.5%	6.3%	6.7%	6.3%
Population Over the Age of 65	19.4%	14.7%	13.2%	14.1%
Median Age	43.7	38.7	36.1	37.6
Median Household Income	$42,880	$47,947	$45,047	$53,889

	Census Tract 279.02 (includes project site)	Jefferson Parish as a whole	Louisiana as a whole	United States as a whole
Population below Poverty Level	22.7%	16.8%	19.8%	15.5%
Less than High School Graduate (Population 25 Years and Over)	30.9%	15.5%	16.6%	13.3%

[1] Persons not "white alone" within the "Not Hispanic or Latino" subgroup.

Source: U.S. Census Bureau, 2011–2015 American Community Survey 5-Year Estimates

The proposed recreational enhancements are anticipated to have no effect on the demographic character or population of the project area. Construction of the Proposed Alternative is expected to employ temporary workers, leading to short-term beneficial impacts.

No Action Alternative

The No Action Alternative would result in no improvements to the existing recreational facilities on Elmer's Island. As a result, no impacts are anticipated to the demographics of the surrounding area.

4.4.3.2 Cultural Resources

4.4.3.2.1 Affected Environment

As noted above, this site has an existing foundation and timber piling from a previously existing camp that was constructed sometime in the mid-20th century. The project site will be reviewed under Section 106 of the National Historic Preservation Act of 1966 (NHPA) to identify any historic properties located within the Proposed Alternative project area and to evaluate whether the alternative would affect any historic properties. NHPA was implemented to protect the cultural heritage and resources of the nation. During initial review, a cultural resource survey report for the Caminada Headland Restoration Project, which includes the Elmer's Island Access project area, was identified in the Division of Archaeology Database of the Louisiana Office of Cultural Development (Coastal Environments, Inc. 2008; Louisiana Department of Culture, Recreation and Tourism 2017). The study included 10,345 acres of land and water between Caminada Pass and Belle Pass, which includes Elmer's Island. Of the 10,345-acre total, 1,006 acres (407.1 hectares) of various landforms were considered to have both high- and low-probability potential for the presence of archaeological sites and were intensively examined through surface and/or subsurface investigation. The remaining area of 9,338 acres (3,779.4 hectares) was considered to have virtually no potential for the presence of archaeological sites, so it only was examined by visual inspection from a boat. Four archaeological sites—16LF271, 272, 273 and 274—were recorded during the survey. The report states that two of the sites were destroyed by pipeline construction and a third was located off-shore. The fourth, which included shell midden, was recorded; however, the exact location of the site was not provided in the database. None of the four sites identified in the report have previously been determined eligible for listing or are listed on the National Register of Historic Places (NRHP). The State Historic Preservation Office has been contacted as part of the Section 106 assessment.

4.4.3.2.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources. Cultural and historic resources would be considered when preparing site-specific restoration measures and management actions. Where there is a likelihood of disturbance of cultural resources, cultural resource managers would conduct appropriate surveys to assess the methods and location of restoration and management actions. Restoration measures and management actions would be designed to avoid cultural resources to the extent practicable.

At this time there would be no known impacts on cultural resources and no cumulative impacts.

No Action Alternative

Under the No Action Alternative, the Elmer's Island Access project would not be implemented, construction activities would not occur, and recreation improvements would not be added to the site. Therefore, no additional adverse or beneficial impacts to cultural resources would be expected. The conditions at the project site would remain the same as described in the Affected Environment section above.

4.4.3.3 Infrastructure

4.4.3.3.1 Affected Environment

The proposed project area is located within the Elmer's Island Wildlife Refuge, bordered by Highway 1 to the north, Caminada Pass and Grand Isle to the east, the Gulf of Mexico to the south, and Bayou Thunder to the west. The refuge is accessible by boat and by a 1.5-mile access road (Elmer's Island Road) reached via Highway 1. Elmer's Island Road is maintained by LDWF and open to both vehicles and pedestrians. Parking is permitted near the terminus of the access road. Access to the beach is limited to pedestrian access from parking areas or by boat.

Hunting and commercial fishing is not allowed within Elmer's Island; however, recreational fishing is permitted.

A pump station, located in the western section of Elmer's Island, can be reached by an approximate1-mile access road from Elmer's Island Road. In addition, oil and gas pipelines cross the refuge. A disused sand airstrip is located south of Highway 1, perpendicularly intersecting Elmer's Island Road north of the pumping station access road intersection.

4.4.3.3.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative provides long-term beneficial impacts by improving existing infrastructure within the project area and enhancing accessibility to and within the project area.

Construction activities would increase traffic by construction equipment and worker commuting; however, this would be minimal and short-term. Care would be taken during construction activities to prevent impeding traffic flow and obstructing access to the project area and adjacent properties.

No Action Alternative

The No Action Alternative would result in no improvements to the existing infrastructure in the project area and thereby would have no effects on this resource.

4.4.3.4 Land and Marine Management

4.4.3.4.1 Affected Environment

As previously discussed, Elmer's Island is owned and operated by the LDWF as a wildlife refuge.

The CZMA is a federal program that encourages states to develop coastal management programs for preserving statewide coastal resources. Under this act, once a state develops a federally approved coastal management program, "federal consistency" requires that any federal actions affecting coastal land or water resources (the coastal zone) must be consistent with the state's program. In Louisiana, the LDNR, Office of Coastal Resources oversees the state's Coastal Zone Management Program (CZM Program). The proposed project area, as well as the entirety of Jefferson Parish, is located within the Louisiana Coastal Zone established by the State and Local Coastal Resources Management Act of 1978 and modified in 2012. The Jefferson Parish CZM Program divided the parish into 12 management units and included Elmer's Island in the "Grand Isle Management Unit," with the established goals to include marsh restoration, beach stabilization, flood and erosion control, maintenance of the natural ecological and hydrological integrity, and limited dredging and channelization (Jefferson Parish 1982).

4.4.3.4.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve enhancements to the recreational infrastructure within the Elmer's Island Wildlife Refuge. Therefore, the Proposed Alternative would maintain current land use and would be consistent with the refuge management plan. All proposed improvements would conform to the requirements set forth in the Jefferson Parish CZM Program. Additionally, a consistency determination will be submitted to LDNR Office of Coastal Resources.

Long-term impacts would be beneficial as improvements would help maintain of the natural ecological and hydrological integrity of the area.

No Action Alternative

The No Action Alternative would result in no improvements to the existing recreational facilities on Elmer's Island. As a result, no adverse impacts are anticipated to this environmental resource.

4.4.3.5 Tourism and Recreational Use

4.4.3.5.1 Affected Environment

The proposed project area is a publicly owned and managed wildlife refuge used for recreational activities, such as fishing and bird watching, and for restoration projects, outdoor education programs, and volunteer opportunities. Fish species found in the area include blue crab, red drum, southern flounder, spotted and sand seatrout, and sea catfish (LDWF 2016). More than 170 species of birds are thought to use Elmer's Island and the surrounding environment; almost 40 of these species are listed as bird species of conservation concern in Louisiana (LDWF 2016).

Hunting, commercial fishing, and overnight camping are not permitted within the refuge.

Elmer's Island attracts visitors from around the region, more than 75% of respondents to one survey stated that they visited Elmer's Island from localities more than 2.5 hours away (Caffey et al. 2003). Historically, the refuge has seen 40,000 visitors annually, when it was privately owned and managed as a campground (Caffey et al. 2003).

4.4.3.5.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would serve to improve public access by car, shuttle, boat, and foot to the recreational resources of Elmer's Island. The proposed construction of boat launches and parking areas would allow anglers and others to better reach marshes, canals, and the back bay area of the refuge. The Proposed Alternative would involve the repair of a small washout area north of Elmer's Island Road, which would allow access to a fishing area located in the Gormley Canal on the eastern end of the refuge. In addition, the Proposed Alternative would include the operation of a shuttle service, easing access to the beach. When compared to the original Proposed Alternative with the behind-the-dunes boardwalk component, the current Proposed Alternative would provide better beach access for recreational visitors while having fewer short- and long-term, minor to moderate adverse impacts to the physical and biological environment.

Though construction activities may cause short-term adverse impacts due to closures of certain areas of the refuge, the Proposed Alternative would serve to enhance the visitor experience over the long-term providing beneficial impacts.

No Action Alternative

The No Action Alternative would result in no improvements to the existing recreational facilities on Elmer's Island. As a result, no impacts are anticipated to this environmental resource.

4.4.3.6 Aesthetics and Visual Resources

4.4.3.6.1 Affected Environment

The proposed project area is the Elmer's Island Wildlife Refuge, characterized by saltwater marshes, coastal dunes, and beaches. The vegetation throughout the refuge is dominated by salt spray tolerant grasses (LDWF 2016).

4.4.3.6.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve construction of recreational facilities such as boat launches and parking areas. The proposed facilities and the operation of a shuttle service would improve accessibility to other areas within the refuge, allowing for views perhaps otherwise unseen.

Construction activities may impede the natural aesthetics and visual resources of the area; however, such impacts would be temporary in nature. Impacts from construction may be adverse, but localized, short-term, and minor. Long-term impacts would be beneficial, as improvements would enhance accessibility to visual resources.

No Action Alternative

The No Action Alternative would result in no improvements to the existing recreational facilities on Elmer's Island. As a result, no impacts are anticipated to this environmental resource.

4.4.3.7 Public Health and Safety, Including Flood and Shoreline Protection

4.4.3.7.1 Affected Environment

The proposed project area is a wildlife refuge open to the public for recreational purposes such as recreational angling and bird watching. The LDWF operates the refuge with the goal of restoring the habitat to benefit the native ecosystem, planting native species on the beach/coastal dune grasslands, and salt marsh habitats that characterize the site (LDWF 2016). Though the area is prone to flooding and erosion, dunes and marshlands, when fostered naturally, serve as a buffer against tidal flooding and storm surges. Coastal environments are expected to be at increasing risk due to sea level rise and increases in hurricane intensity and storm surge. In the Gulf Coast region, the sea level rise threat is moderate in comparison to other geologically sensitive areas (U.S. Global Change Research Program [USGCRP] 2014). Sea level rise could result in more frequent flooding of low-lying areas, which would permanently alter some ecological communities (USGCRP 2014).

4.4.3.7.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve the construction of boat launches and parking areas out of crushed limestone or sand, repair of a washout area with rocks and sand, and the installation of culverts under the access road to improve the hydrology of the back bay marshes. The Proposed Alternative would also include the operation of a shuttle service. The resiliency of the proposed structures to sustain sea-level rise, hurricanes and storm surges will be determined during final design.

Long-term impacts would be beneficial, as hydrologic and road improvements would have indirect beneficial impacts to shoreline protection. Impacts from construction may be adverse, but localized, short-term, and minor. To minimize short-term adverse impacts to this environmental resource, several mitigation measures would be employed:

- The use of impervious materials would be avoided as much as feasible.
- Erosion and sedimentation control measures, including minimizing the amount of clearing and exposed soil, would be implemented and maintained.
- Sedimentation controls would be installed prior to the start of construction and maintained throughout the construction period.
- Disturbed areas would be revegetated with native species as soon as possible after work has been completed.

In addition, construction activities may temporarily impact the public health and safety of the project area. BMPs would be employed to mitigate any such impacts:

- Take caution to prevent spills of oils and grease if handling fuels on site.

- Employ spill mitigation measures immediately following a spill of any hazardous material.
- Cover the load compartments of trucks hauling dust-generating materials.

Use heavy water spray or chemical dust suppressant in exposed areas to control airborne dust. BMPs specific to operation of the shuttle service that could be implemented are described in **Appendix E** and include halting the shuttle service in unsafe environmental conditions or other emergency closures. Additionally, signs would be removed when a named storm enters the Gulf of Mexico and Elmer's Island closure protocols would be instituted to minimize public health risk.

No Action Alternative

The No Action Alternative would result in no improvements to the existing recreational facilities on Elmer's Island. As a result, no impacts are anticipated to this environmental resource.

4.4.3.8 Fisheries and Aquaculture

The LDWF does not permit commercial fishing within Elmer's Island Wildlife Refuge. As the proposed project area is within the boundaries of the refuge, this environmental resource does not apply.

4.4.3.9 Marine Transportation

The proposed project area, the Elmer's Island Wildlife Refuge, does not include a navigable waterway for waterborne commerce or ferry services. Therefore, this environmental resource does not apply.

4.4.4 Cumulative Impacts of the Alternatives

4.4.4.1 Potential Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations to implement NEPA require the assessment of cumulative impacts in the decision-making process for federal projects, plans, and programs. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertake such other actions" (40 CFR § 1508.7). As stated in the CEQ handbook, Considering Cumulative Effects Under the National Environmental Policy Act (CEQ 1997), cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful. Cumulative impacts should be considered for all alternatives, including the No Action Alternative. Consistent with CEQ regulations, the cumulative impacts analysis considers the environmental impacts of the Proposed Alternative when added to impacts of past, present, and reasonably foreseeable future actions in the project's impact zone. The following section describes the multistep approach used for evaluating cumulative impacts in this document.

4.4.4.2 Methodology for Assessing Cumulative Impacts

Cumulative impacts are typically analyzed using four steps:

- Step 1 – Identify resources affected. In this step, each resource affected by the alternatives is identified. It is important to note that when direct and indirect impact analyses conclude

that a particular resource is not affected, a cumulative impact analysis for that resource is not required. The following cumulative impact analysis is organized corresponding to specific affected resources.

- Step 2 – Establish boundaries. To identify the past, present, and reasonably foreseeable actions to consider in the cumulative impact analysis, affected-resource-specific spatial and temporal boundaries must be identified. The spatial boundary is the area where past, present, and reasonably foreseeable future actions have taken place, are taking place, or could take place and result in cumulative impacts on the affected resource when combined with the impacts of the alternatives being considered. The temporal boundary describes how far into the past and forward into the future actions should be considered in the impact analysis. Appropriate spatial and temporal boundaries may vary for each resource.
- Step 3 – Identify a cumulative action scenario. In this step, the past, present, and reasonably foreseeable future actions to be included in the impact analysis for each specific affected resource are identified. These actions fall within the spatial and temporal boundaries established in Step 2. The following analysis identifies these actions below.
- Step 4 – Cumulative impact analysis. This final step develops the analysis in the context of the incremental impact of the alternative (X), when added to the impacts from applicable past, present, and reasonably foreseeable future actions (Y), yielding the potential cumulative impacts of the alternative and applicable actions on an affected resource (Z); more simply, X + Y = Z.

4.4.4.3 Identification of Resources Affected and Boundaries of Analysis

4.4.4.3.1 Resources Affected

In this RP/EA #2, cumulative impacts include each of the resources identified in Physical Environment, Biological Environment, and Socioeconomics and Environmental Justice sections discussed above. Several of the resources that would have no effects, negligible effects, or only short-term minor impacts and based on their magnitude, with respect to context and intensity, would not contribute to cumulative impacts. Those resources are excluded from this cumulative impact analysis for Elmer's Island Access:

- Air quality
- Noise
- Socioeconomic and environmental justice
- Cultural resources
- Fisheries and aquaculture
- Marine transportation

The following resources were analyzed for potential environmental consequences that could result from the Proposed Alternative of Elmer's Island Access:

- Geology and substrates
- Hydrology and water quality

- Habitats
- Wildlife species
- Protected species
- Marine and estuarine fauna, essential fish habitat, and managed fish species
- Infrastructure
- Land and marine management
- Tourism and recreational use
- Aesthetics and visual resources
- Public health and safety, including flood and shoreline protection

4.4.4.3.2 Spatial Boundary of Analysis

As discussed above, the spatial boundaries used to provide the necessary context for the cumulative impact analysis typically are defined based on the resource being assessed. For this analysis, the spatial boundary includes those areas where the Proposed Alternative would occur and adjacent areas, focusing on actions occurring along, on and within the vicinity of Elmer's Island.

4.4.4.3.3 Temporal Boundary of Analysis

Guidance on determining what actions to consider in the cumulative impact analysis comes from a variety of sources. The CEQ has produced several guidance documents, including a memorandum entitled "Guidance on Consideration of Past Actions in Cumulative Effects Analysis" (CEQ 2005). This CEQ document states that consideration of past actions is only necessary insofar as it informs agency decision making. Typically, the only types of past actions considered are those that continue to have current cumulative impacts effects on the affected resources. This present effect will dictate how far into the past actions are considered and how the impacts of these past actions are captured in the discussion of the affected environment for each resource. The guidance states that "[a]gencies are not required to list or analyze the effects of individual past actions unless such information is necessary to describe the cumulative effect of all past actions" (CEQ 2005). Agencies can aggregate the effects of past actions without delving into the historical details of individual past actions. Present actions are those that are currently occurring and result in impacts on the same resources within the same spatial boundary that the alternatives affect. Reasonably foreseeable future actions are those actions that are likely to occur and affect the same resource as the Proposed Alternative. The determination of what future actions should be considered requires a level of certainty that they will occur. This level of certainty could be met by several factors such as the completion of permit applications, the subject of approved proposals or planning documents, or other similar evidence. Determining how far into the future to consider actions is based on the impact of the alternatives being considered. Once the impacts of the alternatives are no longer experienced by the affected resource, future actions beyond that need not be considered. For this RP/EA #2, future actions are identified as those actions likely to be initiated prior to finalization of the potential projects proposed in this RP/EA #2 and actions that are likely to occur beyond finalization of the RP/EA

#2 and are determined to be reasonably foreseeable and likely to contribute to the overall cumulative impacts.

4.4.4.4 Cumulative Action Scenario

To effectively consider the potential cumulative impacts, past, present, and reasonably foreseeable future actions near the proposed project area were identified. A list of permitted past, existing, and future projects was compiled for each of the projects using Louisiana and USACE permitting databases and internet searches for more detail, as needed. The project site is coastal and regulations pertaining to coastal permits were considered appropriate for developing a list of past and reasonably foreseeable future activities that may affect the resources. Based on information obtained from permitting databases, past and potential future activities near the project area include beach nourishment, road maintenance, additional recreational improvements, and pipeline installation. **Table 4-6** below summarizes the identified actions and the potential cumulative impacts for the Elmer's Island Access Proposed Alternative.

Based on the assessment summarized in **Table 4-6**, the resource areas with potential for cumulative adverse impacts are geology and substrates; hydrology and water quality; habitats; wildlife species; marine and estuarine fauna, essential fish habitat, and managed fish species; and protected species. The proposed Elmer's Island Access project would create long-term benefits to these resources along with some long-term impacts. The anticipated long-term impacts to habitats, wildlife, and protected species from the operation of the shuttle service could be minimized with the development of species BMPs. The resources would likely have short-term, adverse impacts from the four identified actions, but would also have long-term benefits from the Proposed Alternative and two of the identified actions. The cumulative effects from the Proposed Alternative and the four identified actions are expected to result in cumulative beneficial impacts to geology and substrates; hydrology and water quality; habitats; wildlife species; marine and estuarine fauna, essential fish habitat, and managed fish species; and protected species.

The proposed Elmer's Island Access project and identified actions are expected to have long-term beneficial impacts on the following resources infrastructure; land and marine management; tourism and recreational use; aesthetics and visual resources; and public health and safety, including flood and shoreline protection. Therefore, cumulative impacts are expected to be positive.

Table 4-6. Past, Present, and Reasonably Foreseeable Future Actions Included in Cumulative Impact Analysis

Category/Projects	Project Description	Key Resource Areas with Potential Cumulative Impacts
Caminada Headland Beach and Dune Restoration	Recently constructed projects to restore and maintain the headland through creation of dunes and beach habitat.	Short-term, adverse impacts to: ▪ Not applicable because project is already constructed Long-term, adverse impacts to: ▪ No applicable impacts identified Long-term, positive impacts to: ▪ Habitats ▪ Wildlife species ▪ Protected species ▪ Land and marine management ▪ Tourism and recreational use ▪ Aesthetics and visual resources ▪ Public health and safety, including flood and shoreline protection
Caminada Headlands Back Barrier Marsh Creation Project	Planned future project designed to create 300 acres of back barrier intertidal marsh and nourish 130 acres of emergent marsh behind 3.5 miles of Caminada Beach	Short-term, adverse impacts to: ▪ Geology and substrates ▪ Hydrology and water quality ▪ Habitats ▪ Wildlife species ▪ Marine and estuarine fauna, essential fish habitat, and managed fish species ▪ Protected species Short-term, adverse impacts to: ▪ No applicable impacts identified Long-term, positive impacts to: ▪ Geology and substrates ▪ Hydrology and water quality ▪ Habitats ▪ Wildlife species ▪ Marine and estuarine fauna, essential fish habitat, and managed fish species ▪ Protected species ▪ Land and marine management ▪ Tourism and recreational use ▪ Aesthetics and visual resources ▪ Public health and safety, including flood and shoreline protection

Category/Projects	Project Description	Key Resource Areas with Potential Cumulative Impacts
Road Maintenance	Past and potential future projects may include periodic road maintenance and road improvements on Elmer's Island	Short-term, adverse impacts to: ▪ Geology and substrates ▪ Hydrology and water quality ▪ Habitats ▪ Wildlife species Long-term, adverse impacts to: ▪ No applicable impacts identified Long-term, positive impacts to: ▪ Infrastructure ▪ Land and marine management ▪ Tourism and recreational use ▪ Aesthetics and visual resources ▪ Public health and safety, including flood and shoreline protection
Recreational Improvements	Potential future improvements may include additional recreational improvements to the site, such as additional shuttle service, picnic areas, restrooms, and bird watching structures	Short-term, adverse impacts to: • Geology and substrates • Habitats • Wildlife species • Protected species Long-term, adverse impacts to: • Habitats • Wildlife species • Protected species Long-term, positive impacts to: • Infrastructure • Land and marine management • Tourism and recreational use • Aesthetics and visual resources

Under the No Action Alternative, the following resources are expected to have adverse impacts:

- Hydrology and water quality
- Habitats
- Wildlife species
- Marine and estuarine fauna, essential fish habitat, and managed fish species
- Protected species
- Land and marine management

These adverse impacts are expected to be limited to Elmer's Island Wildlife Refuge and only two of the identified actions are expected to also contribute to adverse, short-term impacts to Elmer's Island road maintenance and recreational improvements. Because those two actions do not have adverse impacts to marine and estuarine fauna, essential fish habitat, and managed fish species and land and marine management, cumulative adverse impacts to those resources are not anticipated.

When the No Action Alternative is analyzed in combination with other past, present, and reasonably foreseeable future actions, short- and long-term, minor, adverse cumulative impacts on hydrology and water quality and marine and estuarine fauna, essential fish habitat, and managed fish species would likely occur. However, they would not contribute substantially to adverse cumulative impacts. The identified actions have the potential to result in some long-term, beneficial cumulative impacts on hydrology and water quality and marine and estuarine fauna, essential fish habitat, and managed fish species by preserving and enhancing the Gulf Coast at Elmer's Island.

4.5 Statewide Artificial Reefs

4.5.1 Physical Environment

4.5.1.1 Geology and Substrates

4.5.1.1.1 Affected Environment

The 11 reef sites are each located in open water in south Louisiana at existing artificial reef locations. Of the 11 sites within the project area, 10 sites would be located at water depths of 7 to 13 feet in mud and/or sandy substrates. The Grand Isle 9 nearshore reef site is the exception and is located at a water depth of 50 feet over mud and sand substrates. Existing artificial reef material includes limestone, concrete, and shell; however, Grand Isle 9 is comprised of decommissioned oil and gas structures (the former Freeport Sulphur Mine). Additionally, one reef site (Ship Shoal 26) was the location of a former oil and gas platform and fishing hotspot known as the Pickets, which upon decommissioning was replaced by a series of limestone reef structures due to the relatively shallow water in the area (i.e., not supportive of larger oil/gas structures as reef material).

Geology in these areas consists entirely of Holocene sediments deposited directly or indirectly by the Mississippi River, with a natural divide into two primary geomorphic zones: the Mississippi River Deltaic Plain of southeastern Louisiana and the Chenier Plain of southwest Louisiana (McBride et al. 2007). The sediments in this area are generally expected to include clay with varying amounts of silt, sand, and organic content. The Chenier Plains, located at the western end of south Louisiana, is a marginal-deltaic environment, which is primarily a mud-dominated environment capped by marsh and interspersed with thin sand- and shell-rich ridges known as cheniers. The Deltaic Plains include areas of overlapping active and abandoned Mississippi River delta complexes primarily consisting of clay, mud, and peat (LGS 1984).

4.5.1.1.2 Environmental Consequences

Proposed Alternative

The existing artificial reefs were constructed of various materials, including concrete pilings, crushed concrete, shell, limestone, and oil/gas structures. The proposed restoration project would include adding new reef material, consisting of limestone, recycled concrete, formed concrete structures, or a combination thereof, at 11 reef locations located in each of Louisiana's coastal basins. Aspects of the Proposed Alternative, which have environmental consequences for the geology and substrates, include placement of the materials for reef construction.

In-water work is expected for placement of the reef construction materials at each of the sites. The total permitted area of the 11 proposed artificial reefs is approximately 1,272 acres. In-water

dredging or digging associated with the restoration work is not anticipated, though substrate displacement and compaction from placement of reef material is expected. The total area of impacted substrate depends on the volume and footprint of material placed at each location. It is expected that total area of substrate displaced in the marine environment would be limited to a relatively small area around the perimeter of the existing artificial reefs. As such, minor long-term adverse effects on an area of marine substrates at each reef location would occur due to this project component.

Construction equipment would likely be limited to barges and barge-mounted construction equipment that would not impact substrates.

Specific mitigation measures would be implemented during construction to minimize erosion and overall soil impacts. These would include following established BMPs for construction activities such as the implementation of silt curtains prior to commencement of construction activities and/or ongoing construction monitoring to ensure compliance.

No Action Alternative

Under the No Action Alternative, the existing artificial reefs would remain in their current and state and would not be enhanced. As a result, no impacts are anticipated to this environmental resource.

4.5.1.2 Hydrology and Water Quality

4.5.1.2.1 Affected environment

The proposed project sites are located throughout coastal Louisiana in both the inshore and nearshore environment. Most of the proposed projects are located in LDEQ basin subsegments that are listed as fully supporting the designated use for primary and secondary contact recreation in addition to fish and wildlife propagation. LDEQ data for each artificial reef location, including river basin, LDEQ basin subsegment, and designated uses, are presented in **Table 4-7**. Water quality inventory reports by LDEQ list suspected sources of water quality problems in these subsegments as onsite treatment systems, package plants, atmospheric deposition, natural conditions, and unknown sources (LDEQ 2016).

Most of the Proposed Alternative sites are located in open water outside the bounds of FEMA flood mapping efforts. However, East Calcasieu, West End, and Lake Front are all located in Zone VE, which is subject to inundation by the 1%-annual-chance flood event, with additional hazards due to storm-induced velocity wave action.

Table 4-7. LDEQ Data, Including Water Body Subsegments and Designated Use Status, for the Statewide Artificial Reefs Proposed Alternative

Artificial Reef Project (Type)	Water Quality Basin	LDEQ Sub segment Basin Number	Water Body Type	Designated Use (Fully Supporting)	Designated Use (Not Supporting)	Suspected Source of Impairment
East Calcasieu (Inshore)	Calcasieu River Basin	LA030402_00	Estuary	PCR, SCR, FWP, OYS	--	--
Cypremont Point (Inshore)	Vermilion-Teche River Basin	LA061104_00	Estuary	PCR, SCR, FWP	OYS	Onsite Treatment Systems

Artificial Reef Project (Type)	Water Quality Basin	LDEQ Sub segment Basin Number	Water Body Type	Designated Use (Fully Supporting)	Designated Use (Not Supporting)	Suspected Source of Impairment
Rabbit Island (Inshore)	Vermilion-Teche River Basin	LA061001_00	Estuary	PCR, SCR, FWP	OYS	Natural Sources
Ship Shoal 26-Pickets (Nearshore)	Vermilion-Teche River Basin	LA061002-00	Estuary	FWP	PCR, SCR, OYS	Natural Sources, Package Plants
Bird Island (Inshore)	Vermillion-Teche River Basin	LA120802_00	Estuary	PCR, SCR, FWP, OYS	--	--
Point Mast (Inshore)	Vermillion-Teche River Basin	LA120803_00	Estuary	PCR, SCR, FWP, OYS	--	--
West End (Inshore)	Lake Pontchartrain Basin	LA041002_00	Estuary	PCR, SCR, FWP, OYS	--	--
Lake Front (Inshore)	Lake Pontchartrain Basin	LA041002_00	Estuary	PCR, SCR, FWP, OYS	--	--
Independence Island (Inshore)	Barataria Basin	LA021102_00	Estuary	PCR, SCR, OYS	FWP	Atmospheric Deposition, Natural Conditions, Unknown Sources
Grand Isle 9 (Nearshore)	Barataria Basin	LA021102_00	Estuary	PCR, SCR, OYS	FWP	Atmospheric Deposition, Natural Conditions, Unknown Sources
California Point (Inshore)	Lake Pontchartrain	LA042202_00	Estuary	PCR, SCR, FWP, OYS	--	--

Notes: PCR = primary contact recreation, SCR = secondary contact recreation, OYS = oyster propagation, FWP = fish and wildlife propagation

4.5.1.2.2 Environmental Consequences

Proposed Alternative

LDWF has obtained permits from USACE under Category I of the Programmatic General Permit (PGP) (pursuant to Section 404 of the CWA and/or Sections 9 and 10 of the Rivers and Harbors Act of 1899) for all artificial reef projects with the exception of Grand Isle 9. The permit application for Grand Isle 9 has been submitted and is expected in the near future. Any additional coordination and permitting with USACE would occur prior to construction.

The primary impacts to water quality and hydrology under the Proposed Alternative would be through the temporary effects of construction due to the disturbance of soil and sediment. These activities would result in minor short-term minor adverse impacts to water quality. Similar to the Elmer's Island Access project, pollution prevention plans would be prepared as necessary and BMPs, in addition to other avoidance and mitigation measures as required by state and federal regulatory agencies, would be implemented to minimize water quality and hydrology impacts.

Depending on the magnitude of colonization of the artificial reefs by filter feeders, the Proposed Alternative could have long-term moderate beneficial effects on water quality.

No Action Alternative

Under the No Action Alternative, the construction of artificial reef enhancements would not occur. As a result, no impacts are anticipated to this environmental resource.

4.5.1.3 Air Quality

4.5.1.3.1 Affected Environment

EPA has set national air quality standards for air pollutants. These standards, as well as the AQI monitoring program and GHGs as they relate to air resources are discussed in the following section.

The 11 reef sites are located in Cameron, St. Mary, Terrebonne, Orleans, Jefferson, and Plaquemines Parishes. Each of these six parishes is listed as in attainment for all NAAQS pollution metrics (i.e., comply with all air quality standards) and has overall good air quality (USEPA 2017). Daily AQI data were unavailable for Cameron, St. Mary, and Plaquemines Parishes. For the past 5 years (2011 to 2016), Terrebonne, Orleans, and Jefferson Parishes maintained an average AQI of 30, 40, and 43 (USEPA 2017), respectively, which is under the poor air quality threshold of 50.

4.5.1.3.2 Environmental Consequences

Proposed Alternative

Implementation of the Proposed Alternative could include use of construction equipment such as barges, cranes, small excavators, generators, and hand tools. During construction activities, impacts to air quality would occur from exhaust produced from gasoline- and diesel-powered construction equipment. Most impacts to air quality are expected to be localized and occur only during active construction activities.

Engine exhaust from construction equipment would contribute to an increase in criteria pollutants and GHGs. However, due to the small-scale and short duration of the construction portion of the project, predicted emissions would be short-term and minor and would not require a detailed assessment. Long-term ongoing emissions are expected to increase slightly due to the increase in recreational use and visitation to the sites; however, based on the current and anticipated number of users per year, the increase is expected to be minimal.

Emission reduction measures to mitigate for short-term air quality impacts could include the use of ultra-low sulfur diesel fuel in construction equipment, limiting unnecessary idling time of diesel-powered engines, controlling dust related to construction site activities, and covering loose materials.

Short-term adverse impacts to air quality would be minor, local, and temporary, only occurring during active construction activities.

No Action Alternative

Under the No Action Alternative, the construction of enhancement measures to existing artificial reef sites would not occur. As a result, no impacts are anticipated to this environmental resource.

4.5.1.4 Noise

4.5.1.4.1 Affected Environment

As previously mentioned, each of the 11 reef sites are located in open water near the Louisiana Gulf Coast and utilized primarily by recreational anglers.

Under most conditions, the ambient (background) noise at each of the reef sites is from waves, wind, and birds. Watercraft traffic and recreational activities may influence noise levels at the project sites. The level of noise in the project areas vary, depending on the season, time of day, number and types of noise sources, and distance from the noise source.

4.5.1.4.2 Environmental Consequences

Proposed Alternative

The project components would generate construction noise associated with equipment during placement of the reef materials. Construction activities for the Proposed Alternative would include mobilizing a barge with construction equipment and aggregate/material placement. Implementation of the project would include marine transportation of construction materials to the project area and placement of reef materials that would contribute to short-term noise disturbances.

The construction activities are expected to be short-term and primarily consist of placing reef materials. Wildlife in and around the project area may be sensitive to changes in noise sources or levels due to project construction. Construction equipment (e.g., cranes, barges) noise is known to disturb fish, marine mammals, and shorebirds. Conservation measures for marine mammals from noise are discussed in the Biological Environment section. Construction noise can also be a nuisance to humans recreating in the waters adjacent to project construction activities. Construction activities at the site would result in short-term moderate impacts to noise at the site and in the immediate vicinity.

Mitigation measures that serve to limit noise impacts to humans from construction activities would be implemented. Such measures include:

- Limit activity at project sites to daytime hours
- Promote awareness that producing prominent discrete tones and periodic noises should be avoided as much as possible
- Require that work crews seek pre-approval for any weekend activities or activities outside of daytime hours
- Plan the timing of in-water noise-producing activities to minimize disturbances to marine life
- Install muffle units for generators

Because construction noise is temporary, any adverse impacts to the human and marine environment during construction activities would be short-term and minor.

Once the improvements are in place, there may be some noise associated with an increase in recreational activities. These noises could be slightly more disturbing to any resting or feeding

birds that may utilize the site compared to baseline conditions, although the nature of the noises, such as fishing and boating, and the site's proximity to waterway traffic, may result in negligible increases. Overall, long-term adverse noise impacts from boating, fishing, and other recreational activities would likely be minor.

No Action Alternative

Under the No Action Alternative, construction activities associated with the reef enhancements would not occur, and reef improvements would not be added to the site. As a result, no impacts are anticipated to this environmental resource.

4.5.2 Biological Environment

4.5.2.1 Habitats

4.5.2.1.1 Affected Environment

The Statewide Artificial Reefs project would fund the enhancement of 11 existing artificial reef sites to provide enhanced recreational opportunities for anglers in six parishes throughout coastal Louisiana. As explained in Section 3.2.1, the LARP has developed more than 100 artificial reef sites, including inshore and nearshore reefs in state and federal waters.

Siting of areas suitable for artificial reef development have undergone several considerations aimed at avoiding or minimizing adverse effects to listed species, other protected species, common wildlife, and their habitats. Benthic surveys of most of the project areas were completed in 2013 by BioWest, and the results of those surveys are available upon request. Areas identified as biologically sensitive, such as natural reefs, grassbeds, bivalve beds, or live bottoms, were not considered for artificial reef development.

Hard substrate is typically a limiting factor on Louisiana's deltaic water bottoms. The addition of reef material, when properly sited, has been demonstrated to produce exponentially more biomass than surrounding mud bottoms. Louisiana's existing artificial reef sites are located in multiple estuarine and marine systems and subject to localized processes and environmental changes. Generally, the environmental qualities of the reef sites are of sufficient quality to support the biota that are likely or intended to be recruited. Substrate suitability and water quality parameters, including salinity, temperature, dissolved oxygen levels, and prevailing currents, were all taken into consideration when siting the artificial reefs.

4.5.2.1.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would enhance 11 existing coastal reef sites by adding new reef material to increase the habitat complexity of the reef complex while also providing increased recreational fishing opportunities for the public. The development and execution of reef enhancement projects is guided by the *Louisiana Artificial Reef Plan*, which is implemented through LDWF under the oversight of the Louisiana Artificial Reef Council. The reef sites proposed for enhancement are all established reef sites, and in many cases, were sites that were approved by the Council for expansion to facilitate future enhancement opportunities.

Monitoring of this Proposed Alternative would be multi-faceted and integrated with the operations of the LARP, as administered through the LDWF. Details of the monitoring and

adaptive management plan are included in **Appendix E**. Compliance with permit conditions and implementing monitoring programs would likely minimize the adverse effects of the Proposed Alternative on habitats.

Materials transported to the artificial reef locations are typically barged in; contractors and subcontractors shall secure approval of the access route to reef locations from LDWF and shall ingress and egress to the project locations only along the approved routes. Additional details on the construction equipment and methods are to be provided during the E&D phase. If new reef material is deposited by barge or some other method of relatively uncontrolled sinking, then direct impacts may include the burial of or damage to existing artificial reef and potential burial of benthic substrates. However, due to the limited footprint of the enhancement areas, as compared to the overall permitted reef sites, these impacts are anticipated to be negligible and may be further reduced by controlled installation of reef materials in portions of reef sites without existing reef material.

The development of artificial reefs is a tradeoff between the existing habitat at the selected locations and the desired habitat. While the proposed reef enhancements would convert small areas of soft bottom (i.e., mud/sand) benthic habitat into reef habitats, these areas are already adjacent to existing artificial reefs and may not be optimal for organisms that prefer soft bottom habitats. The relatively small footprints of these enhancements would minimize adverse modification to benthic habitats. Selecting to enhance existing artificial reefs instead of creating new artificial reefs concentrates the conversion of benthic habitats to these localized areas instead of increasing the distribution of artificial structures.

The artificial reef enhancements would be designed and constructed with a primary focus on minimization of in-water disturbance and water bottom impacts. Per the National Fishing Enhancement Act and Louisiana Fishing Enhancement Act, artificial reefs would be sited, constructed, and subsequently maintained, monitored, and managed based upon the best scientific information available. A buffer of 1,000 feet at minimum would be established between identified biologically sensitive areas and artificial reef development to protect the sensitive areas from potential adverse impacts. Therefore, the Proposed Alternative would have no adverse effect on sensitive aquatic and benthic habitats. Additionally, the Proposed Alternative would have long-term moderate beneficial effects on aquatic and benthic habitats.

Potential impacts to marine and estuarine open water and benthic habitats would be considered and minimized to the extent practicable during design and construction. When impacts cannot be avoided, best practices would be implemented to minimize the magnitude and duration of impacts to aquatic habitats. Signage or buoys can be used to focus boat traffic to certain areas, thereby limiting reef disturbances. Best practices during construction may include minimizing the duration of reef construction and controlling the release of reef materials to targeted areas of the reef site.

No Action Alternative

Under the No Action Alternative, there would be no habitat improvements, expanded recreational opportunities, or long-term monitoring services. Since these areas already experience high levels of human use and fishing pressure, the absence of these improvements and services may adversely affect aquatic habitats compared to the Proposed Alternative. As such, the No Action

Alternative would likely result in fewer short-term minor adverse impacts to local habitats but would result in more long-term moderate adverse impacts to these resources compared to the Proposed Alternative.

4.5.2.2 Wildlife Species (including birds)

4.5.2.2.1 Affected Environment

Within the proposed project area, potential wildlife species include birds and estuarine-dependent species. Migratory birds, which could potentially use the proposed project site, were identified using the USFWS IPaC database report. Based on this database, the following birds have potential to occupy the proposed project areas or be affected by activities in these locations: American golden-plover (*Pluvialis dominica*), American oystercatcher (*Haematopus palliatus*), Audubon shearwater (*Puffinus lherminieri*), black skimmer (*Rynchops niger*), buff-breasted sandpiper (*Calidris subruficollis*), clapper rail (*Rallus crepitans*), dunlin (*Calidris alpina*), gull-billed tern (*Gelochelidon nilotica*), king rail (*Rallus elegans*), least tern (*Sternula antillarum*), lesser yellowlegs (*Tringa flavipes*), long-billed curlew (*Numenius americanus*), magnificent frigatebird (*Fregata magnificens*), marbled godwit (*Limosa fedoa*), red knot , semipalmated sandpiper (*Calidris pusilla*), short-billed dowitcher (*Limnodromus griseus*), snowy plover (*Charadrius nivosus*), band-rumped storm-petrel (*Oceanodroma castro*), black rail (*Laterallus jamaicensis*), Hudsonian godwit (*Limosa haemastica*), whimbrel (*Numenius phaeopus*), Wilson's plover (*Charadrius wilsonia*), and yellow rail (*Coturnicops noveboracensis*).

4.5.2.2.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve placing new material into inshore and nearshore areas to enhance existing artificial reefs. Therefore, impacts to birds are not anticipated. Many of the birds identified in the USFWS IPaC are shorebirds and would not likely be present in the inshore and nearshore open waters where the Proposed Alternative would occur. Some seabirds, like gulls and skimmers, may be present flying overhead, resting on nearby waves, or foraging. No bird nesting habitat is present in the Proposed Alternative area.

During the project design phase, coordination would occur with USFWS and the state trust resource agency to site and design projects to avoid or minimize impacts to migratory bird habitats, particularly important feeding/loafing areas. Project activities would be temporarily halted if migratory birds enter the work area to rest, forage, or fly overhead to avoid accidental harassment or injury. Therefore, the Proposed Alternative is not anticipated to have any adverse effects on wildlife.

No Action Alternative

Under the No Action Alternative, placement of new materials to existing artificial reef sites would not occur. As a result, no adverse impacts are anticipated to this environmental resource.

4.5.2.3 Marine & Estuarine Fauna, Essential Fish Habitat, & Managed Fish Species

4.5.2.3.1 Affected Environment

The Proposed Alternative reef enhancement areas provide essential nursery, sheltering, and foraging habitats supportive of a variety of aquatic fauna, including economically important

estuarine and marine species. Shrimp generate the largest share of this income followed by oysters, menhaden, blue crab, and striped mullet (LCW Task Force 1998). However, commercial oyster harvest is not allowed on artificial reef sites and the reef sites are not conducive to shrimp trawling activities. In addition, there are important recreational fisheries for the species listed above, as well as other estuarine and marine species that utilize artificial reef sites, including red drum, black drum, southern flounder, sheepshead (*Archosargus probatocephalus*), seatrout (*Cynoscion* spp.), grouper (*Epinephelus* spp.), snapper (*Lutjanus* spp.), and mackerel (*Scomberomorus* spp.). Artificial reef sites also support a variety of non-targeted settling species like mussels and barnacles, crustaceans like crabs and shrimp, as well as forage fish like Atlantic croaker, Atlantic spadefish (*Chaetodipterus faber*), pinfish (*Lagodon rhomboides*), silver perch (*Bairdiella chrysoura*), spot (*Leiostomus xanthurus*), and pigfish (*Orthopristis chrysoptera*).

NMFS has delineated EFH for federally managed species in coastal Louisiana (NMFS 2017a). At the 11 artificial reef sites for enhancement, EFH has been designated in the estuarine and marine open water habitats for the following resources:

- Coastal Migratory Pelagic Resources (see **Table 4-8** for species)
- Red Drum
- Reef Fish (see **Table 4-8** for species)
- Shrimp (see **Table 4-8** for species)

EFH for each managed fishery within the artificial reef project areas listed above is the same for the Elmer's Island Access project and is described in detail in Section 4.4.2.3.

The 2005 Generic EFH Fishery Management Plan Amendment should be consulted for additional detailed information on habitats identified as EFH. The seasonal and year-round locations of designated EFH for the managed fisheries are available on the NMFS website (http://sero.nmfs.noaa.gov/habitat_conservation/index.html), and both inshore and offshore species abundance maps are available on the NMFS EFH website (www.habitat.noaa.gov/protection/efh/efhmapper/).

Table 4-8. Species with Gulf of Mexico Council EFH Designations in the Statewide Artificial Reefs Enhancement Project Area (NMFS 2017a)

GULF COUNCIL	
COASTAL MIGRATORY PELAGICS	
king mackerel	*Scomberomorus cavalla*
Spanish mackerel	*Scomberomorus maculates*
Cobia	*Rachycentron canadum*
RED DRUM	
red drum	*Sciaenops ocellatus*
REEF FISH	
queen snapper	*Etelis oculatus*
mutton snapper	*Lutjanus analis*
blackfin snapper	*Lutjanus buccanelia*
red snapper	*Lutjanus campechanus*
cubera snapper	*Lutjanus cyanopterus*
gray (mangrove) snapper	*Lutjanus griseus*
lane snapper	*Lutjanus synagris*
silk snapper	*Lutjanus vivanus*
yellowtail snapper	*Ocyurus chrysurus*
Wenchman	*Pristipomoides aquilonaris*
vermilion snapper	*Rhomboplites aurorubens*
speckled hind	*Epinephelus drummondhayi*
yellowedge grouper	*Epinephelus flavolimbatus*
goliath grouper	*Epinephelus itajara*
red grouper	*Epinephelus morio*
warsaw grouper	*Epinephelus nigritus*
snowy grouper	*Epinephelus niveatus*
Nassau grouper	*Epinephelus striatus*
black grouper	*Mycteroperca bonaci*
yellowmouth grouper	*Mycteroperca interstitialis*
Gag	*Mycteroperca microlepis*
yellowfin grouper	*Mycteroperca venenosa*
Scamp	*Mycteroperca phenax*
goldface tilefish	*Caulolatilus crysops*
blueline tilefish	*Caulolatilus microps*
Tilefish	*Lopholatilus chamaeleonticeps*
greater amberjack	*Seriola dumerili*
lesser amberjack	*Seriola fasciata*
almaco jack	*Seriola rivoliana*
banded rudderfish	*Seriola zonata*
gray triggerfish	*Balistes capriscus*
Hogfish	*Lachnolaimus maximus*
SHRIMP	
brown shrimp	*Farfantepenaeus aztecus*
white shrimp	*Litopenaeus setiferus*
pink shrimp	*Farfantepenaeus duorarum*
royal red shrimp	*Hymenopenaeus robustus*

4.5.2.3.2 Environmental Consequences

Proposed Alternative

Because all artificial reef locations are located in open water habitats, the environmental consequences of the Proposed Alternative on marine and estuarine fauna, EFH, and managed fish species would be similar to those described for habitats in Section 4.4.2.1.2. Section 4.4.2.1.2 also includes an explanation of how compliance with permit conditions and implementing monitoring programs would likely minimize the adverse effects of the Proposed Alternative on aquatic fauna, managed species, and EFH. Additionally, siting of areas suitable for artificial reef development have undergone several considerations aimed at avoiding or minimizing adverse effects to listed species, other protected species, common wildlife, and their habitats, and 1,000-foot minimum buffers have been established around biologically sensitive areas.

Contractors and subcontractors shall secure approval of the access route to reef locations from LDWF and shall ingress and egress to the project locations only along the approved routes. Additional details on the construction equipment and methods are to be provided during the project planning phase. If new reef material is installed by relatively uncontrolled sinking, then direct impacts may include burial of or damage to existing artificial reef and potential burial of benthic organisms on or within the existing substrates. However, due to the limited footprint of the enhancement areas and directed deployment of materials to otherwise barren portions of the permitted reef sites, these impacts are anticipated to be negligible and may be further reduced by controlled installation of reef materials.

The development of artificial reefs is a tradeoff between the existing biological community at the selected locations and the desired biological community. The additional artificial reef material would modify and/or displace the existing organisms. However, the relatively small footprints of these enhancements would minimize adverse modification to benthic habitats. In addition, BMPs, including certain equipment and installation methods that maximize accurate material placement, would be implemented. Thus, any local benthic organisms are likely to move to nearby, undisturbed suitable habitats.

The artificial reefs would be designed and constructed with a primary focus on minimization of in-water disturbance and water bottom impacts, per the National Fishing Enhancement Act and Louisiana Fishing Enhancement Act. Projected benefits would be enhanced fishing opportunities and multi-trophic ecological services of the artificial reefs in addition to enhanced habitat for reef-dependent species. The enhancement of these artificial reefs should not interfere with known migratory patterns or spawning grounds of fishes and marine mammals. The reefs would have a positive effect on several fisheries with designated EFH, such as reef fish, by providing additional suitable habitat in areas without much natural structure.

The Proposed Alternative would enhance the utilization of existing artificial reefs as recreational fishing areas that offer safe access to renewable fish and wildlife resources and their supporting habitats. An increase in fishing pressure from reef enhancements would likely result in an increase in the use and potential loss of fishing gear. The use of trawl gear within the reef project areas is not expected, as the reef profile would not facilitate trawling activities. Therefore, reef site coordinates are made publicly available by LDWF and NOAA's National Ocean Service, Marine Chart Division. While recreational fishing would increase from current levels, it is not expected to

have a significant adverse effect on local fisheries, as the artificial reefs are expected to improve fish habitat.

Potential impacts to estuarine and aquatic fauna, managed fisheries, and EFH would be considered and avoided or minimized to the extent practicable during design and construction. Any potential short-term minor adverse impacts to EFH from the conversion of mud bottoms to artificial reef would be small in extent. Additionally, the artificial reef sites occur within large areas of mud bottom. Therefore, there is abundance adjacent habitat for any estuarine species that prefer mud bottom habitat. When impacts to estuarine and aquatic fauna, managed fisheries, and EFH cannot be avoided, best practices would be implemented to minimize the magnitude and duration of impacts to these resources. Signage or buoys can be used to focus boat traffic to certain areas, thereby limiting reef disturbances. Best practices during construction may include time-of-year restrictions for any in-water work to avoid and minimize impacts to protected and managed species when they are expected to be present or when most vulnerable. EFH consultation guidance documents (NMFS 2017b) on the NMFS webpage may provide additional best practices to avoid or limit project impacts to EFH: www.habitat.noaa.gov/protection/efh/consultations.html.

Overall, the Proposed Alternative would result in long-term moderate beneficial impacts to estuarine and aquatic fauna, managed fisheries, and EFH.

No Action Alternative

Under the No Action Alternative, construction of project features in estuarine and marine open water habitats would not occur, nor would the associated increase in public use. There would be no habitat improvements, expanded recreational opportunities, or long-term monitoring services. Since these areas already experience high levels of human use and fishing pressure, the absence of these improvements and services may adversely affect aquatic habitats and fauna compared to the Proposed Alternative. As such, the No Action Alternative would likely result in fewer short-term impacts to local habitats but would result in more long-term adverse impacts to these resources compared to the Proposed Alternative.

4.5.2.4 Protected Species

4.5.2.4.1 Affected Environment

A list of federally threatened and endangered species and other species of special concern with the potential to occur within the project area was developed based on the USFWS IPaC resource list for the project area (USFWS 2017b) (**Table 4-9**).

Table 4-9. Protected Species with the Potential to Occur within the Proposed Alternative Project Area

Common Name	Scientific Name	Status
West Indian manatee	*Trichechus manatus*	Threatened
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Loggerhead sea turtle	*Caretta*	Threatened
Kemp's Ridley sea turtle	*Lepidochelys kempii*	Endangered
Atlantic (Gulf) sturgeon	*Acipenser oxyrinchus desotoi*	Endangered

4.5.2.4.2 Environmental Consequences

Proposed Alternative

Similar to the process described in Section 4.5.2.3.2, pre-consultation technical assistance with the regulatory agencies will continue to incorporate any necessary conservation measures. All required consultations would be completed prior to project implementation. It is anticipated that the Proposed Alternative features would have a relatively small footprint of in-water work. Reef locations were selected so that they would minimize disturbances to sensitive habitats (e.g., coral reefs, seagrasses), and a 1,000-foot buffer was established between reef enhancement project locations and the nearest sensitive habitat. Potential effects on protected species and critical habitat and conservation measures for aquatic protected species are discussed below.

Protected Aquatic Species

The Proposed Alternative is not expected to adversely affect any listed sea turtle species or the West Indian manatee. The Proposed Alternative would not affect sea turtle nesting habitats, and sea turtles are unlikely to be significantly affected by reef enhancements. Any sea turtles or West Indian manatees in the open waters of the project areas would be temporarily disturbed by noise and vibration and would move to nearby suitable habitats. Many sea turtles forage or take refuge on reef systems; therefore, reef enhancements would benefit sea turtles over the long-term. West Indian manatees are primarily found in calm waters around seagrass beds. The Proposed Alternative sites were selected to avoid seagrass beds. Thus, this species is unlikely to see any significant beneficial or adverse effect from the Proposed Alternative.

The Proposed Alternative is not expected to adversely affect Gulf sturgeon. Most of the proposed artificial reef sites are located outside of the known range of Gulf sturgeon; however, the documented range of Gulf sturgeon does occur within the vicinity of 3 of the 11 reef enhancement sites: 2 in Lake Pontchartrain (West End and Lake Front) and 1 north of the Mississippi River delta (California Point). Sturgeon are not known to show a particular affinity to artificial reefs where the Proposed Alternative would occur and therefore are unlikely to inhabit the Proposed Alternative sites. Furthermore, time-of-year restrictions would be put in place to prevent work when Gulf sturgeon are most likely to be present in estuarine waters (September to February). Any Gulf sturgeon within the vicinity would move to nearby suitable habitats. At the other eight artificial reef sites outside of the known range of the Gulf sturgeon, the Proposed Alternative would have no effect on Gulf sturgeon.

Marine mammals protected under the MMPA, such as the bottlenose dolphin, are unlikely to be present at inshore reef sites. At coastal reef sites, marine mammals may potentially be present in the vicinity of existing artificial reef areas. However, they are more likely to be found in open waters. If marine mammals are observed in the project area, work would temporarily stop until they have left the area. Marine mammals are highly mobile and would avoid any falling reef materials. However, they may be temporarily disturbed by the noise and vibrations of reef expansion, but these impacts are short in duration. The noise and vibrations would likely cause marine mammals to temporarily leave the area until reef enhancement activities have been completed. Therefore, adverse impacts to the bottlenose dolphin are not anticipated under the Proposed Alternative.

For any in-water work, the Proposed Alternative would implement measures from NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions* (2006), NMFS's *Measures for Reducing Entrapment Risk to Protected Species* (2012), NMFS's *Vessel Strike Avoidance Measures and Reporting for Mariners* (2008), and USFWS and USACE's *Standard Manatee Conditions for In-water Work* (2011). These measures would minimize the potential for impacts to listed sea turtles, West Indian manatee, bottlenose dolphin, and Gulf sturgeon. Additionally, construction BMPs, in addition to other avoidance and mitigation measures as required by state and federal regulatory agencies, would minimize water quality impacts that could affect the aquatic habitat. Therefore, these measures would minimize short-term, minor adverse effects to protected aquatic species.

Critical Habitat

The eastern end of Lake Pontchartrain is designated as critical habitat for Gulf sturgeon, located in Critical Habitat Unit 8 – Lake Borgne. Two proposed site locations are located in this designated area of Lake Pontchartrain: West End and Lake Front. While the proposed reef enhancements would convert small areas of potential sturgeon habitat into reef habitats, these areas are already adjacent to existing artificial reefs and may not be optimal habitat for sturgeon. The relatively small footprints of these enhancements would minimize adverse modification to sturgeon habitats. While BMPs, including certain equipment and installation methods that maximize accurate material placement would be implemented, any local sturgeon that may be displaced are likely to move to nearby, undisturbed suitable habitats. Additional consultation with USFWS and/or NMFS would occur during the planning phase for these two artificial reef locations.

No Action Alternative

Protected Aquatic Species

Under the No Action Alternative, the sites would remain in their current state. Because sea turtles would benefit from the reef habitat creation in the long-term, the No Action Alternative could have a minor, long-term adverse effects on sea turtles. The No Action Alternative is anticipated to have no effect on West Indian manatee because the Proposed Alternative would not impact seagrass habitat. Because the No Action Alternative would result in a small amount of marginal to poor Gulf sturgeon habitat remaining in the current condition, the No Action Alternative is anticipated to provide a small potential benefit to Gulf sturgeon. The No Action Alternative is not anticipated to affect marine mammals, including the bottlenose dolphin.

Critical Habitat

Under the No Action Alternative, there would be no construction of the artificial reefs at the three sites located within Gulf sturgeon critical habitat. Therefore, the No Action Alternative would result in a small portion of critical habitat remaining in its current state.

4.5.3 Socioeconomic Environment

4.5.3.1 Socioeconomics and Environmental Justice

The Proposed Alternative would involve the enhancement of 11 existing artificial reefs in state and federal waters, spanning six parishes and the Gulf of Mexico. As a result of their location in open water, and that these reefs are already sited, the Proposed Alternative would directly not impact the demographics of the overall project area.

Indirect impacts may lead to increased revenue to area businesses servicing recreational users of the artificial reefs, but such an increase is not anticipated to significantly affect the socioeconomic character of the region.

4.5.3.2 Cultural Resources

4.5.3.2.1 Affected Environment

Each of the 11 artificial reef sites is located in areas of open water across the Louisiana Gulf Coast. The sites were originally developed through the LARP authorized in 1986. The project sites will be reviewed under Section 106 of the NHPA to identify any historic properties located within the Proposed Alternative project area and to evaluate whether the alternative would affect any historic properties. NHPA was implemented to protect the cultural heritage and resources of the nation. During initial review of the Division of Archaeology Database of the Louisiana Office of Cultural Development, the presence of cultural resources was not identified.

4.5.3.2.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources. Cultural and historic resources would be considered when preparing site-specific restoration measures and management actions. Where there is a likelihood of disturbance of cultural resources, cultural resource managers would conduct appropriate surveys to assess the methods and location of restoration and management actions. Restoration measures/management actions would be designed to avoid cultural resources to the extent practicable.

The PGP for each of the reef sites states that no activity is authorized under this general permit which may adversely affect significant cultural resources listed or eligible for listing in the NRHP until the requirements for Section 106 of the HDPA are met. Upon discovery of the presence of previously unknown historic and/or prehistoric cultural resources, all work would cease and the SHPO would be notified.

No Action Alternative

Under the No Action Alternative, the existing artificial reef sites would not be disturbed. As a result, no impacts are anticipated to this environmental resource.

4.5.3.3 Infrastructure

4.5.3.3.1 Affected Environment

The Louisiana Artificial Reef Program was established to repurpose decommissioned oil and gas platforms into artificial reef habitats. As of September 2017, 76 offshore, 6 nearshore, and 31 inshore reefs have been developed (LDWF 2017b). Offshore reef sites have utilized the jackets and supportive structures from 386 decommissioned oil and gas structures. Inshore reef sites have been constructed of shell, limestone, recycled concrete, and formed concrete structures. Offshore reefs are located in federal waters, generally 30 to 70 miles from Louisiana's coastline. Inshore reefs are located within Louisiana state waters between the Louisiana Intracoastal Waterway and the Louisiana coastline and within Lake Pontchartrain. Nearshore reefs are from the state's coastline to 100 feet of water depth and may be in state or federal waters. No active oil

and gas structures and pipelines are located within 1,000 feet of an artificial reef, per LDWF directive (LDWF 2015).

4.5.3.3.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve the enhancement of two nearshore and nine inshore reefs across Cameron, Jefferson, Orleans, Plaquemines, St. Mary, and Terrebonne Parishes, as well as in the Gulf of Mexico. New reef materials would be installed on the seafloor in order to enhance the marine habitat. The Proposed Alternative sites are accessed via boat.

Construction activities may interrupt access to the existing artificial reefs; however, this would be temporary in nature. The Proposed Alternative would be implemented in accordance with the *Louisiana Artificial Reef Plan* and the *Louisiana Inshore and Nearshore Artificial Reef Plan*.

Per requirements in the PGP issued by USACE, there will be no unreasonable interference with navigation during or after construction. Safety lights, signals, and signs prescribed by the USCG will be installed and maintained in accordance with the USACE PGP.

No Action Alternative

Under the No Action Alternative, no improvements to the existing artificial reef infrastructure would occur. As a result, no impacts are anticipated to this environmental resource.

4.5.3.4 Land and Marine Management

4.5.3.4.1 Affected Environment

The Louisiana Fishing Enhancement Act of 1986 created the LARP within LDWF and established the Artificial Reef Council, which oversees the program. LDWF holds administrative authority over the program, whereas USACE holds regulatory authority over artificial reef development, including enhancements. For reefs in State waters, USACE shares this responsibility with the LDNR, Office of Coastal Management. This Office ensures that a Proposed Alternative is consistent with the Louisiana Coastal Resource Program before it is authorized to proceed for federal review. This Consistency Determination has been received for all 11 of the reef sites.

In addition, the USCG has regulatory authority over the artificial reefs to ensure that obstructions are marked appropriately so as to avoid navigation obstacles.

4.5.3.4.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would include enhancements to two nearshore reef sites (Ship Shoal 26 [“the Pickets”] and Grand Isle 9 [“Sulfur Mine”]) and nine inshore reef sites located within nine planning areas recently developed to facilitate enhancement opportunities. All 11 sites would require both state and federal permits before enhancement activities could begin. All 11 reef sites have obtained the needed permits from USACE, as well as having received the Consistency Determination from the State Office of Coastal Management. All proposed enhancements would conform to the requirements set forth in the state and federal permits.

The Proposed Alternative is not expected to contribute to short- or long-term adverse impacts to land and marine management.

No Action Alternative

Under the No Action Alternative, no improvements to the existing artificial reefs would occur. As a result, no impacts are anticipated to this environmental resource.

4.5.3.5 Tourism and Recreational Use

4.5.3.5.1 Affected Environment

The LARP includes 113 artificial reefs across Louisiana's estuarine, coastal and offshore waters. The reefs, through the fostering of biodiversity, are popular destinations for recreational activities such as fishing (through personal or charter boats), scuba diving, and conservation outreach.

4.5.3.5.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would serve to enhance recreational opportunities and experiences at 11 statewide artificial reefs. Due to their proximity to population centers, these artificial reef sites offer greater accessibility than offshore reefs, and thereby attract larger numbers of users than their offshore counterparts.

As shown in **Table 4-7**, 10 of the Proposed Alternative sites fully support primary contact recreation activities (e.g., swimming and diving) and secondary contact recreation activities (e.g., fishing and boating). As discussed in Section 4.5.2.3.2, reef enhancements could lead to greater use by recreational anglers; however, such an increase is not anticipated to have a significant adverse effect on local fisheries.

Though, construction activities may result in short-term adverse impacts with closures of a site, the Proposed Alternative would serve to enhance the visitor experience over the long-term, providing beneficial impacts.

No Action Alternative

Under the No Action Alternative, no changes to the existing artificial reefs throughout the region would occur. As a result, no impacts are anticipated to this environmental resource.

4.5.3.6 Aesthetics and Visual Resources

4.5.3.6.1 Affected Environment

The LARP involves the development of artificial reefs, which are submerged underwater. The aim of each reef installation is to stabilize and enhance the existing habitat in a sustainable fashion (LDWF 1987). The resulting biodiversity enriches the underwater aesthetics. In addition, the program repurposes abandoned oil and gas platforms into marine habitats, promoting natural marine processes, which improve the visual resources of the region. The Proposed Alternative would enhance 11 existing reef sites with limestone, recycled concrete, and/or formed concrete structures.

4.5.3.6.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve the further development of 11 existing artificial reefs. Such enhancements would seek to improve upon the existing habitat complexity of the reefs, thereby promoting greater biodiversity and fostering a more interesting aesthetic.

Construction activities may impede the natural aesthetics and visual resources of the area; however, such impacts would be temporary in nature. Impacts from construction may be adverse, but localized, short-term, and minor.

No Action Alternative

Under the No Action Alternative, no changes to the existing artificial reefs would occur. As a result, no impacts are anticipated to this environmental resource.

4.5.3.7 Public Health and Safety, Including Flood and Shoreline Protection

4.5.3.7.1 Affected Environment

The Proposed Alternative area includes 11 artificial reefs located within open water. The reefs are open to the public for recreational and commercial activities. The LARP seeks to both "facilitate access and utilization by recreational and commercial user groups" and to "minimize environmental risks and risks to personal and public health and property" (LDWF 2015). In order to meet both of these objectives, the LARP mandates siting and material considerations.

4.5.3.7.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve the enhancement of existing artificial reefs, utilizing materials that can withstand extreme storm events and would not pose a risk to surrounding areas or to user groups such as divers. Such materials would include limestone, clean recycled concrete, and/or prefabricated concrete modules.

Construction activities may temporarily impact the public health and safety of the project area. Impacts from construction may be adverse, but localized, short-term, and minor. BMPs, such as those listed below, would be employed to mitigate any such impacts:

- If handling fuels on site, caution would be taken to prevent spills of oils and grease.
- Spill mitigation measures would be employed immediately following a spill of any hazardous material.
- Any produced waters or human waste would not be discharged unless the Department of Health and Hospitals requirements are met or exceeded.

No Action Alternative

Under the No Action Alternative, no changes to the existing artificial reefs would occur. As a result, no impacts are anticipated to this environmental resource.

4.5.3.8 Fisheries and Aquaculture

4.5.3.8.1 Affected Environment

Louisiana is home to thriving commercial fishery and aquaculture industries. According to the Louisiana State University AgCenter, marine fisheries and commercial aquaculture brought nearly $650 million and $492 million to the state's economy in 2013 and 2014, respectively (Louisiana State University, Agricultural Center [LSU AgCenter] 2014). As mentioned in Section 4.5.2.3.1, key commercial species within the project area include shrimp, oysters, menhaden, blue crab and striped mullet.

4.5.3.8.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would enhance existing artificial reefs, serving to improve existing fisheries and aquaculture resources. As shown in **Table 4-7**, nine of the Proposed Alternative sites are located in LDEQ sub-basins that are listed as fully supporting fish and wildlife propagation. Additionally, eight sites are located in LDEQ sub-basins that are listed as fully supporting oyster propagation. Because commercial harvest of oysters is not allowed on artificial reef sites, those reefs in areas conducive to oyster growth would serve as unharvested oyster broodstock reefs, which would benefit the surrounding areas. Though, the Proposed Alternative sites are used primarily by recreational anglers, commercial fisheries and aquaculture would benefit in general from the promotion and expansion of habitats that support the aquatic species on which the industry relies.

Impacts from construction may be adverse, but localized, short-term, and minor. Long-term impacts would be beneficial, as reefs are expected to improve existing fisheries and aquaculture.

No Action Alternative

Under the No Action Alternative, no changes to the existing artificial reefs would occur. As a result, no adverse impacts are anticipated to fisheries and aquaculture.

4.5.3.9 Marine Transportation

4.5.3.9.1 Affected Environment

The LARP mandates that shipping channels, designated anchorages, tidal inlets, or areas of heavy navigational traffic are not to be considered for artificial reef development (LDWF 2015). Reef sites have been selected to avoid conflicts with marine transportation as well as other user groups. The existing marking of the reefs meet all USCG requirements, so as to ensure the protection of maritime navigation.

4.5.3.9.2 Environmental Consequences

Proposed Alternative

Per requirements in the PGP issued by USACE, there should be no unreasonable interference with navigation during or after construction. Safety lights, signals, and signs prescribed by the USCG are required to be installed and maintained in accordance with the USACE PGP.

The Proposed Alternative would not interfere with navigation of waterborne commerce, ferry services, or other marine transportation. The reefs would be marked per USCG regulations, if

necessary, and would not create unreasonable obstructions to navigation. However, because of potential increased use of the project sites, care would be taken to minimize impacts or impediments to existing navigation practices.

No Action Alternative

Under the No Action Alternative, no changes to the existing artificial reefs would occur. As a result, no impacts are anticipated to this environmental resource.

4.5.4 Cumulative Impacts of the Proposed Alternative

4.5.4.1 Potential Cumulative Impacts

As described in detail in Section 4.4.4.1, the CEQ regulations to implement NEPA require the assessment of cumulative impacts in the decision-making process for federal projects, plans, and programs. The following section describes the multistep approach used for evaluating cumulative impacts for the Statewide Artificial Reef Enhancement project.

4.5.4.2 Methodology for Assessing Cumulative Impacts

Cumulative impacts are typically analyzed using four steps, as described in detail in Section 4.4.4.2.

4.5.4.3 Identification of Resources Affected and Boundaries of Analysis

4.5.4.3.1 Resources Affected

In this RP/EA #2, cumulative impacts include each of the resources identified in Physical Environment, Biological Environment, and Socioeconomic Environment sections discussed above. Several of the resources that would have no effects, negligible effects, or only short-term minor impacts, would not contribute to cumulative impacts. Those resources are excluded from this cumulative impact analysis for the Proposed Alternative:

- Hydrology and water quality
- Air quality
- Noise
- Wildlife species
- Protected species
- Socioeconomics and environmental justice
- Cultural resources
- Infrastructure
- Land and marine management

The following resources were analyzed for potential environmental consequences that could result from the Proposed Alternative:

- Geology and substrates
- Habitats

- Marine and estuarine fauna, essential fish habitat, and managed fish
- Tourism and recreational use
- Aesthetics and visual resources
- Public health and safety, including flood and shoreline protection
- Fisheries and aquaculture
- Marine transportation

4.5.4.3.2 Spatial Boundary of Analysis

As discussed in Section 4.4.4.2, the spatial boundaries used to provide the necessary context for the cumulative impact analysis typically are defined based on the specific resource being assessed. For this analysis, the spatial boundary includes each of the 11 sites proposed as part of the Statewide Artificial Reefs alternative, as well as their immediate vicinities.

4.5.4.3.3 Temporal Boundary of Analysis

A description of the determination of a temporal boundary for the cumulative impact analysis is included in Section 4.4.4.3.3.

4.5.4.4 Cumulative Action Scenario

Past, present, and reasonably foreseeable future actions in the vicinity of the Proposed Alternative area were identified in order to effectively consider the potential cumulative impacts. A list of permitted, existing, and future projects was compiled for each of the sites using Louisiana and USACE permitting databases and internet searches for more detail, as needed. The project sites are located within the Louisiana Gulf Coast and regulations pertaining to coastal permits were considered appropriate for developing a list of past and reasonably foreseeable future activities that may affect the resources. Based on information obtained from permitting databases, and the location of the reef sites within open water, past and potential future activities near the Proposed Alternative areas are likely limited to future additional reef enhancements. **Table 4-10** below summarizes the identified actions and the potential cumulative impacts for the Proposed Alternative, Statewide Artificial Reef Enhancements.

Based on the assessment summarized in **Table 4-10**, the resource areas with potential for cumulative adverse impacts are geology and substrates; marine and estuarine fauna, essential fish habitat, and managed fish species; fisheries and aquaculture; and marine transportation.

The adverse impacts to geology and substrates due to marsh creation and shoreline protection projects are not expected to contribute to cumulative impacts due to their likely geographic separation from the artificial reef sites. Short- and long-term impacts to geology and substrates, and marine transportation from future additional reef enhancements may contribute to cumulative adverse effects at each of the reef locations. Minor long-term adverse effects on an area of marine substrates within the footprint of the reef enhancements would occur as a result of this Proposed Alternative component and would be cumulative as the reef footprint increases. Cumulative impacts to marine transportation due to the increased footprint of the reef site can be mitigated with the use of marking regulated by the USCG.

Table 4-10. Past, Present, and Reasonably Foreseeable Future Actions Included in Cumulative Impact Analysis

Category/Projects	Project Description	Key Resource Areas with Potential Cumulative Impacts
Future Reef Enhancements	The reef sites may be further enhanced in the future by adding additional materials such as shell, limestone, reef balls, concrete.	Short-term, adverse impacts to: ▪ Geology and substrates ▪ Marine and estuarine fauna, essential fish habitat, and managed fish ▪ Fisheries and aquaculture ▪ Marine transportation Long-term, adverse impacts to: ▪ Geology and substrates ▪ Marine transportation Long-term, positive impacts to: ▪ Habitats ▪ Marine and estuarine fauna, essential fish habitat, and managed fish ▪ Tourism and recreational use ▪ Aesthetics and visual resources ▪ Public health and safety, including flood and shoreline protection ▪ fisheries and aquaculture
Shoreline Protection	Past and future shoreline protection projects along the shores near project sites	Short-term, adverse impacts to: ▪ Geology and substrates ▪ Habitats ▪ Wildlife species Long-term, adverse impacts to: ▪ No applicable impacts identified Long-term, positive impacts to: ▪ Geology and substrates ▪ Habitats ▪ Tourism and recreational use ▪ Public health and safety, including flood and shoreline protection
Marsh Creation	Potential future marsh creation projects in the vicinity of the artificial reef locations	Short-term, adverse impacts to: ▪ Geology and substrates ▪ Marine and estuarine fauna, essential fish habitat, and managed fish ▪ Fisheries and aquaculture ▪ Marine transportation Long-term, adverse impacts to: ▪ No applicable impacts identified Long-term, positive impacts to: ▪ Geology and substrates ▪ Habitats ▪ Marine and estuarine fauna, essential fish habitat, and managed fish ▪ Tourism and recreational use ▪ Aesthetics and visual resources ▪ Public health and safety, including flood and shoreline protection ▪ Fisheries and aquaculture

The three identified actions (**Table 4-10**; future reef enhancements, shoreline protection, and marsh creation) and the Proposed Alternative would likely have short-term, adverse impacts to marine and estuarine fauna, essential fish habitat, and managed fish and fisheries and aquaculture but would also have long-term benefits to these resources. The cumulative effects from the Proposed Alternative and the three identified actions are expected to result in cumulative beneficial impacts to marine and estuarine fauna, essential fish habitat, and managed fish and fisheries and aquaculture.

One of the identified actions would likely have short-term, adverse impacts to habitats. But all three identified actions and the Proposed Alternative would have long-term benefits to this resource. The cumulative effects from the Proposed Alternative and the three identified actions are expected to result in cumulative beneficial impacts to habitats.

The Proposed Alternative and each of the identified actions are expected to have long-term beneficial impacts on tourism and recreational use; aesthetics and visual resources; and public health and safety, including flood and shoreline protection. Therefore, cumulative impacts to these resources are expected to be positive.

The No Action Alternative is expected to result in adverse impacts on:

- Habitats
- Marine and estuarine fauna, essential fish habitat, and managed fish species
- Protected species (sea turtles)

Under the No Action Alternative, there would be no habitat enhancements at existing artificial reef sites, leaving the existing resources strained under high use and potentially causing degradation. However, none of the identified actions are expected to contribute long-term adverse impacts to these resources. Rather, the identified actions are anticipated to have positive impacts to these resources. As a result, cumulative adverse impacts to those resources are not anticipated when considering the No Action Alternative in conjunction with the identified actions.

4.6 Lake Charles SCEC

4.6.1 Physical Environment

4.6.1.1 Geology and Substrates

4.6.1.1.1 Affected Environment

The Proposed Alternative is located in Calcasieu Parish on an undeveloped parcel of land. The area was historically used for agricultural purposes until recent nearby commercial development. Commercial properties are located to the north and west of the site, and undeveloped cleared land is located to the south and east. The geology in the area is characterized by the Beaumont Alloformation, which includes costal deposits of late to middle Pleistocene streams, the oldest alloformation and topographically highest surface of the Prairie Allogroup units of southwestern Louisiana. It exhibits the relict channels of the Red and Calcasieu rivers and includes deposits of the Ingleside barrier trend (LGS 2002). Surface soil in the area has been classified by USDA NRCS as part of the Mowata-Vidrine complex. These soils consist of loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock. The slopes generally range from 0 to

1%, are poorly drained, and rarely flood or pond (USDA NRCS 2017). The Proposed Alternative site is relatively flat with existing grade at approximately El. 12 above sea level, referenced to the North American Vertical Datum of 1988.

4.6.1.1.2 Environmental Consequences

Proposed Alternative

Aspects of the Proposed Alternative that have environmental consequences for the geology and substrates include construction of the building, a fishing pond, outdoor pavilion, nature trail, and visitor parking.

Sitework would occur to construct foundations for the building, outdoor pavilion, and other ancillary structures, as well as construction of the fishing pond and potentially a small water well. Additional ground disturbances and surficial digging would be associated with construction of the parking areas, nature trails, and other site improvements. The depth of disturbances necessary to construct the Proposed Alternative depends on final engineering design. For the parking areas and nature trail, depth of disturbance is expected to be less than 6 inches. Construction equipment and materials for staging have not been identified but would likely be located on site at the proposed parking areas or pond.

Specific measures would be implemented during construction to minimize erosion and overall soil impacts. To the extent possible, construction activities related to the Proposed Alternative would be limited the footprint of the proposed improvements. Other mitigation measures would include following established BMPs for construction activities such as the implementation of an erosion control and stormwater management plan, the installation of sediment traps prior to commencement of construction activities, and ongoing construction monitoring to ensure compliance.

Short- and long-term disturbances to terrestrial soils and substrates would occur as a result of construction and site preparation activities. However, the impacts would be localized to the Proposed Alternative site. Thus, with the impacts localized to the site, this Proposed Alternative component would have minor, long-term, adverse impacts to geology and substrates.

No Action Alternative

Under the No Action Alternative, construction and site preparation activities would not occur; therefore, no additional adverse or beneficial impacts to geology and substrates would be expected.

4.6.1.2 Hydrology and Water Quality

4.6.1.2.1 Affected Environment

The Proposed Alternative site drains east to Kayouche Coulee, which is within the English Bayou watershed. Water quality inventory reports by LDEQ have listed suspected sources of water quality problems for this watershed as natural sources, atmospheric deposition, and discharges from municipal separate storm sewer systems (LDEQ 2016). Based on the Final 2016 *Louisiana Water Quality Integrated Report* (LDEQ 2016), English Bayou (subsegment LA030702_00), which includes Kayouche Coulee and the Proposed Alternative area, is listed as fully supporting the designated use for primary contact recreation, secondary contact recreation, and agriculture.

However, this subsegment is listed as not supporting the designated water use of fish and wildlife propagation. The Proposed Alternative is located within FEMA-designated Flood Zone A, which is subject to inundation by the 1%-annual-chance flood event (FEMA Map Number 22019C0485F, 2011).

4.6.1.2.2 Environmental Consequences

Proposed Alternative

Work in wetlands and other waters of the US would require state and federal permits in addition to construction BMPs as discussed in previous sections. The construction BMPs, in addition to other avoidance and mitigation measures as required by state and federal regulatory agencies, would minimize water quality and hydrology impacts.

The primary impacts to water quality and hydrology under the Proposed Alternative would be through the temporary effects of construction, including potential erosion and sedimentation. BMPs would be used to minimize the short-term minor adverse effect on water quality and hydrology during construction. The Proposed Alternative would result in additional impervious surface from the construction of the proposed facilities. This new impervious surface would increase runoff and reduce infiltration. Thus, the Proposed Alternative will increase stormwater runoff and pollutant loads to the downstream receiving waters. This could cause long-term minor adverse effects to downstream water quality. A stormwater retention pond would be constructed on site, if necessary, to mitigate any potential impacts to water quality and hydrology.

No Action Alternative

Under the No Action Alternative, construction of the Proposed Alternative would not occur. Therefore, there would be no short-term effects to water quality associated with construction. The parcel would remain in its current state and may be developed at a future date for other purposes. Therefore, under the No Action Alternative, there would be fewer short-term impacts to local water quality through potential erosion and sedimentation and also potentially fewer long-term impacts as additional impervious surface may not be constructed.

4.6.1.3 Air Quality

4.6.1.3.1 Affected Environment

Calcasieu Parish is listed as in attainment for all NAAQS pollution metrics. Therefore, this parish complies with all air quality standards. Calcasieu Parish has overall good air quality (USEPA 2017). For the past 5 years (2012 to 2016), Calcasieu Parish maintained an average AQI of 46 (USEPA 2017), which is under the poor air quality threshold of 50.

4.6.1.3.2 Environmental Consequences

Proposed Alternative

Implementation of this Proposed Alternative component could include use of construction equipment such as bulldozers, backhoes, tractor trailers, cranes, excavators, fork lifts, rollers, and generators. During construction activities, adverse impacts to air quality would occur from exhaust produced by gasoline- and diesel-powered construction vehicles and equipment. Most impacts to air quality are expected to be localized and occur only during active construction activities.

Engine exhaust from bulldozers, excavators, backhoes and other vehicles would contribute to an increase in criteria pollutants and emissions. However, due to the small-scale and short duration of the construction portion of the Proposed Alternative, predicted emissions would be short-term and minor and would not require a detailed assessment. Long-term, ongoing emissions are expected to increase slightly due to the increase in recreational use and visitation to the site; however, based on the anticipated number of visitors per year, the quantitative increase is expected to be minimal.

Emission reduction measures to mitigate for short-term air quality impacts could include the use of ultra-low sulfur diesel fuel in off-road construction equipment, limiting unnecessary idling time of diesel-powered engines, controlling dust related to construction site activities, and covering trucks hauling loose materials.

In summary, short-term adverse impacts to air quality would be minor, local, and temporary, only occurring during active construction activities. Long-term adverse impacts to air quality due to visitor traffic is expected to be minor.

No Action Alternative

Under the No Action Alternative, construction activities would not occur, and no additional adverse or beneficial impacts to air quality would be expected.

4.6.1.4 Noise

4.6.1.4.1 Affected Environment

Under most conditions, the ambient (background) noise at the Proposed Alternative site is from vehicular traffic and human activities from nearby commercial and residential properties. The level of noise varies, depending on the season, time of day, number and types of noise sources, and distance from the noise source.

4.6.1.4.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative components would generate construction noise associated with equipment during construction of the Proposed Alternative. Construction activities would include mobilizing equipment, preparing the sites, foundation installation/construction, excavating, grading, and fill placement. Implementation of the Proposed Alternative would include transportation of construction materials to the Proposed Alternative site, which may include trucks or other types of transportation that would contribute to short-term noise disturbances.

Commercial and residential areas to the north, west, and southeast of the Proposed Alternative site may be affected by noise during construction. Construction activities at the site would result in short-term moderate impacts to noise at the site and in the immediate vicinity.

Mitigation measures that serve to limit noise impacts to humans from construction activities include limiting activity at project sites to daytime hours, limiting truck traffic ingress/egress to the site to daytime hours, promoting awareness that producing prominent discrete tones and periodic noises (e.g., excessive dump truck gate banging) should be avoided as much as possible, and requiring that work crews seek pre-approval for any weekend activities or activities outside

of daytime hours. Because construction noise is temporary, any adverse impacts to the environment during construction activities would be short-term adverse and moderate. Standard practices, such as muffle units for generators, would be implemented during construction operations to mitigate noise impacts.

Once the improvements are constructed, visitors may cause some noise associated with parking and recreating. However, overall, long-term noise impacts at this Proposed Alternative location from visitors to the site would likely be minor and adverse.

No Action Alternative

Under the No Action Alternative, construction activities would not occur, and recreation improvements would not be added to the site. Therefore, no additional adverse or beneficial impacts to noise would be expected.

4.6.2 Biological Environment

4.6.2.1 Habitats

4.6.2.1.1 Affected Environment

The Proposed Alternative site is in the Northern Humid Gulf Coastal Prairies ecological region, within the larger Western Gulf Coast Coastal Plain, consisting of marshes and prairies extending inland approximately 60 miles and continuing west along the Texas coastline (Daigle et al. 2006). Quaternary-age deltaic sands, silts, clays, and gravel underlie much of the Northern Humid Gulf Coastal Prairies.

Historically, soils present at the Proposed Alternative site supported native vegetation that was largely tallgrass grasslands with gallery forests along streams. Little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), yellow Indiangrass (*Sorghastrum nutans*), brownseed paspalum (*Paspalum plicatulum*), and switchgrass (*Panicum virgatum*) are dominant grasses in a mixture with hundreds of other herbaceous species across these prairies. Some loblolly pines (*Pinus taeda*) and, historically, longleaf pines (*Pinus palustris*) are present in small upland pockets where the coastal plain transitions to the interior south-central plains. Nearly all of the prairies and large portions of upland and floodplain forest have been converted to cropland, pasture, crawfish aquaculture, or urban land uses (Daigle et al. 2006).

The community of Lake Charles is located on the floodplains and low terraces of the Calcasieu River. A majority of the upland areas are dissected with numerous sluggish rivers, bayous, creeks, and sloughs formed by historic patterns of sedimentation and erosion with influences from the Gulf of Mexico. Largely because of the area's flat topography and relatively fertile soils, most of the prairies are currently farmed (or were historically farmed) or have been developed into urban areas compared to bordering ecological regions.

The Proposed Alternative site is situated in an urban landscape, surrounded by both commercial and residential properties. It has been significantly affected by adjacent development and low levels of vegetation management. Prior to area development and based on area history, the Proposed Alternative site was used for agricultural purposes; active agricultural fields are located within 0.5 mile to the south and east. The topography is relatively flat, and the ground cover is primarily tall grasses and small trees, including Chinese tallow (*Triadica sebifera*).

The nearest water body or wetland is located along the north property boundary; it is NWI-mapped as an excavated pond (PUBHx) and is a stormwater detention feature associated with commercial development on adjacent parcels. No NWI-mapped waters or wetlands are present on the Proposed Alternative site. Additional NWI-mapped features in the vicinity of the site include a small emergent wetland (PEM1C) that has since been filled, intermittent ditches on the property to the south that flow into Kayouche Coulee, and Kayouche Coulee itself, which is located roughly 0.25 mile east of the property (USFWS NWI 2017).

Based on a site visit by LDWF on February 8, 2017, the Proposed Alternative site is primarily fallow field, consisting largely of herbaceous plants and widely scattered small trees and shrubs. A 2001 USACE jurisdictional determination on a large parcel of land encompassing the 10-acre site for the Proposed Alternative found no jurisdictional wetlands were present; however, it expired in 2006 (**Appendix D**). LDWF has requested a new federal wetland jurisdictional determination for the project area prior to filing any applicable permit applications. Louisiana does not regulate any wetlands outside of the designated Louisiana Coastal Zone (LCZ), and the Proposed Alternative site is located outside of the LCZ. Therefore, state wetlands permitting is not applicable.

The following obligate and facultative wetland plant species were observed at the site: Indian plantain (*Arnoglossum ovatum*), spadeleaf (*Centella erecta*), Virginia buttonweed (*Diodia virginiana*), pickerelweed (*Pontederia cordata*), slender arrowhead (*Sagittaria graminea or papillosa*), seaside goldenrod (*Solidago sempervirens*), white old-field aster (*Symphyotrichum racemosum*), Brazilian overlain (*Verbena Brasiliense*), bushy broom sedge (*Andropogon glomeratus*), velvet panicum (*Dichanthelium solariums*), mountain spike sedge (*Eyecharts montana*), soft rush (*Juncus effusus*), anglestem beak sedge (*Rhynchospora caduca*), sugarcane plume grass (*Saccharum giganteum*), broadleaf cattail (*Typha latifolia*), climbing hempvine (*Mikania scandens*), water oak (*Quercus nigra*), and elderberry (*Sambucus nigra subsp. Canadensis*).

The fallow field was historically farmed and is currently mowed on a semi-regular basis. The following native and exotic species were observed during the site visit: common ragweed (*Ambrosia artemisiifolia*), horrid thistle (*Cirsium horridulum*), Texas goldentop (*Euthamia gymnospermoides*), wild geranium (*Geranium* spp.), crow poison (*Nothoscordum bivalve*), yellow wood sorrel (*Oxalis* spp.), camphorweed (*Pluchea baccharis or foetida*), oldfield goldenrod (*Solidago altissima*), chalky bluestem (*Andropogon capillipes*), wax myrtle, blackberry (*Rubus argutus*), southern dewberry (*Rubus trivialis*), yellow jessamine (*Gelsemium sempervirens*), lanceleaf greenbrier (*Smilax smallii*), white clover (*Trifolium repens*), Bermuda grass (*Cynodon dactylon*), live oak, camphor tree (*Cinnamomum camphora*), eastern baccharis (*Baccharis halimifolia*), St. Andrew's cross (*Hypericum hypericoides*), Chinese elm (*Ulmus parviflora*), Chinese privet (*Ligustrum sinense*), Chinese tallow tree, and Japanese honeysuckle (*Lonicera japonica*).

In general, the proposed property offers marginal habitat value for wildlife. Habitats are dominated by early successional, weedy species typical of a previously disturbed, vacant property in an urban setting. Invasive species are also common and are likely outcompeting native species that may have restored some components of the historical tallgrass prairie ecosystem.

4.6.2.1.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would remove all existing vegetation and would involve significant earth moving; therefore, existing habitats would largely be eliminated. However, existing habitats are of poor quality and currently provide little habitat value. The Proposed Alternative would include several features that would create wildlife habitat or facilitate environmental education opportunities. The establishment and management of native habitats would improve the habitat value of the parcel for native wildlife, particularly birds, fish, and amphibians.

The construction of the Proposed Alternative includes implementation of BMPs that would minimize adverse impacts to any desirable and beneficial habitats. An invasive species removal and control plan would be developed and implemented prior to the start of construction. Landscaping plans would incorporate trees and shrubs to establish shade to reduce the likelihood that invasive species would recolonize the area. Landscaping plans would only use native plants from local sources. An erosion control plan would be developed and implemented to minimize erosion during and after construction.

Regarding the potential presence of wetlands on the property, LDWF has requested USACE to update its previous 2001 jurisdictional wetland determination, which stated that the area did not contain wetlands subject to USACE jurisdiction. If the USACE determines the site contains jurisdictional wetlands, project features would be designed and implemented to avoid or minimize impacts to these resources to the maximum extent practicable, consistent with Section 404 permitting. Any required mitigation would be conducted by LDWF not using NRDA funds.

There would be minor short-term adverse impacts to poor quality habitat during construction. However, long-term impacts to habitats would be beneficial, as certain project elements are expected to improve aquatic and wildlife habitat.

No Action Alternative

Under the No Action Alternative, construction activities would not occur. Therefore, no additional adverse or beneficial impacts to habitats would be expected. However, the recreation, public education, and habitat improvements would not be added to the site. Because the Proposed Alternative site possesses degraded habitats that provide little value to local wildlife, the absence of these services would likely adversely affect habitats compared to the Proposed Alternative. As such, the No Action Alternative would result in the continued occupation of the site by invasive and tolerant species typical of urban environments, and the restoration of native habitats that would better support native species would not be realized as compared to the Proposed Alternative.

4.6.2.2 Wildlife Species (including birds)

4.6.2.2.1 Affected Environment

As previously discussed, the Proposed Alternative site is on undeveloped, commercial land that was formerly used for agricultural purposes. Currently, the parcel is mowed and maintained periodically. Therefore, wildlife use of the parcel is limited to species adapted to the urban and peri-urban environment. Migratory birds that could potentially use the Proposed Alternative site were identified using the USFWS IPaC database report. Based on this database, the following

birds have potential to occupy the Proposed Alternative areas or be affected by activities in these locations: American golden-plover, Bachman's sparrow (*Peucaea aestivalis*), Bewick's wren (*Thryomanes bewickii*), Buff-breasted Sandpiper, clapper rail, dunlin, gull-billed tern, Henslow's sparrow (*Ammodramus henslowii*), Hudsonian godwit, Kentucky warbler (*Geothlypis formosa*), king rail, Le Conte's sparrow (*Ammodramus leconteii*), least tern, lesser yellowlegs, long-billed curlew, marbled godwit, Nelson's sparrow (*Ammodramus nelsoni*), prairie warbler (*Setophaga discolor*), prothonotary warbler (*Protonotaria citrea*), red-headed woodpecker (*Melanerpes erythrocephalus*), seaside sparrow (*Ammodramus maritimus*), semipalmated sandpiper, short-billed dowitcher, southeastern American kestrel (*Falco sparverius*), Sprague's pipit (*Anthus spragueii*), swallow-tailed kite (*Elanoides forficatus*), whimbrel, wood thrush (*Hylocichla mustelina*), and yellow rail.

During a February 2017 site visit, LDWF staff observed several birds and frogs within the parcel, including killdeer (*Charadrius vociferus*), northern cardinal (*Cardinalis cardinalis*), Carolina chickadee (*Poecile carolinensis*), red-shouldered hawk (*Buteo lineatus*), Blanchard's cricket frog (*Acris blanchardi*), and southern leopard frog (*Lithobates sphenocephalus*). Evidence of crawfish and spiders were also observed at the site. Other birds that could potentially use the site include songbirds, such as the prothonotary warbler and prairie warbler, in addition to raptors such as the American kestrel.

4.6.2.2.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative could displace wildlife, including migratory birds, which may use the site for nesting, foraging, or resting. Construction activities would create noise and reduce available habitat. These activities could result in direct mortality of wildlife. However, most wildlife species that use the site are mobile and would vacate the area prior to or during construction. The Proposed Alternative would result in minor, long-term loss of poor quality wildlife habitat, which may have a minor effect on local wildlife populations. Wildlife is anticipated to relocate to similar habitat located directly south of the Proposed Alternative site. Project coordination with USFWS would continue so that appropriate conservation measures and BMPs can be incorporated to minimize and avoid impacts to wildlife, including migratory birds. Mitigation measures would include using care to avoid wildlife and birds during construction and avoiding working in migratory bird nesting habitats during breeding, nesting, and fledging (approximately mid-February through late August). Additionally, any vegetation clearing would be conducted outside the migratory bird nesting season or a qualified biologist would inspect for active nests prior to construction. If active nests are observed, then vegetation removal would be conducted after the birds successfully fledge. Because the construction activities and new facilities would have a small, localized footprint and avoidance and mitigation measures would be incorporated into the Proposed Alternative, adverse impacts to wildlife, including migratory birds, would be short-term and minor. The construction of the pond could have long-term minor beneficial effects to wildlife by creating additional foraging habitat for wildlife.

No Action Alternative

Under the No Action Alternative, the site would remain in its current state as a mowed and maintained parcel in a commercial area. Wildlife adapted to urban and peri-urban environments would continue to use the site until the parcel was developed at a future date.

4.6.2.3 Marine & Estuarine Fauna, Essential Fish Habitat, & Managed Fish Species

4.6.2.3.1 Affected Environment

The Proposed Alternative site is an inland parcel that does not contain marine or estuarine habitats. Therefore, no EFH has been designated for the Proposed Alternative property (NMFS 2017a). Similarly, no open water habitats or wetlands capable of supporting managed fish species or marine and estuarine fauna are present on the Proposed Alternative property.

4.6.2.3.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would have no effect on marine and estuarine aquatic fauna or managed fish species. While the Proposed Alternative would have no direct effects on EFH or marine and estuarine aquatic fauna, it would serve as a dedicated venue for fisheries education and outreach activities and would likely have indirect positive effects on EFH and marine and estuarine fauna. Outdoor elements of the Proposed Alternative would provide additional possibilities for public education and opportunities to appreciate and enjoy nature.

The Proposed Alternative may have long-term minor beneficial effects on recreationally managed freshwater fish species through the creation of suitable freshwater habitat associated with the fishing pond. The Proposed Alternative would have no direct effect on commercially managed species but would potentially have long-term minor beneficial effects through the public education and environmental outreach features described above.

No Action Alternative

Under the No Action Alternative, the Proposed Alternative would not be implemented; construction activities would not occur; and recreation, public education, and habitat improvements would not be added to the site. Therefore, no additional adverse or beneficial impacts to aquatic fauna, managed fish species, or EFH would be expected.

While construction of Proposed Alternative features would not occur, under the No Action Alternative, there would be no establishment of native aquatic habitats, construction of an environmental public education and outreach center, or stocking of the pond with recreationally important freshwater fish species. Since the property does not contain any existing aquatic habitats, the No Action Alternative would not preserve any suitable fish habitats or benefit local fisheries. Conversely, the No Action Alternative would prevent project features that would directly and indirectly benefit fisheries. As such, the No Action Alternative would likely result in lost opportunities for public outreach, environmental education, and other programs focused on the importance of fisheries and aquatic habitats.

4.6.2.4 Protected Species

4.6.2.4.1 Affected Environment

A list of federally threatened and endangered species and other species of special concern with the potential to occur within the Proposed Alternative area was developed based on the USFWS IPaC resource list for the Proposed Alternative area (USFWS 2017b) (**Table 4-11**). Red-cockaded woodpecker (*Picoides borealis*) is the only ESA-listed species with the potential to occur within

the Proposed Alternative area. However, no suitable nesting or foraging habitat for this species is located within the Proposed Alternative area.

Table 4-11. Protected Species with the Potential to Occur within the Proposed Alternative Area

Common Name	Scientific Name	Status	Observed in Project Area[1]
Red-cockaded woodpecker	*Picoides borealis*	Endangered	No

[1]Based on personal communication with LDWF staff.

4.6.2.4.2 Environmental Consequences

Proposed Alternative

Similar to the Elmer's Island Access Proposed Alternative, pre-consultation technical assistance with the regulatory agencies will continue to incorporate any necessary conservation measures. Potential effects on protected species and critical habitat are discussed below.

Red-cockaded woodpecker is the only federally listed endangered species with the potential to occur in the Proposed Alternative area. This species requires mature pine forests for foraging and nesting. Based on field visits conducted by LDWF staff, no pine trees are present within the Proposed Alternative site. Therefore, because suitable nesting and foraging habitat for red-cockaded woodpecker is not present, no effects to red-cockaded woodpecker are anticipated through implementation of this Proposed Alternative. Based on the USFWS SOV letter received for the Proposed Alternative, USFWS stated their records indicate that there would be no anticipated impacts to federally listed endangered, threatened, proposed or candidate species as a result of the project. Therefore, no further ESA consultation for the Proposed Alternative will be necessary unless the locations of the project change prior to implementation or a new species is listed.

Critical Habitat

There is no critical habitat present within the Proposed Alternative site. Therefore, there would be no impacts to critical habitat under the Proposed Alternative.

No Action Alternative

Similar to the Proposed Alternative, because the site does not contain suitable habitat for red-cockaded woodpecker, the No Action Alternative is anticipated to have no effect on this species.

Critical Habitat

There is no critical habitat present within the Proposed Alternative site. Therefore, there would be no impacts to critical habitat under the No Action Alternative.

4.6.3 Socioeconomic Environment

4.6.3.1 Socioeconomics and Environmental Justice

4.6.3.1.1 Affected Environment

The Proposed Alternative is located within Lake Charles, Calcasieu Parish, Louisiana. The parish is home to 4.2% of Louisiana's population. Calcasieu Parish has a minority population of more than 31%, less than that of Louisiana and the United States (**Table 4-12**). However, more than half of Lake Charles' population is considered a racial or ethnic minority, considerably more than the

parish, state, and country overall. The Proposed Alternative site is located in a census tract where the proportion of minority residents (nearly 35%) is greater than the parish as a whole; however, it is still less than the city, state, or country as a whole. Though less of the population within the census tract is under the age of 5 than in the city, parish, state, or country as a whole, the median age is slightly lower than in the country overall and nearly equivalent to that in Calcasieu Parish and the state. The census tract containing the Proposed Alternative site has a lower median income than the parish, state, or country overall but a higher income than the city overall. The population living below the poverty level in the census tract is significantly lower than in the city, parish, state, or country overall. In addition, the population within the census tract is more likely to have graduated high school than in Lake Charles, Calcasieu Parish, Louisiana, or the United States.

Table 4-12. Demographic Data for the Proposed Alternative Area

	Census Tract 17 (includes project site)	Lake Charles as a whole	Calcasieu Parish as a whole	Louisiana as a whole	United States as a whole
Total Population	8,877	74,190	195,887	4,625,253	316,515,021
Total Minority Population[1]	34.7%	56.2%	31.3%	40.5%	37.7%
Population Under the Age of 5	5.0%	7.2%	6.8%	6.7%	6.3%
Population Over the Age of 65	12.4%	14.2%	13.4%	13.2%	14.1%
Median Age	36.0	34.1	36.1	36.1	37.6
Median Household Income	$40,071	$36,751	$45,312	$45,047	$53,889
Population below Poverty Level	13.0%	24.1%	17.1%	19.8%	15.5%
Less Than High School Graduate (Population 25 Years and Over)	10.0%	15.3%	14.2%	16.6%	13.3%

[1] Persons not "white alone" within the "Not Hispanic or Latino" subgroup.

Source: U.S. Census Bureau, 2011–2015 American Community Survey 5-Year Estimates

4.6.3.1.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve development on vacant state-owned land. Thus, no displacement or demographic shifts are anticipated as a result of the Proposed Alternative. Construction of the Proposed Alternative is expected to employ temporary workers, leading to short-term beneficial impacts. Educational, outreach and recreational programs offered by the Propose Alternative would be broadly available to the public at no cost.

The population within the immediate vicinity of the Proposed Alternative area is not significantly minority or low-income when compared to the city, parish, state, or country. Thus, there would not be a disproportionate impact on these environmental justice populations.

No Action Alternative

The No Action Alternative would result in no public science center and educational complex in Lake Charles. As a result, no impacts are anticipated to the demographics of the surrounding area.

4.6.3.2 Cultural Resources

4.6.3.2.1 Affected Environment

As previously noted, the Proposed Alternative site is in a developed part of Lake Charles in an area historically used as farmland. The Proposed Alternative site will be reviewed under Section 106 of the NHPA to identify any historic properties located within the Proposed Alternative site and to evaluate whether there would be an affect any historic properties. During initial review of the Division of Archaeology Database of the Louisiana Office of Cultural Development, the presence of cultural resources was not identified.

4.6.3.2.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources. Cultural and historic resources would be considered when preparing site-specific restoration measures and management actions. Where there is a likelihood of disturbance of cultural resources, cultural resource managers would conduct appropriate surveys to assess the methods and location of restoration and management actions. Restoration measures and management actions would be designed to avoid cultural resources to the extent practicable.

At this time there would be no known impacts on cultural resources and no cumulative impacts.

No Action Alternative

Under the No Action Alternative, construction activities would not occur, and improvements would not be added to the site. Therefore, no additional adverse or beneficial impacts to cultural resources would be expected.

4.6.3.3 Infrastructure

4.6.3.3.1 Affected Environment

The Proposed Alternative site is located in the City of Lake Charles, along Power Center Parkway, approximately 0.15 mile southwest of that roadway's intersection with E. Prien Lake Road. The site is nearly 0.25 mile south of I-210 and 0.5 mile east of Highway 14. The site is surrounded to the north and west by commercial establishments, and vacant land and residences to the east, across Power Center Parkway. The proposed site is approximately 1.7 miles southwest of Chennault International Airport. The site itself is vacant land owned by LDWF and is to be situated adjacent to a planned LDWF regional office.

4.6.3.3.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve the construction, which may result in drawing more visitors to the area. This could increase traffic along Power Center Parkway and surrounding

streets. However, due to the developed nature of the surrounding area, such an increase in traffic would not have a significant impact.

Construction activities would increase traffic by construction equipment and worker commuting; however, this would be minimal and short-term. Impacts from construction may be adverse, but localized, short-term, and minor. Care would be taken during construction activities to prevent impeding traffic flow and obstructing access to the Proposed Alternative area and adjacent properties.

No Action Alternative

The No Action Alternative would result in the Proposed Alternative site remaining a vacant lot; therefore, no impacts are anticipated to this environmental resource.

4.6.3.4 Land and Marine Management

4.6.3.4.1 Affected Environment

The City of Lake Charles operates under an adopted zoning ordinance. According to the Lake Charles Zoning Map, the Proposed Alternative site is zoned as Business. Per the Louisiana Department of Natural Resources, Office of Coastal Resources, which oversees the state's CZM Program, the Proposed Alternative site is not located within the coastal zone boundary (LDNR 2017).

4.6.3.4.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would maintain current land use and is consistent with the city's zoning. As a result, no impacts are anticipated to this environmental resource.

No Action Alternative

The No Action Alternative would result in the Proposed Alternative site remaining as vacant land, leading to no potential impacts to this environmental resource.

4.6.3.5 Tourism and Recreational Use

4.6.3.5.1 Affected Environment

The Proposed Alternative site is an LDWF-owned 10-acre vacant parcel, located in a developed area of Lake Charles. The Lake Charles Ward 3 Recreation Center and Lake Charles Multi-Sports Complex are located just over 0.5 mile from the Proposed Alternative site, along Power Center Parkway.

4.6.3.5.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve the construction of a venue for public education and outreach on the state's fisheries management activities and restoration program. The Proposed Alternative would serve to draw visitors to the area, enhancing the recreational opportunities of the area and boosting Lake Charles' tourism industry.

No Action Alternative

The No Action Alternative would result in no changes to the existing vacant parcel, and thereby would not impact this environmental resource.

4.6.3.6 Aesthetics and Visual Resources

4.6.3.6.1 Affected Environment

The Proposed Alternative site is a 10-acre vacant parcel in a developed area of Lake Charles, with commercial properties located directly to the north and west. Recreational facilities are located to the south-southeast of the Proposed Alternative site.

4.6.3.6.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would be in keeping, aesthetically, with the built environment surrounding the proposed site and would not have a significant impact on areas' visual quality.

No Action Alternative

The No Action Alternative would result in the Proposed Alternative site remaining a vacant parcel; thus, no impacts are anticipated to this environmental resource.

4.6.3.7 Public Health and Safety, Including Flood and Shoreline Protection

4.6.3.7.1 Affected Environment

The Proposed Alternative site is vacant land within the 100-year floodplain in a developed area. The site is approximately 4 miles from the shores of Lake Charles.

4.6.3.7.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve construction within the 100-year floodplain. Coastal environments are expected to be at increasing risk due to sea level rise and increases in hurricane intensity and storm surge. In the Gulf Coast region, the sea level rise threat is moderate in comparison to other geologically sensitive areas (USGCRP 2014). Sea level rise could result in more frequent flooding of low-lying areas, which would permanently alter some ecological communities (USGCRP 2014).

In order to minimize potential impacts to the public health and safety, the following mitigation measures would be implemented:

- The use of impervious materials would be avoided as much as feasible.
- Erosion and sedimentation control measures, including minimizing the amount of clearing and exposed soil, would be implemented and maintained.
- Sedimentation controls would be installed prior to the start of construction.
- Disturbed areas would be revegetated with native species as soon as possible after work has been completed.
- Flood access and evacuation plans would be filed on site.

The resiliency of the proposed structures to sustain sea-level rise, hurricanes and storm surges will be determined during final design. In addition, construction activities may temporarily impact the public health and safety of the Proposed Alternative area. Impacts to public health and safety during construction may be adverse, but localized, short-term, and minor. BMPs, such as those listed below, would be employed so as to mitigate any such impacts:

- Take caution to prevent spills of oils and grease if handling fuels on site.
- Employ spill mitigation measures immediately following a spill of any hazardous material.
- Cover the load compartments of trucks hauling dust-generating materials.
- Use heavy water spray or chemical dust suppressant in exposed areas to control airborne dust.

No Action Alternative

The No Action Alternative would result in the site remaining undeveloped; therefore, no impacts to this environmental resource are anticipated.

4.6.3.8 Fisheries and Aquaculture

The Proposed Alternative site does not contain, nor is it adjacent to, an area supporting commercial fishing. The Proposed Alternative would not involve designating an area for commercial fishing. Thus, this environmental resource does not apply.

4.6.3.9 Marine Transportation

The Proposed Alternative site does not contain, nor is it located adjacent to, a navigable waterway for waterborne commerce or ferry services. Therefore, this environmental resource does not apply.

4.6.4 Cumulative Impacts of the Proposed Alternative(s)

4.6.4.1 Potential Cumulative Impacts

As described in detail in Section 4.4.4.1, the CEQ regulations to implement NEPA require the assessment of cumulative impacts in the decision-making process for federal projects, plans, and programs. Proposed Alternative. The following section describes the multistep approach used for evaluating cumulative impacts for the Proposed Alternative.

4.6.4.2 Methodology for Assessing Cumulative Impacts

Cumulative impacts are typically analyzed using four steps, as described in detail in Section 4.4.4.2.

4.6.4.3 Identification of Resources Affected and Boundaries of Analysis

4.6.4.3.1 Resources Affected

In this RP/EA #2, cumulative impacts include each of the resources identified in Physical Environment, Biological Environment, and Socioeconomics and Environmental Justice sections discussed above. Several of the resources that would have no effect, negligible effects, or only short-term minor impacts, and based on their magnitude, with respect to context and intensity, would not contribute to cumulative impacts. Those resources are excluded from this cumulative impact analysis for the Proposed Alternative:

- Protected species
- Socioeconomics and environmental justice
- Cultural resources
- Land and marine management
- Aesthetics and visual resources
- Fisheries and aquaculture
- Marine transportation

The following resources were analyzed for potential environmental consequences that could result from the Proposed Alternative:

- Geology and substrates
- Hydrology and water quality
- Air quality
- Noise
- Habitats
- Wildlife species
- Marine and estuarine fauna, essential fish habitat, and managed fish species
- Infrastructure
- Tourism and recreational use
- Public health and safety, including flood and shoreline protection

4.6.4.3.2 Spatial Boundary of Analysis

As discussed in Section 4.4.4.2, the spatial boundaries used to provide the necessary context for the cumulative impact analysis typically are defined based on the particular resource being assessed. For the purpose of this analysis, the spatial boundary includes those areas where the Proposed Alternative would occur and adjacent areas, focusing on actions occurring at and within the vicinity of the SCEC.

4.6.4.3.3 Temporal Boundary of Analysis

A description of the determination of a temporal boundary for the cumulative impact analysis is included in Section 4.4.4.3.3.

4.6.4.4 Cumulative Action Scenario

A list of past, existing, and future projects was compiled for the projects site using Louisiana and USACE permitting databases and internet searches for more detail, as needed. Based on information obtained from permitting databases, and the location of the proposed SCEC site in a developed area of Lake Charles, LA, past and potential future activities near the Proposed Alternative areas are likely limited to residential and commercial construction, along with road improvements. Currently a new LDWF Region 5 office facility is planned for construction on the

same parcel of land as the SCEC. The office location is planned to be constructed adjacent to the Lake Charles SCEC to maximize efficiencies for staffing and operations. **Table 4-13** below summarizes the identified actions and the potential cumulative impacts for the Lake Charles SCEC Proposed Alternative.

Table 4-13. Past, Present, and Reasonably Foreseeable Future Actions Included in Cumulative Impact Analysis

Category/Projects	Project Description	Key Resource Areas with Potential Cumulative Impacts
LDWF Region 5 office facility	Construction of office building and parking lots.	Short-term, adverse impacts to: ▪ Geology and substrates ▪ Hydrology and water quality ▪ Air quality ▪ Noise ▪ Habitats ▪ Wildlife species ▪ Infrastructure Long-term, adverse impacts to: ▪ Geology and substrates ▪ Hydrology and water quality ▪ Air quality ▪ Noise ▪ Habitats ▪ Wildlife species ▪ Infrastructure ▪ Public health and safety, including flood and shoreline protection
Residential/commercial construction and road improvements	Vacant land to the south and east of the Proposed Alternative site may be developed in the future. Road improvements may occur in the vicinity of the Proposed Alternative.	Short-term, adverse impacts to: ▪ Geology and substrates ▪ Hydrology and water quality ▪ Air quality ▪ Noise ▪ Habitats ▪ Wildlife species ▪ Infrastructure Long-term, adverse impacts to: ▪ Geology and substrates ▪ Hydrology and water quality ▪ Air quality ▪ Noise ▪ Habitats ▪ Wildlife species ▪ Infrastructure ▪ Public health and safety, including flood and shoreline protection Long-term, positive impacts to: ▪ Infrastructure

Based on the assessment summarized in **Table 4-13** above, the resource areas with potential for cumulative adverse impacts are geology and substrates; hydrology and water quality; air quality; noise; habitats; wildlife species; infrastructure; and public health and safety, including flood and shoreline protection.

The identified actions of the LDWF office and future further development are expected to have no or negligible impacts to marine and estuarine fauna, essential fish habitat, and managed fish species and tourism and recreational use; therefore, no cumulative impacts to these resources are expected when considered with the SCEC Proposed Alternative.

The Lake Charles SCEC Proposed Alternative would create long-term benefits to habitats and wildlife species due to the proposed creation of aquatic and terrestrial habitats included in the Proposed Alternative. These resources would likely have short- and long-term adverse impacts from the identified actions, but similar to the Proposed Alternative site, the surrounding land is mostly cleared of vegetation and is currently comprised of poor quality habitat. The cumulative effect from the Proposed Alternative and the identified actions are expected to result in cumulative beneficial impacts to habitats and wildlife species due to the higher quality habitats created as part of the Proposed Alternative.

The Lake Charles SCEC Proposed Alternative and the identified actions are expected to have similar short- and long-term adverse impacts on geology and substrates; hydrology and water quality; air quality; noise; infrastructure; and public health and safety, including flood and shoreline protection. Therefore, cumulative impacts are expected to be adverse but may be mitigated for with the use of BMPs during construction and in project design.

Cumulative impacts to geology and substrates may include disturbances to terrestrial soils during construction of buildings and roads but would likely be limited to each individual project site, therefore the impacts are not expected to substantially contribute to adverse cumulative impacts.

Adverse impacts to water quality and hydrology under the Proposed Alternative and identified actions would likely be from erosion and sedimentation during construction and the increase in impervious surfaces. BMPs may be employed during construction to minimize short-term adverse impacts from erosion and sedimentation and stormwater retention ponds may be incorporated into the design of future land development to mitigate potential impacts to water quality and hydrology. Because large-scale development typically can moderate long-term impacts to water quality and hydrology and the Proposed Alternative includes relatively small impervious area and the creation of a freshwater pond, the Proposed Alternative is not expected to contribute substantially to adverse cumulative impacts in conjunction with past, present, and future actions.

The Proposed Alternative and identified actions would have short-term, minor adverse impacts on air quality as a result of construction activities. During construction, air quality standards are not expected to be exceeded and GHG emissions would be low. Cumulative adverse impacts to air quality may occur if construction at nearby sites occur at the same time as construction on the Proposed Alternative, though these impacts are expected to be minor to moderate, short-term impacts. The Proposed Alternative is not expected to be a major source polluter and would not contribute substantially to adverse cumulative impacts.

The Proposed Alternative and identified actions would have short- and long-term minor adverse impacts on noise due to construction of new buildings and roads. During construction, all projects would likely implement BMPs to reduce noise impacts (e.g., when construction occurs and what type of equipment is utilized). Construction impacts related to noise for each project would be short-term in nature and would conclude once construction is over. The duration and intensity of these short-term impacts would depend on the project size and range from minor (for small construction projects) to moderate (for large development projects). Long-term, minor, adverse impacts may occur from noise related to building operations or an increase in vehicle traffic to the sites. When the Lake Charles SCEC Proposed Alternative is analyzed in combination with other past, present, and reasonably foreseeable future actions, short- and long-term, adverse cumulative impacts on noise would be minor. However, they would not contribute substantially to adverse cumulative impacts.

The Lake Charles SCEC Proposed Alternative and future adjacent construction would have short-term, minor, adverse impacts on infrastructure in Calcasieu Parish as a result of construction activities. Construction of the LDWF office and potential future commercial/residential development would generate additional demand on utilities depending on the size of the development. With further development in the area, there may be long-term adverse impacts to traffic and transportation. However, all new large developments must coordinate with the Louisiana Department of Transportation regarding potential effects on traffic, which is expected to minimize to the extent possible the impacts of these projects. Due to the size of the Lake Charles SCEC building and expected number of visitors, implementation of Proposed Alternative is not expected to contribute substantially to short- or long-term, adverse cumulative impacts on infrastructure when analyzed in combination with other past, present, and reasonably foreseeable future actions.

Adverse impacts to public health and safety, including flood and shoreline protection under the Proposed Alternative and identified actions are expected to be similar as a result of construction in the 100-year floodplain. The Proposed Alternative, as well as future construction projects, are expected to comply with requirements related to construction within a floodplain. Mitigation measures can be incorporated such as providing flood access and evacuation plans. The Proposed Alternative is not expected to contribute substantially to adverse cumulative impacts in conjunction with past, present, and future actions.

Under the No Action Alternative, construction of the SCEC would not take place and there would be no impacts to each of the resources. Therefore, the No Action Alternative carried out in conjunction with the identified actions would not contribute to adverse cumulative impacts.

4.7 Island Road Piers

4.7.1 Physical Environment

4.7.1.1 Geology and Substrates

4.7.1.1.1 Affected Environment

The Proposed Alternative site is located along Island Road, which was originally constructed through marshland in 1953 but currently has open water on either side of the road. The area includes actively managed marsh to the north and brackish areas to the south of the road.

Geology at the Proposed Alternative site is characterized by deltaic deposits underlying the delta plain of the Lafourche delta lobe. They are composed of cyclically interbedded interdistributary peat and clay, natural levee silt and clay, distributary sand, and delta-front and prodelta mud and clay (LGS 2011). Surface soil in the area has been classified by the USDA NRCS as backswamps and marshes comprised of dredged aquents (USDA NRCS 2017). The substrates present along the shoreline have slopes of 1 to 5%, are poorly drained, and occasionally flood. The elevation of the roadway along the Proposed Alternative site is generally a few feet above MSL. Water levels in the adjacent marsh are expected to be less than 5 feet deep.

4.7.1.1.2 Environmental Consequences

Proposed Alternative

Aspects of the Proposed Alternative that have environmental consequences for the geology and substrates include construction of fishing piers and associated parking areas at five locations along Island Road.

In-water work is expected due to the construction of the fishing piers and parking areas. The total overwater area of the fishing piers is estimated to be less than 5,000 square feet. The total overwater work for the parking areas is dependent on the road embankment width at each location but is expected to be less than 6,000 square feet. Pier construction would include placement of new piles using the least invasive techniques, given substrate and construction cost considerations (e.g., jetting, pushing, or driving the piles). Sheet piling installation is expected for construction of the parking areas and would likely be installed via pushing. In-water dredging or digging associated with installation of the pilings and sheeting is not anticipated though substrate displacement and compaction from piling and sheeting installation is expected. The number, size, and depth of piles and sheeting for each structure would be subject to final design though it is expected that less than 1,000 square feet total of substrate would be displaced in the marine environment. As such, minor long-term adverse effects on a small area of marine substrates at each pile or sheeting location would occur as a result of this Proposed Alternative component. In-water work associated with construction of the parking areas is expected to include placing aggregate to widen the roadway at those locations.

Digging may occur in the terrestrial environment to auger holes and/or excavate for foundations for the parking areas and fishing piers at land tie-ins, as needed. The depth of disturbances depends on final engineering design for the piers. Additional ground disturbances and surficial digging—expected to be less than 1 foot—would be associated with construction of the parking areas and likely consist of removing and replacing the riprap currently on the road embankment slopes.

Construction equipment and materials for staging have not been identified but would likely be located on site at the proposed parking areas. Although construction of the piers and parking areas would impact soils, these disturbances would be located along a man-made embankment constructed of imported soil.

Specific mitigation measures would be implemented during construction to minimize erosion and overall soil impacts. To the extent possible, the Proposed Alternative would use existing development footprints and disturbed areas (e.g., parking areas). These would include following

established BMPs for construction activities such as the implementation of an erosion control and stormwater management plan, the installation of sediment traps prior to commencement of construction activities, and ongoing construction monitoring to ensure compliance. Any in-water work, such as construction of pilings, sheeting, or grading, would be performed behind silt curtains to isolate construction impacts.

Short-term as well as long-term disturbances to terrestrial soils and substrates would occur on site as a result of construction and site preparation activities. However, the impacts would be localized to several small areas across the Proposed Alternative site. Thus, with the impacts localized to the site, this Proposed Alternative component would have minor, long-term, adverse impacts to geology and substrates.

No Action Alternative

Under the No Action Alternative, the project would not be implemented; construction and site preparation activities, such as pile and sheeting installation and grading, would not occur; and no additional adverse or beneficial impacts to geology and substrates would be expected. The conditions at the Proposed Alternative site would remain the same as described in the Affected Environment section above.

4.7.1.2 Hydrology and Water Quality

4.7.1.2.1 Affected environment

The Proposed Alternative is located in the Terrebonne Basin, which is an abandoned delta complex. The Terrebonne Basin covers approximately 1,712,500 acres of southern Louisiana, including about 728,700 acres of wetlands (CWPPRA 2017). The Terrebonne Basin is made up of four sub-basins: Verret, Penchant, Fields, and Timbalier. Verret and Penchant sub-basins receive fresh water from the Atchafalaya River and Bay. The Fields Sub-basin receives fresh water primarily from rainfall. The Timbalier sub-basin receives fresh water from rainfall and from Atchafalaya River inflow to the Gulf Intracoastal Waterway West via the Houma Navigation Canal and Grand Bayou Canal (CWPPRA 2017). Previous water quality inventory reports by LDEQ have listed suspected sources of water quality problems in these sub-basins as metals, pesticides, nutrients, fecal coliform, non-native aquatic plants, organic enrichment and low concentration of dissolved oxygen, dissolved and suspended solids, pH levels, sedimentation and siltation, and turbidity (LA CWCS 2005). Based on the Final 2016 Louisiana Water Quality Integrated Report (LDEQ 2016), Timbalier Bay (subsegment LA120803_00), which includes Island Road and the Proposed Alternative area, is listed as fully supporting the designated use for primary contact recreation, secondary contact recreation, fish and wildlife propagation, and oyster propagation. The Proposed Alternative is located within the FEMA-designated Flood Zone A15, which is subject to inundation by the 1%-annual-chance flood event (FEMA Map Number 2252060025 C 1985).

LDWF uses water control structures to manage units within the PACWMA to increase productivity of the marshes in support of the growth and diversification of submerged and emergent vegetation (LDWF 2017c). The Proposed Alternative is located within the Ensminger/Songe marsh management unit. This management unit has multiple water control structures that restrict the flow of higher salinity water into the area. One of the water control structures is located on Island Road between proposed parking lots and piers #2 and #3 (see

Figure 3-5). Therefore, the water surrounding the Proposed Alternative area is hydrologically controlled to maintain this area as more of a freshwater marsh system.

4.7.1.2.2 Environmental Consequences

Proposed Alternative

Similar to the Elmer's Island Access Proposed Alternative, work in wetlands and other waters of the United States would require state and federal permits in addition to construction BMPs as discussed in previous sections. The construction BMPs, in addition to other avoidance and mitigation measures as required by state and federal regulatory agencies, would minimize water quality and hydrology impacts

The primary impacts to water quality and hydrology under the Proposed Alternative would be through the temporary effects of construction, including potential erosion and sedimentation. Additionally, minor changes to local surface water flows may occur due to the placement of the sheet pile walls and timber piling. Long-term minor adverse effects will also occur due to the small increase in impervious surface. Impacts to surface water hydrology would be minimized due to the placement of the parking areas and fishing piers next to the existing road berm. Therefore, the Proposed Alternative would have minor short- and long-term adverse effects to water quality and hydrology.

No Action Alternative

Under the No Action Alternative, the construction of parking areas and fishing piers features would not occur along with the associated sheet pile walls, timber piling installation, and riprap. Therefore, under the No Action Alternative, there would be fewer short-term impacts to local water quality through potential erosion and sedimentation. Local surface water hydrology would remain unchanged.

4.7.1.3 Air Quality

4.7.1.3.1 Affected Environment

Regulatory requirements of air quality are described in Section 4.4.1.3.1. Terrebonne Parish is listed as in attainment for all NAAQS pollution metrics (i.e., it complies with all air quality standards). Terrebonne Parish has overall good air quality (USEPA 2017). For the past 5 years (2012 to 2016), Terrebonne Parish maintained an average AQI of 30 (USEPA 2017), which is under the poor air quality threshold of 50.

4.7.1.3.2 Environmental Consequences

Proposed Alternative

Implementation of this Proposed Alternative component could include use of construction equipment such as bulldozers, trucks, backhoes, tractor trailers, cranes, small barges with crane, small excavators, fork lifts, roller, generators, small trucks, and hand tools. During construction activities, adverse impacts to air quality would occur from exhaust produced by gasoline- and diesel-powered construction vehicles and equipment. Most impacts to air quality are expected to be localized and occur only during active construction activities.

Engine exhaust from bulldozers, excavators, trucks, backhoes and other vehicles would contribute to an increase in criteria pollutants and GHGs. However, due to the small-scale and

short duration of the construction portion of the Proposed Alternative, predicted emissions would be short-term and minor and would not require a detailed assessment. Long-term, ongoing emissions are expected to increase slightly due to the increase in recreational use of the site; however, based on the current and anticipated number of visitors per year, the quantitative increase is expected to be minimal. Due to the minor, short- and long-term emissions, a quantitative analysis of emissions is not warranted.

Emission reduction measures to mitigate for short-term air quality impacts could include the use of ultra-low sulfur diesel fuel in off-road construction equipment, limiting unnecessary idling time of diesel-powered engines, controlling dust related to construction site activities, and covering trucks hauling loose materials.

Short-term adverse impacts to air quality would be minor, local, and temporary, only occurring during active construction activities.

No Action Alternative

Under the No Action Alternative, the project would not be implemented, construction activities would not occur, and no additional adverse or beneficial impacts to air quality would be expected. The conditions at the Proposed Alternative site would remain the same as described in the Affected Environment section above.

4.7.1.4 Noise

4.7.1.4.1 Affected Environment

Under most conditions, the ambient (background) noise near Island Road is from waves, wind, and wildlife, especially birds. Vehicular traffic, watercraft traffic, and recreational activities influence noise levels at the Proposed Alternative site. The area does not include any habitable structures and generally consists of open water. The level of noise in the Proposed Alternative areas vary, depending on the season, time of day, number and types of noise sources, and distance from the noise source.

The Proposed Alternative site includes a two-lane paved roadway, Island Road, which connects Isle de Jean Charles to Highway 665. Island Road is located at the southern boundary of the PACWMA and is a popular roadside fishing destination.

4.7.1.4.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative components would generate construction noise associated with equipment during construction of the fishing piers and parking areas, including placement of new piles, sheeting, and earthwork. Construction activities for the Proposed Alternative would include mobilizing equipment, preparing the sites, pile and sheeting installation, placing foundations, grading, and fill placement. Implementation of the Proposed Alternative would include transportation of construction materials to the Proposed Alternative area, which may include trucks or other types of transportation that would contribute to short-term noise disturbances.

Vehicular traffic and those using the area for recreation may be affected by noise during construction of the proposed improvements. Wildlife in and around the Proposed Alternative

area may be sensitive to changes in noise sources or levels due to project construction. Construction equipment (e.g., generators, pile installation equipment) noise is known to disturb fish, marine mammals, and shorebirds. Conservation measures for marine mammals from noise are discussed in the Biological Environment section. Construction noise can also be a nuisance to residents living or recreating on the shorelines adjacent to project construction activities. Construction activities at the site would result in short-term moderate impacts to noise at the site and in the immediate vicinity.

Mitigation measures that serve to limit noise impacts to humans from construction activities include limiting activity at project sites to daytime hours, limiting truck traffic ingress/egress to the site to daytime hours, promoting awareness that producing prominent discrete tones and periodic noises (e.g., excessive dump truck gate banging) should be avoided as much as possible, and requiring that work crews seek pre-approval for any weekend activities or activities outside of daytime hours. The timing of in-water noise-producing activities would be planned to minimize disturbances to marine life. Because construction noise is temporary, any adverse impacts to the human and marine environment during construction activities would be short-term adverse and minor. Standard practices, such as muffle units for generators, would be implemented during construction operations to mitigate noise impacts.

Once the improvements are constructed, visitors may cause some noise associated with parking and recreating. These noises could be slightly more disturbing to any resting or roosting birds that may utilize the site compared to baseline conditions although the site's proximity to waterway and roadway traffic may render these increases negligible. Overall, the Proposed Alternative would result in short-term minor adverse effects to noise.

No Action Alternative

Under the No Action Alternative, the Proposed Alternative would not be implemented, construction activities would not occur, and recreation improvements would not be added to the site. Therefore, no additional adverse or beneficial impacts to noise would be expected. The conditions at the Proposed Alternative site would remain the same as described in the Affected Environment section above.

4.7.2 Biological Environment

4.7.2.1 Habitats

4.7.2.1.1 Affected Environment

PACWMA, in which the Proposed Alternative site is located, is owned by LDWF and consists of approximately 35,000 acres in Terrebonne and Lafourche Parishes. The PACWMA is comprised primarily of brackish marsh (50%) and intermediate marsh (35%), with bottomland hardwoods/forested canal banks (10%) and levees, fields, and maintained areas (5%) also present. Freshwater systems are largely restricted to the northern reaches of PACWMA, whereas more saline marsh systems are located to the south where the Proposed Alternative is located.

Management practices within PACWMA are primarily directed toward water control using variable crested weirs and levees that effectively increase productivity of the marsh areas for furbearers, waterfowl, alligators (*Alligator mississippiensis*), and fish. PACWMA is an important wintering ground for migratory birds, and management activities are adaptively managed to

provide those services. The goals of all the management units is to generally lower salinity levels and control water levels to encourage the growth and diversification of submerged and emergent vegetation while minimizing restrictions on fisheries movement. By correctly managing these units, habitats are created that are attractive to a wide variety of fish and wildlife species.

Island Road is a small two-lane road and is the southernmost boundary of the Ensminger/Songe marsh management unit on the Terrebonne Parish portion of PACWMA. Island Road was originally built through marshland in 1953, connecting Highway 665 to Isle de Jean Charles. This road acts as a boundary between actively managed marsh to the north (target salinities are 8 parts per thousand [ppt] or less) and unmanaged brackish areas to the south. The road also contains one of the water control structures used to manage the unit. This water control structure funnels and concentrates water exchange, thus, serving as a prime spot for both prey and predators, including humans. As a result, it is a popular fishing location, which creates unsafe conditions on the narrow road with minimal shoulder.

Island Road is a popular roadside fishing destination, particularly around the water control structure. The entire PACWMA is highly utilized by the public for recreational fishing, with approximately 30,000 recreational users annually (LDWF 2017e). The marsh system upstream of Island Road is carefully managed by LDWF, with a water control structure within the elevated berm of Island Road that prevents saltwater intrusion into the upstream marsh system. Lower salinities improve marshland for waterfowl overwintering habitat and are beneficial to recreational fishing in the area.

Open water and saltwater marsh are the prevalent ecological features along Island Road. According to NWI mapping, the open waters on both sides of Island Road are best classified as subtidal, mesohaline (5 to 18 ppt) estuarine waters. The saltwater marsh habitats adjacent to Island Road are primarily classified as estuarine intertidal emergent wetland systems with mesohaline water chemistry. These emergent wetlands are either regularly or irregularly flooded, depending on elevation (USFWS NWI 2017). This community is often dominated by smooth cordgrass and provides highly productive nursery areas for a number of shrimp, crabs, and fish. The higher elevation, irregularly flooded emergent wetland communities support marsh vegetation tolerant of brackish or saline water, including smooth cordgrass, saltmeadow cordgrass, black needlerush, coastal saltgrass, and salt wort (LNHP 2009).

Constructed marsh terraces located just to the north of Island Road were built for levee mitigation (i.e., marsh creation), with the primary purpose of providing wave attenuation to dissipate wave energy and protect nearby shorelines and natural marsh. Secondary habitat benefits include decreased turbidity, increased water clarity, and increased suitable conditions for the propagation of submerged aquatic vegetation, primarily widgeon grass (*Ruppia maritima*).

While neither a benthic survey nor a submerged aquatic vegetation survey have been conducted for the Proposed Alternative site, LDWF biologists indicate that no seagrasses or other marine vegetation are present along Island Road. Likewise, neither corals nor mangroves are located in the shallow estuarine waters within or directly adjacent to Island Road.

Upland habitats are nearly non-existent within the Proposed Alternative and are restricted to Island Road itself. While the pavement, gravel shoulder, and rock revetment slopes do not

support a significant plant community, sparsely distributed and stunted individuals of weedy, herbaceous upland species are present. The upland habitats within the road corridor do not provide suitable wildlife habitats, except for the occasional bird that rests or perches on the rock revetment.

The marsh adjacent to Island Road has over the years eroded and transitioned into open water, leaving Island Road vulnerable to erosion and flooding. These disturbances have decreased the plant and animal biodiversity in the marshes along the road. Restoration and repair of Island Road was completed in 2011, including raising the elevation of the road to protect it from washouts. Island Road is elevated approximately 1 foot above the mean high water elevation of 1 foot and is constructed with rock revetment on either side to reduce wave-generated erosion.

4.7.2.1.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would fund the construction of five small parking lots, or vehicle pullovers, with adjoining fishing piers along the north side of Island Road. The Proposed Alternative features would primarily provide for enhanced recreational fishing and crabbing opportunities, yet it would also offer infrastructure for non-consumptive activities like birding, photography, and nature watching.

The proposed parking lots and pullovers would be constructed using sheet pile walls and limestone and/or soil fill. Each would be approximately 124 feet long by 25 feet wide and would provide approximately 12 parking spaces. The adjoining fishing piers would be 56 feet long by 8 feet wide, extending from each corner of the parking areas. The parking/vehicle pullover areas would extend approximately 11.5 feet from the existing rock revetment into aquatic habitats, and the fishing piers would extend another 56 feet into aquatic habitats. Proposed Alternative activities would be limited to the gravel roadway shoulder, rock revetment side slopes, and open water and wetland habitats along Island Road.

In-water work is unavoidable due to the installation of sheet pile walls and the driving of timber pilings for the parking areas and fishing piers. Each parking/vehicle pullover area and attached fishing piers would require driving of approximately sixty-five, 30-foot-long, 12-inch diameter timber pilings (or equivalent) into open water sediment. The total number of pilings to be installed for this Proposed Alternative is expected to be less than 350. The method of installation would be determined during construction but would likely be jetting, pushing, or driving the piles.

For the three central parking lots and associated piers (i.e., proposed parking lot and piers #2, #3, and #4), all in-water work would be restricted to estuarine open water habitats. While in-water work would be minimized by utilizing a portion of the existing rock revetment, the parking/vehicle pullover areas would result in approximately 1,425 square feet of permanent impacts to open water and benthic habitats. The overwater area of each pier would be approximately 448 square feet, with the permanent impact to benthic substrates being much smaller and limited to the footprint of the individual pilings.

For the most northeastern parking lot and associated piers (i.e., proposed parking lot and piers #1), in-water work would be largely located in estuarine open waters, with direct impacts similar

to those described for the central locations above. However, the piers at this location have the potential to extend into intertidal marsh habitats nearby. Any potential direct impacts to marsh habitats would largely be avoided through precise siting and future engineering and design.

The most southwestern parking lot and associated piers (i.e., proposed parking lot and piers #5) are located directly to the south of constructed marsh terraces. While direct impacts to the marsh terraces are not anticipated, there is the potential for the fishing piers to extend into submerged aquatic vegetation beds that grow around the marsh terraces. These impacts may be avoided or minimized by surveying the proposed pier location for submerged aquatic vegetation beds and locating piers outside of them to the extent practicable. In-water work would be largely located in estuarine open waters, with direct impacts similar to those described for the central locations above.

Dredging is not anticipated; however, installation of the timber piling and vinyl sheet pile wall and aggregate-filled parking areas would disturb bottom sediments.

The expected increase in public use of facilities along Island Road due to the Proposed Alternative would likely lead to an increase in habitat disturbances, particularly to habitats directly adjacent to the new parking lots and fishing piers. These disturbances would likely include increased noise, vibrations, trash/litter, and discarded fishing equipment. These potential effects would likely be minor and localized and would be largely offset by LDWF management actions and Proposed Alternative features, including trash collection and removal services, development and distribution of outreach materials, and long-term monitoring activities.

Any Proposed Alternative impacts to estuarine open waters and wetlands would require the appropriate USACE permits and approvals, including any BMPs designed to minimize impacts outlined in the conditions of the permits. Additional BMPs detailed in Chapter 6, Appendix A of the PDARP/PEIS for wetland and aquatic resource protection (Section A.1.8.6) would be implemented to avoid and minimize any adverse impacts from the Proposed Alternative.

Overall, impacts to habitats are expected to be adverse but short-term and minor.

No Action Alternative

Under the No Action Alternative, the Proposed Alternative would not be implemented, construction activities would not occur, and recreation and public safety improvements would not be added to the site. Therefore, no additional adverse or beneficial impacts to habitats would be expected. The conditions at the Proposed Alternative site would remain largely the same as described in the Affected Environment section above.

While construction of Proposed Alternative features in upland, wetland, and open water habitats would not occur, nor would the associated amenities (i.e., parking lots and fishing piers) and increase in public use. Under the No Action Alternative, there would be no expanded trash collection and removal, development and distribution of public education materials, or long-term monitoring services. Since the area already experiences high levels of human use and fishing pressure, the absence of these services may adversely affect habitats along Island Road compared to the Proposed Alternative. As such, the No Action Alternative would likely result in fewer short-

term impacts to local habitats but would result in more long-term adverse impacts to these resources compared to the Proposed Alternative.

4.7.2.2 Wildlife Species (including birds)

4.7.2.2.1 Affected Environment

The Proposed Alternative is located in PACWMA, which is managed to increase productivity of the marsh areas for furbearers, waterfowl, alligators, and fish. Numerous wetland-dependent wildlife species are present within this wildlife management area and include northern pintail (*Anas acuta*), greater scaup (*Aythya marila*), lesser scaup (*Aythya affinis*), mottled duck (*Anas fulvigula*), mallard (*Anas platyrhynchos*), American wigeon (*Anas americana*), canvasback (*Aythya valisineria*), and ring-necked duck (*Aythya collaris*) in addition to wading birds (Ducks Unlimited 2017). Within the Proposed Alternative area, potential wildlife species include birds and estuarine-dependent species. Estuarine-dependent species are discussed in Section 4.4.2.3.

Migratory birds that could potentially use the Proposed Alternative site were identified using the USFWS IPaC database report. Based on this database, the following birds have potential to occupy the Proposed Alternative areas or be affected by activities in these locations: American golden-plover, American oystercatcher, Audubon's shearwater (*Puffinus lherminieri*), black skimmer, buff-breasted sandpiper, clapper rail, dunlin, gull-billed tern, Henslow's sparrow, Kentucky warbler, king rail, least tern, lesser yellowlegs, long-billed curlew, magnificent frigatebird, marbled godwit, Nelson's sparrow, prothonotary warbler, red knot, reddish egret (*Egretta rufescens*), rusty blackbird (*Euphagus carolinus*), seaside sparrow, semipalmated sandpiper, short-billed dowitcher, snowy plover, Sprague's pipit, swallow-tailed kite, whimbrel, Wilson's plover, wood thrush, and yellow rail.

4.7.2.2.2 Environmental Consequences

Proposed Alternative

Most of the Proposed Alternative features would have a small footprint of both in-water work and upland work. Therefore, the potential impacts to wildlife are minimal. Additionally, most of the upland features would occur on the existing road berm and rip rap. Any bird species present within the Proposed Alternative area would likely leave during construction. Therefore, the potential adverse impacts to wildlife are primarily through short-term minor impacts associated with construction activities. As previously discussed, the Proposed Alternative would include BMPs necessary for control of erosion and sedimentation due to construction-related activities. No vegetation clearing is expected to occur. However, if vegetation clearing is necessary, vegetation would be cleared outside the migratory bird nesting season (approximately mid-February through mid-September) or have a qualified biologist inspect for active nests. If no active nests are found, vegetation may be removed. If active nests are found, vegetation may be removed after the young in the nests have successfully fledged.

No Action Alternative

Under the No Action Alternative, there would be no short- or long-term adverse impacts to wildlife.

4.7.2.3 Marine & Estuarine Fauna, Essential Fish Habitat, & Managed Fish Species

4.7.2.3.1 Affected Environment

Open water and estuarine marsh are the prevalent ecological features along Island Road where the Proposed Alternative is located. The marsh community is often totally dominated by smooth cordgrass and provides highly productive nursery areas for a number of shrimp, crabs, and fish. The higher elevation, irregularly flooded emergent wetland communities support marsh vegetation tolerant of brackish or saline water, including smooth cordgrass, saltmeadow cordgrass, black needlerush, coastal saltgrass, and salt wort (LNHP 2009).

The water bodies and wetlands in the Proposed Alternative provide essential nursery and foraging habitats supportive of a variety of aquatic fauna, including economically important estuarine and saltwater species. Shrimp generate the largest share of this income followed by oysters, menhaden, blue crab, and striped mullet (LCW Task Force 1998). In addition, there are important recreational fisheries for the species listed above and estuarine-marine spotted seatrout, sand seatrout, sea catfish, black drum, pompano, and southern flounder. LDWF collects information on the fish resources within PACWMA through various sampling gears and creel surveys (LDWF 2017d; LDWF 2017e). Inland saltwater fish, such as red drum, seatrout, and flounder, make up the majority of the recreational catch, with crabs and shrimp also harvested. Freshwater fish are largely restricted to the northern reaches of PACWMA, whereas more saline marsh systems are located to the south where the Island Road Proposed Alternative is located.

NMFS has delineated EFH for federally managed species in coastal Louisiana (NMFS 2017a). At Island Road at the southern limit of PACWMA, EFH has been designated in the estuarine open water and wetland habitats for the following resources:

- Coastal Migratory Pelagic Resources (see **Table 4-14** for species)
- Red Drum
- Reef Fish (see **Table 4-14** for species)
- Shrimp (see **Table 4-14** for species)

EFH for each managed fishery listed above within the PACWMA project area is the same for the Elmer's Island Access Proposed Alternative and is described in detail in Section 4.4.2.3.

The 2005 Generic EFH Fishery Management Plan Amendment (GMFMC 2005) should be consulted for additional detailed information on habitats identified as EFH and HAPC. The seasonal and year-round locations of designated EFH for the managed fisheries are available on the NMFS website (http://sero.nmfs.noaa.gov/habitat_conservation/index.html), and both inshore and offshore species abundance maps are available on the NMFS EFH website (www.habitat.noaa.gov/protection/efh/efhmapper/).

Table 4-14. Species with Gulf of Mexico Council EFH Designations in the Island Road Proposed Alternative Area (NMFS 2017a)

GULF COUNCIL	
COASTAL MIGRATORY PELAGICS	
king mackerel	*Scomberomorus cavalla*
Spanish mackerel	*Scomberomorus maculates*
Cobia	*Rachycentron canadum*
RED DRUM	
red drum	*Sciaenops ocellatus*
REEF FISH	
queen snapper	*Etelis oculatus*
mutton snapper	*Lutjanus analis*
blackfin snapper	*Lutjanus buccanelia*
red snapper	*Lutjanus campechanus*
cubera snapper	*Lutjanus cyanopterus*
gray (mangrove) snapper	*Lutjanus griseus*
lane snapper	*Lutjanus synagris*
silk snapper	*Lutjanus vivanus*
yellowtail snapper	*Ocyurus chrysurus*
Wenchman	*Pristipomoides aquilonaris*
vermilion snapper	*Rhomboplites aurorubens*
speckled hind	*Epinephelus drummondhayi*
yellowedge grouper	*Epinephelus flavolimbatus*
goliath grouper	*Epinephelus itajara*
red grouper	*Epinephelus morio*
warsaw grouper	*Epinephelus nigritus*
snowy grouper	*Epinephelus niveatus*
Nassau grouper	*Epinephelus striatus*
black grouper	*Mycteroperca bonaci*
yellowmouth grouper	*Mycteroperca interstitialis*
Gag	*Mycteroperca microlepis*
yellowfin grouper	*Mycteroperca venenosa*
Scamp	*Mycteroperca phenax*
goldface tilefish	*Caulolatilus crysops*
blueline tilefish	*Caulolatilus microps*
Tilefish	*Lopholatilus chamaeleonticeps*
greater amberjack	*Seriola dumerili*
lesser amberjack	*Seriola fasciata*
almaco jack	*Seriola rivoliana*
banded rudderfish	*Seriola zonata*
gray triggerfish	*Balistes capriscus*
Hogfish	*Lachnolaimus maximus*
SHRIMP	
brown shrimp	*Farfantepenaeus aztecus*
white shrimp	*Litopenaeus setiferus*
pink shrimp	*Farfantepenaeus duorarum*
royal red shrimp	*Hymenopenaeus robustus*

4.7.2.3.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would greatly enhance the utilization of Island Road as a recreational fishing area that offers safe access to renewable fish and wildlife resources and their supporting

habitats. The Proposed Alternative would primarily provide for enhanced recreational fishing and crabbing opportunities, yet it would also offer infrastructure for non-consumptive activities like birding, photography, and nature watching. In-water work in EFH-designated estuarine waters is unavoidable due to the installation of sheet pile walls and the driving of timber pilings for the parking areas and fishing piers. The primary impacts to the environment would be through the permanent effects of new parking and fishing structures and temporary effects of construction, including potential erosion and sedimentation. Details of potential Proposed Alternative effects on aquatic habitats are provided in Section 4.5.2.3.1.

For the parking areas, in-water work would be minimized by utilizing a portion of the existing rock revetment, the parking/vehicle pullover areas would result in approximately 1,425 square feet of permanent impacts to EFH and aquatic habitats. The creation of parking areas would permanently impact the shoreline area where the structure is placed and is likely to increase impacts to nearby shoreline and open water areas due to increased human activities (e.g., foot traffic, litter). While these impacts may affect aquatic fauna, fisheries, and EFH in localized areas, the footprints of the parking areas are small, and temporary disturbances are expected to be limited in scope and duration. Temporarily disturbed aquatic fauna would likely find refuge in plentiful suitable habitats nearby. Therefore, the parking areas are not expected to have significant adverse effects on aquatic fauna, local fisheries, or designated EFH

The overwater area of each pier would be approximately 448 square feet, with the permanent impact to EFH and benthic substrates being much smaller and limited to the footprint of the individual pilings. While installation of fishing piers and parking areas would cause minor adverse impacts to EFH (less than 0.5 acre), there are over 1,000 acres of EFH directly adjacent to the Proposed Alternative Site. Therefore, the Proposed Alternative is not expected to have significant adverse effects on aquatic fauna, local fisheries, or designated EFH.

One of the primary Proposed Alternative goals is to promote recreational fishing; therefore, an increase in fishing pressure would result in an increase in the use and potential loss of hook and line gear and potentially small, personal crab pots. However, parking capacity, crowding, and the absence of boat docks or marinas would limit the total number of visitors, thereby putting an upper limit on the magnitude of fishing pressure. The use of trawl gear or gillnets within the Proposed Alternative area is not expected. While recreational fishing would increase from current levels, it is not expected to have significant adverse effects on local fisheries or designated EFH.

Potential impacts to estuarine and aquatic fauna, managed fisheries, and EFH would be considered and avoided or minimized to the extent practicable during design and construction. When impacts cannot be avoided, best practices would minimize the magnitude and duration of impacts to aquatic fauna, EFH, and managed species. Evaluation of impacts to EFH will continue during the E&D phase to determine the extent of permanent impacts and any necessary offsets these impacts. Signage, fencing, or landscaping can be used to focus foot and boat traffic to certain areas, thereby limiting shoreline and nearshore disturbances. Best practices during construction would likely include time-of-year restrictions for any in-water work to avoid and minimize impacts to protected and managed species when they are expected to be present or when most vulnerable. They would also likely include standard erosion and sediment control measures (e.g.,

silt fence) to protect water quality and aquatic habitats from impacts resulting from construction stormwater and sediment runoff. Unavoidable impacts to jurisdictional wetlands and waters would be mitigated, if necessary. EFH consultation guidance documents (NMFS 2017b) on the NMFS webpage may provide additional best practices to avoid or limit Proposed Alternative impacts to EFH: www.habitat.noaa.gov/protection/efh/consultations.html

No Action Alternative

Under the No Action Alternative, the Island Road Piers Proposed Alternative would not be implemented, construction activities would not occur, and recreation and safety improvements would not be added to the site. Therefore, no additional adverse or beneficial impacts to aquatic fauna, EFH, or managed fisheries would be expected. The conditions at the Proposed Alternative site would remain largely the same as described in the Affected Environment section above.

While construction of Proposed Alternative features in estuarine open water habitats would not occur, nor would the associated amenities (i.e., parking lots and fishing piers) and increase in public use. Under the No Action Alternative, there would be no expanded trash collection and removal, development and distribution of public education materials, or long-term monitoring services. Since the area already experiences high levels of human use and fishing pressure, the absence of these services may adversely affect aquatic habitats and fauna along Island Road compared to the Proposed Alternative. As such, the No Action Alternative would likely result in fewer short-term impacts to local habitats but would result in more long-term adverse impacts to these resources compared to the Proposed Alternative.

4.7.2.4 Protected Species

4.7.2.4.1 Affected Environment

A list of federally threatened and endangered species and other species of special concern with the potential to occur within the Proposed Alternative area was developed based on the USFWS IPaC resource list for the Proposed Alternative area (USFWS 2017b) (**Table 4-15**).

The presence of the water control structure located in Island Road, in addition to other water control structures around the management unit that contains the Proposed Alternative area, is a physical barrier that prevents access to the Proposed Alternative area by protected aquatic species, including the ESA-protected sea turtles and West Indian manatee in addition to the MMPA protected bottlenose dolphin. The Proposed Alternative site is outside of the current recorded ranges of both the Gulf sturgeon and pallid sturgeon. The pallid sturgeon is present in the Mississippi and Atchafalaya rivers, whereas the Gulf sturgeon is present in river and nearshore waters east of the Mississippi River delta.

Table 4-15. Protected Species with the Potential to Occur within the Proposed Alternative Area

Common Name	Scientific Name	Status	Observed in Refuge[1]
West Indian manatee	*Trichechus manatus*	Threatened	No
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	No
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	No
Loggerhead sea turtle	*Caretta caretta*	Threatened	No
Kemp's Ridley sea turtle	*Lepidochelys kempii*	Endangered	No
Piping plover	*Charadrius melodus*	Threatened	No
Red knot	*Calidris canutus rufa*	Threatened	No
Atlantic (Gulf) sturgeon	*Acipenser oxyrinchus desotoi*	Endangered	No
Pallid sturgeon	*Scaphirhynchus albus*	Endangered	No

[1]Based on personal communication with LDWF staff.

4.7.2.4.2 Environmental Consequences

Similar to the Elmer's Island Access Proposed Alternative, pre-consultation technical assistance with the regulatory agencies will continue to incorporate any necessary conservation measures. Potential effects on protected species and critical habitat and conservation measures for aquatic and terrestrial protected species are discussed below.

Protected Aquatic Species

The Proposed Alternative is not anticipated to impact protected aquatic species, such as listed sea turtles, West Indian manatee, and bottlenose dolphin, because the presence of water control structures prevents these species from entering the area. Additionally, suitable habitat for these species is not located within the Proposed Alternative area. Potential indirect effects to protected aquatic species include temporary, localized impacts to water quality due to construction activities, which could affect downstream receiving waters. Pollution prevention plans would be prepared in conjunction with the NPDES permitting process prior to construction of the chosen alternative. These plans would include all specifications and BMPs necessary for control of erosion and sedimentation during construction. The construction BMPs, in addition to other avoidance and mitigation measures as required by state and federal regulatory agencies, would minimize water quality impacts that could affect downstream aquatic habitat. Based on the USFWS SOV letter received for the Proposed Alternative, USFWS stated their records indicate that there would be no anticipated impacts to federally listed endangered, threatened, proposed or candidate species as a result of the project. Therefore, no further ESA consultation for the Proposed Alternative will be necessary unless the locations of the project change prior to implementation or a new species is listed.

Protected Terrestrial Species

Direct affects to piping plover and red knot are unlikely due to the minimal upland construction footprint under the Proposed Alternative. The upland Proposed Alternative features would occur on the existing road berm and riprap. Use of Island Road and existing riprap revetment by the piping plover and red knot is unlikely under existing conditions, and any use is most likely limited to resting or perching. It is not anticipated that the Proposed Alternative would impact suitable foraging habitat for the piping plover or red knot, since there is very little to no suitable foraging habitat for piping plover or red knot in this area. BMPs would include temporary stoppage of

work when shorebirds, such as the piping plover and red knot, are present. Based on the USFWS SOV letter received for the Proposed Alternative, USFWS stated their records indicate that there would be no anticipated impacts to federally listed endangered, threatened, proposed or candidate species as a result of the project. Therefore, no further ESA consultation for the Proposed Alternative will be necessary unless the locations of the project change prior to implementation or a new species is listed.

Critical Habitat

There is no critical habitat present within the Proposed Alternative area. Therefore, there would be no impacts to critical habitat under the Proposed Alternative.

No Action Alternative

Protected Aquatic Species

Similar to the Proposed Alternative, no adverse effects to protected aquatic species are anticipated under the No Action Alternative.

Protected Terrestrial Species

Under the No Action Alternative, no adverse effects to protected terrestrial species are anticipated.

Critical Habitat

There is no critical habitat present within the Proposed Alternative. Therefore, there would be no impacts to critical habitat under the Proposed Alternative or the No Action Alternative.

4.7.3 Socioeconomic Environment

4.7.3.1 Socioeconomics and Environmental Justice

4.7.3.1.1 Affected Environment

The Proposed Alternative site is located within Terrebonne Parish, home to 2.4% of Louisiana's population. As **Table 4-16** shows, the residents within the census tract that contains the Proposed Alternative site are considerably less likely to be a racial or ethnic minority than in the parish, state, or country. Though the population within the census tract is similarly likely to be over the age of 65 than in the state and country as a whole (and slightly higher than in the parish as a whole), the median age in the census tract is 3 to 5 years older than in the larger geographies. This is likely due in part to the relatively small population under the age of 5 within the census tract. The median household income is lower in the area of the Proposed Alternative site and, correspondingly, the population living below the poverty level is higher than in the parish, state, or country. More than 2.5 times as many residents in the census tract do not have a high school diploma than in the country overall.

4.7.3.1.2 Environmental Consequences

Proposed Alternative

Per EO 12898, Section 1-101, for environmental justice to be a concern, the Proposed Alternative would have a "disproportionately high and adverse" effect on a minority or low-income population. The population within the immediate vicinity of the Proposed Alternative area is

Table 4-16. Demographic Data for the Proposed Alternative Area

	Census Tract 11 (includes project site)	Terrebonne Parish as a whole	Louisiana as a whole	United States as a whole
Total Population	3,661	112,742	4,625,253	316,515,021
Total Minority Population[1]	20.8%	32.1%	40.5%	37.7%
Population Under the Age of 5	3.7%	7.2%	6.7%	6.3%
Population Over the Age of 65	13.5%	12.2%	13.2%	14.1%
Median Age	40.4	35.2	36.1	37.6
Median Household Income	$43,843	$47,826	$45,047	$53,889
Population below Poverty Level	24.2%	19.5%	19.8%	15.5%
Less Than High School Graduate (Population 25 Years and Over)	34.7%	22.9%	16.6%	13.3%

[1] Persons not "white alone" within the "Not Hispanic or Latino" subgroup.

Source: U.S. Census Bureau, 2011–2015 American Community Survey 5-Year Estimates

considerably less likely to be a minority but more likely to be low-income than Terrebonne Parish, Louisiana or the United States. However, the Proposed Alternative would involve the construction of five fishing piers and adjoining vehicle pullover areas, with the aim of enhancing and increasing the safety of the existing infrastructure. Therefore, the Proposed Alternative is not anticipated to have an adverse effect on the disproportionately high low-income population in the Proposed Alternative area.

The Proposed Alternative would involve the development of recreational infrastructure within PACWMA, which is owned and operated by LDWF. Therefore, no displacement or demographic shifts are anticipated as a result of the Proposed Alternative. Construction of the Proposed Alternative is expected to employ temporary workers, leading to short-term beneficial impacts.

No Action Alternative

The No Action Alternative would not result in enhancement of existing recreational infrastructure within PACWMA, thereby resulting in no anticipated impacts to the demographics of the surrounding area.

4.7.3.2 Cultural Resources

4.7.3.2.1 Affected Environment

As noted previously, Island Road was constructed in 1953 through marshland and is currently located in open water. The Proposed Alternative site will be reviewed under Section 106 of the NHPA to identify any historic properties located within the Proposed Alternative and to evaluate whether the alternative would affect any historic properties. During initial review of the Division of Archaeology Database of the Louisiana Office of Cultural Development, the presence of cultural resources was not identified.

4.7.3.2.2 Environmental Consequences

Proposed Alternative

NHPA was implemented to protect the cultural heritage and resources of the nation. The Proposed Alternative would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources. Cultural and historic resources would be considered when preparing site-specific restoration measures and management actions. Where there is a likelihood of disturbance of cultural resources, cultural resource managers would conduct appropriate surveys to assess the methods and location of restoration and management actions. Restoration measures and management actions would be designed to avoid cultural resources to the extent practicable.

At this time there would be no known impacts on cultural resources and no cumulative impacts.

No Action Alternative

Under the No Action Alternative, the Proposed Alternative would not be implemented, construction activities would not occur, and recreation improvements would not be added to the site. Therefore, no additional adverse or beneficial impacts to cultural resources would be expected. The conditions at the Proposed Alternative site would remain the same as described in the Affected Environment section above.

4.7.3.3 Infrastructure

4.7.3.3.1 Affected Environment

The PACWMA is 35,267 acres within Lafourche and Terrebonne Parishes, and is owned and managed by LDWF. The Proposed Alternative is located along Island Road within the portion of PACWMA within Terrebonne Parish. Island Road is an approximate 4-mile two-lane roadway stretching from Highway 665 through Isle de Jean Charles. The roadway is popular among recreational fishermen, their parked cars often blocking the through traffic. Isle de Jean Charles is only accessible by boat or Island Road.

4.7.3.3.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would include the construction of five parking areas and adjoining fishing piers along Island Road. The Proposed Alternative's aim is to allow for safe pull-off areas, outside of the flow of traffic. The piers and roadway/parking improvements would provide long-term, beneficial impacts to the recreational and roadway infrastructure.

Construction activities would increase traffic by construction equipment and worker commuting; however, this would be minimal and short-term. Prior to construction, a traffic control plan would be developed and implemented to ensure minimal interruptions to the transportation network. Care would be taken during construction activities to prevent impeding traffic flow and obstructing access to the Proposed Alternative area and Isle de Jean Charles.

Impacts from construction may be adverse, but localized, short-term, and minor. Long-term impacts would be beneficial, as parking improvements would enhance existing infrastructure and accessibility.

No Action Alternative

The No Action Alternative would result in no pull-off areas and adjoining fishing piers, maintaining unsafe parking practices by recreational fishermen and reducing the level of service of the existing transportation infrastructure network.

4.7.3.4 Land and Marine Management

4.7.3.4.1 Affected Environment

The Proposed Alternative area is owned and operated by LDWF as part of the PACWMA.

In Louisiana, the LDNR Office of Coastal Resources oversees the state's CZM Program in compliance with the CZMA. The Proposed Alternative area, as well as the entirety of Terrebonne Parish, is located within the Louisiana Coastal Zone, established by the State and Local Coastal Resources Management Act of 1978 and modified in 2012. The Terrebonne Parish CZM Program divided the parish into 13 environmental management units (EMUs). The PACWMA is included in the Montegut Unit; Island Road demarcates the southern boundary of this EMU. Among the goals of the parish's CZM Program is "to protect, preserve, enhance and, where possible, restore the renewable resources of the coastal wetlands for the enjoyment and long-term benefit of parish residents" and to "protect public health, safety and welfare" (Terrebonne Parish Consolidated Government 2000).

4.7.3.4.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve the installation of recreational infrastructure along Island Road, enhancing safe recreational opportunities within the PACWMA. Thus, the Proposed Alternative would meet the goals of the CZM Program. In addition, the Proposed Alternative would not impact current land use within the Proposed Alternative area. Additionally, a consistency determination will be submitted to LDNR Office of Coastal Resources.

The Proposed Alternative is not expected to contribute to short- or long-term adverse impacts to land and marine management.

No Action Alternative

The No Action Alternative would result in no change to the existing infrastructure along Island Road. As a result, no impacts are anticipated to this environmental resource.

4.7.3.5 Tourism and Recreational Use

4.7.3.5.1 Affected Environment

The Proposed Alternative area is within a publicly owned and managed wildlife management area, used for recreational activities such as recreational fishing, bird watching, hunting, boating and tent-only camping. The Proposed Alternative site includes a portion of Island Road, which is a popular roadside destination for recreational fishing. However, due to the narrowness of the roadway and little shoulder, fishermen often park in a way that impedes traffic, causing unsafe conditions. The PACWMA sees a range of 25,000 to 40,000 visitors each year. Commercial fishing is not permitted in the PACWMA, except in Cutoff Canal and Wonder Lake (LDWF 2017c). All nighttime activities are prohibited within the PACWMA, except for roadside fishing along Island Road.

4.7.3.5.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would serve to enhance recreational opportunities along Island Road, allowing for safe off-road areas to fish, crab, bird watch, and sightsee.

Though, construction activities may cause short-term adverse impacts due to closures of segments along Island Road, the Proposed Alternative would serve to enhance the visitor experience over the long-term providing beneficial impacts.

No Action Alternative

The No Action Alternative would result in no improvements to the existing conditions along Island Road. As a result, visitors stopping along the roadway would continue to be at risk.

4.7.3.6 Aesthetics and Visual Resources

4.7.3.6.1 Affected Environment

The Proposed Alternative area is along Island Road within the PACWMA. With the exception of overhead utility lines, Island Road offers uninterrupted views of the water.

4.7.3.6.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve the construction of off-road parking areas and adjoining fishing piers. The Proposed Alternative would improve access to the recreational function of Island Road and would not diminish the existing aesthetics and visual resources of the Proposed Alternative area.

Construction activities may impede the natural aesthetics and visual resources of the area; however, such adverse impacts would be temporary in nature.

No Action Alternative

The No Action Alternative would result in no changes to the recreational function of Island Road. As a result, no impacts are anticipated to this environmental resource.

4.7.3.7 Public Health and Safety, Including Flood and Shoreline Protection

4.7.3.7.1 Affected Environment

The Proposed Alternative is within the 100-year flood zone crossing over the Viguerie Canal. Coastal environments are expected to be at increasing risk due to sea level rise and increases in hurricane intensity and storm surge. In the Gulf Coast region, the sea level rise threat is moderate in comparison to other geologically sensitive areas (USGCRP 2014). Sea level rise could result in more frequent flooding of low-lying areas, which would permanently alter some ecological communities (USGCRP 2014).

The Proposed Alternative area is within a wildlife management area open to the public for recreational purposes, including fishing, crabbing, and bird watching. Island Road is a highly used by recreational fishermen; however, the narrowness of the roadway and shoulder lead to roadside parking that can interrupt traffic flow and unsafe conditions.

4.7.3.7.2 Environmental Consequences

Proposed Alternative

The Proposed Alternative would involve the construction of five off-road parking areas and adjoining fishing piers. The Proposed Alternative would enable site visitors to park in a safe manner, away from the flow of traffic. In this way, the safety of recreational facilities users would be protected.

Because the project would be constructed within a floodplain and along the shoreline, there may be short-term adverse impacts. Impacts to public health and safety during construction may be adverse, but localized, short-term, and minor. Long-term impacts to public health and safety would be beneficial, as construction of parking areas would have beneficial impacts to public safety.

The Proposed Alternative would involve construction within the floodplain and along the shoreline. In order to minimize potential impacts to this environmental resource, the following BMPs would be implemented:

- The use of impervious materials would be avoided as much as feasible.
- Erosion and sedimentation control measures, including minimizing the amount of clearing and exposed soil, would be implemented and maintained.
- Sedimentation controls would be installed prior to the start of construction.
- Disturbed areas would be revegetated with native species as soon as possible after work has been completed.

The resiliency of the proposed structures to sustain sea-level rise, hurricanes and storm surges will be determined during final design.

In addition, construction activities may temporarily impact the public health and safety of the Proposed Alternative area. BMPs, such as those listed below, would be employed to mitigate any such impacts:

- Take caution to prevent spills of oils and grease if handling fuels on site.
- Employ spill mitigation measures immediately following a spill of any hazardous material.
- Cover the load compartments of trucks hauling dust-generating materials.
- Use heavy water spray or chemical dust suppressant in exposed areas to control airborne dust.

No Action Alternative

The No Action Alternative would result in maintaining the existing conditions along Island Road, thereby continuing parking practices that lead to unsafe traffic conditions along the roadway.

4.7.3.8 Fisheries and Aquaculture

LDWF does not permit commercial fishing within the PACWMA, except in Cutoff Canal and Wonder Lake. As the Proposed Alternative area is within the boundaries of the WMA, but not within or adjacent to Cutoff Canal or Wonder Lake, this environmental resource does not apply.

4.7.3.9 Marine Transportation

The Proposed Alternative does not contain, nor is it located adjacent to, a waterway utilized for waterborne commerce or ferry services. Therefore, this environmental resource does not apply.

4.7.4 Cumulative Impacts of the Proposed Alternative

4.7.4.1 Potential Cumulative Impacts

As described in detail in Section 4.4.4.1, the CEQ regulations to implement NEPA require the assessment of cumulative impacts in the decision-making process for federal projects, plans, and programs. The following section describes the multistep approach used for evaluating cumulative impacts for the Island Road Piers Proposed Alternative.

4.7.4.2 Methodology for Assessing Cumulative Impacts

Cumulative impacts are typically analyzed using four steps, as described in detail in Section 4.4.4.2.

4.7.4.3 Identification of Resources Affected and Boundaries of Analysis

4.7.4.3.1 Resources Affected

In this RP/EA #2, cumulative impacts include each of the resources identified in Physical Environment, Biological Environment, and Socioeconomics and Environmental Justice sections discussed above. Several of the resources that would have minor to negligible effects, and based on their magnitude, with respect to context and intensity, would not contribute to cumulative impacts. Those resources are excluded from this cumulative impact analysis for the Island Road Piers Proposed Alternative:

- Hydrology and water quality
- Air quality
- Noise
- Habitats
- Wildlife species
- Marine and estuarine fauna, essential fish habitat, and managed fish species
- Protected species
- Socioeconomics and environmental justice
- Cultural resources
- Aesthetics and visual resources
- Fisheries and aquaculture
- Marine transportation

The following resources were analyzed for potential environmental consequences that could result from the Proposed Alternative:

- Geology and substrates

- Infrastructure
- Land and marine management
- Tourism and recreational use
- Public health and safety, including flood and shoreline protection

4.7.4.3.2 Spatial Boundary of Analysis

As discussed in Section 4.4.4.2, the spatial boundaries used to provide the necessary context for the cumulative impact analysis typically are defined based on the particular resource being assessed. For the purpose of this analysis, the spatial boundary includes those areas where the Proposed Alternative would occur and adjacent areas, focusing on actions occurring along on and within the vicinity of Island Road.

4.7.4.3.3 Temporal Boundary of Analysis

A description of the determination of a temporal boundary for the cumulative impact analysis is included in Section 4.4.4.3.3.

4.7.4.4 Cumulative Action Scenario

To effectively consider the potential cumulative impacts, past, present, and reasonably foreseeable future actions in the vicinity of the Proposed Alternative area were identified. A list of permitted, existing, and future projects was compiled for each of the projects using Louisiana and USACE permitting databases and internet searches for more detail, as needed. The Proposed Alternative site is coastal and regulations pertaining to coastal, wetlands, and stormwater (uplands and wetlands) permits were considered appropriate for developing a list of past and reasonably foreseeable future activities that may affect the resources. Based on information obtained from permitting databases, past and potential future activities near the Proposed Alternative area include the Island Road Marsh Creation project, actions related to water control structures, terrace construction, construction and maintenance of levees/berms, and dredging. **Table 4-17** below summarizes the identified actions and the potential cumulative impacts for the Island Road Piers Proposed Alternative.

Based on the assessment summarized in **Table 4-17** below, the only identified resource areas with potential for cumulative adverse impacts are geology and substrates. The adverse impacts to geology and substrates due to the identified actions are not expected to contribute to cumulative impacts due to their likely geographic separation from the footprint of the Proposed Alternative.

The identified actions would have impacts to infrastructure; land and marine management; tourism and recreational use; and public health and safety, including flood and shoreline protection, though the impacts from the identified actions and impacts from the Proposed Alternative are expected to result in long-term positive impacts to these resources. Therefore, the cumulative effects from the Proposed Alternative and the five identified actions are expected to result in cumulative beneficial impacts to infrastructure; land and marine management; tourism and recreational use; and public health and safety, including flood and shoreline protection.

Table 4-17. Past, Present, and Reasonably Foreseeable Future Actions Included in Cumulative Impact Analysis

Category/Projects	Project Description	Key Resource Areas with Potential Cumulative Impacts
Island Rd Marsh Creation Project (TE-117)	The restoration concept provides for the creation and/or nourishment of approximately 383 acres of emergent saline marsh that will form a land bridge along portions of the perimeter of Cutoff Canal, Twin Pipelines Canals, and Island Road. The Proposed Alternative's primary feature is to create 364 acres and nourish 19 acres of saline marsh.	Short-term, adverse impacts to: ▪ Geology and substrates Long-term, adverse impacts to: ▪ No known impacts Long-term, positive impacts to: ▪ Geology and substrates ▪ Land and marine management ▪ Tourism and recreational use ▪ Public health and safety, including flood and shoreline protection
Installation of water control structures along Island Rd or on adjacent embankments	Past and potential future projects may include installation, maintenance, and management of water control structures in the vicinity of the project.	Short-term, adverse impacts to: ▪ Geology and substrates Long-term, adverse impacts to: ▪ No applicable impacts Long-term, positive impacts to: ▪ Land and marine management ▪ Tourism and recreational use
Terrace Construction	Past and potential future actions include terrace construction north of the project site.	Short-term, adverse impacts to: ▪ Geology and substrates Long-term, adverse impacts to: ▪ No applicable impacts Long-term, positive impacts to: ▪ Geology and substrates ▪ Land and marine management ▪ Tourism and recreational use ▪ Public health and safety, including flood and shoreline protection
Construction and Maintenance of Levees/Berms	Past and potential future actions include construction and maintenance of levees and adjacent to Island Road.	Short-term, adverse impacts to: ▪ Geology and substrates Long-term, adverse impacts to: ▪ No applicable impacts Long-term, positive impacts to: ▪ Infrastructure ▪ Land and marine management ▪ Tourism and recreational use ▪ Public health and safety, including flood and shoreline protection
Dredging	Past dredging activities have occurred along Island Road and in the vicinity of the site. Future dredging is likely in the vicinity of Island Road.	Short-term, adverse impacts to: ▪ Geology and substrates Long-term, adverse impacts to: ▪ No applicable impacts Long-term, positive impacts to: ▪ No applicable impacts

Under the No Action Alternative, the following resources are expected to have adverse impacts:

- Infrastructure
- Tourism and recreational use
- Public health and safety, including flood and shoreline protection

These adverse impacts are expected to be limited to Island Road and none of the identified actions are expected to also contribute adverse impacts to infrastructure; tourism and recreation use; and public health and safety, including flood and shoreline protection. Because the identified actions do not have adverse impacts to these resources and some of the actions have positive impacts to these resources, cumulative adverse impacts to those resources are not anticipated when considering the No Action Alternative in conjunction with the identified actions.

4.8 No Action Alternative

The No Action Alternative for each of the four Proposed Alternatives is used as the baseline for comparison of the impacts expected from the Proposed Alternatives. Under the No Action Alternative for each of the Proposed Alternatives, no improvements to recreations infrastructure would occur at the Proposed Alternative sites. In most cases the No Action Alternative is not expected to contribute to short- or long-term adverse impacts to each of the resources.

The No Action Alternative for the Elmer's Island Access, Lake Charles SCEC, and Island Road Piers Proposed Alternatives may potentially contribute to long-term and/or indirect adverse impacts to the following resources: hydrology and water quality; wildlife species; marine and estuarine fish habitat and managed fish species; protected species; infrastructure; tourism and recreational use; and public health and safety, including flood and shoreline protection.

The No Action Alternative for the Elmer's Island Access Proposed Alternative is expected to have long-term and/or indirect, adverse impact to hydrology and water quality, wildlife species, marine and estuarine fish habitat, and managed fish species, and protected species due to the anticipated decrease in water quality and hydrology without the installation of new culverts at the site.

The No Action Alternative of the Lake Charles SCEC Proposed Alternative is expected to have indirect, adverse impacts to marine and estuarine fish habitat due to an absence of the proposed public outreach and education component of the Proposed Alternative.

The No Action Alternative of the Island Road Fishing Piers Proposed Alternative is expected to have long-term, indirect, adverse impacts to infrastructure; tourism and recreational use; and public health and safety, including flood and shoreline protection due to continuing unsafe parking and fishing at the Proposed Alternative site.

A summary of the environmental consequences for the No Action Alternative for each of the Proposed Alternatives is included in **Table 4-18**.

4.9 Comparison of Alternatives

In general, the four Proposed Alternatives would result in some adverse impacts to several of the environmental resources mainly occurring during construction; however, nearly all of these impacts are expected to be short-term and minor.

Long-term impacts to several of the environmental resources are expected to be beneficial as water quality, habitats, infrastructure, and recreational components are improved with implementation of the Proposed Alternatives. These resources include geology and substrates; hydrology and water quality; habitats; wildlife species; marine and estuarine fish habitat and managed fish species; protected species; infrastructure; land and marine management; tourism and recreational use; aesthetics and visual resources; public health and safety, including flood and shoreline protection; and fisheries and aquaculture.

A summary of the environmental consequences for each alternative, including the two non-preferred alternative elements of Elmer's Island Access, is provided in **Table 4-18**.

Table 4-18. Summary of the Environmental Consequences for Each Alternative

Resource Topic	Elmer's Island Access		Statewide Artificial Reefs		Lake Charles SCEC		Island Road Piers	
	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative
Geology and Substrates	*Preferred Alternative* Short-term, minor, adverse impacts. Adverse impacts would include localized soil disturbance and displacement due to construction activities. Long-term beneficial impacts due to improvements that would direct and condense foot and vehicle traffic into designated areas. *Non-Preferred Alternatives* Short- and long-term, moderate adverse impacts. Long-term moderate adverse impacts include increased foot traffic near dune areas and potential scour and washout around the boardwalk pilings.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Short-term and long-term, minor, adverse impacts. Adverse impacts would include localized soil disturbance and displacement due to construction activities.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Minor, localized, long- and short-term, adverse impacts to geology and substrates from the building and associated improvements.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Short-term, minor, adverse impacts. Adverse impacts would include localized soil disturbance and displacement due to construction activities.	This alternative is not expected to contribute to short- or long-term, adverse impacts.
Hydrology and Water Quality	*Preferred Alternative* Short- and long-term, minor, adverse impacts. Adverse impacts would include localized potential erosion and sedimentation due to construction activities and a small increase in impervious surface. Long-term beneficial impacts due to improvements in water quality and hydrology to the back bay and wetland of Elmer's Island. *Non-Preferred Alternatives* Short- and long-term, minor, adverse impacts. Adverse impacts would include localized potential erosion and sedimentation due to construction activities and a small increase in impervious surface.	Long-term, minor adverse impacts due to decreased water quality and hydrology without the installation of new culverts.	Short-term, minor, adverse impacts. Adverse impacts would include localized potential erosion and sedimentation due to construction activities. Possible long-term moderate beneficial impacts from to filter feeder colonization.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Minor, short- and long-term adverse impacts due to construction and an increase in impervious surfaces.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Short-term and long-term, minor, adverse impacts. Adverse impacts would include localized potential erosion and sedimentation due to construction activities.	This alternative is not expected to contribute to short- or long-term, adverse impacts.

Resource Topic	Elmer's Island Access		Statewide Artificial Reefs		Lake Charles SCEC		Island Road Piers	
	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative
Air Quality	*Preferred Alternative* Short-term, minor adverse, and localized, impacts. *Non-Preferred Alternatives* Short-term, minor adverse, and localized, impacts only during construction.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Short-term, minor adverse, and localized impacts only during construction.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Short-term impacts from construction and long-term impacts from visitor traffic may be adverse, but localized and minor.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts from construction may be adverse, but localized, short-term, and minor.	This alternative is not expected to contribute to short- or long-term, adverse impacts.
Noise	*Preferred Alternative* Short-term, moderate adverse impacts during construction. Long-term, minor adverse impacts expected due to an increase in recreational activities. *Non-Preferred Alternatives* Short-term, moderate adverse impacts during construction. Long-term, minor adverse impacts expected due to an increase in recreational activities.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Short-term, moderate adverse impacts during construction. Long-term, minor adverse impacts expected due to an increase in recreational activities.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Short-term impacts from construction would be moderate and adverse. Long-term impacts due to visitor traffic may be adverse and minor.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts from noise during construction would be no more than short-term, minor, and adverse.	This alternative is not expected to contribute to short- or long-term, adverse impacts.
Habitats	*Preferred Alternative* Impacts from construction may be adverse but localized, short-term, and minor. Long-term impacts from shuttle operation would vary from minor to moderate. Long-term moderate impacts would be beneficial as certain project elements are expected to improve wetland, estuarine, and marine aquatic habitat. *Non-Preferred Alternatives* Long-term, moderate adverse impacts associated with a permanent wooden structure and habitat fragmentation.	This alternative is not expected to contribute to short-term adverse impacts, but would result in long-term moderate adverse impacts to wetland and open water habitats	No adverse impact to aquatic or benthic habitats. Long-term moderate impacts would be beneficial, as certain reefs are expected to improve marine aquatic habitat.	This alternative is not expected to contribute to short-term, adverse impacts, but would result in long-term moderate adverse impacts due to continued high use leading to degradation of existing habitats.	Short-term adverse impacts to poor quality habitat during construction. Long-term impacts would be beneficial, as certain project elements are expected to improve aquatic and wildlife habitat.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts from construction may be adverse, but localized, short-term, and minor.	This alternative is not expected to contribute to short- or long-term, adverse impacts.

Resource Topic	Elmer's Island Access		Statewide Artificial Reefs		Lake Charles SCEC		Island Road Piers	
	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative
Wildlife Species	*Preferred Alternative* Impacts from construction may be adverse but localized, short-term, and minor. Long-term impacts from shuttle operation would vary from minor to moderate. Long-term impacts would be beneficial as certain project elements are expected to improve wildlife habitats. *Non-Preferred Alternatives* Long-term, adverse impacts to approximately 1.8 acres of sensitive dune and wetland habitats that would have adverse impacts on wildlife.	This alternative is not expected to contribute to direct short-term adverse impacts. Long-term moderate adverse impacts may occur due to lower water quality and the absence of a litter and debris removal program.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Short-term minor adverse impacts to wildlife during construction. Long-term impacts would be beneficial, as certain project elements are expected to improve wildlife habitat.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts from construction may be adverse, but localized, short-term, and minor.	This alternative is not expected to contribute to short- or long-term, adverse impacts.
Marine and Estuarine Fauna, Essential Fish Habitat, and Managed Fish Species	*Preferred Alternative* Impacts from construction may be adverse but localized, short-term, and minor. Long-term impacts to marine fauna in the surf zone would be minor. Long-term impacts would be beneficial, as certain project elements are expected to improve hydrology and water quality, including fish habitats. *Non-Preferred Alternatives* Short- and long-term, minor to moderate adverse impacts due to construction in sensitive dune and wetland areas.	Long-term, moderate, adverse impacts due to decreased water quality and hydrology without the installation of new culverts. Indirect adverse impacts may occur due to lower water quality and the absence of a litter and debris removal program.	Long-term impacts would be beneficial, as reefs are expected to improve fish habitats.	This alternative is not expected to contribute to short-term, adverse impacts, but would result in long-term moderate adverse impacts may occur due to continued high use leading to degradation of existing habitats.	Long-term impacts would be beneficial on recreationally managed freshwater fish species through the creation of suitable freshwater habitat.	Indirect adverse impacts may occur without construction of project features that include public outreach and education, which would benefit fisheries.	Impacts from construction may be adverse, but localized, short-term, and minor. Possible long-term minor beneficial impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.
Protected Species	*Preferred Alternative* Impacts from construction may be adverse, but localized, short-term, and minor. Long-term impacts from shuttle operation would vary from minor to moderate.	This alternative is not expected to contribute to direct short-term, adverse impacts. Long-term moderate adverse impacts may occur due to lower water quality and the absence of a litter and debris removal program.	Short-term construction impacts may affect but are not likely to adversely affect Gulf sturgeon. Sea turtles may benefit from reef enhancement over the long-term. Adverse impacts to the bottlenose dolphin are not anticipated.	Long-term adverse impacts may occur to sea turtles due to continued high use leading to degradation of existing habitats. Short-term beneficial impacts may occur to gulf sturgeon, as their habitat	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts to protected species.	This alternative is not expected to contribute to short- or long-term, adverse impacts.

Resource Topic	Elmer's Island Access		Statewide Artificial Reefs		Lake Charles SCEC		Island Road Piers	
	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative
	Long-term impacts would be beneficial as certain project elements are expected to improve water quality and habitats for protected species. *Non-Preferred Alternatives* Long-term, moderate adverse impacts to federally designated critical habitat for the piping plover.			remains in current condition.				
Socioeconomics and Environmental Justice	*Preferred Alternative* This alternative is not expected to contribute to short- or long-term, adverse impacts. Construction is expected to employ temporary workers, leading to short-term, beneficial impacts. *Non-Preferred Alternatives* This alternative is not expected to contribute to short- or long-term, adverse impacts. Construction is expected to employ temporary workers, leading to short-term, beneficial impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Not applicable	Not applicable	This alternative is not expected to contribute to short- or long-term, adverse impacts. Construction is expected to employ temporary workers, leading to short-term, beneficial impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts. Construction is expected to employ temporary workers, leading to short-term, beneficial impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.
Cultural Resources	*Preferred Alternative* Through consultation with the SHPO, any impacts on cultural resources present on the sites would be mitigated or avoided. At this time, there would be no known impacts on cultural resources and no cumulative impacts. *Non-Preferred Alternatives* Through consultation with the SHPO, any impacts on cultural resources present on the sites would be mitigated or avoided. At this time, there would be no known impacts on cultural resources and no cumulative impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Through consultation with the SHPO, any impacts on cultural resources present on the sites would be mitigated or avoided. At this time, there would be no known impacts on cultural resources and no cumulative impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Through consultation with the SHPO, any impacts on cultural resources present on the sites would be mitigated or avoided. At this time, there would be no known impacts on cultural resources and no cumulative impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Through consultation with the SHPO, any impacts on cultural resources present on the sites would be mitigated or avoided. At this time, there would be no known impacts on cultural resources and no cumulative impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.

Resource Topic	Elmer's Island Access		Statewide Artificial Reefs		Lake Charles SCEC		Island Road Piers	
	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative
Infrastructure	*Preferred Alternative* Impacts from construction may be adverse, but localized, short-term, and minor. Long-term impacts would be beneficial as improvements would enhance existing infrastructure and accessibility. *Non-Preferred Alternatives* Impacts from construction may be adverse but localized, short-term, and minor. Long-term impacts would be beneficial as improvements would enhance existing infrastructure and accessibility.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Adverse impacts from construction may be short-term and minor due to interruption in reef access.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts from construction may be adverse but localized, short-term, and minor.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts from construction may be adverse but localized, short-term, and minor. Long-term impacts would be beneficial as improvements would enhance existing infrastructure and accessibility.	Long-term, adverse impacts due to continuing unsafe parking and reducing the level of service of the existing transportation infrastructure along Island Road.
Land and Marine Management	*Preferred Alternative* Long-term impacts would be beneficial, as improvements would help maintain the natural ecological and hydrological integrity of the area. *Non-Preferred Alternatives* Long-term impacts would be beneficial as improvements would help maintain the natural ecological and hydrological integrity of the area.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.
Tourism and Recreational Use	*Preferred Alternative* Impacts from construction may be adverse but localized, short-term, and minor due to closures of certain areas of the refuge. Long-term impacts would be beneficial as the improvements would serve to enhance the visitor experience. *Non-Preferred Alternatives* Long-term, moderate beneficial impacts due to increased access.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts from construction may be adverse but localized, short-term, and minor due to closures. Long-term impacts would be beneficial as the improvements would serve to enhance recreational fishing.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Long-term impacts would be beneficial as the project would include public education, outreach, and recreational activities.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts from construction may be adverse but localized, short-term, and minor due to road closures. Long-term impacts would be beneficial as the improvements would serve to enhance recreational fishing.	Long-term, adverse impacts due to continuing unsafe fishing and parking along Island Road.

Resource Topic	Elmer's Island Access		Statewide Artificial Reefs		Lake Charles SCEC		Island Road Piers	
	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative	Proposed Alternative	No Action Alternative
Aesthetics and Visual Resources	*Preferred Alternative* Impacts from construction may be adverse but localized, short-term, and minor. Long-term impacts would be beneficial as improvements would enhance accessibility to visual resources. *Non-Preferred Alternatives* Long-term, minor, adverse impacts due to placement of boardwalk.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts from construction may be adverse but localized, short-term, and minor.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts from construction may be adverse but localized, short-term, and minor.	This alternative is not expected to contribute to short- or long-term, adverse impacts.
Public Health and Safety, including Flood and Shoreline Protection	*Preferred Alternative* Impacts to public health and safety during construction may be adverse but localized, short-term, and minor. Long-term impacts would be beneficial as hydrologic and road improvements would have indirect beneficial impacts to shoreline protection. *Non-Preferred Alternatives* Long-term, minor beneficial impacts due to safer access.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts to public health and safety during construction may be adverse but localized, short-term, and minor.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts to public health and safety during construction may be adverse but localized, short-term, and minor.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Impacts from construction may be adverse but localized, short-term, and minor. Long-term impacts would be beneficial as road improvements and parking areas would have beneficial impacts to public safety.	Long-term, adverse impacts due to continuing unsafe parking practices along Island Road.
Fisheries and Aquaculture	*Preferred Alternative* Not applicable *Non-Preferred Alternatives* Not applicable	Not applicable	Impacts from construction may be adverse but localized, short-term, and minor. Long-term impacts would be positive as reefs are expected to improve existing fisheries and aquaculture.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Not applicable	Not applicable	Not applicable	Not applicable
Marine Transportation	*Preferred Alternative* Not applicable *Non-Preferred Alternatives* Not applicable	Not applicable	This alternative is not expected to contribute to short- or long-term, adverse impacts.	This alternative is not expected to contribute to short- or long-term, adverse impacts.	Not applicable	Not applicable	Not applicable	Not applicable

Section 5

Compliance with Other Laws and Regulations

In addition to the requirements of OPA and NEPA, other laws may apply to the proposed alternatives in the RP/EA #2. The LA TIG will ensure compliance with these relevant authorities, which are listed below. Whether and to what extent an authority applies to a future project depends on the specific characteristics of a particular project, among other things. In this section, compliance is only discussed for those alternatives identified in Section 3.

Examples of applicable laws or executive orders include but are not necessarily limited to those listed below. Additional detail on each of these laws or executive orders can be found in Chapter 6 of the Final PDARP/PEIS.

Additional federal laws may apply to the proposed alternatives considered in this RP/EA #2. Legal authorities applicable to restoration alternative development were fully described in the context of the DWH restoration planning in the Final PDARP/PEIS, Section 6.9 Compliance with Other Applicable Authorities and Appendix 6.D Other laws and executive orders. That material is incorporated by reference here.

5.1 Federal Laws

Additional federal laws, regulations, and executive orders that may be applicable include but are not limited to:

- Endangered Species Act (16 U.S.C. §§ 1531 *et seq.*)
- Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §§ 1801 *et seq.*)
- Marine Mammal Protection Act (16 U.S.C. §§ 1361 *et seq.*)
- Coastal Zone Management Act (16 U.S.C. §§ 1451 *et seq.*)
- National Historic Preservation Act (16 U.S.C. §§ 470 *et seq.*)
- Coastal Barrier Resources Act (16 U.S.C. §§ 3501 *et seq.*)
- Migratory Bird Treaty Act (16 U.S.C. §§ 703 *et seq.*)
- Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668 *et seq.*)
- Clean Air Act (42 U.S.C. §§ 7401 *et seq.*)
- Federal Water Pollution Control Act (CWA, 33 U.S.C. §§ 1251 *et seq.*) and/or Rivers and Harbors Act (33 U.S.C. §§ 401 *et seq.*)
- Marine Protection, Research and Sanctuaries Act

- Estuary Protection Act
- Archaeological Resource Protection Act
- National Marine Sanctuaries Act
- Farmland Protection Policy Act
- EO 11988: Floodplain Management (now as augmented by Executive Order 13690, January 30, 2015)
- EO 11990: Protection of Wetlands
- EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- EO 12962: Recreational Fisheries
- EO 13112: Safeguarding the Nation from the Impacts of Invasive Species
- EO 13175: Consultation and Coordination with Indian Tribal Governments
- EO 13186: Responsibilities of Federal Agencies to Protect Migratory Birds
- EO 13693: Planning for Federal Sustainability in the Next Decade

Federal environmental compliance responsibilities and procedures will follow the *Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the Deepwater Horizon (DWH) Oil Spill* (DWH Trustees 2016d), which are laid out in Section 9.4.6 of that document (DWH Trustees 2016c). Following these standard operating procedures, the implementing Trustee for each project will ensure that the status of environmental compliance (e.g., completed versus in progress) is tracked through the Restoration Portal. Implementing Trustees will keep a record of compliance documents (e.g., ESA biological opinions, USACE permits) and ensure that they are submitted for inclusion to the Administrative Record.

For the proposed alternatives under this RP/EA #2, the LA TIG the LA TIG is currently seeking technical assistance with the regulatory agencies.

5.2 Compliance with State and Local Laws

The LA TIG will ensure compliance with all applicable state and local laws and other applicable federal laws and regulations relevant to the State of Louisiana. Additional laws and regulations are listed below.

- Archeological Finds on State Lands (La. Rev. Stat. 41:1605)
- Coastal Wetlands Conservation and Restoration Authority (La. Rev. Stat. 49:213.1)
- Coastal Wetlands Conservation and Restoration Plan (La. Rev. Stat. 49:213.6)

- Louisiana State and Local Coastal Resources Management Act (La. Rev. Stat. 49:214.21 – 214.42)
- Louisiana Oil Spill Prevention and Response Act (La. Rev. Stat. 30:2451 *et seq.*)
- Management of State Lands (La. Rev. Stat. 41:1701.1 *et seq.*)
- Louisiana Coastal Resources Program (La. Admin. Code 43:700 *et seq.*)
- Louisiana Surface Water Quality Standards (La. Admin. Code 33.IX, Chapter 11)
- Management of Archaeological and Historic Sites (La. Rev. Stat. 41:1605)
- Oyster Lease Relocation Program (La. Admin. Code 43:I, 850-859, Subchapter B)

5.3 Summary and Next Steps for Preferred Alternatives

The LA TIG would ensure compliance with all applicable state and local laws and other applicable federal laws and regulations relevant to the selected restoration alternatives, including technical assistance from appropriate regulatory agencies during E&D evaluation to identify any compliance issues. The LA TIG has started coordination and reviews for protected species and their habitats under the ESA, EFH protected under Magnuson-Stevens Act, marine mammals under the MMPA, migratory birds under the MBTA, eagles under the BGEPA, cultural resources under the NHPA, permits under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act, and other federal statutes, where appropriate. The Louisiana Office of Coastal Management completed the Louisiana Coastal Resources Program consistency review on June 5, 2018, to comply with the Coastal Zone Management Act (**Appendix F**). Additional reviews may occur during permitting processes required for implementation. **Table 5-1** provides a summary of the federal regulatory compliance review and approvals as of June 22, 2018. Wherever pre-existing consultations or permits are present, they would be reviewed to determine if the consultations/permits are still valid or if a re-initiation of the consultations is necessary. Implementing Trustees are required to implement alternative-specific mitigation measures (including BMPs) identified in this RP/EA #2 and completed consultations/permits. Implementing Trustees would provide oversight with regard to ensuring no unanticipated effects to listed species and habitats occur, including ensuring that BMPs are implemented and continue to function as intended.

Table 5-1. Current Status of Federal Regulatory Compliance Reviews and Approvals

Alternative	Bald and Golden Eagle Protection Act (USFWS)	Coastal Barrier Resources Act (CRA) (USFWS)	Coastal Zone Management Act (CZMA)	Endangered Species Act (ESA) Section 7 (NMFS)	Endangered Species Act (ESA) Section 7 (USFWS)	Essential Fish Habitat (EFH) (NMFS)	Marine Mammal Protection Act (MMPA) (NMFS)	Marine Mammal Protection Act (MMPA) (USFWS)	Migratory Bird Treaty Act (MBTA) (USFWS)	National Historic Preservation Act (NHPA)	Rivers and Harbors Act/Clean Water Act (USACE Permit)
Elmer's Island Access	Complete	Complete	Complete	Complete	In Progress	Complete	Complete	Complete	Complete	In Progress	In Progress
Statewide Artificial Reefs	Complete	Complete	Complete	In Progress	Complete	Complete	Complete	Complete	Complete	In Progress	Complete
Lake Charles Science Center and Educational Complex	Complete	Complete	Complete	N/A	Complete	N/A	N/A	N/A	Complete	In Progress	In Progress
Island Road Piers	Complete	Complete	Complete	Complete	Complete	In Progress	Complete	Complete	Complete	In Progress	Complete

Section 6

Monitoring and Adaptive Management Plan and Best Management Practices

According to the NRDA regulations for OPA (15 CFR § 990.55), a RP should include "a description of monitoring for documenting restoration effectiveness, including performance criteria that will be used to determine the success of restoration or need for interim corrective action." Given the temporal, spatial, and funding scales associated with this RP/EA #2, the LA TIG recognizes the need for a robust monitoring and adaptive management framework to measure the beneficial impacts of restoration and support restoration decision making. In order to increase the likelihood of successful restoration, the LA TIG would conduct the monitoring and evaluation needed to inform decision making for current alternatives and refine the selection, design, and implementation of future restoration. This monitoring and adaptive management framework may be more robust for elements of the RP/EA #2 with higher degrees of uncertainty or where large amounts of restoration are planned within a given geographic area and/or for the benefit of a particular resource.

A monitoring plan for each project was developed and is included in **Appendix E** of this RP/EA #2. The restoration objective of this RP/EA #2 is to restore a portion of the lost recreational fisheries use in Louisiana caused by the DWH Oil Spill by enhancing recreational fishing opportunities in Louisiana. This would be accomplished by improving the public's accessibility and enjoyment of natural resources through the various proposed alternatives. Monitoring and adaptive management plans include measurable objectives with associated performance standards to track progress toward restoration goals, methodologies and parameters for data collection, identification of key uncertainties, and tracking of compliance with appropriate regulations.

6.1 Best Management Practices for Elmer's Island Beach Shuttle Service

For the beach shuttle service, vehicles must abide by BMPs for beach driving, including weight and tire restrictions, speed limits, driving only on or adjacent to the wet sand area of the beach, and at no time disturbing nesting birds, sea turtles, or other wildlife.

Controlled Operations/Path. Controlled driving could be allowed only in the area above the water's edge or on or adjacent to the wet sand. Under this BMP, driving would be strictly prohibited near or on the dune habitat. This policy would minimize impacts to foraging, loafing, and nesting birds and other wildlife that use these areas. This policy also would protect dune vegetation and minimize impacts (e.g., increased erosion, reduce dune stability). Additionally, the shuttle service would have designated stops along the beach. This could provide further protections for birds and other wildlife by directing recreational use away from prime foraging and nesting area while still allowing recreational beach access. The designated shuttle stops will be integrated in the monitoring and adaptive management plan for the shuttle service.

Studies have shown that vehicle access has minimal impacts on species that occupy the intertidal zone (Leatherman and Godfrey 1979; Godfrey et al. 1980). Samples taken inside and outside vehicle tracks showed that crab and clam species were not damaged and could be protected by burrows as shallow as 5 cm (Walcott and Walcott 1984). Another study found no significant differences between damage to intertidal macrofaunal species at low-intensity use (5 passes) versus high-intensity use (50 passes) and concluded that the intertidal animals appeared to be safe from damage by vehicles, even at high intensity, provided they were buried and the sand was reasonably compact (van der Merwe and van der Merwe 1991). The New Zealand Department of Conservation (1999) recommends that impacts to intertidal fauna could generally be avoided by driving on wet, compacted sand, seaward of the drift/wrack line during daylight hours (Stephenson 1999).

Through the monitoring and adaptive management of this project, shuttles would be outfitted with GPS units, so that tracks can be plotted along with stop (drop-off/pick-up) locations to better illustrate the shuttle service footprint and relative areas of utilization. This information would be included as part of the monitoring reports. Likewise, shuttle operators would be advised to minimize impacts by driving only on the wet sand and avoiding the wrack line when possible. Adherence to these BMPs would be a requirement for any contractor operating the shuttle service, and the contract award/revocation would be contingent on these conditions.

Depending on the time of year and the corresponding need for the service, the number of shuttles operating will vary, but no more than four vehicles would be used at any one time. When multiple shuttles are in service, efforts would be made to operate in caravans to minimize the frequency of shuttle service impacts to birds and other wildlife present.

In addition, LDWF reserves the right to suspend the shuttle service at any time for any reason, including unfavorable driving conditions. For example, LDWF can temporarily suspend shuttle operations during a high-water event, where the water is pushed against dune habitat. In this scenario, the shuttles would have to drive on the dunes, which is not allowed, due to high water. In this instance, the shuttle service would be suspended until appropriate driving conditions return. In addition, shuttle service could be suspended or altered due to other conditions as deemed appropriate by LDWF (e.g., minimizing impacts to wildlife, etc.).

Shuttle Vehicle Requirements. The shuttle service could only be allowed to use multi-passenger UTV/ATV style vehicles or four-wheel drive vehicles customized for carrying multiple passengers in an effort to reduce the number of shuttles and trips. One trailer per vehicle would be attached for carrying additional gear. Operational protocols would reflect the following BMPs and other pertinent guidelines set forth during the planning stage and over time through adaptive management. Additional restrictions on vehicles could include the following:

- Weight limitations.
- Tire restrictions/requirements – Reducing tire pressure and using four-wheel drive reduces ruts on the sand, minimizing damage to intertidal species and to the beach.

- Limited operating hours – Elmer's Island is open during daytime hours (closed at night); operating vehicles strictly during the day would reduce impacts to nocturnal wildlife that use the beach.
- Speed limits – Driving slowly would allow the operator/driver to notice any animals within the vehicles line of travel.

Contractual Requirements. The shuttle service would be contracted to an independent third party, subject to the standard terms and conditions of Louisiana state contracts. Maintaining the contract would depend upon complying with all terms and conditions. LDWF would be responsible for monitoring the terms of the contract, adhering to all policies and restrictions. State contracts can span from 1 to 3 years (maximum); thus, every iterative contract would evaluate the successful implementation of the shuttle service and would be adaptively managed to provide the best recreational access opportunities while minimizing negative impacts to the environment and natural resources that occur on Elmer's Island.

State Oversight. Per the management plan and the BMPs, LDWF would continually monitor Elmer's Island Wildlife Refuge for nesting birds, sea turtle nests, and other protected resources. LDWF would inform the shuttle operators of any issues, so that they can adhere to the LDWF management plan and all state and federal laws. The LDWF enforcement division has agents monitoring Elmer's Island Wildlife Refuge, who have the ability to enforce state and federal laws if needed. For the first year, the shuttle service would only operate to the east of the existing parking area. After the first year, operation of the shuttle service would be evaluated to determine if the shuttle would service the beachfront westward of the existing parking lot or remain operational only east of the existing parking area.

Beach Raking. Beach raking (i.e., the removal of drift/wrack) is prohibited without permission from LDWF, as such activity would destroy habitat and could adversely impact the beach profile through mechanical disturbance. This restriction helps prevent loss of foraging habitat for birds and loss of cover habitat for smaller animals such as invertebrates.

Emergency Management. The shuttle service would not be responsible for public safety measures at Elmer's Island. Visitors to Elmer's Island would be responsible for their own health and safety. Emergency services can be obtained through 911 telephone calls. Likewise, the shuttle service may be halted due to unsafe environmental conditions (localized weather systems with lightning) or other emergency closures.

Personnel Training. All shuttle operators and employees would be trained in the BMPs as a condition of the contract. LDWF would continue to follow the Elmer's Island management plan to protect nesting shorebirds. Sea turtle nesting has not been documented on Elmer's Island; some false crawls have been observed by LDWF biologists. All shuttle operators and employees would be required to meet with wildlife personnel to learn what sea turtle tracks/crawls look like and would be required to call the Louisiana sea turtle strandings coordinator if a sighting occurred. BMPs would be initiated if a turtle is sighted (e.g., all vehicles must stop until nesting is completed and the turtle has returned to water). Contractors would be required to alert LDWF to any marine mammal or sea turtle stranding.

Signage. Signage could be posted to inform the public of environmental issues and include telephone numbers to call to report any issues. There also could be signage stating where the public could report disturbance to nesting birds or sea turtles.

Litter Abatement. This plan provides funding for litter abatement, scheduled weekly during the summer seasons.

Section 7

Response to Public Comments

The public comment period for the LA TIG Draft Restoration Plan/Environmental Assessment #2: Provide and Enhance Recreational Opportunities (Draft RP/EA # 2) opened on December 20, 2017 and closed on February 2, 2018. During the public review period, the LA TIG hosted one public meeting in New Orleans on January 24, 2018.

The public comment period for the LA TIG Supplemental RP/EA: Elmer's Island Access Project Modification opened on May 20, 2018 and closed on June 20, 2018. During the public review period, the LA TIG hosted one public meeting in New Orleans on May 22, 2018.

At the public meetings, the LA TIG accepted oral comments that were recorded by court reporters. In addition, the LA TIG hosted a web-based comment submission site and provided a mailing and email address for the public to provide comments in the Federal Register and during the public meeting.

During the public comment period for the Draft RP/EA #2, the LA TIG received 23 submissions from private citizens; businesses; federal, state, and local agencies; and non-governmental organizations. During the public comment period for the Supplemental RP/EA, the LA TIG received 11 comments.

All comments submitted during the period for public comment were reviewed and considered by the LA TIG prior to finalizing this RP/EA #2. All comments submitted are represented in the summary comment descriptions listed in this chapter, and all public comments, whether written or oral, will be included in the Administrative Record (https://www.doi.gov/deepwaterhorizon/adminrecord)

7.1 The Comment Analysis Process

Comment analysis is a process used to compile similar public comments into a format that can be addressed efficiently. Comments were sorted into logical groups by topics and issues, consistent with the range of topics applicable to the Draft RP/EA #2 and the Supplemental EA. The process was designed to capture and condense all comments received rather than to restrict or exclude any comments. The comment analysis process allows the LA TIG to provide an organized and comprehensive response to public comments, consistent with OPA and NEPA regulations. The DOI Planning, Environment and Public Comment (PEPC) database was used to manage public comments. The database stores the full text of all submissions and allows each comment to be grouped by topic and issue. All comments were read and analyzed, including those of a technical nature; those that contained opinions, feelings, and preferences for one element over another; and comments of a personal or philosophical nature.

7.2 Comments Summary

Below is a summary of the comments received by the LA TIG during both comment periods and the LA TIG's responses to those comments.

7.2.1 General Comments Received About the Draft Restoration Plan and Environmental Assessment #2

1. Comment: Several commenters expressed support for various project features of the LA TIG restoration plan. These included comments in support of Elmer's Island Access as the beach is one of the only barrier beaches on the Louisiana coast with highway access and as a long-standing destination for fishing, birding, and wildlife viewing. Support was given for the Statewide Artificial Reefs as they will increase habitat complexity of the reef complex and provide increased recreational fishing opportunities to the public. Support was given for the Island Road Piers, so the public can park safely and engage in fishing and crabbing.

Response: The LA TIG acknowledges and appreciates this support.

7.2.2 Comments Specific to Alternative: Elmer's Island Access

7.2.2.1 Boardwalk Feature

1. Comment: Several commenters expressed opposition to the proposed lagoon boardwalk and proposed different alignments or other options:

    a. Commenters opposed to the boardwalk were concerned primarily with the fact that it would bisect the lagoon, preventing access to kiteboarding, kayaking, jet skiing, etc.

    b. Commenters suggested alternatives such as creating a walking bridge beginning at the current west-side parking lot extending alongside and parallel to the dunes toward Caminada Pass.

    c. Commenters suggested restricting the boardwalk feature to birding and fishing locations without crossing the lagoon (no beach access).

    d. Commenters suggested consideration of a type of beach shuttle service via third party support for transport of visitors to the beach and also to support birding tours.

Response: The LA TIG acknowledges and appreciates the comments and suggested alignments. Consideration was given to public suggestions and alignments, and a Supplemental EA was completed to evaluate other boardwalk alignments and a beach shuttle service.

2. A few commenters provided or suggested additional features for the boardwalk component:

    a. The proposed boardwalk should be able to accommodate hand towed beach wagons/kayaks.

    b. Install a set of steps from the fishing pier on Highway 1 and extend to the beach front along Caminada Pass.

Response: The LA TIG acknowledges and appreciates comments and suggested boardwalk components. The boardwalk feature of the Elmer's Island Access alternative was modified as evaluated in the Supplemental RP/EA. As described in this Final RP/EA #2, the LA TIG's preferred feature to assist the public in accessing the Caminada Pass area for fishing and beach recreation is a beach shuttle service, rather than a boardwalk.

7.2.2.2 Sustainability

1. Comment: Several comments were received regarding sustainability (design and construction) of the boardwalk and other features:

    a. Build/construct boardwalk and other features with durable best design materials, easily repaired infrastructure to sustain storm/hurricane damage and to minimize long-term costs.

    b. Design/construct boardwalk (specifically) to minimize erosion/scour around structural components.

Response: The LA TIG fully supports the use of sustainable materials and construction practice; specific design/construction components would be considered during the engineering and design phase of the project. As described in this RP/EA #2, the LA TIG's preferred feature to assist the public in accessing the Caminada Pass area for fishing and beach recreation is a beach shuttle service, rather than a boardwalk. Implementation/utilization of a shuttle service, rather than a boardwalk, would address sustainability concerns associated with construction of a hard structure in this dynamic, coastal environment.

7.2.2.3 Operation & Maintenance (O&M)

1. Comment: Comments were received regarding O&M of and along the boardwalk(s) and other features of this alternative such as trash management:

    a. Consider options to maximize O&M funding that will focus on trash removal/regulation to mitigate negative impacts to habitat (e.g., no beach raking, user fees for user-managed garbage removal, vigilant management of human activity, etc.).

    b. Consider adding permanent bathroom facilities for increased number of visitors.

Response: The LA TIG fully supports utilizing O&M funding to include all options that maximize trash management and removal resulting from increased human usage of Elmer's for fishing, birding, and beach related activities. Tentatively, LDWF proposes a routine weekly clean up during the summer months and monthly organized efforts during the "off-season" (October – April). The idea of adding permanent bathroom facilities has been considered; however, the construction and maintenance of this type of service would be both cost-prohibitive and in contrast to the desired natural or primitive setting and management style of Elmer's Island Wildlife Refuge.

7.2.2.4 Public Safety and Enforcement/Management

1. Comment: A few comments were received regarding public safety concerns and enforcement of non-vehicular traffic and property/protected habitat trespassing:

a. Enforcement staff (and enforcement signage) to oversee access and driving restrictions should be included in the operational budget.

b. Consider a cooperative endeavor for shared management responsibilities between LDWF and other parties to enhance customer service, enforcement, and asset protection.

Response: The LA TIG agrees that signage to denote property lines, driving restrictions and other access issues should be included in the operational budget. These types of educational signs are included under the outreach and education section of the project budget and would be implemented by LDWF once the project is approved. While consideration was given for increased enforcement, at this time, the LA TIG believes the current level of enforcement presence is appropriate. Monitoring results may indicate that the higher number of users generated through this project may require more enforcement presence; in that event, funds may be directed toward increased enforcement presence at Elmer's Island. LDWF would continue to depend on various organizations to assist with management responsibilities at Elmer's Island.

7.2.2.5 Public Outreach and Education

1. Comment: A few comments were received regarding public outreach and education:

   a. Consider signage along Elmer's Island Road for "Terrapin Crossing."

   b. Consider a virtual visitors center adjunct to the LDWF website, utilizing tower-mounted webcams to broadcast real-time images.

   c. Consider outreach and education focused heavily on discouraging littering, improper discard of fishing line and tackle items.

   d. Include signage at multiple locations to increase environmental awareness.

   e. Consider signage at the boat launches that incorporates a map showing the refuge boundaries (to deter trespasses on private property).

Response: The LA TIG has considered and would be implementing many of these ideas, such as educational signage for the protection of wildlife, adhering to property lines and other management issues.

7.2.2.6 Shuttle Service/Supplemental RP/EA

1. Multiple comments were received on the positive aspect of a shuttle service versus the originally proposed boardwalk.

   a. A commenter noted the benefits of the shuttle service to the kiteboarding community.

   b. A commenter noted the benefits of the shuttle service to a lot of people.

   c. A commenter provisionally endorsed the proposed substitution of a shuttle service for a permanent boardwalk provided the enhanced recreational use do not degrade the natural resources present.

Response: The LA TIG acknowledges and appreciates the comments in support of the shuttle service.

2. Comment: One comment was received from a representative of the adjacent landowners of the beach who stated they are in support of the shuttle service as long as it is limited and managed.

    a. Consider limiting the area of shuttle service to have a buffer at either end of the beach to give birds a place to go and nest without being disturbed.

    b. Consider shuttle driver education and morning scouting for nests prior to driving.

    c. Consider public expectation of future shuttle service and potential monetary costs, including future funding and collecting a small fee from visitors using the shuttle.

    d. Consider providing trash bags to shuttle users.

    e. Consider developing an Elmer's Island electronic application (app), which could have educational information on different species and fishing conditions and allow for users to report sightings.

Response: The LA TIG acknowledges and appreciates comments in support of the shuttle service. The shuttle service would include BMPs to minimize potential impacts to birds, including restricting vehicular traffic to or adjacent to the intertidal wet sand area of the beach; avoiding the wrack line when possible; and setting weight limits, tire restrictions, limited hours, restrictions during certain times of year and for certain weather conditions, and speed limits. Additionally, a monitoring and adaptive management plan would be used in association with the shuttle service to identify potential issues and develop BMPs to minimize future impacts. Although the development of an Elmer's Island app would be useful, there are several free apps that provide species descriptions and fishing conditions.

3. Comment: Two comments were received recommending Elmer's Island be left alone with the exception of providing additional trash receptacles.

Response: The LA TIG acknowledges and appreciates comments. Trash management would be a component of the preferred alternative at Elmer's Island Wildlife Refuge.

4. Multiple commenters provisionally endorsed the substitution of a shuttle service for a permanent boardwalk while raising concerns and offering suggestions to help address those concerns.

    a. The commenters recommended a restriction of the beach shuttle from the parking lot to the east to Caminada Pass.

    b. The commenters recommended crafting a shuttle management plan with clear standards prior to initiation of the service. The commenters also requested to help draft the management plan.

    c. The commenters recommended a one-year trial contract for the shuttle service to ensure that all parties adhere to the conditions of the shuttle management plan rather than three-year contracts.

d. The commenters recommended the creation of "no access" areas where public cannot interfere with beach-nesting bird activities.

e. The commenters recommended that the design of the public entry point at the parking area be evaluated with regard to the potential for dune erosion.

f. The commenters recommended increased LDWF enforcement to ensure the protection of wildlife and safety of beach visitors.

g. The commenters recommended training opportunities for beach users on potential impacts of recreational activities as a method to protect birds and wildlife through education of the general public.

h. The commenters recommended changing all references of "Elmer's Island Refuge" in the document to "Elmer's Island Wildlife Refuge."

i. The commenters recommended charging a fee to the public for use of the shuttle as a way to ensure the public buys into the service from the start. They also recommend using this fee to cover long-term expenses.

Response: The LA TIG acknowledges and appreciates comments in support of the shuttle service and the additional recommendations. A detailed response to the above recommendations is presented below:

Comment a) Adaptive management would play an important role in the shuttle service operations. This shuttle service would be contracted through the state bidding process, according to which each contract can span from 1 to 3 years (maximum). As such, each contract would provide the opportunity to employ an adaptive management approach to routinely evaluate contract performance/effectiveness, environmental effects, the needs of recreational users, and other feedback. As part of this approach, the LA TIG would consider restricting the shuttle service to the eastern end of the beach only (from the parking area east to Caminada pass) during the initial shuttle contract period. Decisions regarding the scope of shuttle service operations for subsequent contract periods would take into account the effectiveness of this approach, user feedback, and the results of contract monitoring during this initial period. Additionally, the LA TIG believes the BMPs and contractual obligations of the shuttle service would provide further protections for birds as described in the Final RP/EA #2. As part of the adaptive management plan, the shuttle service would employ the use of designated stops. This would provide further protections for birds by directing recreational use away from prime foraging and nesting area while still allowing recreational beach access. The designated shuttle stops would be integrated in the monitoring and adaptive management plan for the shuttle service.

Comment b) A shuttle management plan would be developed prior to the start of the shuttle service as part of the contract process. Additionally, LDWF would be able to alter the shuttle service or stop operation based on any changes in environmental conditions to protect birds and other wildlife. Ongoing assessments would be part of the adaptive management process. LDWF would consider further opportunities for input during the management plan development process, consistent with State contracting requirements.

Comment c) The LA TIG understands the importance of shuttle contractor performance. The adaptive management plan contains multiple elements that would allow for frequent monitoring of performance and opportunities to modify shuttle schedule, location, and method of operation based on LDWF monitoring and assessment. While the initial contract period has not been determined at this time, a number of factors would need to be taken into account, including cost-effectiveness considerations. The contract would be developed consistent with State contracting requirements which include means of terminating a contract for cause or convenience. Additionally, periodic performance reviews would be part of the shuttle contract and also will allow for monitoring and revision of the shuttle operation as necessary.

Comment d) The LA TIG understands the importance of protecting bird nesting and foraging areas including the use of "no access" areas as recommended. Currently, LDWF establishes no access areas to protect nesting birds on Elmer's Island Wildlife Refuge. LDWF would continue to post areas to protect nesting birds, when nesting activity is present, generally from May through August. The LA TIG also believes the adaptive management restrictions related to controlled shuttle operations/path and the use of designated stops would also serve to help protect sensitive bird nesting areas from human disturbance.

Comment e) Re-design of the public entry points at the parking area is not within the scope/budget of the Elmer's Island Access project. Under a separate effort, the State would be installing more dune fence and plantings near the entrance, designed to control sand accretion and manage nesting near the access points. The adaptive management plan should provide sufficient monitoring and assessment to identify any potential erosion issues.

Comment f) While consideration was given for increased enforcement, at this time, the LA TIG believes the current level of enforcement presence is appropriate. The presence of shuttle service personnel and recreational users would provide additional "self-monitoring" of the area as shuttle drivers would be able to monitor and report their observations, as well as the observations of recreational users, of potential violations to LDWF.

Comment g) The LA TIG understands the importance of educating the general public about wildlife and protected species issues. Signage would be used at Elmer's Island Wildlife Refuge to educate recreational users about sensitive species and habitats, as well as provide the public with phone numbers to call to report any issues. LDWF would also require through the State contracts that all shuttle operators be trained in the BMPs, as addressed in Section 6 of this Final RP/EA #2 (see Personnel Training).

Comment h) The LA TIG agrees with the commenters concerning the use of the full name of the Refuge in this RP/EA #2. Therefore, all references to the Refuge have been changed to Elmer's Island Wildlife Refuge as suggested.

Comment i) At this time, the LA TIG is not considering the shuttle service as a revenue-generating feature of the Elmer's Island Access project. Throughout the life of the project, the LA TIG would track project costs and effectiveness to help ensure the high quality and long-term feasibility of the service.

7.2.3 Comments Specific to Alternative: Statewide Artificial Reefs

7.2.3.1 General Comments

1. Comment: A couple commenters expressed that the Artificial Reefs were appropriate use of restoration funds to increase recreational fishing opportunities.

Response: The LA TIG acknowledges and appreciates this support.

7.2.4 Comments Specific to Alternative: Lake Charles Science Center and Educational Complex

7.2.4.1 General Comments

1. Comment: A commenter expressed concern for such a heavy dollar emphasis on a facility so distant from the major spill impact zone.

Response: The LA TIG acknowledges the fact that the major spill direct-impact zone was the eastern part of the state; however, it respectfully notes that the lost recreational use opportunities resulting from the spill were statewide. The SCEC location is within the city limits of Lake Charles and in proximity to multiple schools and other public venues; thus, it would be available to a large potential visitor population.

2. Comment: A commenter suggested inclusion of education and outreach to include ongoing whooping crane restoration efforts, which has a geographic nexus to the Lake Charles area.

Response: The LA TIG acknowledges the suggestion to include information on the successful whooping crane restoration efforts as supported by the LA TIG. Moreover, while the major focus of the Science Center and Educational Complex is on fisheries, there are wildlife-oriented education and outreach components included in the preliminary design. Further development of elements that showcase all of LDWF's wildlife and fisheries management efforts and issues, including those for whooping cranes, would be further refined during the final design process.

7.2.5 Comments Specific to Alternative: Island Road Piers

7.2.5.1 General Comments

1. Comment: Two commenters suggested the piers would provide excellent recreational viewing opportunities, while also providing safer parking for the public.

Response: The LA TIG acknowledges and appreciates this comment and notes that a variety of recreational opportunities, including non-consumptive activities like viewing nature, would result from this project. Additionally, the parking facilities would provide a safer experience for visitors.

2. Comment: One commenter expressed concern regarding the responsibility for long-term maintenance of the Island Road itself, which provides access to the piers and ultimately to Isle de St. Jean Charles.

Response: The LA TIG acknowledges the concern about the long-term maintenance of Island Road, which is a common theme for most infrastructure in south Louisiana. In consultation with

the coastal zone manager for Terrebonne parish, LDWF understands that Terrebonne Parish is actively maintaining Island Road and has no formal plan to stop maintenance. The residents on Isle de Jean Charles island have not been relocated nor has any land been acquired to date. As long as there are residents on the island, FEMA is expected to continue with disaster assistance to repair the road from major hurricane events.

3. Comment: One commenter suggested inclusion of measures to address incidental capture of the endangered Kemp's Ridley sea turtle by recreational hook and line fishers.

Response: The LA TIG acknowledges the concern with incidental capture of sea turtles and other marine life. The structures would be located on the northern side of the road, which is part of the Ensminger/Sonde marsh management unit. This area is managed with water control structures, which serve as a barrier to ingress of species like Kemp's Ridley sea turtles, and accordingly there have been no observations of sea turtles or marine mammals within this marsh management unit.

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Section 8
List of Repositories

Table 8-1. List of Repositories

Library	Address	City	Zip
St. Tammany Parish Library	310 W. 21st Avenue	Covington	70433
Terrebonne Parish Library	151 Library Drive	Houma	70360
New Orleans Public Library, Louisiana Division	219 Loyola Avenue	New Orleans	70112
East Baton Rouge Parish Library	7711 Goodwood Boulevard	Baton Rouge	70806
Jefferson Parish Library, East Bank Regional Library	4747 W. Napoleon Avenue	Metairie	70001
Jefferson Parish Library, West Bank Regional Library	2751 Manhattan Boulevard	Harvey	70058
Plaquemines Parish Library	8442 Highway 23	Belle Chasse	70037
St. Bernard Parish Library	1125 E. St. Bernard Highway	Chalmette	70043
St. Martin Parish Library	201 Porter Street	St. Martinville	70582
Alex P. Allain Library	206 Iberia Street	Franklin	70538
Vermilion Parish Library	405 E. St. Victor Street	Abbeville	70510
Martha Sowell Utley Memorial Library	314 St. Mary Street	Thibodaux	70301
South Lafourche Public Library	16241 E. Main Street	Cut Off	70345
Calcasieu Parish Public Library Central Branch	301 W. Claude Street	Lake Charles	70605
Iberia Parish Library	445 E. Main Street	New Iberia	70560
Mark Shirley, LSU Ag Center	1105 West Port Street	Abbeville	70510

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Section 9

List of Preparers, Agencies, and Persons Consulted

Table 9-1. List of Preparers, Agencies, and Persons Consulted

Agency/Firm	Name	Position
State of Louisiana		
Louisiana Department of Wildlife and Fisheries	Todd Baker	Assistant Chief
Louisiana Department of Wildlife and Fisheries	Brady Carter	Program Manager of Fisheries Habitat Section
Louisiana Department of Wildlife and Fisheries	Craig Gothreaux	Fisheries Program Manager
Louisiana Department of Wildlife and Fisheries	Julia Lightner	Fisheries Biologist DCL-A
Louisiana Coastal Protection and Restoration Authority	Annie Howard	Coastal resources scientist, project manager
Louisiana Coastal Protection and Restoration Authority	Matt Mumfrey	Attorney
National Oceanic and Atmospheric Association		
NOAA Restoration Center	Christina Fellas	DWH Environmental Compliance Coordinator/Biologist
NOAA Restoration Center	Ramona Schreiber	DWH NEPA Coordinator
NOAA Restoration Center/Earth Resources Technology, Inc.	Courtney Schupp	Marine Habitat Resource Specialist
U.S. Department of Agriculture		
USDA-NRCS	Ronald Howard	Program Specialist
USDA-NRCS	Mark Defley	Biologist
U.S. Environmental Protection Agency		
EPA Office of Water	Tim Landers	Environmental Protection Specialist
EPA Region 6	Doug Jacobson	Environmental Protection Specialist, Louisiana Team Leader
EPA Office of General Counsel	James Bove	Attorney Advisor
EPA Assessment and Watershed Protection Division	Gale Bonanno	Associate Division Director
U.S. Department of the Interior		
DOI	David Reeves	Science Policy Fellow
DOI	Robin Renn	DWH NEPA Coordinator
DOI	Kevin Reynolds	Designated Natural Resource Trustee Official – Louisiana Trustee Implementation Group
DOI	John Tirpak	Louisiana Restoration Area Coordinator
Contractor Team		
CDM Smith	Jamie Bartel	Senior Project Manager, Geologist
CDM Smith	Murray Wade	Senior Biologist
CDM Smith	Brendan Brown	Biologist/Ecologist Specialist

Agency/Firm	Name	Position
CDM Smith	Matt Petty	Biologist/Ecologist Specialist
CDM Smith	Adam Khalaf	Biologist/Ecologist
CDM Smith	Traci Mordell	Technical Editor
CDM Smith	Melissa Vagi	Technical Editor
CDM Smith	Kim Brotzge	Administrative

Section 10

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Appendix A

Project Universe

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Lake Hermitage Marsh Creation Additional Increment	The Lake Hermitage Marsh Creation - NRDA Early Restoration Project involves the creation of marsh within a project footprint known as the Lake Hermitage Marsh Creation Project developed for and funded through the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Program. This proposal substitutes approximately 104 acres of created brackish marsh for approximately 5-6 acres of earthen terraces that would otherwise have been constructed within the CWPPRA project boundary. CWPPRA provides over $80 million per year for planning, design and construction of coastal restoration projects in Louisiana. Each year, a list of projects is selected for implementation, and funds are approved for engineering and design. The Lake Hermitage Marsh Creation Project (BA-42) was funded in 2006 as part of CWPPRA Priority Project List #15. The Lake Hermitage Marsh Creation Project is located within the Barataria Hydrologic Basin in Plaquemines Parish, Louisiana, to the west of the community of Pointe a la Hache, and northwest of the community of Magnolia (Figure 5). This basin was identified as a priority area for coastal restoration, and has been the focus of extensive study and project design and implementation. The primary goals of the Lake Hermitage Marsh Creation base CWPPRA Project are (1) to restore the eastern Lake Hermitage shoreline to reduce erosion and prevent breaching into the interior marsh and (2) to recreate marsh in the open water areas south and southeast of Lake Hermitage. Specific objectives of the CWPPRA project are to: (1) create 549 acres of marsh by filling open-water areas and fragmented marsh with dredged material; (2) restore approximately 6,106 linear feet of the eastern Lake Hermitage shoreline; and (3) create 5 acres of emergent habitat by constructing 7,300 linear feet of earthen terraces. The proposed terrace field consists of approximately 104 acres.	Lake Hermitage, Plaquemines Parish, Louisiana	$ 13,200,000	Public
"BP" The Blue Print for Restoring the Gulf's Fisheries	This program will allow Fishers and NMFS to test and address some of the possible management strategies that the fishing industry has recommended to Gulf of Mexico Fishery Management Council since the Oil Spill. It will contain the basic blue print of those recommendations. It will help to address the needs of the commercial reef fish fishermen in the Gulf of Mexico with their by catch of regulatory discards. This will benefit the fishery by having those fish available to the market place instead of being thrown back into the Gulf Waters. This provides benefit to the fisherman, the consumer of the resource, the coastal communities and the living marine resource. This program will allow the fisherman a way to participate at a cost that may not be available to them now. Plus it would help distribute the fishery resource among the coastal states and the profit from the product to the local community. This program will lease fish from Red Snapper and Grouper Allocation holders and make them available at a reduced price to those that presently have a commercial reef fish permit and do not presently hold adequate allocation to address their by catch. There will be the necessary safe guards built into the lease so that those purchasing the leased fish will have to fish them. The second phase will have a working group meet to discuss the success they have had with a fish tagging system and various ways to administer the program in a such a way that there may be additional benefits to such a program. There are methods the states could use to administer the program so that there are no added cost for the states should such a program be done as management in the future. This second phase of the program will help to also address the needs of the charter for hire and special tournament needs for the private angler and the private angler that has not been able to fish due to closed seasons and disasters. This program would be done through a fish tagging program and will require the fisherman, the states, the science center and NMFS coming on board. This would be done at a extra cost to the program for the second phase. This program would help to address the regulatory discards in the recreational community and will benefit the coastal communities through tourism. The charter for hire could use their fish tags when it was beneficial to their business and community and the tournament caught fish will allow the private angler the opportunity to fish out of season when their season is closed, as well as the private angler that has not had the opportunity to fish during closed seasons and disasters. These programs will help the managers with the recommendation they make for management for the future. These programs will be protecting the fishery by reducing by catch while producing income and food for the Nation. This "Blue Print for Restoring the Gulf Fisheries brings Opportunities" that will be lost if not funded!	Texas, Louisiana, Mississippi, Alabama, Florida	$ 8,000,000	Public
40 Meters and Landward: Assessment, Monitoring, and Adaptive Management for Gulf of Mexico Coastal Ocean, Estuarine, and Riparian Habitat	This project uses novel satellite technology to provide classified habitat shoreward of approximately 40 meters water depth across the Gulf of Mexico. Because satellites pass over any location regularly, this unique project will create a time series of spatial habitat data thus allowing rapid identification of where and when change occurs. Such data are invaluable for effective, targeted restoration planning, project monitoring, and observing how the region responds to a variety of pressures. Many open ocean fish, invertebrates, marine mammals, and turtles injured during Deepwater are dependent on both nearshore and estuarine habitats. Indeed, central to many restoration planning discussions leading to the PDARP were the linkages between offshore and nearshore or estuarine habitats. This is because the most viable - and pragmatic - open ocean restoration often has a nearshore or estuarine focus. However, nearshore and estuarine habitats were also injured by the Deepwater Horizon oil spill and are further degraded by channelization, energy development, subsidence, and sea level rise. These processes will present challenges into the foreseeable future. Mitigating such losses - or even reversing them - would be most effectively achieved if one understands how and where change is most rapid. Advanced satellites now offer the capability to rapidly collect bathymetric and categorical habitat data to water depths as deep as forty meters. This capability means that broadscale maps of habitat and bathymetry covering large swaths of the continental shelves can be developed quickly and efficiently. Further, repeated satellite passes over any given area allows one to measure habitat and landform change through time. These techniques offer distinct advantages in coverage and speed over the piecemeal approaches deployed today that use aircraft, sidescan and multibeam sonars. The work will provide refined habitat data for the Gulf of Mexico, support improvements in circulate on models that all rely on bathymetric data, and offer a means to monitor change in critical habitat from 40 meters up into terrestrial environments across the Gulf of Mexico. This project will use recent developments in satellites and classification analyses to provide habitat-categorized maps of the coastal zone (inshore of the riparian out to a water depth of 40m depending on water quality). The satellite-derived timeseries of habitat data will be examined to identify those areas that are stable and those that are undergoing rapid change in elevation of habitat type. The information will be useful for states planning geoengineering, restoration personnel preparing for marsh and seagrass projects, and biologists interested in the habitats of fishes, cetaceans, and turtles.	TX, LA, MS, AL, FL. Others possible.	$ 5,000,000	Public
8029 acres mitigation , marsh creation, coastal restoration	Cameron Parish http://www.blacklakelandco.com fresh and brackish water impoundments coastal restoration mitigation credit potential marsh and open water prior owner BP - AMMACO permitted for 5000 acres terraces under marsh management plan approved by state and core permitted for marsh creation	Cameron Parish, Louisiana	Not provided with submission	Public
A low-cost solution for a cleaner gulf	Clean up bays and estuaries by paying fishermen to bring in garbage. This is from a Brazilian architect who has been a mayor and a governor in Brazil and has won awards for his "green" activities and ideas: http://readersupportednews.org/off-site-opinion-section/60-60/9217-low-cost-solutions-for-a-sustainable-world Of course, there might be some haggling about how much to pay for the garbage, but if you set up an ENDOWMENT with some of the restoration money, you could use some of that, in perpetuity, to keep the program going.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
A way to clean some of oil out of the gulf	Fisherman catch tar ball in their nets. They rake these tar balls back into water. So instead of them raking the tar ball back into water, give them some kind of storage container to put the tar balls in. To give them an incentive to do this, pay them by the pound or container. This is how we feel some of the oil can be removed from the Gulf.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Acquisition of at-risk landscape and developing independent science-based priority measures for America's Delta.	I'm a credentialed coastal ecologist, with ten years as a faculty member at LSU and 18 years as a coastal policy advisor to five Louisiana governors. My recommendation for allocating Louisiana's portion of the early installment of the CWA funding was described in some detail in an essay published here: http://lacoastpost.com/blog/?p=32499. What follows here is a concise summary. The Louisiana coastal restoration program has long suffered from many problems, not least the fact that elected officials suffer from appalling ignorance of and disregard for coastal science. For example, they deny anthropogenic climate change and accelerated sea level rise from global warming. They also lack the political courage to overrule local opposition to large river diversion projects (the only realistic long term solution to land loss) and they support environmentally damaging, expensive and unsustainable continuous massive earthen levees (such as Morganza-to-the-Gulf) as a primary means of protection against gulf storms. Given this reality I predict with great confidence that allowing Louisiana funds to be subdivided into separate specific projects will become so politicized as to make every project meaningless and a waste of money. Therefore I recommend that Louisiana's $100 million be allocated for two very specific exclusive purposes: (1) acquiring property rights for at-risk landscape; and (2) developing independent science-based priority measures. $75 to 80 million should be used exclusively to purchase surface rights and/or easements to coastal property characterized by: (a) low population density; (b) subject to high subsidence rates and imminent inundation; and/or (c) particularly effective for storm energy absorption, such as privately owned coastal forests that could otherwise be logged. $15-20 million should be used to commission an independent team of geophysical scientists, oceanographers, hydrologists, ecologists and social scientists to develop, within one year, a set of priority measures that could realistically sustain specific portions of America's Delta (all of SE Louisiana) into the future.	Louisiana	$ 100,000,000	Public
Atchafalaya Delta Wildlife Management Area Access Improvements (AD WMA Access)	Public Access Enhancement (dredging channels popular with public navigation)	Atchafalaya Delta WMA - St. Mary	$ 1,500,000	LDWF Wildlife (WMA)
AD WMA Campgrounds	Campground Improvements including bulkhead addition	Atchafalaya Delta WMA - St. Mary	$ 7,800,000	LDWF Wildlife (WMA)
Adaptive management of marine mammals effected by the freshwater and sediment diversion projects in southern Louisiana	Planned coastal restoration activities including Mississippi River diversion projects are a key component to the State of Louisiana's masterplan to rebuild the coastline. These coastal restoration activities could have an effect on resident bottlenose dolphin populations in Barataria Bay, Lake Borgne, and Breton Sound. It is estimated that 2,000 dolphins call Barataria Bay home, and about 800 reside in the Breton Sound area. This adaptive management plan will monitor the health of the marine mammals, including the bottlenose dolphin, that reside in Lake Borgne, Barataria Bay, and Breton Sound. Audubon Nature Institute's Coastal Wildlife Network (CWN) is an excellent partner to monitor the health of the bottlenose dolphins affected by the Mississippi River diversion projects. CWN serves as the primary response partner for Louisiana Department of Wildlife and Fisheries (LDWF) for rehabilitating marine mammals (dolphins, whales, manatees) and sea turtles in the state of Louisiana. CWN is the only entity in the state of Louisiana responsible for the rehabilitation of live marine mammals and also monitors and collects data to investigate the cause of illness and death. Currently, CWN staff participates in NOAA dolphin health assessments and will participate in an upcoming tagging study in conjunction with LDWF and CPRA. Through this project, CWN would use adaptive management techniques to monitor bottlenose dolphin populations and their health in areas where bottlenose dolphins reside and could be affected by the Mississippi River diversion projects.	Barataria Bay/Lake Borgne/Breton Sound, Louisiana	$ 900,000	Public
Addressing Marine Debris to Expedite Recovery along the Gulf Coast (Addressing Marine Debris)	The significant and long-term negative impacts along the Gulf Coast resulting from the Deepwater Horizon oil spill will require a suite of restoration projects. In addition to physical marsh restoration and other activities to restore resources, the entire Gulf region will significantly benefit from a targeted, sustained outreach and education campaign to improve the health of impacted resources. This type of restoration project, conducted as part of NRDA in the past, will reduce future injury to protected species - both marine mammals and sea turtles - and their habitats through the reduction of existing marine debris as well as the prevention of future introduction of hazards. By preventing preventable future injuries, this project will enhance the capacity for species and habitat recovery and the time of impact to recovery will be shortened. Enhancing nearshore and shoreline habitats through reducing impacts of marine debris will aid in the long-term, sustainable recovery of the Gulf Coast at an accelerated rate. Specifically, this project will effectively coordinate and execute a two-year, intense outreach and education campaign that will result in lasting changes after the project is complete. Hosted at the NOAA Disaster Response Center in Mobile, AL, and coordinated as a NOAA partnership project with the NOAA Marine Debris Program as lead coordinator, this project will engage all five states, maintain and improve partnerships with state and local organizations, and strengthen public engagement across the Gulf. This project is specifically targeted to involve and educate Gulf Coast communities how marine mammals, sea turtles, and habitat will all directly benefit from debris prevention and removal. The project will also look to identify targeted areas for debris removal that will have the most impact to improve the ecological health of the Gulf. Key contacts associated with this project already have strong professional working relationships across the region. As has been successfully demonstrated in previous projects in the Gulf of Mexico, Sea Grant extension agents have a unique capacity to strengthen community involvement - including select communities where English is not the first language - and broaden awareness through effective beach clean-ups, fish rodeos, etc. This project will incorporate powerful Public Service Announcements, print materials, and technology to effectively raise the awareness across the Gulf States that a sustained outreach campaign focused on debris prevention and removal will benefit livelihoods in the entire region in both the short and long-term.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 10,000,000	Public
Aerating the Dead Zone	Begin near the mouth of the Mississippi River and install compressors to pump air into a network of pipelines to oxygenate the water from every oil platform in the area. Keep expanding outward into the Dead Zone and only run the operation during the rainy season. Adding oxygen, like all the delta catfish farmers do, will counter the effects of the depleted oxygen. The aerated surface turbulence will also help to rapidly evaporate hydrocarbons from any future oil spills. Eliminating the Dead Zone would be a much larger benefit to the USA than many of the other research and shoreline restoration plans submitted so far. The oil industry have thousands of miles of pipelines for their 4,000 oil platforms. If each platform had a few air compressors and an air hose pipeline with diffusor heads in a network spreading out two square miles you would have 8,000 square miles of quality water during the months of June, July and August. The Dead Zone estimate for this year is only 7,000 square miles. Compressors could be powered by something renewable or by the gas burn-off on the towers. Figure out how to do one and then it is a simple replicating process. The infrastructure would last for many years and the Dead Zone would rapidly disappear as nature rejuvenates itself into a highly productive, job creating, sustainable region. This may be a larger infrastructure project than you are ready to tackle but I am sure the US Army Corps of Engineers would be up to the task and complete it very fast. They can figure out how much it would cost. I believe the offshore oil industry might contribute also to prove they are good stewards of the environment. Maybe next year we can start harvesting from the former dead zone.	Louisiana	Not provided with submission	Public
Assessing the Human Dimensions of Marine Mammal Management	In the wake of the widespread environmental and ecological destruction caused by the BP oil spill, there can be no higher priority than ensuring the health and well-being of marine mammals, fish, and other wildlife populations from this point forward. Just as these populations are monitored and managed according to the use of proper science and the best available data, so too should the human dimensions of marine mammal management (i.e., how humans interact with species, awareness of proper behavior around marine wildlife, knowledge of laws to prevent problematic interactions, etc.) be assessed methodically and scientifically. Human dimensions data collection can be accomplished through the use of focus groups and scientific, probability-based surveys, which are effective and commonly used tools for gauging the human dimensions component of resource management. It is recommended that NOAA and other resource agencies avail themselves of these methods in order to develop and evaluate communications, campaign messages, and outreach strategies designed to curb harmful interactions with marine wildlife. Ongoing human dimensions data collection can reveal trends in attitudes and opinions and identify gaps in knowledge and awareness -- such data are critical to understanding the effectiveness and impact of communications, messages, and outreach strategies, ensuring the wise allocation of funds and resources.	Louisiana	$ 150,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Atchafalaya Basin/ Atchafalaya National Wildlife Refuge (Atchafalaya NWR)	This effort would add up to 5,000 acres to the current protected land base within the Atchafalaya Basin in south Louisiana. The protection would ensure increasingly valuable filtered surface water flows, for the long-term health of the Gulf of Mexico. In addition to protecting water quality for the Gulf, this source for significant quantities of surface water flow has provided the only significant sediment accretion forming wetlands within the Louisiana Coastal Zone. Further, this area provides critical stopover, foraging and breeding habitat for numerous migratory birds. Sherburne Wildlife Management Area, located in the Morganza Floodway system of the Atchafalaya Basin, is situated in the lower and upper portions of Pointe Coupee, St. Martin, and Iberville Parishes respectively, between the Atchafalaya River and the East Protection Guide Levee. The Sherburne WMA, Atchafalaya National Wildlife Refuge and the U.S. Army Corps of Engineers lands combine to form nearly 50,000 acres of protected lands. The Louisiana Department of Wildlife and Fisheries owns 12,000 +/- acres, the U.S. Fish and Wildlife Service owns 15,800 acres and the remaining acreage is owned by the U.S. Army Corps of Engineers.	Atchafalaya Basin, Louisiana	Not provided with submission	Public
Avery Island	Enhancement/repairs to dock at Avery Island public launch with the addition of a covered pavilion/restroom facility	Avery Island - Iberia	$ 250,000	LDWF Fisheries (CSA)
Barataria Basin barrier shoreline restoration: Caminada Headland, LA	Restoration of the Caminada Headland would consist of dune, shoreline, Chenier ridge and marsh creation across 13 miles. One component of this restoration is a project on the easternmost segment known as Elmer's Island which consists of approximately 2 miles of dune restoration and marsh creation. The restoration strategies should maintain the headland without disrupting the natural hydrologic patterns, preserve the integrity of the headland by closing existing breaches, sustain and improve shoreline, dune, and interior marsh habitat quality for fish and wildlife, and provide a natural storm buffer. Restoration of the headland may also help to protect Port Fourchon and local and State highways, including the only hurricane evacuation route in the region. (scalable)	Caminada Headland, Louisiana	$ 220,000,000	Public
Barataria Bay Rim Marsh Creation	Historic wetland loss in the area occurs in the form of shoreline erosion along Barataria Bay and interior marsh loss. The interior loss is caused by subsidence, sediment deprivation, and construction of access and pipeline canals. Based on analysis conducted by USGS, loss rates in the area are estimated to be -0.615% per year for the period 1984 to 2011. Shoreline erosion along the northeast shore of Barataria Bay, in the area proposed to be addressed by this project, is approximately 3 to 4 feet per year. While this rate may not seem excessive, this reach of shoreline is very narrow and loss of this shoreline would connect Barataria Bay to a large lagoon, greatly altering the hydrology of the marsh. The proposed project would create approximately 232 acres and nourish approximately 322 acres of marsh using sediment dredged from Barataria Bay. The dredged material would be fully contained. Containment dikes will be degraded as necessary to reestablish hydrologic connectivity with adjacent wetlands. In case the area does not re-vegetate on its own, the maintenance cost estimate will include funds to plant 25% of the created marsh at Year 3. The anticipated land loss rate reduction through the area of direct benefits of the project totals over 50% over the life of the project. The project would help to stabilize the very fragmented and vulnerable northern rim of Barataria Bay. The communities of Lafitte and Barataria lie to the north of this important landmass, which provides a buffer to these communities against the impacts of surge from tropical weather events. Vital oil & gas infrastructure would also benefit from the reduced land loss in the area.	Barataria Bay, Louisiana	$ 14,200,000	Public
Barataria Bay Rim Shoreline Protection	This project is to protect shoreline with 740-Geo-TECH-Jetti's Units. The project is a nominee PPL24 with CWPPRA, to create 232 acres of marsh with dredge material. The South shoreline is open to wide open water and should be protected with a barrier. We propose to install 740 Geo-TECH-Jetty Units above the water line, (as determined by official government determinations). Our Geo-TECH-Jetty units are filled with dredged material sourced from near the installation. Within a prepared area on top of the Geo-tech containers are Root-Zone Humus-filled, (RZHO), biodegradable containers. The RZHO-filled containers are planted with mature native marsh grasses and other select native plants. Our specialized method, proven in several previous deployments, ensures highly energetic and sustained plant growth, while providing shoreline force protection. Our proven methods allow for replacement of rock as stabilization means. Using our proven methods, we ensure rapid reestablishment of habitat. Shellfish, fin-fishes, invertebrates, and other vital coastal organisms are able to reestablish populations. Installing our Geo-TECH-Jetty units, we accomplish rapid rebuilding of the entire food-web, by providing the multiple benefits. (1) We can provide protection from sea-rise. (2) We ensure rapid establishment of native plants along shorelines, making possible rapid habitat establishment. (3) Our methods assure accretion, as the long, well-set units of Geo-TECH-Jetty prevent erosion. (4) The Geo-TECH-Jetties also provide protection from surface and sub-surface oil encroachment on shorelines and into adjacent marshes. (5) Shoreline areas of land, (marshes or barrier island shores), behind the rows of Geo-TECH-Jetty units are filled with dredged material has our process continues, the filled RZH and RZHO are applied to ensure fertility. The Geo-TECH-Jetty is set in place from barges. Trident plans to hire all local personnel for project.	Barataria Bay, Louisiana	$ 1,556,400	Public
Bay Dogris Marsh Creation	Historic wetland loss in the area occurs in the form of interior marsh loss and shoreline erosion along Turtle Bay and Little Lake. The interior loss is caused by subsidence, sediment deprivation, and construction of access and pipeline canals. The Little Lake Coast 2050 mapping unit land loss rate for the period of 1983 to 1990 was 1.6% per year. The proposed project would create approximately 213 acres and nourish approximately 441 acres of marsh using sediment dredged from Little Lake. The dredged material would be fully contained. Containment dikes will be degraded as necessary to reestablish hydrologic connectivity with adjacent wetlands. In case the area does not re-vegetate on its own, the maintenance cost estimate will include funds to plant 25% of the created marsh at Year 3. The anticipated land loss rate reduction through the area of direct benefits of the project totals over 50% over the life of the project. The project would help to stabilize the very fragmented and vulnerable land mass that separates Barataria Bay from Little Lake. The communities of Lafitte and Barataria lie to the north of this important landmass, which provides a buffer to these communities against the impacts of surge from tropical weather events. Vital oil & gas infrastructure would also benefit from the reduced land loss in the area.	Little Lake, Lafourche and Jefferson Parishes, Louisiana	$ 18,300,000	Public
Bayou Dularge	Kayak launch and roadside fishing	Bayou Dularge - Terrebonne	$ 250,000	LDWF Fisheries
Bayou Sale Shoreline Protection (TV-20)	This project is listed under the CWPPRA program as project number TV-20 (http://lacoast.gov/reports/managers.asp?projectNumber=TV-20). Eroding shoreline at an estimated rate of 13.5 ft./year has been caused by the open water fetch and resulting wave energy from East Cote Blanche Bay. The resulting shoreline has resulted in a substantial loss of live oak forest, emergent wetlands and critical habitat used by a multitude of fish and wildlife species including the endangered black bear. The goal of this project is to reduce and/or reverse shoreline erosion and create marsh between the breakwater and existing shoreline. The project was originally envisioned as a rubble mound dike, up to seven miles in total length. However, the presence of known oil and gas infrastructure and a large number of magnetic anomalies makes rock construction unfeasible. The team has identified a possible solution, using a product such as the OysterBreak (http://www.wayfarertech.com/oysterbreak/oyster-reef-building). Such a structure could be constructed with shallow draft equipment such as conventional barges or specialty vessels available in the area, thereby eliminating the need to dredge access channels. This option would allow the floating construction equipment to safely pass over known pipelines and unidentified magnetic anomalies. It is understood that no oysters would grow on the structure; the OysterBreak would function as a concrete armor unit breakwater. In summary, this proposal consists of up to approximately seven miles of the OysterBreak Shoreline Protection System, with gaps as appropriate to allow fisheries access, and to avoid known pipelines and unidentified magnetic anomalies.	East Cote Blanche Bay, St Mary Parish, Louisiana	$ 18,000,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Bayou Villars Shoreline Stabilization	Location: The project is located in Region 2, in the Barataria Basin. The project site is located along the east portion of Lake Salvador near the Barataria Preserve of Jean Lafitte National Historical Park and Preserve (JLNHP&P) and lands south of Bayou Villars in Jefferson Parish, Louisiana. Communities in the immediate vicinity of the project include Jean Lafitte, Barataria and Crown Point. These communities depend on commercial and recreational fishing, ecotourism, and the oil and gas industry for their economic stability, and were highly impacted by the BP oil spill. One key feature of this project is the protection for these local communities and adjacent infrastructure and two very important Federal assets. The project site is located in a critical area 15 miles south of New Orleans that provides one of the last lines of defense against storm surge coming toward the Metropolitan Area from Lake Salvador and the Barataria Bay. The project also prevents Lake Salvador from continuing to break through into the Gulf Intracoastal Water Way (GIWW) and protects the JLNHP&P from erosion. In addition, oil and gas infrastructure in the immediate area would be protected. Problem: Within the past 50 years, the project area has lost more than 650 acres of wetlands along the east shore of Lake Salvador. The opening of Bayou Villars at Lake Salvador has retreated approximately 5,100 feet into the GIWW. Shoreline retreat and wetland loss were accelerated by winds and storm surge caused by Hurricanes Katrina and Rita. Within the project area, these storms eroded the shoreline 100 feet in places and interior marsh was compacted or torn apart creating open water ponds. Flooding of Crown Point, Jean Lafitte, and Barataria communities may be partially attributed to these high wetland losses. Stabilizing the shoreline and protecting the remaining marsh would protect natural coastal resources, communities and infrastructure. The average shoreline retreat in the project area is approximately 38 feet year. Some areas have a shoreline retreat as great as 89 feet/year. The shoreline retreat along the southern bank of Bayou Villars is encroaching on the GIWW. Currently the opening at the GIWW is at 2,000 linear feet. The opening at Bayou Villars has the potential to open to approximately 10,000 linear feet in 20 years once the islands to the south of Bayou Villars are lost to shoreline retreat. Proposed Project Features: 1. Install approximately 31,000 tons of rock along 5,500 linear feet of shoreline from existing pipeline crossing north of Bayou Villars the north bank of the mouth of Bayou Villars 2. Install approximately 44,000 tons of rock along 8,000 linear feet of shoreline from existing pipeline crossing south of Bayou Villars the south bank of the mouth of Bayou Villars.	Lake Salvador, Jefferson Parish, Louisiana	$ 10,000,000	Public
Bayside Segmented Breakwaters at Caminada	The back-bay side of Grand Isle, Louisiana's only inhabited barrier island, is subject to wave action from strong north winds during winter cold fronts and when tropical storms and hurricanes make landfall east of the island. Breakwaters have been constructed along adjacent segments of the north side of the island to protect residential and commercial development. The existing breakwaters have been shown successful in eliminating erosion and actually benefiting the island by creating sandbars. The proposed project seeks to reduce erosion of the wetland marsh areas on the bay side of Grand Isle by installing 2.4 miles of 12,000 linear foot-long segmented rock breakwaters along the perimeter of the wetlands. The project will continue protection provided by existing segmented breakwaters to the east and complete back bay side protection for Grand Isle—the only inhabited barrier Island in the State of Louisiana.	Grand Isle, Jefferson Parish, Louisiana	$ 4,500,000	Public
Belle Chasse	Walker Road boat launch facility in Belle Chasse; Plaquemines Parish	Belle Chasse - Plaquemines	$ 200,000	Wallop-Breaux - Plaquemines Parish
Berwick	Improvements to Jessie Fontenot boat launch near Berwick	Berwick - St. Mary	$ 270,000	Wallop-Breaux - St. Mary Parish
Big Branch Marsh National Wildlife Refuge (Big Branch Marsh NWR)	Acquisition of 1,500 +/- acres, in multiple parcels, of coastal emergent habitat intermixed with open water/marsh habitats. These parcels are inholdings within the existing federal ownership at Big Branch National Wildlife Refuge, which sits adjacent to Lake Pontchartain and Lake Borgne, in southeast Louisiana. The protection of this acreage would also provide an opportunity for important coastal restoration of this coastal wetland system.	St. Tammany Parish, Louisiana	Not provided with submission	Public
Big Fish: Cooperative monitoring and restoration of a regional network of multi-species fish spawning aggregations	The wider Gulf of Mexico (GOM) supports the livelihoods of tens of millions of people that depend directly or indirectly on commercial and for-hire recreational fisheries and marine tourism industries worth billions. The GOM includes a vast and complex network of habitats and ecosystems that are vastly productive yet vulnerable to natural and anthropogenic stressors. Restoring and maintaining the sustainability of the system requires understanding the interconnections between species, habitats and ecosystem processes that are not well understood presently. Most of the valuable fishes harvested by commercial and recreational fisheries include groupers, snappers, drums and croakers. All of these groups reproduce in multi-species fish spawning aggregations (FSAs). FSAs serve as productivity hotspots: small areas of the ocean that are dictated by the interactions between physical forces and geomorphology that attract multiple species to reproduce in large numbers. These marine oases also attract a wide diversity of apex predators that feed on aggregating fishes and planktivores that feed on the highly concentrated source of protein-rich eggs. The objectives of the proposed program are to provide quantitative monitoring of multispecies FSAs in both inshore and offshore environments and to use those data to assess the impacts of natural and anthropogenic stressors on these habitats. The research will clarify the role of FSAs as nexus points that are critical to unlocking a more holistic understanding of ecosystem structure and function, species and habitat connectivity, and recruitment and productivity of key species in the GOM. We propose to establish 10 sentinel sites in the waters of the US, Cuba, Mexico and Belize. Sites will be selected from those that are already known and characterized, where local teams are in place to lead monitoring and where intensive research will rapidly inform managers. These will include both snapper/grouper FSAs on offshore shelf edges, and croaker/drum FSAs in coastal estuarine passes. Sites will be monitored continuously and simultaneously following a comprehensive and standardized protocol for the GOM that we developed with RESTORE funding. Monitoring will include a combination of advanced (e.g. hydroacoustics, passive acoustics, telemetry) and traditional (underwater surveys, biological sampling, genetic analyses, data sondes) approaches to quantify and characterize the timing, abundance, size structure, movement patterns, reproductive activity, productivity, connectivity and distribution of fishes in relation to physical and environmental variations. As part of these efforts, all sites will be instrumented with a suite of in situ biological and physical oceanographic monitoring equipment (e.g. acoustic data loggers, VR2Ws, ADCPs. We hypothesize that protected, multi-species FSA sites will demonstrate measurable increases in the number of species and the number of individuals of each species that reproduce there, thus maximizing reproductive output. This proposal supports most of the main goals of the NRDA Trustees including: restore and conserve habitat, replenish and protect living coastal and marine resources, provide and enhance recreational opportunities, and provide for monitoring and adaptive management. The proposal also supports exploration and characterization of new sites. The project will be led by a diverse group of co-PIs representing private business, federal government, and academia from the wider GOM. By working cooperatively with stakeholders from multiple countries including fishermen, managers and scientists, and broadly sharing results via multi-media communications we will engender shared ownership of this long-term, large-scale applied research and management program. This integrated ecosystem restoration approach will translate results into actionable policy recommendations to protect spawning fish and contribute to marine ecosystem resilience.	Florida, Texas, Louisiana	$ 20,000,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Bioremediation of Estuaries and oil affected Intertidal areas	For more information, request resume. Project Type: Mitigation of polluted waters through filtration by mussel clusters. Overview/Abstract: My work and research in bioremediation began in a most unusual manner. (1987). Working alone in a remote area of SA's Eastern Wild Coast I noticed one day a group of naked African ladies clad only in panty hose. They had filled their leggings with crushed mussels, and stood waist deep in the surf, chatting merrily away. Periodically, one would waddle up the beach with crayfish festooned and claw attached to the human bait bags. Into a bucket went the lobsters, and back serious to fishing went the Mammas. With my interest piqued I called for a beach meeting. Long and short of it, we began a Ladies Club to find ways of farming fresh vegetables, mussel and crayfish. The seaside area known as (Mbotyi) had become seriously over harvested. The impact caused by the subsistence family need for a rich protein source, and dumb tourists who'd buy undersized lobster, being the main contributing factors. Our implements consisted of old ropes and onion sacks clad over rocks. Ropes attached to coke bottle floats with brick anchors in the local estuary, and panty hose converted to lines, anchored in rocky dive holes became the tools of our industry. Naked panty hose fishing went on none the less. (It was a social thing, I guess). Our activity worked well until the Katima P oil tanker hit the bed rock bottom off the Mozambique Coast some 2000 miles north away. The warm south current had huge globs of crude disgorged all over our beach within days. Help from local authorities was a joke, uTata Mandela's release taking priority. On study of the oil debacle I noticed that tiny mussel spat on our rock covers, and on lines in the estuary had survived. In areas immediate to our farming, sea grasses and sea weeds seemed far less affected. Rocks with mussel cover cladding cleaned up oil rapidly in comparison with unclad intertidal areas. Reeds immediate to our lines in the estuary survived and flourished. Crab, prawn, mullet fry and sea worm proliferated in areas of mussel cluster. Our project continued, and until the violent political issues of the time intervened we made rustic strides in aquaculture, taking the project to a new level where crushed mussel shell fertilized home gardens, and steamed mussel meat fed poultry. Sufficent to say, we eat well. Unbeknown to me then, I'd unwittingly pioneered an African subsistence food source methodology, and without due intention had made use of available junk, allowing a lifetime passion and study of filtration at work. Our project was of a highly rudimentary nature. The modern form of the activity is best explained by Swedish experts Odd Lindahl and Sven Kollberg (http://www.bioscience-explained.org/ENvol5_1/pdf/musseleng.pdf). This natural process of mitigating your oil degraded ecosystems will prove slow, yet highly effective. There is no 'quick fix'. In an innovative and cost effective manner, bioremediation of petro carbons becomes a natural process through filtration, wherein nature is assisted, and allowed to do its work. Accordingly may I suggest a project with the involvement of the fantastically innovative ladies of (Matter Of Trust. Org), who have stock piles of nylon and a commendable panache for getting things done. (A copy of this mail is forwarded to them). I am happy to project manage the venture, being in a 'go to position', where my time and enthusiasm are at your disposal. My motto is "Shut up, Put up, and get the job done". The analogy being that as oil users, I am equally to blame. Project Suggestions: A project name. Driven by an NGO. Under guidance and autonomy of NOAA. Suggested timeframe (three years). A series of projects in identified affected areas. A local community participation at project sites. Local area school project participation. School and community donations for items in kind. Requirements of the writer Assistance with a USA Volunteer Visa. Relocation to site. Basic living and travel stipend x project duration. Permission to undertake research. Vehicle. Camper trailer. Boat with outboard.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Blowout Preventer Backup Safety System (2nd project-Oil Containment Barrier Boom I & II)	Copies of Utility patents pending available.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 1,000,000	Public
Blue Crab Trap Removal	Crab traps are a significant problem in the Gulf of Mexico, having negative impacts on habitat and species. Derelict gear such as blue crab traps can cause a number of problems since throughout the Gulf of Mexico, more than 250,000 traps are thought to be added to the derelict population each year (Guillory 2001). The most significant is that they continue to catch and kill a variety of species, in a process called ghost fishing. Traps can also damage habitat, interact with threatened and protected species, and introduce debris into the food web. They also hinder commercial operations such as shrimp fishing and can result in damage to boats and injuries to people. Derelict gear can persist for decades once it is lost. These traps can be physically removed during winter months due to the shallow water depths at that time of year. This is a "shovel-ready" project that would involve both state partners as well as local fishermen who would be contracted to conduct the removal. Based on estimated annual trap losses, including increased loss rates due to hurricanes and storms, it is estimated that this project could retrieve 500,000 derelict crab pots if fully funded. States have derelict trap programs that are habitually compromised by inconsistent budgets and participation rates. There are no NEPA concerns, with the only legal requirement being coordination with State agencies for short-term closures to facilitate removal activities. Removal will positively impact species by minimizing bycatch, including more than 20 species of fish and 6 species of invertebrates. The number of derelict traps in the Gulf of Mexico is currently unknown. There are, however, some annual estimates of trap disposal and overall trap loss; the latter also includes trap loss due to theft. Estimates of annual trap loss on a percentage basis for each Gulf state range widely: 30%-50% in Florida; 20%-50% in Alabama; 20%-30% in Mississippi; and up to 100% in Louisiana (Guillory 2001). Rolling fished ry closures, coordinated closely with the most appropriate agency in each state, will allow for the physical collection of derelict or lost blue crab traps. States independently manage their own existing trap removal efforts, and this restoration project will have strong education and outreach. Traps will be removed from the coastal environment, and recycled to avoid waste contribution to landfills. Local fishermen and personnel will be consulted to determine the regions most in need of cleanup.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 10,000,000	Public
Bohemia	Shoreline access along Mississippi River in Bohemia	Bohemia - Plaquemines	$ 250,000	LDWF Fisheries (CSA)
Bonne Carre	Shoreline access and/or fishing pier near the Bonne Carre recreational area that has an existing launch and the Wetland Watchers Park	Bonne Carre Recreation Area - St. Charles	$ 250,000	LDWF Fisheries (CSA)

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Project Name	Project Description	Location	Cost ($)	Submission Source
BP Deepwater Horizon Oil Spill Restoration Evaluation and Monitoring Program	The Natural Resource Damage Assessment regulations make clear that final Restoration Plans should include a monitoring component so that the effectiveness of restoration measures can be evaluated. Given that BP is providing $1 billion for early restoration projects before completion of a Deepwater Horizon Restoration Plan, some of these funds should be used to establish a restoration evaluation and monitoring program. There is precedent for funding monitoring activities before an oil spill restoration plan is final. Before a restoration plan was complete, the Exxon Valdez Oil Spill Trustee Council invested funds in tracking injury and recovery at the species level, as well as research and monitoring at the ecosystem scale, to identify restoration opportunities, understand factors limiting recovery, and evaluate the effectiveness of restoration measures. An early and steady flow of information on the recovery status of specific natural resources and ecosystem services generated through this program would help managers make responsive management decisions. Without this information, less effective restoration may result, potentially requiring managers to restrict human uses of these resources. Specifically, a restoration evaluation and monitoring program is needed to: 1) evaluate the effectiveness of early restoration projects; 2) track the recovery of specific injured natural resources or lost or reduced services; and 3) report to the public on the status of injured resources, lost services, and progress toward restoration. Establishing a restoration evaluation and monitoring program for early restoration can be adapted as restoration needs change and transition into a longer-term program. On behalf of the Deepwater Horizon Oil Spill Trustee Council, NOAA, in cooperation with the Department of Interior (USFWS), is in the best position to establish and administer a Deepwater Horizon Oil Spill restoration evaluation and monitoring program. Together, NOAA and USFWS have the experience and existing infrastructure to coordinate monitoring across state-federal boundaries. Both agencies would serve as joint custodians of this program. This structure will facilitate the efficient gathering of data that will allow comprehensive monitoring of the full range of restoration activities. Regardless of the entity implementing monitoring, this program will require coordination among trustee agencies and possibly some new data gathering. Each year NOAA and USFWS would produce a report on the results of restoration measures, recovery of injured species, and newly discovered injuries.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Breakwater Park West End	The proposed Breakwater Park at the historic West End of New Orleans will consist of large greenspaces on the shores of Lake Pontchartrain. The park has undergone the planning process through the Louisiana Regional Planning Commission. Funding needs consist of fill, vegetation, shoreline stabilization, bikeways, beach fill, parking, restrooms, small outdoor pavilion, boardwalk, electrical & plumbing, lighting, sidewalks, parasailing launch area, catamaran launch area, etc. Located in the largest population center directly affected by the oil spill, this project seeks to return the public to the shores of Lake Pontchartrain as well as improve the health of the entire Lake Pontchartrain Basin ecosystem via shoreline breeding habitats and marine bird habitats.	New Orleans, Orleans Parish, Louisiana	$ 50,000,000	Public
Brush Island Bird Rookery Conservation Project	Brush Island is recognized by the Louisiana Department of Wildlife and Fisheries as a rookery for a variety of bird species. Pelicans, sea gulls, terns, American Oyster Catchers and Piping Plover among other species inhabit the island. The island provides a combination of oyster ridges and marsh/shell island platform conducive for nesting of these species. However, the island shoreline has deteriorated significantly as a result of high energy storm and normal wave erosion. The project will create a shoreline protection barrier beginning on the northwestern corner of the island and extending approximately one-quarter mile down the southeastern shoreline utilizing vertical oyster reefs (ReefBlk) and oyster cultch. ReefBlk units will be deployed and #57 concrete aggregate will be spread in strategic locations to a thickness of 4-8 inches extending from the shoreline at mean high tide into the water for a distance of 50-150'. The vertical profile ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that expands linearly and vertically. This reef dampens and dissipates wave action thereby retarding erosion and undercut of the marsh platform. ReefBlk also enhances species habitat diversity and provides oyster larvae for recruitment to adjacent oyster grounds, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. ReefBlk technology is successfully in use along estuarine shorelines in Texas, Louisiana, Alabama and Florida. The use of cultch substrate provides immediate shoreline armoring and similarly induces oyster growth which serves to create long-term armoring through shoreline oyster shell accretion and deposition within the project area. This form of natural armoring occurs throughout the project area. Brush Island received heavy oiling along the project shoreline and was cleaned under STRs issued by Unified Command and it s successors. This project will be a part of the overall scope of education and research contemplated for the Oyster Research Center at Hopedale which is also listed under NOAA NRDA projects.	Either Terrebonne Parish or St. Bernard Parish, Louisiana (Two Brush Islands exist)	$ 750,000	Public
Bubba Dove	Pier adjacent to the Bubba Dove water control structure	Bubba Dove - Terrebonne	$ 400,000	LDWF Fisheries
Bucktown	Recreational access projects in conjunction with the Bucktown Harbor Master Plan, including fishing pier, artificial reef, kayak launch, pavilion, parking, etc.	Bucktown - Jefferson	$ 1,750,000	Jefferson Parish - LDWF Fisheries
Buyout of Longliners' Use of the Gulf of Mexico During the Bluefin Tuna Spawning Season	I suggest that in distributing funds ($2.4 billion) received from the settlement of British Petroleum's Deepwater Horizon oil blowout, consideration be given to recovery of the marine organism whose population, while already dangerously close to extinction, was the most directly and severely affected by the disaster – the bluefin tuna. I believe the best way to do this is to close the entire Gulf of Mexico to commercial fishing for highly migratory species (HMS) during the period when adult western North Atlantic bluefin are using the area for spawning (late April through early June of each year) and to pay commercial vessels not to fish in the closed area each year for 10 years until a full recovery of the population to a healthy level can be demonstrated. The amount to be disbursed to each vessel with a demonstrated history of recent landings of HMS species during April through June at ports in the Gulf of Mexico (including Miami) could be based on average net revenue of the fleet during the closure period plus an annual inflation adjustment. The annual allocation of funds (following each year's closed season) could be made as a lump sum to the Blue Water Fishermen's Association, which represents all the involved fishing vessel operators. Violators could be sanctioned by suspension of their HMS permits for an appropriate period of time. North Atlantic bluefin tuna spawn only in the Mediterranean Sea and in the Gulf of Mexico. They are two separate and distinct populations. The South Atlantic bluefin tuna population was extirpated by commercial fishing in just 10 years (1960-1970) once its spawning area off Brazil was discovered. The western North Atlantic population spawns each May in the north central Gulf of Mexico. Many of its eggs and larvae would thus have been carried by the Loop Current directly into the Deepwater Horizon's plume of toxic petroleum and toxic dispersants where they would die. Because of overfishing on this the world's most valuable fish, the western North Atlantic population - "our" bluefin tuna - has declined in abundance by about 98% since 1960 (for the details, see my website, www.BigMarineFish.com/bluefin.html). As a result, on May 24, 2010, the Center for Biological Diversity petitioned the U.S. federal government to "list" the North Atlantic bluefin as "threatened" or as "endangered" and to protect it under authority of the Endangered Species Act. If the adult bluefin can be protected where they are concentrated in a relatively small area for spawning, we should be able to reverse the recent succession of poor year class formation thus allowing the population to recover and providing much greater value in increased catch through time for both recreational and commercial fishing interests. The closure would also reduce mortality of severely depleted Atlantic blue marlin, white marlin, a variety of sea turtles and the great number of other non-targeted marine life which are caught and die particularly during this season on longlines set for the "money fish" (swordfish and yellowfin tuna). Accordingly, such a program should have the support of bluewater (HMS) commercial fishermen, commercial fisheries businesses, chefs, offshore sport fishermen, conservationists and the public. Economic benefits to both the commercial and sport fishing industries of increased survival of populations of not only bluefin tuna but also other premiere big game fish (e.g., blue marlin, swordfish, white marlin, sailfish, etc.) would be many times the annual cost to fund the proposed longliners' buyout.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 10,000,000	Public

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Project Name	Project Description	Location	Cost ($)	Submission Source
Calcasieu River Hardwood and Cypress Restoration	1,000 acres on each side of Calcasieu River in in Allen and Jefferson Davis Parishes, Louisiana.	Allen and Jefferson Parishes, Louisiana	$ 1,700,000	Public
Cameron	Calcasieu Ship Channel Access Improvement in Cameron Parish; located adjacent to ferry crossing; Improvements include renovated parking, boat launch, fishing pier, pavilion and restroom facilities	West bank of Calcasieu Ship Channel - Cameron Parish, Louisiana	$ 250,000	LDWF Fisheries - Sea Grant - LSU (School of Landscape Architecture)
Caminada Headlands Back Barrier Marsh Creation - 1 (BA-171)	The Caminada Headland has experienced some of the highest shoreline retreat rates in Louisiana. Historically the shoreline has migrated landward at about 40 feet per year. Between 2006 and 2011, shoreline migration increased dramatically, exceeding 80 feet per year in near Bay Champagne and 110 feet per year in the Bayou Moreau area. The increased losses occurred in the wake of Hurricanes Katrina and Rita in 2005 as the breaches remained open for an extended length of time. The losses were exacerbated by Tropical Storm Fay and Hurricanes Gustav and Ike in 2008. Significant prolonged breaches greatly increase the net export of sediment from the headland. In addition to the shoreline migration, the area is also experiencing high loss rates of interior marshes. As the beach and dune continue to migrate landward, overwashed sediment will be lost into newly formed open water and land loss rates will be exacerbated. The continued deterioration of Caminada headland threatens thousands of acres of wetland habitat as well as critical infrastructure, including Port Fourchon, LA Highway 1, and the lower Lafourche levee system. The goals of this project are to: 1) Create and/or nourish 430 acres of back barrier marsh, by pumping sediment from an offshore borrow site; 2) Create a platform upon which the beach and dune can migrate, reducing the likelihood of breaching, improving the longevity of the barrier shoreline, and protecting wetlands and infrastructure to the north and west. The proposed project is expected to slow the current trend of degradation in the headland. This project would create 300 acres of back barrier inter-tidal marsh and nourish 130 acres of emergent marsh behind 3.5 miles of the Caminada beach using material dredged from the Gulf of Mexico. The marsh creation and nourishment cells are designed to minimize impacts on existing marsh and mangroves. Assuming some natural vegetative recruitment, vegetative plantings are planned at 50% density, with half planned at project year one and half planned at project year 3. Containment dikes will be degraded or gapped by year three to allow access for estuarine organisms.	Caminada Headland, Louisiana	$ 31,000,000	Public
Caminada Headlands Back Barrier Marsh Creation - 2	The Caminada headland has experienced some of the highest shoreline retreat rates in Louisiana, measuring between 55 and 65 feet per year from 1998 to 2010 (historically, up to 100 feet per year). At the same time, the area is also experiencing extremely high loss rates of interior marshes. As the barrier headland continues to retreat, overwashed sediment will be lost into newly formed open water and these land loss rates will be exacerbated. The project would create 257 acres and nourish 256 acres of emergent marsh using sediment from an offshore borrow site. This material would be placed behind approximately 4 miles of Caminada beach as the front containment, while using as much of the existing pipe canal levees and healthy mangrove marsh as feasible for containment. In areas where the use of the existing marsh is not possible, other tactics may be employed, such as the use of hay bales or a sheet pile. Where open water exists over longer distances along the proposed containment, borrow from the outside of the cell may be used. Total constructed containment (including earthen, hay bales, and sheet pile) will total 7,411 feet. Vegetative planting will occur on 50% of the project area. The marsh created will serve as a platform for the overwashed beach sediment to fall back against, rather than losing the sediment to open water.	Caminada Headland, Louisiana	$ 20,900,000	Public
Cane Bayou	Improvements to launch and additional parking	Cane Bayou Boat Launch - St. Tammany	$ 250,000	LDWF Fisheries (CSA)
Capacity Building, Disaster Preparedness, and Sustaining Fishing Communities in the Gulf after the BP Oil Spill	In the wake of the interconnected cultural, socio-economic, and environmental effects of the BP Oil Spill, Gulf fishing communities are facing unprecedented short- and long-term challenges in sustaining their traditional lifeways. Our two years of ethnographic research investigating traditional cultural communities and properties in the Gulf during the BP Oil Spill and response efforts has demonstrated the intimate and vulnerable cultural relationships these communities have with their surrounding environments. This research also illustrated the need for more inclusivity of fishing community traditional ecological knowledge (TEK) in implementing innovative capacity building strategies and the development of effective conservation and sustainability plans. McGoodwin (2001) has importantly pointed out that, over the course of its development, much of fisheries-management science, both in theory and in practice, has had a misplaced emphasis. Whereas its first concerns should have been the human beings who utilize fisheries resources, its cornerstones were instead…the conservation of important marine-biological species…[and] allocating fisheries resources and maximizing the economic benefits from them. The aftermath of the BP Oil Spill has particularly elucidated the need to emphasize and better understand the human aspects of fisheries and the roles fishing communities play in producing and promoting sustainable fishery environments. In this context and in conjunction with mandates presented by the Magnuson-Stevens Act and National Standards 8 regarding the need for fishing community consideration in fishery conservation and management decision making, this proposed project seeks to establish capacity building strategies inclusive of fishing community perspectives, values, beliefs, and TEK in: (1b) the development of community sustainability and management plans; (1c) the creation of fishery conservation networks; and (1d) the development of intergenerational and entry level access to and inclusion in fisheries. Methods: Participatory Learning and Action (PLA) is a method that promotes community interfacing and provides a vehicle for people to share, discuss, and expand their knowledge related to particular contexts and situations as well as to effectively prioritize, monitor, plan, and act at the community level. With each participating fishing community, the project team will organize a PLA workshop by collaborating with community members, educational institutions, and other local institutions. The workshops will be held in public facilities (where possible) at times most convenient for fisher communities and will extend over the course of three days. These workshops will provide structured as well as open interactive forums and activities where communities can present their concerns and needs, identify solutions to meet those needs, and develop community action plans and best practices related to sustainability and management programs; the creation of fishery conservation networks; and the development of intergenerational and entry level access to fisheries. The process of working in partnership with fishing communities to develop inclusive, feasible, desirable, and sustainable programs will contribute to innovative capacity building strategies that can aid the short- and long-term interests and needs of these communities in confronting the conservation and sustainability management challenges as well as the social and cultural impacts of the BP Oil Spill. Project Outcome(s): Anticipated short-term outcomes of the PLA workshops include: 1) wider community participation in capacity building activities; 2) community specific fishery TEK exchanges that can help strengthen capacities of communities to identify local fishing community needs, build community consensus, and develop appropriate strategies to meet those needs; 3) the development of culturally informed fishing community sustainability plans; and 4) establishment of Fishing Community Sustainability Planning Committees. Each of these steps will help initiate community ownership of sustainable and conservation planning processes and help build local accountability. Long term utility of this project will help integrate local fishing community needs and perspectives into management and conservation strategies related to the BP Oil Spill and response and will help meet goals established by the Magnuson-Stevens Act and National Standards 8 mandating consideration for the impacts of conservation and management practices on fishing communities. It will also provide baseline data of the management challenges related to the BP Oil Spill as well as present a path forward for future research needs regarding the integration and use of fishing community perspectives and TEK into conservation and sustainability strategies outlined in the Magnuson-Stevens Act and National Standards 8. Proposed Activities: The project team has two years of experience working directly with the fishing communities listed above.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 500,000	Public

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Project Name	Project Description	Location	Cost ($)	Submission Source
	The tasks necessary for identifying community stakeholders, building trust, and developing working relationships have already been established. The following are the steps the project team will take to successfully organize and implement PLA workshops with the identified fishing communities: 1) Follow-up with community leaders and government representatives to ensure community participation; 2) Work with community leaders and government representatives to establish PLA workshop logistics and participant recruitment strategies; 3) Directly engage and recruit fishing community members on the ground in coordination with community leaders and representatives; 4. Hold PLA workshops with participating fishing community members and stakeholders; 5) Analyze results from PLA workshops; 6) Present PLA workshop results back to participating fishing communities; 7) Select members for Fishing Community Sustainability Planning Committees in coordina tion with community leaders and representatives; 8) Work with Fishing Community Sustainability Planning Committees in using PLA workshop results to draft Fishery Conservation and Sustainability Plans inclusive of fishing community values, beliefs, and TEK; 9) Provide Fishing Community Sustainability Planning Committees with Fishery Conservation and Sustainability Plan drafts for review; 10) Author final Fishery Conservation and Sustainability Plan Report and submit to Fishing Community Sustainability Planning Committees, NFWF, and other agencies overseeing NRDA. Measure of Success: We will measure progress and success of the PLA workshops through the percent of the participating target populations, including the active participation of multigenerations, support agencies, and institutions (e.g. educational, governmental, NGOs) as well as those seeking entry level access to fisheries. We will measure progress and success of the Fishery Conservation and Sustainability Plan through a recording and accounting for identified management challenges related to the BP Oil Spill and response, how TEK can assist in sustaining fishing community lifeways while abiding by the parameters of the Magnuson - Stevens Act and National Standards 8, and development of an action plan that can be implemented by individual fishing communities as well as through fishing community networks and partnerships in the context of these events and regulatory requirements. All progress and success, as well as new challenges and obstacles, of Fishery Conservation and Sustainability Plans will be monitored in conjunction with Fishing Community Sustainability Planning Committees. Funding for future research and program implementation will assist effective monitoring of progress and success of Fishery Conservation and Sustainability Plans and will be sought by the project team.			
Case Manager/Shrimper	Oil Clean-up	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Channel Marker Reef Ball Micro-Habitats	States, Counties and municipalities have channel markers they are responsible for maintaining under their USCG channel marker permit. Deployment of a Reef Ball® on each channel marker would provide increased micro habitat for finfish and invertebrate recruitment throughout the Gulf of Mexico. Production of Reef Balls is provided by Reef Innovations in Sarasota, FL or the regional production sites (RPS) proposed for the area. This project can be run through the Reef Ball Foundation which is a 501(c) 3 publicly supported nonprofit and international environmental NGO working to rehabilitate marine reefs. This has proven beneficial where nonprofit organization involvement is desirable. The Reef Ball Foundation's mission is to rehabilitate our world's ocean reef ecosystems and to protect our natural reef systems using Reef Ball artificial reef technologies. A proposal has been submitted for funds to set up “Reef Ball Production Sites” in the Panhandle and Big Bend regions in Florida as well as proposals for sites in Texas and Mississippi. This would reduce the cost of deliver modules to the various projects in the region and reduce the cost per microhabitat unit. For this project, a crew of 3 workers could work their way across the state or region installing the micro habitats over a period of 3 to 10 years, or the units and deployment training could be supplied to the individual county for implementation. Reef Innovations would provide the product and quality control of the project. Local port authority could provide the labor with a crew normally installing markers. Reef Innovations could provide a foreman to work with locally hired crews. Reef Modules used depend upon the water depth, piling diameter and relief desired. As you move toward deeper water its is suggested to increase the size Reef Ball. Monitoring during the initial survey, objectives will be established for the microhabitat including expected species recruitment. Initial Survey: Reef Innovations, Government Organization…Permitting Follow up Survey. Reef Innovations has the right to make a full survey yearly, or an approved researcher appointed by Reef Innovations. Government organization will provide survey reports to Reef Innovations on a yearly basis. Government organization will provide a 10 year survey report, and summary of project. A database of locations and observations will be established for the monitoring of the project results. Presentations will be prepared for at conferences at the 5 and 10 year point. There are three protocols for placing the units: 1. Unit incorporation during marker replacement as part of the regular maintenance, 2. Lowering the Reef Ball over an existing channel marker piling, 3. Placing a two piece unit around the piling of an existing marker. Environmental Benefits: Reef Balls have a proven track record for providing habitat for juvenile finfish and invertebrate recruitment. These units located along deep water channels will provide increased habitat for the movement of both finfish and invertebrates species in and out of coastal estuaries. They also provide increased settlement substrate for sessile oysters, corals and macroalgae. A supplemental document is available breaking down the costs and identifying the process. Contact Larry Beggs for that document (Larry@reefinnovations.com). The project can be implemented locally, the cost projection on this description is a yearly cost for 10 years, across multiple regions of the Gulf.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 613,500	Public
Chef Menteur to Rigolets Restoration & Protection (Chef Menteur to Rigolets)	The Conservation Fund (TCF), and its project partner Ecosystem Investment Partners, are pursuing funding to complete the full restoration of this 16,500 +/- acres of coastal marsh intermixed with marine/estuarine habitats. Upon restoration, TCF expects the tract could be donated to a State, or Federal agency, or another non-profit, for public use and long-term stewardship. This tract represents approximately half of the land bridge area which is the interface between the marine environment within the Lake Borgne/Gulf of Mexico, and the estuarine system within Lake Pontchartrain. This coastal wetland complex supports a significant local fishing industry, as well as hunting and other recreation based tourism. With significant frontage (approximately 14 miles) along Lake Borgne/Gulf of Mexico, this tract provides important aquatic habitat, as well as critical migratory bird habitat on the front line of the Gulf of Mexico. Louisiana’s 2012 Comprehensive Master Plan for a Sustainable Coast calls for 8,510 acres of marsh creation to occur on this site. This complex contains a variety of coastal wetland components, including salt and brackish marshes, lagoons, canals, cheniers (former beach fronts) and natural bayous. The marshes along Lakes Pontchartrain and Borgne serve as estuarine nurseries for various fish species, crabs and shrimp. These diverse habitats meet the needs of up to 340 bird species during various seasons of the year. Peak waterfowl populations of up to 25,000 use these wetland areas during the fall, winter, and early spring months. In addition, wading birds, shorebirds, brown & white pelicans, raptors, a variety of mammals, along with numerous reptiles and amphibians are found within the habitats provided.	Orleans Parish, Louisiana	$ 100,000,000	Public
Chef Pass	Chef Menteur Pass Access Improvements; components include boat launch, parking, fishing pier, covered pavilions, restrooms, walking trails, and observation towers	Chef Pass - Orleans	$ 250,000	LDWF Fisheries - Sea Grant - LSU (School of Landscape Architecture)
Chitimacha	Chitimacha boat launch; construction of a new boat launch facility	Charenton - St. Mary	$ 570,000	Wallop-Breaux - Chitimacha Tribe/St. Mary Parish

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Project Name	Project Description	Location	Cost ($)	Submission Source
Close-kin Mark Recapture as a Tool for Estimation of Spawning Biomass in the Gulf of Mexico Bluefin Tuna Population	The western Atlantic bluefin tuna (WBFT) population sustained injuries from the Deepwater Horizon (DWH) oil spill since the Gulf of Mexico is its only major spawning ground and the spill occurred in one of the spawning hotspots during the peak spawning season. The DWH Damage Assessment estimated that billions of bluefin larvae were killed, in part due to documented cardiotoxicity, with injury up to 4 million kg for large tunas. As part of the restoration plan, adaptive management has been prioritized, including collection of fishery-independent data to better understand status and trends. Close-kin mark recapture (CKMR) is a new method which uses next generation genetic techniques to match parents and offspring to estimate spawning abundance in situations where traditional assessment methodologies are highly uncertain. This is certainly the case for WBFT. The method proceeds as follows: randomly sample juveniles and adults, use next-generation sequencing to obtain a unique genetic signature for each parent and each juvenile, and count the number of matches, or Parent–Offspring Pairs (POPs). Traditional mark-recapture population estimation methods then can estimate the number of adults in the population. Fewer POPs indicates a larger spawning population. By repeating the sampling over several years, one can obtain an updated abundance estimate, greatly improve the precision of the population estimate and estimate survival of parents when their progeny are identified over multiple years. To deal with sampling complexities in cases like WBFT, it is also necessary to look for Half-Sibling Pairs among juvenile samples. A pilot project is underway to collect samples of larval, juvenile, and adult WBFT to determine the best approaches for sample collection and genetic analyses. In this study, we propose to collect the remaining number of required samples (estimated at 1500 young and 1500 adults) and conduct the full CKMR by using modern reduced-representation high-thro ughput genotyping methods to count the number of POPs. This information will give us an accurate count of the number of individual adult WBFT for the first time, helping scientists and managers to determine how to successfully rebuild this depleted population, which sustained further injury from the DWH spill. The CKMR results will be incorporated in the management strategy evaluation being developed by an international team to design a more effective and efficient harvest strategy that will benefit both the stock and fishery, commercial and recreational alike. This approach has already been applied for southern bluefin tuna and is in progress for Pacific bluefin tuna.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 350,000	Public
Coastal Land and Marsh Protection	This is a general recommendation, not tied to a specific project: Instead of habitat restoration, focus instead on purchasing lands in fee title or in easement to protect these fragile and ecologically important areas that are threatened by future development while they still exist. As you know, land development usually causes conditions that are irreversible. By protecting these areas in perpetuity, we would permanently protect these areas and the ecological services they provide for a multitude of coastal terrestrial and aquatic species. By doing so, we not only protect habitat for many species, but also prevent future damage to human structures as a result of climate change (severe weather events such as hurricanes, sea level rise, etc.). It is my personal opinion that protecting as much currently undeveloped land as is possible from future land development, especially in coastal areas that typical exhibit a more rapid growth rate than in other areas, is the single most important thing we should be doing with available funding. To me it is a more valuable use of dollars than habitat restoration, which is very costly and may or may not be successful.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Codfish Point Living Shoreline Stabilization Project	Project Description: Coastal Environments, Inc and partners propose to fabricate and install bio-induced oyster reefs to stabilize shorelines and help restore and sustain valuable and sensitive estuarine ecosystems in the Bayou La Loutre headland in St. Bernard Parish. This project will stabilize up to 5700' of shoreline by restoring intertidal oyster reef habitat using a cost-efficient and effective vertical breakwater technology called ReefBlk. The ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that provides both shoreline protection and habitat for estuarine organisms. As oyster growth progresses and the reef unit becomes more dense, the bioengineered structure dampens and dissipates wave energy and protects the estuarine marsh from erosion. Oyster cultch will be spread within the project area to further retard erosion and enhance oyster and related estuarine habitat. ReefBlk is a proven living shoreline and erosion control method currently inducing the growth of bio-engineered and self-sustainable living oyster reefs that expand both linearly and vertically to buffer wave action and retard erosion along estuarine shorelines in Texas, Louisiana, Alabama and Florida. High vertical profile oyster reefs also enhance species habitat diversity and provide oyster larvae for recruitment to adjacent public oyster grounds, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. The proposed use of cultch to armor the shoreline through oyster shell accretion and deposition within the ReefBlk area will add to the proven benefits of ReefBlk. The cultch application will consist of #57 concrete aggregate or limestone spread 4-8" thick to a distance between 50-100' from the shoreline within the project area. The project will provide effective long-term erosion reduction for a remnant headland that provides crucial natural services through maintenance of the hydrologic regime necessary to commercial and sports fisheries of the southern Biloxi Marsh and by serving as a significant natural storm surge barrier for fishing communities in eastern St. Bernard and Plaquemines Parishes. St. Bernard Parish sees this project as an important element of a larger effort to fortify shorelines throughout the Biloxi Marsh as part of the parish's long-term coastal management plan. An STR was issued for the project area by GCIMT with cleanup completed in the spring of 2011. The area was cleaned of thick tar at various shoreline locations. The project area is recognized by the Louisiana Department of Wildlife and Fisheries and U.S. Fish and Wildlife for its value to migratory and wintering shorebirds including the federally listed Piping Plover. This project falls within the overall scope of education and research contemplated for the Oyster Research Center at Hopedale which is also listed under NOAA NRDA projects.	Bayou La Loutre, St. Bernard Parish, Louisiana	$ 1,800,000	Public
Comfort Island Living Shoreline Stabilization Project	Coastal Environments, Inc and partners propose to fabricate and install bio-induced oyster reefs to stabilize Comfort Island shoreline and help restore and sustain valuable and sensitive estuarine ecosystems. Shoreline stabilization will be accomplished through both the attenuation of wave energy utilizing ReefBlk vertical profile oyster reefs and shoreline armoring utilizing aggregate cultch. The vertical profile ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that expands linearly and vertically. This reef dampens and dissipates wave action thereby retarding erosion and undercutting of the marsh platform. ReefBlk also enhances species habitat diversity and provides oyster larvae for recruitment to adjacent oyster grounds, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. ReefBlk technology is successfully in use along estuarine shorelines in Texas, Louisiana, Alabama and Florida. The use of cultch substrate provides immediate shoreline armoring and similarly induces oyster growth which serves to create long-term armoring through shoreline oyster shell accretion and deposition within the project area. This form of natural armoring occurs throughout the Biloxi Marsh area. This project will stabilize up to 1450' of highly eroding shoreline by strategic alignment of ReefBlk units and the application of #57 concrete aggregate as cultch 4-8" thick to a distance between 50-100 from the shoreline. This project can be shovel ready shortly after the funding award. Staging can be achieved by expanding current ReefBlk operations at Hopedale, LA, and previous ReefBlk permitting and attendant land owner protocols in the area will facilitate and speed permit acquisition. The shoreline in the project area was cleaned under STR 3-17 for pooled oil, patties and oiled debris in the middle and upper tidal zones. Comfort Island is identified as a historic rookery by LDWF. This project will be a part of the overall scope of education and research contemplated for the Oyster Research Center at Hopedale which is also listed under NOAA NRDA projects.	Chandaleur Sound, St. Bernard Parish, Louisiana		Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Comprehensive stewardship of breeding water birds across barrier and nearshore islands in the Gulf (Alabama – Texas)	Water birds were disproportionately injured during the Gulf oil spill in 2010, particularly on barrier and bay islands. We propose to restore some of the species, including Gull-billed, Least, Common, Caspian, Royal, and Sandwich Tern, Reddish Egret, Brown Pelican, American Oystercatcher, Snowy Plover, and Wilson's Plover. National Audubon Society and partners will increase production of birds, reduce mortality, and concomitantly restore and protect habitats on which injured species rely. We will use an adaptive management framework to assess threats, implement strategies to address those threats, monitor success, and adapt both within season where appropriate, and across seasons. We will work on the four key priorities for bird restoration outlined in the PDARP. Priority 1: Restore and conserve bird nesting and foraging habitat. Objectives: At key sites, implement stewardship activities to alleviate dominant threats and improve productivity. Activities: Direct protection of nesting colonies and solitary nesters, predator control, vegetation management, erosion control, outreach and education to increase community cooperation and acceptance. Expected Outcomes: Increased productivity of injured birds Priority 2: Establish or re-establish breeding colonies. Objectives: Attract colonial nesting species to new or restored islands. Activities: Social attraction techniques, including use of decoys and playback of vocalizations. Expected Outcomes: Increased number of nesting colonies of injured species and increased probability of region-wide population persistence. Priority 3: Prevent incidental bird mortality. Objectives: Reduce incidental mortality of coastal water birds of all species. Activities: Set up recycling for monofilament line, educate fishers about dangers of entanglement and reduce barriers to recycling. Expected Outcomes: Fishers have increased awareness and compliance with monofilament recycling and bird mortality from entanglement in monofilament reduced. Priority 4: Address relevant data gaps. Objectives: Using the objectives hierarchy established by the Gulf of Mexico Avian Monitoring Network, develop monitoring to fill key knowledge gaps. Activities: Develop standardized protocols for monitoring bird populations and productivity, conduct studies to ascertain the effects of predators, habitat use, and sediment type on bird productivity. Expected Outcomes: Improved understanding of Gulf-wide population dynamics, gained knowledge required to prioritize areas for restoration and to develop comprehensive management plans. Benefits to Public: Improved management of birds nesting on bay and barrier islands will allow for better balance between species of birds, potentially reducing human-bird conflicts. Recent studies have linked the reduction in coastal birds, lead by the reduction in many of these species of water birds, to an explosion in populations of Menhaden, along with a decrease in oil content, quality, and economic value of this important prey species. Restoring balance to this ecosystem by restoring predatory birds will improve livelihoods for fishers and help restore fisheries. Restoring the species harmed during the spill will improve public perception of our coasts as ideal landscapes for living, working, and recreating. It will also improve access to recreation such as bird watching. Benefits to Environment: These species are important as both predators and prey in coastal environments, thus restoring populations of water birds will help restore balance to marine fish community structure. Furthermore, the proposed actions will provide benefits to ecosystem services by restoring native vegetation and dune structure and by removing introduced predators that prey on other native vertebrate species. They also disperse aquatic invertebrates, change benthic species composition and abundance, change sediment composition, and improve water quality.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 10,000,000	Public
Conservation Educational Outreach Program (CEOP)	The Soft Skills Training Institute of Florida and its strategic partners will develop a program involving cooperative efforts in cultural and natural resource conservation training and education program or projects related to trail development and maintenance, historic, cultural and native habitat restoration and rehabilitation. CEOP is a hands-on, environmental education program that teaches young people valuable lessons about wildlife management, conservation, leadership, team-building, citizenship, and communication. As a participant in CEOP, you will gain a greater understanding of the value of land and how it can be managed to benefit much wildlife and fish species. Participants will use their skills and knowledge to create better habitats for wildlife now and in the future, and be open to perhaps a career as a wildlife professional, a landowner, or an active volunteer in their community to help teach others to become good stewards of their natural resource environment. The team will promote and stimulate public purposes such as education, job training, development of responsible citizenship, productive community involvement and furthering the understanding and appreciation of natural and cultural resources through the involvement of youth and young adults in the care and enhancement of public resources SSTI will enhance the longstanding efforts of state parks to provide opportunities for public service, youth education and training programs for minority and underrepresented youth and young adults development and participation in accomplishing conservation-related opportunities to learn and be stewards of natural resources. Youth and young adults will learn: 1. About different kinds of wildlife, what they eat, and where they live. 2. Wildlife terms and ideas. 3. How to attract different wildlife species. 4. How to judge the quality of wildlife habitat. Other CEOP activities include: Wildlife Identification – Participants are tested on their ability to identify pre-determined wildlife species. Twenty photographs of wildlife species, which clearly show a juvenile, adult, male, or female of the species is presented to the participants. General Wildlife Knowledge – Participants are tested on their knowledge of topics ranging from wildlife habitat for select species to management practices that benefit wildlife. Wildlife Management Practices – Participants compete are taken to an outdoor site with defined boundaries and are asked to evaluate the quality of habitat for select wildlife species. Based on each participant's site evaluation, he or she is asked to recommend wildlife management practices that will benefit each select wildlife species. Written Wildlife Management Plan – Participants will participate on a team and will write a two-page management plan for an outdoor site with defined boundaries that meets objectives established in a field conditions sheet provided to each team. Oral Defense of Written Plan – Each participant completes an activity individually, the individual score counts toward their final team score for the written plan. Each individual team member appears before a panel of two to three judges and answers questions over a five-minute period about their written plan, as well as general wildlife questions.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 3,750,000	Public
Cranetown Bay Living Shoreline Stabilization	Coastal Environments, Inc and partners propose to fabricate and install bio-induced oyster reefs to stabilize Drum Island shoreline and help restore and sustain valuable and sensitive estuarine ecosystems. Shoreline stabilization will be accomplished through both the attenuation of wave energy utilizing ReefBlk vertical profile oyster reefs and shoreline armoring utilizing aggregate cultch. The vertical profile ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that expands linearly and vertically. This reef dampens and dissipates wave action thereby retarding erosion and undercutting of the marsh platform. ReefBlk also enhances species habitat diversity and provides oyster larvae for recruitment to adjacent oyster grounds, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. ReefBlk technology is successfully in use along estuarine shorelines in Texas, Louisiana, Alabama and Florida. The use of cultch substrate provides immediate shoreline armoring and similarly induces oyster growth which serves to create long-term armoring through shoreline oyster shell accretion and deposition within the project area. This form of natural armoring occurs throughout the Biloxi Marsh area. This project will stabilize up to 1100' of highly eroding shoreline by strategic alignment of ReefBlk units and the application of #57 concrete aggregate as cultch spread thick to a distance between 50-100 from the shoreline. Given appropriate bottom conditions, alignment of the ReefBlk units will create a lagoon-like habitat in a portion of the protected area to facilitate overall marine nursery activity.	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 2,000,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Cranetown Bay Living Shoreline Stabilization Project	Coastal Environments, Inc and partners propose to fabricate and install bio-induced oyster reefs to stabilize Cranetown Bay shoreline and help restore and sustain valuable and sensitive estuarine ecosystems. Shoreline stabilization will be accomplished through both the attenuation of wave energy utilizing ReefBlk vertical profile oyster reefs and shoreline armoring utilizing aggregate cultch. The vertical profile ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that expands linearly and vertically. This reef dampens and dissipates wave action thereby retarding erosion and undercutting of the marsh platform. ReefBlk technology is successfully in use along estuarine shorelines in Texas, Louisiana, Alabama and Florida. The use of cultch substrate provides immediate shoreline armoring and similarly induces oyster growth which serves to create long-term armoring through shoreline oyster shell accretion and deposition within the project area. This form of natural armoring occurs throughout the Biloxi Marsh area. This project will stabilize eroding shoreline by strategic alignment of ReefBlk units and the application of #57 concrete aggregate as cultch spread 4-8" thick to a distance between 50-150' from the shoreline. Given appropriate bottom conditions, alignment of the ReefBlk units will create a lagoon-like habitat in a portion of the protected area to facilitate overall marine nursery activity. The project can be developed and implemented in shovel-ready fashion. CEI's experience obtaining permits for The Nature Conservancy's Lake Eloi ReefBlk project and establishing landowner protocols combined with easily expandable current ReefBlk operations in Hopedale, LA, ensures rapid approval and implementation of the project. The fabrication and staging for this project will occur in St Bernard Parish creating jobs to offset the negative impacts of the Deepwater Horizon Spill to the fisheries ind ustry of the region.	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 2,500,000	Public
Cultch spreading to stabilize denuded muddy shoreline and near-shore areas and enhance oyster production.	The spreading of cultch on existing bottom reefs and oyster bottoms is an established technique for enhancing oyster productivity. The cultch is usually brought to the deployment area on oyster luggers or barges and washed over the side with a high pressure hose. Clean oyster shells are the preferred material, but crushed and size-graded concrete and other artificial cultch materials may also be used. Because oyster shells are scarce, St. Bernard oyster fishermen have recently begun to use crushed concrete as a substitute material. Large quantities of concrete are available in the St. Bernard area from slabs of homes destroyed by hurricane Katrina. Gravel-sized particles of crushed concrete have proven to be an acceptable substitute for the attachment of oyster larvae. St. Bernard oyster fishermen are a very skilled manpower source for applying cultch at designated sites throughout the shallow water areas of eastern St. Bernard because this is a commonly used method for enhancing oyster production on their privately owned leases.	St. Bernard Parish, Louisiana	$ 4,000,000	Public
Davis Pond	Kayak launch and pier near Hwy 90 by Davis Pond	Davis Pond - St. Charles	$ 400,000	LDWF Fisheries
Deatonville	Kayak launch and roadside fishing	Deatonville - Calcasieu	$ 250,000	LDWF Fisheries
Deepwater Pass Living Shoreline Stabilization	Coastal Environments, Inc and partners propose to fabricate and install bio-induced oyster reefs to stabilize the shoreline and help restore and sustain valuable and sensitive estuarine ecosystems. The project will prevent breaching of the narrow marsh/shell shoreline and resultant exposure of the interior bay to high energy open water conditions. Such a breach would accelerate island deterioration. This project will stabilize up to approximately 800' of shoreline by restoring intertidal oyster reef habitat using a cost-efficient and effective vertical breakwater technology called ReefBlk combined with cultch spreading. The ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that provides both shoreline protection and habitat for estuarine organisms. As oyster growth progresses and the reef unit becomes more dense, the bio-engineered structure dampens and dissipates wave energy to protect the estuarine marsh from erosion. These proven living shoreline and erosion control methods are currently inducing the growth of bio-engineered and self-sustainable living oyster reefs that expand both linearly and vertically to buffer wave action and retard erosion along estuarine shorelines in Texas, Louisiana, Alabama and Florida. High vertical profile oyster reefs also enhance species habitat diversity and provide oyster larvae for recruitment to adjacent pubic oyster grounds, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. The proposed use of cultch to armor the shoreline through oyster shell accretion and deposition within the ReefBlk area will add to the proven benefits of ReefBlk. The project includes installation of approximately 800' of ReefBlk units aligned parallel to the shore and the application of #57 concrete aggregate as cultch 4-8" thick to a distance between 50-100' from the shoreline. The project area is recognized as a historic rookery by the Louisiana Department of Wildlife and Fisheries. SCAT reported light oiling in the region. This project will be a part of the overall scope of education and research contemplated for the Oyster Research Center at Hopedale which is also listed under NOAA NRDA projects.	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 700,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Delacroix Island Protection and Restoration: A Hurricane Protection and Community Resilience Project	Proposed by Land Trust for Southeast Louisiana to Louisiana NRDA (November 17, 2011) Delacroix Island or Delacroix is an unincorporated town in St. Bernard Parish, Louisiana, United States. Land Trust for Southeast Louisiana proposes to use NRDA restoration funds to: 1. acquire (through fee simple purchase) nearly 1300 acres of marsh beginning at the confluence of the western bank of Bayou Terra Buffs and the southern bank of Bayou Gentilly 2. perform baseline assessments, develop and implement an Ecological Restoration Plan following standards set forth by Society for Ecological Restoration 3. manage and monitor the property in perpetuity to maintain conservation and restoration values as set forth in the plan. Historical Overview of Delacroix and Project Need: In the 1780s, Spanish Canary Islanders, or Isleños, settled in the area after being given land grants from Spain. After selling their land grants to the planters, the Isleños frequently worked on the plantations they helped to create. Some began to resettle in the easternmost reaches of St. Bernard parish around the 1820s resulting in the firm establishment of Delacroix Island fishing community before the Civil War. By the 1900s, Yscloskey, Louisiana and Shell Beach, Louisiana near Lake Borgne were thriving communities. Seafood harvested by these fishermen in the 1800s and 1900s supplied New Orleans restaurants with a seemingly inexhaustible supply of shrimp, fish and crabs. Previously connected to the outside world by boat, in the 1930s a road was constructed to "the island" (in reality an inland area surrounded by marsh and bayous). Since the 20th century, Delacroix has been regionally famous for fishing and trapping. Like much of the region, Delacroix was devastated by Hurricane Katrina and its storm surge in 2005. The entire area was flooded, and the majority of buildings completely destroyed. Also destroyed was much of the area's fishery along with commercial and recreational fishing fleets, seafood and fuel docks. By 2010, much of this fishing town had been reconstructed, with most new construction elevated high on piers. The fisheries however, took another devastating blow April 20, 2010 with the explosion of Deepwater Horizon which drilled on the BP operated Macondo Prospect. From this point forward the lives of many of those families that had for generations reaped the bounties of seafood in the waters of Southeast Louisiana, would be changed forever. The spill caused extensive damage to marine and wildlife habitats and to the Gulf's fishing and tourism industries. Skimmer ships, floating containment booms, anchored barriers, sand-filled barricades along shorelines, and dispersants were used in an attempt to protect hundreds of miles of beaches, wetlands, and estuaries from the spreading oil. Scientists also reported immense underwater plumes of dissolved oil not visible at the surface as well as an 80-square-mile (210 km²) "kill zone" surrounding the blown well. In late November 2010, 4,200 square miles (11,000 km²) of the Gulf were re-closed to shrimping after tar balls were found in shrimpers' nets. The amount of Louisiana shoreline affected by oil grew from 287 miles (462 km) in July to 320 miles (510 km) in late November 2010. In January 2011, an oil spill commissioner reported that tar balls continue to wash up, oil sheen trails are seen in the wake of fishing boats, wetlands marsh grass remains fouled and dying, and crude oil lies offshore in deep water and in fine silts and sands onshore. A research team found oil on the bottom of the seafloor in late February 2011 that did not seem to be degrading. On May 26, 2011, the Louisiana Department of Environmental Quality extended the state of emergency related to the oil spill. By July 9, 2011, roughly 491 miles (790 kilometers) of coastline in Louisiana, Mississippi, Alabama and Florida remained contaminated by BP oil, according to a NOAA spokesperson. In October 2011, a NOAA report shows dolphins and whales continue to die at twice the normal rate. Proposed Scope of Work: The Delacroix Project is designed to protect and restore 1300 acres that will: fortify hurricane protection for the town of Delacroix, enhance community resilience, improve wildlife habitat, especially waterfowl, improve estuarine habitat essential to early life stages of commercial and recreational fishery, create jobs for local residents, especially those related to duck hunting and fishing habitat for sportsman worldwide, and enhance nature-based tourism opportunities. The project calls for fee simple purchase of nearly 1300 acres of marsh beginning at the confluence of the western bank of Terre Aux Boeufs and the southern bank of Bayou Gentilly. This land mass represents the remaining land barrier for the town of Delacroix from south and western tidal surge. Land Trust for Southeast Louisiana has negotiated a "bargain sale" which means that the owner will sell the property below appraised value and contribute the difference as match for grant program funding. Two events in recent history have caused some habitat loss on the property; a fire along the ridge adjacent to Terre Aux Boeufs caused significant loss of live oaks and other hardwoods shortly after Hurricane Katrina. Hurricane Katrina also caused physical damage to the western marsh of this property bordering a waterway known as the Graveyard. An aggressive Ecological Restoration Plan would be developed and implemented once the land is purchased. The Plan would include: reforestation of live oak, associated hardwood species and cypress - shoreline restoration on the property's western boundary would include soil replacement and planting of native grasses LTSL will utilize its volunteer base as well as partnering with both state and federal governmental agencies and other NGOs to insure both success and compliance. Once the project is completed the town of Delacroix will have a restored and healthy landmass for future hurricane protection, enhanced community resilience and a continued economy sustained by commercial fishing, sports hunting and fishing and nature-based tourism. About the Land Trust for Southeast Louisiana: The Land Trust is a 501C3 that works with community partners to create a healthy and sustainable natural environment by conserving and protecting valuable natural areas and agricultural lands of southeast Louisiana. We preserve ecosystem and landscape values through conservation easements, land acquisition and community engagement. The way we choose to conduct our business is clear: We build meaningful relationships with landowners and citizens in our service area by adhering to core values: Commitment to "in perpetuity", Community: working collaboratively, Decision-making through consensus, Integrity, Respect for the rights of individuals, private property owners and government regulations, and Sustainability. LTSL is a member of the Land Trust Alliance; we are guided by its national standards and have included LTA accreditation in our strategic plan. We are committed to "in perpetuity" as the bar for LTSL financial planning and legal authority to manage lands and easements.	Delacroix, St. Bernard Parish, Louisiana	$ 1,200,000	Public
Delcambre	Kayak launch and other access projects in conjunction with Delcambre Direct Seafood Market	Delcambre - Iberia	$ 200,000	LDWF Fisheries
Delta National Wildlife Refuge Hydrologic, Shoreline, and Estuarine System Restoration	The Mississippi River birds foot delta provides habitat for a wide array of estuarine and open ocean dependent species of birds, fish, and invertebrates. Hydrologic disruptions and coastal erosion of the estuarine marshes have led to large losses of this important habitat. This loss is expected to increase with the recent arrival of an invasive scale insect which attacks Roseau cane (Phragmites spp.). The major passes or channels of the delta have infilled with material for a number of reasons and now prevent the seaward flow and deposition of river sediments into receiving ponds and bays. Project would dredge the major passes which bisect the delta, restoring hydrologic flow and sediment transport, and deposit that material in a manner which rebuilds and stabilizes eroding shorelines on the seaward edge of the delta. Project would enhance transport and natural deposition of river sediments while protecting existing shorelines and estuarine marshes. Newly created shoreline/islands provide nesting, loafing, and wintering habitat for a number of colonial nesting seabirds, shorebirds and other estuarine dependent species of birds. Protection of marshes and interior ponds and bays will serve to promote growth of submerged aquatic vegetation and emergent marsh vegetation which provide spawning and nursery habitat for a number of coastal and open ocean species of fish and invertebrates including several commercially important species such as white and brown shrimp and blue crab. Project can be easily scaled up or down during each phase based on available funding and project contract costs. Project would be constructed in phases over the course of 10-15 years and would include areas on both Delta National Wildlife Refuge (USFWS) and Pass-a-Loutre Wildlife Management Area (Louisiana Department of Wildlife and Fisheries). Phase 1 would place material along approximately 4 miles of shoreline beginning at the north bank of Pass-a-Loutre pass at the south-east boundary of the refuge. Material would be placed in a linear band to a width of 400 feet and initial pump height of 5-7 feet along the centerline. Material would be placed unconfined and allowed to seek natural slope. Each mile of material placed in this configuration would create approximately 50 acres of subaerial habitat for a total construction of approximately 200 acres of subaerial habitat. In addition, tidal and subtidal mudflats and shallow water habitats would be created on each side of the band as pumped material slopes outward. Protective shoreline would decrease wave fetch and promote the establishment and growth of submerged aquatic vegetation in interior bays and ponds. Fish passage features would be created at predetermined intervals, interval and design to be determined in consultation with NOAA National Marine Fisheries staff. Future phases would create up to 40 miles of similar features/habitat over the course of next 15 years if funded during future funding cycles.	Bird's Foot Delta, Louisiana	$ 10,000,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Deployment of VisNIR DRS for Rapid, On-site Quantification of Total Petroleum Hydrocarbons	Visible near infrared diffuse reflectance spectroscopy (VisNIR DRS) has been proven effective at on-site quantification of total petroleum hydrocarbons (TPH). The non-destructive, proximal sensing technology uses visible and near infrared light to assess hydrocarbon levels. Soil samples containing hydrocarbon reflect less light (a spectral absorbance) than non-contaminated soils of similar composition. This reduction in reflection can be precisely measured via both wavelength and intensity of returned spectral scans and correlated with established levels of TPH through computer algorithms. The approach provides multiple benefits over traditional sampling/lab work: 1) results are returned to the investigator, on-site instantly, 2) linked with GPS, data from the scans can be used to produce spatial variability maps of contamination or document temporal reductions in contaminant levels in response to remediation techniques deployed, 3) the process is non-destructive allowing for sample preservation for future comparisons, and 4) minimization or elimination of traditional laboratory analyses saves considerable money over long periods of deployment. Through three rounds of evaluation, the technique has been successfully demonstrated to the US Coast Guard and members of the BP HITT team. Furthermore, the technique was featured on the July/August 2010 cover of the Journal of Environmental Quality, a high level, peer-reviewed journal of environmental science. What remains to be done is full scale deployment of this technique across contaminated areas of the Gulf Coast for rapid TPH quantification. The objectives of this proposal are to define the following: 1) scope of work germane to implementation of VisNIR DRS for TPH quantification on the Gulf Coast, 2) definition of the roles of various partners in the implementation, 3) establish deliverables of the project, 4) establishment of a tentative timeline for implementation and, 5) costs/budgets associated with deployment of this technology.	Florida, Texas, Louisiana	$ 405,154	Public
Des Allemands	Create a new boat launch facility to replace current unsafe launch	Des Allemands - St. Charles Parish, Louisiana	$ 1,110,000	Wallop-Breaux - St. Charles Parish
Develop a finfish hatchery and submersible concrete barge fingerling grow out tanks. (Marine Fish Hatchery with Concrete Barge Growout)	Proven aquaculture technology exists for hatchery produced and controlled grow out of key coastal species of finfish, specifically speckled trout and red fish. The neighboring state of Texas has a program for controlled grow out and release of these species. Red fish and hybrid striped bass have been successfully grown in coastal waters of Louisiana and marketed to restaurants in the state as a private enterprise. Submerged concrete barges can be used as finfish grow out tanks. Funds are requested to develop these facilities.	Louisiana	$ 2,000,000	Public
Develop a marine technology program at Nunez Community College	Coastal restoration and flood protection in St. Bernard Parish is a multi-billion dollar industry. Much of the program is water or marine based. Operation of vessels in inland waters is an important part of the cultural heritage of St. Bernard Parish. Navigation, boat operation and maintenance, and all of the required skills are traditionally handed down from father to son. With the advent of satellite communication and navigation and advances in marine technology, a more formal program for these and other skills related to design, construction, operation and maintenance of ecosystem management projects would both help prepare the youth of the parish for desirable jobs, and also provide a trained workforce to implement the program as it continues to develop during this and future decades. For these reasons, we proposed immediate funding of a program for marine technology development at the Nunez Community College located in Chalmette, Louisiana. The first step should be an economic evaluation to identify work force requirements for short-term and long-term coastal restoration and related activities of fisheries and oil and gas. Concurrently an evaluation of marine technology education in other coastal states should also be made. Pilot courses should be developed immediately.	Chalmette, St Bernard Parish, Louisiana	$ 2,500,000	Public
Develop an oyster hatchery and off-bottom grow out technology	Because of the low spat counts in the eastern St. Bernard estuarine area since the BP oil event, a supply of disease resistant, fast growing live larvae is needed as an important component of oyster reef and fishing grounds restoration. Dr. John Supan of the LSU Sea Grant program has developed and is operating an oyster hatchery at the Louisiana Department of Wildlife and Fisheries Facility located at Grand Isle, Louisiana. Part of Dr. Supan's program is to foster advanced technology, off-bottom grow out techniques and to help introduce these techniques to the oyster fishers. Dr. Supan has made a commitment to participate in the Hopedale Oyster Reef and Fishing Grounds restoration program. Funds are requested to move this essential component of restoration of the oyster grounds and industry.	Hopedale, St Bernard Parish, Louisiana	$ 1,000,000	Public
Develop plan and design for Violet safe harbor	The Violet Canal is an important water gateway from the east bank of the Mississippi River to Lake Borgne via Bayou Dupre. It has been proposed by the U.S. Army Corps of Engineers as a route for a diversion channel to deliver water from the Mississippi into the MRGO channel and Lake Borgne. Near its northern Bayou Dupre end it crosses through floodgates in the flood protection levees and thence crosses the MRGO channel before entering Lake Borgne. Historically it has been a harbor for fishing boats. During Hurricane Katrina a large part of the St. Bernard fishing fleet took refuge in the canal and survived the storm. This is currently the only "safe harbor" in the eastern end of the parish. Until recently there was a shrimp cannery along the canal, but it was closed after Hurricane Katrina. The function of this important canal and the land adjacent to it is in serious need for re-evaluation. Because of the importance of this canal to the fishing industry of St. Bernard it is recommended that funds be provided to conduct a comprehensive economic and land use evaluation and to develop a plan.	Violet, St Bernard, Louisiana	$ 400,000	Public
Develop plan and design to upgrade infrastructure in working waterfront communities of eastern St. Bernard.	The fishing villages of eastern St. Bernard include Reggio, Delacroix, Yscloskey, Shell Beach, Ft. Beauregard, Hopedale and Delacroix. They are linear communities aligned along highways that follow bayous. They are as close to the rich estuarine resource base as road access will permit, but they lie outside of the protection of the hurricane and flood protection levees. They are characterized by boat launching and docking facilities, seafood off-and loading areas intermixed with houses and trailers perched on high foundations and pilings. Water front recreational communities are part of the mix. They are the staging area for commercial and recreational fishers with a sprinkling of support for oil and gas field personnel. They were devastated by Hurricane Katrina and were in the recovery mode only to be set back by the BP oil event. Infrastructure is not as well developed here as in the more densely populated urban corridor of St. Bernard, but there is electricity, roads and bridges, public water supply, as well as police fire and other emergency protection. The lower-elevated landscape is subject to flooding from storm surge and building construction must meet rigorous new standards for base floor elevations and resistance to hurricane force winds. The fishing village area needs long term planning for further development of its infrastructure to accommodate present and future uses. Economically and culturally, this is an important part of St. Bernard Parish. It is proposed that funding be provided to develop a comprehensive plan for the area.	St. Bernard Parish, Louisiana	$ 500,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Reef Ball® Dock and Sea Wall Habitat	Docks and seawall have historically been viewed a significant developmental impacts to the coastal environment. These areas generally have a lower overall species diversity and abundance of finfish, invertebrates, and aquatic plants when compared to surrounding natural areas. The general characteristics of seawalls are high energy zones where water continually scours the bottom restricting natural community formation, while docks have been shown to dramatically reduce the available sunlight and increase sedimentation. These types of environments are not conducive to increasing natural community structures. The addition of Reef Ball® habitat to approved docks, piers, and seawalls not only provide physical protection in the event of seasonal storms but can increase the recruitment and survivability of juvenile finfish and invertebrate populations. These structures have also been shown to provide ideal settlement substrates bivalves, corals, and macroalgae increasing natural nutrient cycling and reducing turbidity. Cleaner, less turbid waters have been correlated to increased species diversity and abundance worldwide and could constitute a significant step in the conversion of sterile manmade structures into a more natural living shoreline. Addition of these habitats could help mitigate shoreline development that would normally not be directly used by native finfish and invertebrates. Starting with Phase I, Reef Innovations would provide a crew to survey public docks and piers determine suitability for the individual areas for enhancement. The criteria for suitability will be developed in conjunction with the regulatory agency ensuring compliance with local, state and federal guidelines. Reef innovations will develop a site plan for each deployment based on the site criteria and deploy the units to maximize structural protection and species recruitment. The addition of the Reef Ball Habitat units will immediately reduce water flows through these areas and provide e settlement areas for the finfish and invertebrate community. The extent and makeup of the community will depend on the area. Phase 2, expands this program to private property owners following the criteria used for public docks and seawalls. These homeowners would finance their own projects thus saving the government money and giving the homeowners vested interest in marine conservation and restoration. Science has shown a need for increased restoration efforts in estuarine habitats. Shareholder involvement is a vital component to establishing a living shoreline and helps to create sustainability along our coastline through habitat restoration. Reef Innovations and/or their approved contractors can handle all parts of Phase I and Phase II activities. Funding requests grant will be based on size of project, distance of travel, cost of modules, used, and transportation of modules to the deployment site. Additional Information, Pictures and Pricing on within attached file updated Jan 2017. The project could be a small community project or combined as a large area wide project, in the packet it identifies a 10 year progression for the project.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 1,000,000	Public
Dolphin Conservation Mobile Education/ Outreach Exhibit	This project involves developing a mobile outreach and education exhibit that would travel throughout the Gulf States to educate residents and visitors about dolphin conservation issues. The audience includes recreational fisherman, beach-goers, motorized and non-motorized recreational vessel operators, and the general public. By educating these audiences and distributing outreach materials at fishing piers, marinas, and events, this project will: - Reduce injury and mortality to bottlenose dolphins from hook-and-line fishing gear by educating fisherman about ways to avoid interactions with dolphins while fishing and provide them with Dolphin Friendly Fishing Tips. - Increase bottlenose dolphin survival though better understanding of cause of illness and death as well as early detection and intervention of anthropogenic and natural threats because this audience would know how to help a stranded, injured or entangled marine mammal and to report these animals to the appropriate stranding network immediately. - Reduce injury, harm, and mortality to bottlenose dolphins by reducing illegal feeding and harassment activities because audiences will better understand the harm and consequence of these activities. They will learn how to recognize dolphin behaviors that are signs of harassment and also how to responsibly view dolphins in the wild. - Reduce injury and mortality of marine mammals from vessel collisions by educating mariners about marine mammal viewing guidelines and precautions they can take to avoid vessel strikes. A large van would be purchased and wrapped with colorful, eye catching dolphin graphics and bold educational messages. Not only would this attract people during outreach but the wrap would also serve as a rolling billboard that has the potential to reach thousands when traveling throughout the Gulf States. The inside of the van would be a customized exhibit illustrating and educating audiences about the topics above. The budget includes funds to purchase and customize the vehicle, as well as funds for salary of an educator/driver, fuel, per diem (food/lodging), outreach materials, and insurance & maintenance of the vehicle for at least 3 years.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 500,000	Public
Door Point and Pelican Point Living Shoreline Stabilization Project	This project provides for the fabrication and installation of bio-induced oyster reefs to stabilize Door Point and Pelican Point shoreline and help restore and sustain valuable and sensitive estuarine ecosystems. Shoreline stabilization will be accomplished through the attenuation of wave energy utilizing vertical profile oyster reefs and shoreline armoring utilizing aggregate cultch. The vertical profile units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that expands linearly and vertically. This reef dampens and dissipates wave action thereby retarding erosion and undercutting of the marsh platform. Vertical reef units also enhance species habitat diversity and provides oyster larvae for recruitment to adjacent oyster grounds. ReefBlk vertical reef technology is successfully in use in St Bernard Parish and along other estuarine shorelines in Louisiana, Texas, Alabama and Florida. The use of cultch substrate provides immediate shoreline armoring and similarly induces oyster growth which serves to create long-term armoring through shoreline oyster shell accretion and deposition within the project area. This form of natural armoring occurs throughout the Biloxi Marsh area.	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 3,500,000	Public
Drum Bay Island Living Shoreline Stabilization Project	Coastal Environments, Inc and partners propose to fabricate and install bio-induced oyster reefs to stabilize Drum Island shoreline and help restore and sustain valuable and sensitive estuarine ecosystems. Shoreline stabilization will be accomplished through both the attenuation of wave energy utilizing ReefBlk vertical profile oyster reefs and shoreline armoring utilizing aggregate cultch. The vertical profile ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that expands linearly and vertically. This reef dampens and dissipates wave action thereby retarding erosion and undercutting of the marsh platform. ReefBlk also enhances species habitat diversity and provides oyster larvae for recruitment to adjacent pubic oyster grounds, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. ReefBlk technology is successfully in use along estuarine shorelines in Texas, Louisiana, Alabama and Florida. The use of cultch substrate provides immediate shoreline armoring and similarly induces oyster growth that serves to create long-term armoring through shoreline oyster shell accretion and deposition within the project area. This form of natural armoring occurs throughout the Biloxi Marsh area. This project will stabilize up to 1100' of highly eroding shoreline by strategic alignment of ReefBlk units and the application of #57 concrete aggregate as cultch 4-8" thick to a distance between 50-100' from the shoreline. Given appropriate bottom conditions, alignment of the ReefBlk units will create a lagoon-like habitat in a portion of the protected area to facilitate overall marine nursery activity. This project can be considered almost fully shovel ready. Staging and logistics for the project can be implemented immediately upon grant approval by expanding the current ReefBlk operation at Hopedale, Louisiana now servicing The Nature Conservancy project for Lake Eloi. Permitting for the Drum Bay Island project also is facilitated by having obtained permits previously for this type of activity within the subject area and by having established landowner protocols. The shoreline in the project area was cleaned under STR 4-003 for mats in the middle and upper tidal zones and patties in the lower tidal zone. Drum Island is identified as a historic pelican and wading bird rookery. This project will be a part of the overall scope of education and research contemplated for the Oyster Research Center at Hopedale which is also listed under NOAA NRDA projects.	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 750,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Drum Bay/Fishing Smack Bay Living Shoreline	Coastal Environments, Inc and partners propose to fabricate and install bio-induced oyster reefs to stabilize shoreline and help restore and sustain valuable and sensitive estuarine ecosystems. Shoreline stabilization will be accomplished through both the attenuation of wave energy utilizing ReefBlk vertical profile oyster reefs and shoreline armoring utilizing aggregate cultch. The project is an important aspect of maintaining the area's salinity regime for oyster production and preserving the storm buffering capacity of the Biloxi Marsh. The vertical profile ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that expands linearly and vertically. This reef dampens and dissipates wave action thereby retarding erosion and undercutting of the marsh platform. ReefBlk technology is successfully in use along estuarine shorelines in Texas, Louisiana, Alabama and Florida. The use of cultch substrate provides immediate shoreline armoring and similarly induces oyster growth which serves to create long-term armoring through shoreline oyster shell accretion and deposition within the project area. This form of natural armoring occurs throughout the Biloxi Marsh area. This project will stabilize highly eroding shoreline by strategic alignment of ReefBlk units and the application of #57 concrete aggregate as cultch spread 4-8" thick to a distance between 50-100 from the shoreline at strategic locations. Given appropriate bottom conditions, alignment of the ReefBlk units will create a lagoon-like habitat in a portion of the project area to facilitate overall marine nursery activity.		$ 9,000,000	
Dulac	Kayak launch and roadside fishing	Dulac - Terrebonne	$ 400,000	LDWF Fisheries
Early NRDA Restoration Louisiana Delta	Early NRDA Recommendations (June 25, 2011) Coalition to Restore Coastal Louisiana, Environmental Defense Fund, Lake Pontchartrain Basin Foundation, National Audubon Society, National Wildlife Federation, The Nature Conservancy. Planning for restoration in Louisiana was well-advanced prior to the BP Deepwater Horizon Oil Spill. We support efforts to use early NRDA funding to advance projects that are ready to be implemented and which are based upon tested techniques that have had proven success in achieving restoration goals for the Mississippi River Delta, and for addressing damages caused by the spill. Delta building sediment diversions -- We nevertheless recognize that the projects listed below fail to address the underlying, systemic impediment to long term coastal ecosystem restoration in the impact area, which is the separation of the Mississippi River from its delta. It is unfortunate that no pulsed sediment diversion and sub-delta building projects are either ready to be implemented, or able to be scaled and phased to the restoration funds available. We encourage the Trustees to consider combining NRDA funding streams in out years to construct one or more of the pulsed sediment diversion projects now advancing through the planning and compliance process, such as White's Ditch or Myrtle Grove. Consideration should also be given to funding diversions that would sustain deteriorating interior freshwater ecosystems, such as the Violet Canal Diversion and the Convent/Blind River Diversion. NRDA Design Changes -- While the projects suggested below are in many cases long-standing proposals taken from existing program lists, the special circumstances of NRDA restoration suggest that the phases of projects proposed and other features of the projects should be chosen to offset damage to specific natural resources damaged by the spill. These would include colonial nesting birds; migratory shorebirds; marsh nesting birds and other marsh organisms (blue crabs, brown and white shr imp, etc.); beach nesting birds, sea turtles and beach dependent crabs, mollusks and other organisms; oysters and oyster reef dependent fauna; as well as Threatened and Endangered Species including Least Terns and Piping Plovers. Examples of measures that might enhance the NRDA specific goals of these restoration projects include: Use of artificial oyster reef in place of or along with rock for shoreline protection; Rebuilding colonial bird (terns, gulls, pelicans) nesting barrier islands in the Timbalier, Dernieres, and Breton island chains; Armoring with reef block and adding sediment (where appropriate) to colonial nesting islands (pelicans, spoonbills, herons, egrets, oystercatchers) on disappearing islets on the baysides of the barrier chains, as at Bay Ronquille (e.g. Cat/Mangrove Island) and in Chandeleur and Breton Sounds; Enhancing barrier spits and overwash fans, and designing barrier island and barrier headland restoration projects to incorporate topographic and habitat diversity to benefit migratory shorebirds, nesting Wilson's Plovers and Least Terns, and wintering Piping Plovers. Offshore Marine Restoration -- The projects proposed herein are coastal restoration projects. We recognize that much of the natural resource damage caused by the BP spill affected populations of organisms in the marine environment for which there are no ready counterparts for the kinds of physical projects herein proposed. However, we encourage the Trustees to examine actions like enhanced monitoring, artificial reefs, increased enforcement, temporary closures of fisheries (with compensation for affected interests), buy-outs for unsustainable fisheries, and either temporary or permanent marine sanctuaries as measures that might help restore affected resources. Project Substitution - The projects suggested below are often smaller appropriately scaled components of larger landscape level authorizations with broader ecosystem objective - barrier island and headland restoration as at Terrebonne and Barataria; land bridge projects as at Bayou Dupont; or parts of larger ecosystem restoration projects as at Biloxi Marsh. Trustee agencies should evaluate which segments of these larger projects can be efficiently coupled with other projects for maximum benefit for both NRDA and long-term restoration. For instance, where possible projects should be coupled with CWPPRA or CIAP projects underway to avoid mobilization and de-mobilization costs, or to utilize existing infrastructure such as sediment pipelines. Where savings in time and cost can be achieved by substituting project segments or phases that achieve comparable ecosystem and NRDA benefits to those suggested below, we support such substitutions. Project Selection --The following list of potential projects for utilization of early NRDA funding by the State of Louisiana and the Trustees are based upon our assessment of: OPA early screening criteria (see Appendix A); State selection criteria for early restoration (see Appendix A); Strategic restoration objectives as reflected in the shared vision and campaign goals of our organizations, as well as in Louisiana's Comprehensive Master Plan for a Sustainable Coast, the LCA, and other planning documents. (see Appendix B) Projects: A) Pontchartrain-Breton MRGO Ecosystem Restoration The Mississippi River Gulf Outlet Ecosystem Restoration Plan, still in development, is a multi-component plan designed to ameliorate and reverse some of the damage done as a consequence of the dredging of and failure to maintain channel dimensions of the MRGO. Biloxi Marsh Shoreline Protection Engineered Oyster Reef (Living Shoreline) and Rock Revetment The proposal is to armor up to 30 miles of the eroding Biloxi Marsh interface with Chandeleur Sound and Lake Borgne. Shoreline sections should be chosen based upon rate of retreat, likelihood of breakthrough into interior bays, and habitat suitability. Wherever possible, living reef structures should be used in place of or in combination with rock. Orleans Land Bridge Alligator Bend Marsh Restoration and Shoreline Protection This project will restore approximately 300 acres of marsh on the Orleans Land Bridge by use of marsh creation. It will provide shoreline protection for approximately nine miles of the northwest shoreline of Lake Borgne. The proposed protection will consist of a foreshore rock dike and possible terracing and vegetative plantings in specific areas. B) Barataria LCA Barataria Basin Barrier Shoreline The goals of this project include: restoring dune and marsh habitat as well as stabilizing remaining un-vegetated portions. The project consists of beach, dune and back barrier marsh habitat creation to restore the physical form and function of the Barrier Island and shoreline and provide critical habitat, and long-term sustainability of these features of the estuary. CWPPRA BA-76 Cheniere Ronquille Barrier Island Restoration The project consists of constructing 11,000 linear feet of dune/beach and 259 acres of marsh platform contiguous with the northern side of the Gulf of Mexico shoreline on Cheniere Ronquille in Plaquemines Parish. Specific NRDA enhancements to this project could include armoring and adding material to colonial birds nesting islands in Bay Ronquille and Bay Long using living reef where appropriate. CWPPRA BA-48 Bayou Dupont Marsh and Ridge Creation Project The project consists of creating/nourishing 300 acres of marsh and associated edge habitat through pipeline sediment delivery from the Mississippi River, and creating 11,000 linear feet of ridge along a portion of the southwestern shoreline of Bayou Dupont in Jefferson Parish. It complements the future Myrtle Grove Sediment Diversion Project now being studied. CWPPRA BA-68 Grand	Louisiana	Not provided with submission	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
	Liard Marsh and Ridge Restoration The project consists of creating/nourishing 468 acres of marsh and associated edge habitat for aquatic species through pipeline sediment delivery, and restoring 14,500 linear ft. of the Grand Liard ridge to reduce wave and tidal setup and provide fallout habitat for neotropical migrant birds adjacent to Grand Liard Bayou in Plaquemines Parish, Louisiana. C) Terrebonne LCA Terrebonne Basin Barrier Shoreline The goal of the project is to decrease the continuing degradation and deterioration of the Isles Dernieres (Raccoon Island, Whiskey Island, Trinity Island, East Island, and Wine Island) and Timbalier Islands (Timbalier Island and East Timbalier Island), and to maintain the integrity of the shoreline between Point au Fer and Lake Pelto. Raccoon Island Restoration and Protection Raccoon Island is the largest colonial nesting bird colony in Louisiana. This project proposes to extend the life of the barrier island and create additional habitat, including dune and back barrier marsh. TNC TE-67 Maintain Land Bridge between Caillou Lake and Gulf of Mexico In an effort to protect the land bridge between Caillou Lake and the Gulf of Mexico, approximately 21 miles of artificial oyster reef will be constructed and placed along shorelines most in danger of being lost. This project will be executed in three separate phases, and will employ proven engineered reef technology as the means of attenuating wave energy and as a substrate upon which oysters will attach and grow. (See Appendix C) D) Department of Interior Breton National Wildlife Refuge Chandeleur Islands Restoration Sediment pipeline delivery to continue restoration of the main island to build upon work already completed at the north end. Specific NRDA-related add-ons to this project might include adding pumped material to shoals at Curlew, Gosier and/or East Breton to speed up re-emergence of critical colonial bird nesting islands. Delta National Wildlife Refuge Pass a Loutre Dredging, Beneficial Use, and Crevasse Opening The project would re-open Pass a Loutre to flow by dredging the channel, beneficially placing the sediments in Delta Refuge and Pass a Loutre WMA, and by opening crev...			
Ecological responses to freshwater diversions in Barataria Bay and surrounding areas	Louisiana is moving forward with the design, engineering, and construction of several large-scale sediment diversions adjacent to the Mississippi River. More information is needed to understand the nature and degree of ecological changes that can occur in receiving estuarine environments and for such predictions. We propose to assess estuarine health at sites near Fort Saint Phillip where passive breaches in the Mississippi River levy have resulted in large influxes of freshwater into the lower sections of Breton Sound. Biological, chemical and physical (habitat) characteristics will be measured in response to the long-term influx of freshwater and sediment from the Mississippi River, as opposed to sites isolated from any direct river water influx. Conditions at these sites will be compared to those adjacent to, and downstream of, the proposed outfall of the mid-Barataria diversion. The intent of our multi-parameter, inter-disciplinary design is twofold: (1) to document and compare the conditions at estuarine sites receiving freshwater and (2) to document baseline conditions for the Barataria Bay estuary. Moreover, by way of these observations across the fresh- to salt water gradients, models will be applied to the data for use in predicting the likelihood of changes for other estuaries receiving diverted freshwater. The null hypothesis is that biological, chemical, and physical conditions will not change substantially at estuarine sites receiving diverted freshwater and sediment. Site conditions encountered at sites located across the fresh- to salt water gradient will be compared using integrated data and ecological modeling. Over a period of 3 years, 12 sites, approximately split between the eastern and western Mississippi River will be sampled. Monthly data will be collected on nutrients, suspended sediment, and chlorophyll a. with concurrent field readings on dissolved oxygen, pH, salinity, conductivity, and turbidity. Sediment accumulation will be measured and samples analyzed for organic compounds and metals, annually. Each spring and fall (under similar tidal conditions), water current (direction and velocities) will be measured with Acoustic Doppler Current Profilers (ADCPs) at transects to determine hydrologic characters that can influence water quality. Depth profiles by the ADCPs will generate bathymetry parameters over the period of study. Fish, benthic (infaunal and epifaunal) invertebrates, and bacteria (measured using metabolic activity in water and sediment) metrics will be compared to chemical and physical measures and will be used as ecological end points. Suspended sediment and chlorophyll a data collected for this study will be used to develop algorithms for estimating those constituents using remote sensing techniques. This project also will build upon a recently developed hydrodynamic-water quality-oyster population coupled modeling system for Breton Sound that can help provide understanding for how oyster population characteristics (growth, mortality, recruitment) and other characteristics support adaptive management strategies for future restoration projects. This project is complimentary to several other ongoing projects and plans in Louisiana. It addresses several specific research needs listed in the Research Strategy identified in the RESTORE Act which are relevant to the Louisiana's Coastal Master Plan. Our sampling strategy will be more intense and cover a smaller area than SWAMP and CRMS. Adherence to quality control and assurance protocols, and specific standardized operating procedures, ensures that our project will provide data valuable to SWAMP and to CRMS. Results will tie directly to the Trustee approach of broad perspective, ecosystem-level considerations. Such process-driven, systematic modeling approaches have not yet been applied in coastal master plan applications, but is envisioned as a pathway forward for coastal master plan development.	Barataria Bay, Louisiana	$ 1,360,000	Public
Economics and The Gulf Coastal States	The objective is to collect economical data for the Gulf Coast fishermen, anglers, processors, charter for hire and businesses that rely on our Nation's marine resource to provide food and jobs for our Nation. This project will attempt to capture the true value of our Gulf of Mexico State's marine resources and seafood to the Nation as a whole. Activities include the collection of economic data which will include mail out surveys, email surveys, phone calls to various users of our resources to validate the data collected from the mail out surveys. We will also meet face to face with many of our businesses. We will collect economic data from the products harvested throughout the entire seafood supply chain. We have never collected the true value to regional businesses benefitting from Gulf seafood. In most surveys they only show the x-vessel price. We will do a literature review to make sure we have included all value from the fish to the plate and all the jobs that depend on our marine resource and all revenue that our nation receives. One example is Menhaden is used for making oil, fertilizer, dog and cat food. The oil is used as the primary ingredient in WD forty. This example is to show how the value chain comes into play and the many jobs that are created through the value chain. The outcome is to have a social and economical survey that will help capture the true value of the commercial seafood industry to the Nation as a whole. We will also provide the other businesses that depend on the seafood from the Gulf of Mexico to make their living. This data has never been collected before. If a disaster should strike again we will have the true value and as an extra bonus of this proposal .Our science center will have the information and so will our fishery management councils that use this type of information in their management plans.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 5,000,000	Public
Ecosystem Based Restoration Project Management and Decision Support System	As multiple restoration projects are implemented in the northern Gulf of Mexico, there is a need to understand and quantify impacts on the ecosystem. Furthermore, there is risk that interactions across projects may have "unintended consequences". For example, changes in water quality such as salinity and sediment load may adversely impact desired habitat conditions (e.g., oyster reefs and marsh restoration). This could result from freshwater diversions and changes in circulation with barrier island construction. Consequently, a method that informs ecosystem based management is needed. This proposal is to develop and deploy a placed-based decision support system (DSS) for scientific assessments of synergistic interactions of multiple restoration projects. The DSS will be built using existing technologies and data for conducting scenario analyses and simulations. Existing models and ongoing ecosystem assessments will used to develop a place-based DSS. Projects and their alternative will be assessed using Multi-Criteria Decision Analysis (MCDA). MCDA provides a systematic tool for identifying a preferred course of action when considering multiple forms of dissimilar information and differing value judgments among stakeholders. The DSS will allow managers to evaluate impacts of multiple projects on the overall quality of the ecosystem in the northern Gulf of Mexico and provide science based assessments for adaptive management as restoration projects develop over time. Enhanced assessment techniques will be used to evaluate the stability and sustainability of projects during construction and post construction. The project will be a collaborative effort with engineers and scientists from Mississippi State University (MSU) and the University of Southern Mississippi (USM) and will be coordinated with state and Federal agencies conducting restoration in the northern Gulf of Mexico. Emphasis will be placed on projects in the Mississippi Sound and Lower Mississippi River. More detailed proposal is available upon request.	Mississippi Sound and Lower Mississippi River		Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Elmer's Island Access	This proposed project would include a suite of recreational access elements at the LDWF Elmer's Island Refuge, which is managed as a natural area that is open to the public for fishing, birding, and other outdoor activities. Project elements would include components that would improve upon existing access points, enhance the natural features of the project area through reconnected hydrology, and develop a solution for improved access for recreational fishing activities targeting the eastern portion of Elmer's Island adjacent to Caminada Pass. Specific project elements would include improvement of aquatic hydrology through the installation of culverts under the access road, enhancement of access features by improvements to currently improvised parking areas and kayak/small-boat launches, construction of an elevated boardwalk to facilitate beach access points, repair of breach/washout location off the main access road to allow foot traffic to additional fishing locations, improvements to dedicated birding area including walking path and observation area, outreach and educational materials to compliment the project, long term operation al costs including routine trash collection and removal, long term maintenance costs associated worth project upkeep including routine and emergency road repairs, and long tem monitoring of recreational usage of Elmer's Island Refuge.	Elmer's Island, Jefferson Parish, Louisiana	$ 6,000,000	LDWF
Elmer's Island Restoration	As part of an erosional headland, Elmer's Island is dominated by marine processes including overwash. The island has narrowed and decreased in elevation escalating the rate of overwash and breaching near the confluence with the headland as well as along Caminada Pass. As the island has become more vulnerable from overwash and breaching, island habitat has been lost and protection of mainland marsh and infrastructure has diminished. Sand fencing efforts are helping portions of the island maintain hummocky dunes. Extension of the spit into Camanida Pass and periodic closures of Bayou Thunder von Tranc at the Gulf (and siltation throughout) is altering the hydrologic connection of the lagoon and marshes north of Elmer's island. The spit along the pass is breached. Although sediment transport will continue across the breach supporting extension of the spit towards Caminada Bay, the breach is likely to persist and worsen without corrective actions. The 1985 to 2009 Port Fourchon subunit loss rate is -0.49% per year. The proposed project goals are: 1) habitat, 2) hydrology, and 3) protection. The proposed features include approximately 26 acres of spot dune repair at sites where overwash and breaching is reoccurring; breach closure, and 300 acres of back barrier marsh creation. Sediment for marsh creation would be mined offshore of the headland at a distance to avoid inducing shoreline erosion. Sand is necessary for the spot dune repair and the breach closure. Mining the newly developing portions of the spit may be targeted. If so, spit habitat losses are expected to be temporary as re-growth is expected over time. Maintenance dredging of Bayou Thunder (if adequate sand content) and offshore mining (if sand is available without infrastructure constraints) also would be considered as alternative sources for dune construction material. Mining of the spit may temporarily re-establish historic hydrology as could dredging the bayou. The spot dune repair and bre ach closure would be planted with dune vegetation and the marsh platform would be planted with marsh vegetation. Various design alternatives will be considered for the breach closure. A rock core with sand capping tentatively is assumed. Consideration will be given to directly or indirectly create tidal flats to replace those that exist now, but would be filled with the dune and marsh restoration.	Elmer's Island, Jefferson Parish, Louisiana	$ 26,200,000	Public
Empire	Kayak launch and pier near Empire - Bay Adams	Empire - Plaquemines Parish, Louisiana	$ 400,000	LDWF Fisheries
Enhancements to marine charter for-hire fishing surveys (Enhancements to Charter Surveys)	Make enhancements to the charter for-hire telephone fishing effort survey for improving fisheries management. Link to Injury: Members of the public who hire charter boats to fish offshore lost access to a considerable portion of federal and state waters in the northern Gulf of Mexico that were closed to fishing during the BP oil disaster. Charter boats provide access to offshore fishery resources for members of the public who do not own vessels themselves. Benefit and Rationale: A telephone survey is the primary method used by fishery managers to collect charter for-hire fishing effort, which helps track quota usage. Making enhancements to the survey, such as increasing frequency and sample size, would result in more effective monitoring of fishing effort, improved management and possibly longer fishing seasons. Better data from enhanced telephone surveys would help fishery managers be more responsive and adaptive in their management of fishery species exposed to oil. Other: This project could be compensatory in nature if a reduction in fishing that anglers experienced in 2010 due to oil-related fishery closures is offset in the future by extending fishing seasons made possible through better (more accurate and precise) data on fishing effort. For example, an enhanced charter for-hire telephone survey in summer 2010 increased the precision of catch and effort estimates that allowed, in part, the red snapper fishery to reopen in the fall of 2010 after a summer closure.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 5,000,000	Public
Enhancements to marine private recreational fishing surveys (Enhancement to Private Surveys)	Make enhancements to the marine private recreational fishing survey to improve timeliness and spatial resolution of catch and fishing effort data for better management. Link to Injury: Private recreational anglers lost access to a considerable portion of federal and state waters in the northern Gulf that were closed to fishing during the BP oil disaster. Therefore, the angling public must be compensated for lost access to fishing as a service. Benefit and Rationale: Improving the private recreational survey in the Gulf of Mexico will help keep fishery resources healthy and available to anglers. Specifically, improving the timeliness and spatial resolution of catch and effort data can help fishery managers keep total catch within prescribed fishing limits and prevent recreational anglers from exceeding their quotas and incurring penalties. These improvements would benefit the public by lowering the likelihood of overfishing and accountability measures, which, if triggered, could result in shorter fishing seasons in the future.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
ENHANCING OYSTER REEF RESTORATION IN COASTAL ALABAMA: OYSTER FARMING AS A RESTORATION MULTIPLIER	The core partners listed have formed a coalition to assist with and supplement any oyster restoration projects planned throughout the coastal waters of Alabama. Here we propose to contribute significant numbers of live oysters (both larval and post-set) to restoration projects throughout the coastal waters of Alabama, increasing the likelihood of success of restoration efforts, jump-starting oyster populations in these areas, and increasing the return on investment of restoration dollars. A secondary benefit of this NRDA restoration project will be the creation of environmentally, economically and socially sustainable jobs for coastal residents pursuing off-bottom oyster farming in Alabama, as well as providing outstanding educational opportunities at an area high school. Additionally, the oyster farming jobs will relieve fishing pressure on natural reefs. Public oyster reef restoration projects will be supplemented by seeding with larval and/or juvenile oysters spawned by the Auburn University Shellfish Laboratory (AUSL), raised by local oyster farmers, and in partnership with Alma Bryant High Schools aquaculture program. Within 5 years, up to 10 billion oyster larvae and 100 million juvenile oysters could be added to public oyster restoration sites in the region. This supplemental restoration program will increase the likelihood of successful reef restoration by ensuring that oyster reefs are initially seeded with hatchery reared oyster larvae and then supplemented with juvenile oysters at each restoration site. While wild oyster set is expected and hoped for, successful oyster set is not guaranteed. Supplemental planting will provide two benefits. It ensures that the site has an initial population of oysters before competing species (e.g., barnacles, mussels) become established and preempt oyster settlement and decreases the time for oysters to reach sexual maturity. Additionally, supplemental stocking will help oysters become established in areas where larval supply may be limited (e.g., Bon Secour Bay) and will decrease the time to see a return on investment of restoration dollars. The enhancement of natural oyster reef structure and oyster abundance as early as possible will also provide critical ecosystem services through improved water quality, increased biodiversity and creation of more diverse habitat. In addition to assisting with the restoration of public oyster reefs, this project will provide an important boost to the development of off-bottom oyster farming in Alabama and other Gulf of Mexico states. The quantity of oyster larvae needed for this project can be readily produced at the Auburn University Shellfish Lab located on the campus of the Dauphin Island Sea Lab with upgrades in infrastructure (as was done with the Louisiana Sea Grant shellfish hatchery as one of Louisiana's early restoration projects). Production of juvenile oysters, however, requires the establishment of environmentally-friendly oyster farms. We propose to establish 2,100-acre oyster aquaculture parks (or 450-acre parks) in coastal Alabama, where watermen are paid to produce juvenile oysters to supplement oyster reef restoration. Over the long-term and when the restoration project ends we expect to see these farms continue and shift to producing adult oysters for the food market as an additional sustainable source of income through the operation of environmentally-friendly family farms. For this project the parks will support 40 independently operated 5-acre oyster farms each capable of producing 500,000 juvenile oysters per year per farm for restoration efforts. Combined, the cooperative project with local farmers would produce up to 20 million oysters per year for supplementation of restoration efforts. Additionally, 40 farms, once established, could raise oysters for premium half-shell markets, generating at least $5 million per year of combined income within 5 years through sales of premium oysters. Single choice oysters command higher prices than those oysters traditionally produced from the oyster reefs in Alabama thereby providing greater income for the oyster producers and also reducing pressure on natural oyster resources by creating additional sources of income. Research in Alabama suggests that a 5-acre operation would allow an oyster farmer to raise 400,000 oysters per year; potentially yielding a gross annual income (with a conservative 80% survival) of over $80,000. This would be a significant increase in annual income for the typical oyster catcher who might currently earn $20,000/year. This project will also develop and implement an aquatic environmental education program for high school students throughout Mobile County. COASTAL Academy (Coastal Ocean Aquatic Science Technology And Learning Academy) will be centered around the aquaculture and marine biology programs located on the campus of Alma Bryant High School. Although the academy will involve all aspects of aquatic environmental sciences and coastal issues, the primary program focus will be on "Half-Shell High School", a program that will educate students and community members through the hands-on management and operation of an oyster farm, including restoration and biology projects, and the development of a curriculum that can serve as a model for the region. This combination of opportunities is a powerful means of engaging students, improving student knowledge, and, ultimately, student achievements and decision-making abilities. The emphasis on science, technology, engineering, and math education (STEM) and a hands-on, project-based learning system will be the core of COASTAL Academy. STEM education will lead to students being able to pursue occupations that require similar skills that have been acquired in the Academy and prepare students for success in technical schools, and two- and four-year colleges. Total project budget of $13 million over 5 years broken into the following categories: Juvenile oysters for restoration projects, 20 million/yr. for 5 years @ $20/1,000 for $400,000/yr. or $2 million total. Assistance with initial permitting and surveying of oyster parks, for $1 million total. Eyed Oyster larvae (larvae that are ready to set) for restoration projects, 2 billion larvae/yr. for 5 years @ $1/1,000 for $400,000/yr. or $2 million total. Expansion of capacity and increase in storm-preparedness (building addition, larval tanks, generators, etc.) for Auburn University Shellfish Laboratory as a resource for oyster restoration, for $2.5 million total. Oyster gardening program to expand restoration capabilities and increase community involvement, for $50,000/yr. for 5 years or $250,000 total. Oyster restoration assistance and educational program development at Alma Bryant High Schools aquaculture program (Bayou la Batre), for $250,000/yr. for 5 years or $1.25 million total. Oyster restoration assistance and educational program development at Sea, Sand & Stars (Orange Beach), for $100,000/yr. for 5 years or $0.5 million total. Program funds for state agencies for management of and assistance to restoration projects and aquaculture oversight, for $2.5 million total. Monitoring and technical assistance provided to partners by Auburn University Marine Extension & Research Center, for $200,000/yr. for 5 years or $1 million total.	Alabama, Louisiana	$ 13,000,000	Public
Erosion Prevention, Marsh Creation and Land-Building	Shoreline and Marsh erosion prevention and land building, with new designed geotextile containment units (GEO-TECH- Jetty), with planted native plants and grass in RZHO. GEO-TECH Units are spiked with XX Heavy Duty PVC Pipe for stabilization. This will help Shoreline Erosion Control, Stabilization, Accretion, and Habitat Assurance and "coast building." This new concept will coincide with the two other projects submitted.	Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Establish or expand fisheries observer coverage to assess marine mammal bycatch	There are several commercial fisheries operating in the Gulf of Mexico that have been determined by the National Marine Fisheries Service (NMFS) to have frequent or occasional serious injuries or mortalities of marine mammals. Fisheries are identified as Category I or II fisheries, respectively, under the Marine Mammal Protection Act, and include: • Atlantic Ocean, Caribbean, Gulf of Mexico large pelagics longline fishery; • Gulf of Mexico gillnet fishery; • Southeastern U.S. Atlantic, Gulf of Mexico shrimp trawl fishery; • Southeastern U.S. Atlantic, Gulf of Mexico stone crab trap/pot fishery; and • Gulf of Mexico menhaden purse seine fishery. Bycatch of marine mammals in Gulf commercial fisheries has the potential to prevent the recovery and restoration of nearshore and offshore populations that have been reduced due to the oil spill - primarily bottlenose dolphins but also other species such as Atlantic spotted dolphins, pantropical spotted dolphins, pilot whales, Risso's dolphins, and pygmy sperm whales. An expansion of current observer coverage levels is necessary to provide better estimates of marine mammals injured or killed incidental to commercial fishing activities. Expanded observer coverage would also provide additional information needed by managers to determine factors associated with bycatch, such as gear type, time of day, bait type, fishing methods, areas fished, etc., and to identify, test, and implement measures to reduce bycatch. Research and field studies are also needed to identify and test alternative observation methods that could be used to supplement or replace traditional human observers. Such methods may include, but are not limited to, the use of: remote observation platforms, underwater cameras, electronic monitoring, and unoccupied aircraft systems (UASs).	Gulf Of Mexico	Not provided with submission	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Establishment of a Gulf Sperm Whale (pelagic ecosystem) Nation Marine Sanctuary, Sperm Whale and Pelagic Ecosystem Interpretive Center, Gulf Sperm Whale and Pelagic Ecosystem Research vessel	A. Establishment of a Gulf Sperm Whale/Pelagic Ecosystem National Marine Sanctuary of significant size. This sanctuary will serve as a truly pelagic sanctuary for the remaining estimated 700 resident sperm whales in the Gulf of Mexico, providing a safe haven for the Gulf's largest and most endangered marine mammal species, which is the most dependent on the full spectrum of depths and habitats in the offshore water column. Sperm whales rest at the surface, dive to and feed in depths over one mile, and are most frequently found associated with the interface between cold-core and warm-core eddies along the 1,000m isobath. B. The creation of the Sperm Whale and Pelagic Ecosystem Interpretive Center on-shore a specialized, high tech facility provided for the interpretation to the public of sperm whale life histories and population dynamics, and of the pelagic environment generally, creates the capacity to educate the American public about the complex pelagic environment that very few people are ever able to directly witness. The offshore Gulf has fueled the economy through fisheries (tuna to anchovies), shipping, and oil and gas. People need to understand why, as well as what animals live there and how humans impact them. The depths of the Gulf are generally unknown to the public. The lives of sperm whales are extreme by any measure of comparison to other animals on earth and in the ocean. C. Design, development, and commissioning of the Gulf Sperm Whale and Pelagic Ecosystem research vessel, an offshore vessel dedicated to studying marine mammal population growth in the pelagic environment. The study of the pelagic environment takes specialized talents and technologies, and is truly multidisciplinary. With the establishment of the Gulf Sperm Whale National Marine Sanctuary there must be a mechanism for the natural resource managers, researchers, and others to access the sanctuary and the pelagic environment of the northern Gulf. It will be necessary to invest su bstantial time in assessing the growth or decline of populations, health of the marine mammals (fecundity and mortality and dispersion), and learn further about the life histories of the sperm whales and other marine mammals in the Gulf. D. Review of the proposed monetary allocation by the NRDA of $144 million for the restoration of marine mammals. This allocation should be adjusted by adding an allocation of $70 million for the sole purpose of establishing and managing the Gulf Sperm Whale National Marine Sanctuary, and adding a $100 million endowment dedicated to sustained research, restoration, and adaptive management in the Gulf Sperm Whale National Marine Sanctuary, lasting at least the life time of an average sperm whale, bringing the total to $314 million in funds to restore the marine mammals of the northern Gulf.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 70,000,000	Public
Expanding seabird observer placements in support of the Gulf of Mexico Marine Assessment Program for Protected Species (GoMMAPPS)	Executive summary: A modest funding request of ~$72K to the Gulf of Mexico Marine Assessment Program for Protected Species (GoMMAPPS) is requested to more than double spatial and temporal coverage in year 1 of this interagency program to better inform restoration actions and decisions for at least 25 injured seabirds listed as "offshore" in Table 4.7-3 of the Final Programmatic Damage Assessment and Restoration Plan (PDARP). Supplemental funding would increase total days surveyed from 90 to 190 in the first full program year, and would be leveraged with up to ~$200K already granted annually for 3 years from Bureau of Ocean Management (BOEM) to the GoMMAPPS component for vessel-based seabird surveys. Proposed work conforms to all protocols and requirements under a GoMMAPPS Seabird Science Plan, and the interagency agreement established between BOEM and U.S. Fish & Wildlife Service (USFWS). Data collected will be used by BOEM to inform NEPA analyses, Exploration Plans (EPs), Development Operations Coordination Document (DOCDs), oil spill risk assessment (OSRA) models, and by the USFWS for Section 7 consultations and planning of O&G activities in the Outer Continental Shelf (OCS) to reduce or mitigate associated impacts to offshore seabirds. Supplemental funding for seabird observers is requested for GoMMAPPS program year 1 only, after which time the principal investigators will reevaluate (and likely scale back) the scope of seabird observer placement during program years 2 and 3. Background: The Gulf of Mexico (GoM) region is critically important in affording breeding, staging, and wintering habitats for North America's migratory avian resources. Despite the numbers of energy-related platforms and cumulative level of oil and gas activity in the northern GoM region exceeding all other Bureau of Ocean Energy Management regions combined, limited information is still available about the species composition, distribution, and abundance of birds Gulfwide, particularly for offshore seabirds. Consequently, such information is important for assisting the science foundation and regulatory decision-making by Department of Interior agencies (BOEM, USFWS, U.S. Geological Survey) in relation to offshore resource extraction in an effort to mitigate potential effects to avian resources. Upon completion, the GoMMAPPS Seabird Project is anticipated to be the most spatially and temporally extensive avian research effort in the northern GoM, and is intended to document avian distribution, abundance, and diversity to better inform regulatory decisions that influence conservation of migratory birds.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 72,436	Public
Exploratory committee to examine the possibility of a class action civil law suit against British Petroleum	Establish an exploratory committee to examine the possibility of a class action civil law suit against British Petroleum for the damage done by the BP Horizon Gulf oil spill. This would replace lost revenue for affected business and funds to restore polluted wetlands and diminished wildlife. The purpose is to supplement government fines and penalties.	Texas, Louisiana, Mississippi, Alabama, Florida		Public
Facilitating Open Ocean project support: Peer review, project evaluation, stakeholder facilitation, and administrative services for bird restoration in Deepwater Horizon Trustee Implementation Groups	Executive summary: Restoration programs exact an adherence to statutory obligations as well as public accountability, transparency, and participation in the process itself. Terra Mar Applied Sciences, LLC, proposes to adopt and apply an administrative model used effectively by the Exxon Valdez Oil Spill Trustee Council to furnish peer-review, project evaluation, and other support services for program components of the Open Ocean (and potentially other) Trustee Implementation Groups (TIGs) that oversee bird restoration after the Deepwater Horizon incident. Scope for these services would cover primarily those injured bird species that do not nest in Gulf states. Project period would run at least five (5) years, be implemented in stages using standards of peer expertise, accountability, and transparency, and rely substantially on existing stakeholder networks to enhance synergies for optimizing long-term restoration success. Roles and responsibilities for Terra Mar would include: 1) designing and conducting an independent, expert peer review system for avian monitoring, research, and/or restoration projects on behalf of TIG(s); 2) evaluating the recurring or completed bird restoration projects on behalf of TIG(s); 3) building and facilitating a network of practitioners to work collaboratively towards the TIGs' identified restoration goals; and 4) organizing and/or hosting workshops, symposia, or conference sessions to report out the TIGs' restoration achievements in publicly-accessible venues. All decision-making authority for restoration projects and funding allocations would reside solely with the TIGs. Terra Mar would furnish regular, expert guidance to TIGs about priority-setting methodology, furnish design input on crafting requests for proposals (RFPs), and help craft criteria for proposal evaluation, make recommendations to improve project quality, and facilitate a participatory administrative and project selection process that fosters wide public involvement and encourages a broad sense of ownership in the restoration outcomes for open ocean bird species. Rationale: Dimensions of the Deepwater Horizon blow out and the subsequent oil spill, both temporally and spatially, were such that birds and their habitats were affected over an unprecedented geographic scale. Consequently, achieving restoration under these particular conditions is fraught with substantial logistical obstacles: 1) the daunting scope and scale of the Gulf ecosystem itself as well as the range of open ocean bird species affected; (2) the very large number of partners, stakeholders, and kinds of expertise that are involved, including collaboration with international teams; and (3) the amount of funding ultimately needed to successfully design and implement a comprehensive, Gulf-wide avian monitoring program (e.g., GoMAMN 2017). Of the 25 species identified as primarily offshore and targeted for restoration (Table 4.7-3 of the Final Programmatic Damage Assessment and Restoration Plan), some 15 of those species breed entirely or mostly outside the jurisdictions of the five Gulf states affected by the spill, or outside the jurisdiction of the U.S. entirely. Consequently, the types and diversity of professional expertise required to implement a truly comprehensive restoration program must, necessarily, involve many actors, organizations, types of research specialties, and working beyond U.S. borders.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 1,511,725	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Field of Dreams	Terrebonne Parish is one of the largest providers of workers in the State of Louisiana to both the Oil & Gas Industry and the Seafood Industry. Terrebonne is also one of the largest seafood providers in this state. Therefore it goes without saying that Terrebonne Parish was hit very hard by the BP Oil Spill. The quality of life was compromised for the residents of Terrebonne Parish along with the economy. The fishermen and oil workers in this parish suffered severely. Terrebonne Parish Recreation touches the lives of everyone in this parish. There is no better way to stimulate an economy and enhance quality of life than to hold regional sporting events in a community. Unfortunately Terrebonne Parish doesn't have a facility conducive to lure regional sporting events to this area. As a lifelong resident of Terrebonne Parish I recognize the need for a Regional Sports Complex in this parish. For years this concept has been discussed but funds have not been available. I, along with a group of concerned citizens, am requesting BP to participate in the funding of the construction of a Regional Sport Complex. The parish has identified land for this construction, had it professionally assessed and are ready to embark on a master planning process. The property is located in a strategic area of the parish for easy access by out of town teams as well as local teams. We are not only looking for financial help but also asking for BP's involvement during the entire process. This will involve a great deal of public input through a series of community meetings throughout the parish. BP can be front and center and the face of a project that is near and dear to hearts of most of the residents in this parish. Funding a Sport Complex will do two things for BP. First and foremost it will touch the lives of almost every resident in this parish through their children. There is no better way to make people smile than to allow them to watch their kids and grand kids play organized sports. Secondly, this can be a great public relations project for BP and have a very long lasting "Good Neighbor" effect in this region. BP will be the center of what is near and dear to everyone for many years to come. It will serve as a good gesture towards the well being and quality of life for the residents of Terrebonne. This will be something everyone can enjoy both young and old. In conclusion, a small investment now can go a long way towards a lasting effect to the residents of Terrebonne Parish. The whole community will be behind this and be grateful to BP for making this happen.	Terrebonne Parish, Louisiana	$ 8,000,000	Public
Fifi Island Rock and Restoration Project	The project is located adjacent to Bayou Rigaud, on the northern side of Grand Isle in Jefferson Parish, Louisiana. The long-term goal for the restoration of Fifi Island is to restore maritime forest and wetlands as features of the island. Given the extensive erosion caused by hurricanes, storm surges, frontal passages, and other natural sources the actual land mass of Fifi Island has significantly decreased over many years. In order to restore Fifi Island, the Grand Isle Independent Levee District (GIILD) has developed a Master Plan, which includes the installation of a rock dike on the southern side of Fifi Island to completely encompass the island, and later fill the encompassed area, utilizing dredged material from Bayou Rigaud and Barataria Bay, in a manner to create wetlands and a maritime forest as features of the island. The full rock dike project includes approximately 5,975 lineal feet of rock dike to be constructed to +8 feet, in addition to 1,400 lineal feet of existing rock dike to be improved to +8 feet. In 2014, the GIILD, Jefferson Parish and the State of Louisiana allocated $6.0 M for Phase 1 of the rock armament on the south side of FiFi Island. This Phase is now under construction and consists of the construction of approximately 3,400 lineal feet of new rock dike beginning at the western terminus of the existing rock dike and extending in a westerly direction along the permitted alignment. The second phase of this project is permitted and awaiting funding to proceed to construction. When completed FiFi Island will be armored on all 4 sides with rocks revetment and will be built up to +8.0' elevation on the South side and 3.5' elevation on the North side using "beneficial use" dredge material or dedicated dredging from Bayou Rigaud and the Barataria Bay Waterway. This project has a high level of local support from stakeholders such as the Town of Grand Isle, Grand Isle Port Commission, Jefferson Parish Marine Fisheries Advisory Board, Jefferson Parish Coastal Stakeholders Group and residents of Grand Isle.	Fifi Island, Jefferson Parish, Louisiana	$ 35,000,000	Public
FINAL FRIDAYZE: RESTORATION FESTIVALS FOR YOUTH IMPACTED BY TRAGEDY	YOUTHanasia Foundation has been working with children of parents rendered unemployed as a result of the oil spill. Most of these parents worked for seafood restaurants, tourism industry entities, etc. People think unemployment only affects the emotional state of adults, but their kids are affected too. Thus, YOUTHanasia Foundation created "Final Fridayze", a series of self esteem festivals & citywide, emotional uplift activities for kids. Final Fridayze has been held since the disaster occurred. These mental wellness events have been funded largely out of the pockets of individuals, because we didn't know we could apply for grant funding from BP. So many are concerned with the coastal restoration, but YOUTHanasia Foundation is restoring the lives of children and their families. When kids lose hope, they begin to act out (sometimes violently) hurting themselves and/or others. If you would like to see our work live and in color, attend TALENTED YOUTHFEST 2012 on July 21, 2012 at Oakwood Center Mall. 12 noon - 7pm. It is an all day feel good celebration of kids who want to express their inner emotions through singing, rapping, dance, music, etc. Oakwood Center Mall is located at 197 Westbank Expressway, Gretna, LA 70053.	Gretna, Jefferson Parish, Louisiana	$ 625,000	Public
Finish the Cleanup underseas	I've heard nothing about BP finishing the job of cleaning all the oil off the bottom of the seabed - there is still an oil slick out there lying on the bottom of the Gulf at least 5 miles square - when are they going to clean that up????	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
FishSmart: Building Sustainability in the Snapper and Grouper Recreational Fisheries and Associated Industry in the Gulf of Mexico (Fish Smart: Snapper and Grouper)	Justification: The Deepwater Horizon Oil Spill substantially impacted recreational fisheries and their supporting industry in the Gulf of Mexico. Responses to a questionnaire following the spill indicated that nearly all surveyed fishing equipment retailers experienced reductions in their monthly sales, with the majority reporting losses of greater than 50%. Bookings for charter fishing trips and other associated recreational businesses plummeted. Even though some fish stocks such as red snapper are now showing signs of rebounding, NOAA Fisheries noted that as the population grows and the fish get bigger, recreational fishermen are likely to catch their quota faster, resulting in even shorter fishing seasons. This will translate into reduced recreational fishing trips, further reductions in tackle and equipment sales, fewer bookings for charter business, and generally lower economic viability for many recreational fishery-related businesses still trying to recover from the oil spill. Mandatory catch and release due to regulations will result in a slower stock rebuilding process and be a continuing drag on the recreational industry if anglers are not engaged to adopt “Best Practices” (tools and techniques to avoid catching fish that must be released combined with tools and techniques to improve the survival of recreationally caught and released fish). Objective: To increase angler adoption of “Best Practices” thereby advancing the sustainability of fish stocks and potentially extending fishing opportunities, anglers must be aware of practices that have proven successful. In four Gulf states alone (Florida, Louisiana, Mississippi, and Alabama) anglers released more than 4 million snappers (1.5 million of these red snapper) in 2011. Using conventional release techniques, between 15% and 40% of released red snapper do not survive, depending on depth at which they were caught, water temperature, and other factors. Increasing the survival of these by a few percent will result in a tremendous conservation benefit to fish stocks and eventually increase sustainable fishing opportunities and economic benefits from recreational fishing. Since 2008, anglers have been required by Federal fisheries authorities to use release devices and to “vent” fish (remove gases from the fishes’ body to enable it to return to habitat depth on its own) that they release in an effort to improve survival. However, recent findings of the “2012 FishSmart Workshop on Improving the Survival of Released Fish” concluded that use of recompression (returning a fish to depth without invasive procedures involved with venting) may be equally effective in improving the survival of released fish. Whether venting or recompressing, it is imperative that anglers are knowledgeable of the best scientifically-based information and implement Best Practices that minimize interaction with the fish that must be released and maximize the survival of those fish that are caught and released. This is not only a sound conservation practice, it is also good for business since reductions in mortality will eventually be reflected in longer seasons and/or larger bag limits that provide more angling opportunities. However, increasing survival is dependent on educating the anglers who interact with and handle the fish. Approach: The project will consist of four primary aspects to educate anglers to implement Best Practices, measure results, and potentially increase fishing seasons and the economic returns to coastal communities: A survey of anglers in the Gulf states to develop a baseline for awareness of Best Practices. To accomplish this, 8-10 focus groups will be conducted across the Gulf states to assess the knowledge of and attitudes toward Best Practices. These focus groups will allow baseline information to be gathered on responses of anglers to test messages in each region of the Gulf community. Following this, a telephone survey to anglers will be conducted to ascertain the general knowledge across the regional angler base before the multimedia campaign is initiated. A 3 year multimedia awareness/education campaign to inform anglers of the need for implementing Best Practices and drive them to online information sources. The TV/Radio and Digital Media communications will be conducted in segmented markets of Alabama, western Florida, Louisiana, Mississippi, and Texas coordinated through the Recreational Boating and Fishing Foundation (RBFF). RBFF was established for the sole purpose of communicating messages to anglers to affect behavior and fishing participation rates. Development and delivery of online content on Best Practices and gear. Information gained from the 2012 FishSmart Gulf of Mexico/South Atlantic workshop on Best Practices and messaging will provide the basis for a communications and media campaign. This information will be assembled into online delivery mechanisms for anglers. Effectiveness Evaluation: A follow up survey of anglers in the Gulf states to determine effectiveness of and response to the multi-media awareness campaign and online education material. Cost: Approximately $20 - $20.5 million ($15 million of this for creative ad campaign development, media buys, and ad placements covering 5 states). Expected Results: Measurement of success will be the adoption of Best Practices and tools by anglers reached through the multimedia campaign. Statistics will be available on extent of reach and demographic characteristics, increases in web traffic to information sources, and effectiveness of the campaign in changing angler behavior. Ultimately, increased survival of fish will translate into enhanced fishing opportunities, increases in angler opportunities, and increases in retail traffic to stores to purchase appropriate gear. A similar effort in Australia to encourage anglers to adopt “fish friendly” tackle (known as FishSmart tackle in the USA) and techniques had 59% recall with 35% of anglers saying that it helped change their practices. Sales of some fish friendly tackle increased 20-50% in the outlets surveyed. Other Considerations: The FishAmerica Foundation is the conservation and research foundation of the American Sport fishing Association and an early supporter of the FishSmart program. FishSmart is a program driven by the angling community, not a top-down government program, to identify best release practices and communicate those to anglers. FishSmart utilizes several approaches consisting of; 1) expanding our knowledge and understanding of released fish survival; 2) developing new technologies and equipment to enhance released fish survival, 3) promoting the adoption of careful release techniques, and; 4) developing an angler communication infrastructure to disseminate best practices to increase the survival of released fish.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 20,000,000	Public
Fort Jackson	Fishing pier	Fort Jackson - Plaquemines Parish, Louisiana	$ 400,000	LDWF Fisheries
Fort Macomb	Improve launch and rebuild fishing pier	Fort Macomb - Orleans Parish, Louisiana	$ 250,000	LDWF Fisheries (CSA)
Fort Pike	Improve launch and rebuild fishing pier	Fort Pike - Orleans Parish, Louisiana	$ 250,000	LDWF Fisheries (CSA)
Fourchon	Kayak launch and roadside fishing	Fourchon - Lafourche parish, Louisiana	$ 250,000	LDWF Fisheries
Freshwater Bayou	Enhance fishing and crabbing access at public site at Freshwater Bayou locks; area on the west side of Freshwater Bayou adjacent to the locks (south) that the public uses to fish and crab in the bayou; additional parking	Freshwater Bayou - Vermilion Parish, Louisiana	$ 250,000	LDWF Fisheries (CSA)
Giving Gulf Wetlands a Future	I propose that low coastal uplands surrounding the Gulf of Mexico be protected now so that 1. Tidal wetlands damaged by the spill but that cannot recover can be recompensed by future wetlands 2. Tidal wetlands for which mitigation is attempted but fails can likewise be recompensed, and 3. Total tidal wetland area along the Gulf coast is maintained as close to existing area in the face of subsidence and sea-level rise. Tidal wetlands in the Gulf of Mexico are being lost to subsidence caused in part by oil and gas exploration and development. Additional tidal wetlands will probably be lost due to sea-level rise resulting from climate change, for which the consumption of fossil fuels including oil and gas is responsible. Even at present low rates of sea-level rise, substantial coastal landscape evolution is occurring as coastal forests retreat, wetlands migrate up-slope, and open water replaces tidal wetlands. These effects will become more significant as the rate of sea-level rise accelerates. At present, low coastal uplands provide a destination for migrating wetlands but in decades to come these uplands will be developed, defended, and otherwise unavailable to tidal wetlands. The benefit of protecting such low uplands now is high because developed lands will not be undeveloped for the sake of wetland migration. The economy provides an opportunity to protect low coastal uplands at a considerable savings. I suggest that a planning horizon of 50 years guide the protection of low coastal uplands. Fee-simple purchases and conservation easements could sunset if the rate of sea-level rise observed by then, or predicted with very high confidence by expert models, are found within the natural adaptive range of tidal wetlands to maintain themselves in place.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Giving Gulf Wetlands a Future	I propose that low coastal uplands surrounding the Gulf of Mexico be protected now so that 1. Tidal wetlands damaged by the spill but that cannot recover can be recompensed by future wetlands 2. Tidal wetlands for which mitigation is attempted but fails can likewise be recompensed, and 3. Total tidal wetland area along the Gulf coast is maintained as close to existing area in the face of subsidence and sea-level rise. Tidal wetlands in the Gulf of Mexico are being lost to subsidence caused in part by oil and gas exploration and development. Additional tidal wetlands will probably be lost due to sea-level rise resulting from climate change, for which the consumption of fossil fuels including oil and gas is responsible. Even at present low rates of sea-level rise, substantial coastal landscape evolution is occurring as coastal forests retreat, wetlands migrate up-slope, and open water replaces tidal wetlands. These effects will become more significant as the rate of sea-level rise accelerates. At present, low coastal uplands provide a destination for migrating wetlands but in decades to come these uplands will be developed, defended, and otherwise unavailable to tidal wetlands. The benefit of protecting such low uplands now is high because developed lands will not be undeveloped for the sake of wetland migration. The economy provides an opportunity to protect low coastal uplands at a considerable savings. I suggest that a planning horizon of 50 years guide the protection of low coastal uplands. Fee-simple purchases and conservation easements could sunset if the rate of sea-level rise observed by then, or predicted with very high confidence by expert models, are found within the natural adaptive range of tidal wetlands to maintain themselves in place.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
GOM Marine Sanctuaries	Funds and Trustee influence should be used to promote the legislative effort to expand the marine sanctuaries in the GOM to cover all the natural reef systems as well as the bridging artificial reefs. Protecting this important habitat may help to offset some of the fisheries impacts of the oil spill.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Goose Bayou	Restore the west bank above 'The Pen' south of Hwy 90 with Bayou Backer. All areas which are not suited to rock or any hard, heavy and costly methods are now approachable. Long strips of 40 mil plastic are shoved into the mud bottom 1.5 to 2 feet deep. This leaves two, 6 inch wide by 3 to 4 foot long 'blades' sticking up from the bottom. Placed 2 foot apart, the collective 'plugs' damp waves, catch sediments and aquatic plants. These plants can begin to take root and build up habitat. Cost, simplicity and effectiveness are the primary advantage for using Bayou Backer. Please go to my website for pictures and history! Thanks. Joe	Jefferson Parish, Louisiana	$ 650,000	Public
Grand Isle LDWF Lab	Fishing pier to enhance outreach activities at the LDWF Fisheries Research Laboratory, specifically to be used for scheduled group outreach and educational events.	LDWF Grand Isle Complex - Jefferson Parish, Louisiana	$ 250,000	LDWF Fisheries
Grand Isle Pier	Grand Isle Fishing Pier improvements including additional parking, shelters, and ADA accessible bathroom facilities for piers at both ends of Hwy 1 bridge	Grand Isle - Jefferson Parish, Louisiana	$ 1,000,000	Wallop-Breaux/Town of Grand Isle
Grand Isle State Park	Joint partnerships to improve Grand Isle State Park fishing access	Grand Isle State Park - Jefferson	$ 300,000	LDWF Fisheries Suggestion - State Parks Collaboration
Grand Pass Living Shoreline Stabilization Project	Coastal Environments, Inc and partners propose to fabricate and install bio-induced oyster reefs to stabilize shorelines and help restore and sustain valuable and sensitive estuarine ecosystems in the Biloxi Marsh. This project will stabilize the shoreline by restoring intertidal oyster reef habitat using a cost-efficient and effective vertical breakwater technology called ReefBlk. The ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that provides both shoreline protection and habitat for estuarine organisms. As oyster growth progresses and the reef unit becomes more dense, the bioengineered structure dampens and dissipates wave energy and protects the estuarine marsh from erosion. These proven living shoreline and erosion control methods are currently inducing the growth of bio-engineered and self-sustainable living oyster reefs that expand both linearly and vertically to buffer wave action and retard erosion along estuarine shorelines in Texas, Louisiana, Alabama and Florida. High vertical profile oyster reefs also enhance species habitat diversity and provide oyster larvae for recruitment to adjacent pubic oyster grounds, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. The proposed use of cultch to armor the shoreline through oyster shell accretion and deposition within the ReefBlk area will add to the proven benefits of ReefBlk. The project will stabilize approximately 800' of shoreline by restoring intertidal oyster reef habitat using ReefBlk units and the application of #57 concrete aggregate as cultch 4-8" thick to a distance between 50-75 from the shoreline. The ReefBlk units and cultch function as substrate for oyster spat attachment and allow growth of an intertidal reef. The project area has experienced shoreline erosion and the narrow marsh ridge propos ed for stabilization currently threatens to breach into an interior bay. SCAT reported light to very light oil impact in the project reach, but including the project reach, there was contiguous shoreline oiling for over six miles in this area. This project will be a part of the overall scope of education and research contemplated for the Oyster Research Center at Hopedale which is also listed under NOAA NRDA projects.	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 650,000	Public
Grand Pierre Island Restoration	This area is undergoing shoreline erosion, interior wetland loss, overwash, and breakup. The Gulf shoreline erosion rate has doubled from 1988 to 2006. Project area marshes also are being eroded at -11.8 ft./yr. between 2003 to 2006 as well as being converted to open water from internal breakup. This project is the missing link in restoring the 14 mile barrier island complex. This project was initially brought forward as a potential project for CWPPRA PPL24. The project would restore 127 acres of beaches and dunes and create/nourish 229 acres of marsh. The project would use existing near-shore borrow areas, with a projected need of 1.45 million cubic yards. The purpose of the Project is to restore the missing link in the barrier island complex by restoring 127 acres of beaches and dunes and nourishing/creating 229 acres of marsh. The completion of this project would complete the restoration of nearly 14 miles of barrier islands in the Gulf which protect the rest of the Barataria Basin as a first line of defense for storm surge. The project will reduce the impacts of storm events on the Barataria Basin. Grand Pierre Island also provides important habitat for nesting shorebirds as well as migratory birds.	Bay Ronquille, Plaquemines Parish, Louisiana	$ 18,600,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
GSMFC Cooperative Regional Monitoring Project	When the BP drilling rig Deepwater Horizon exploded approximately 50 miles southeast of the mouth of the Mississippi River on April 20, 2010, it caused significant damage to the waters of the Gulf of Mexico. In order to effectively assess the long-term effects of this event, there needs to be a coordinated regional approach in monitoring the status and health of the marine resources in the Gulf of Mexico. The Gulf States Marine Fisheries Commission (GSMFC) is uniquely poised to provide such an approach. Established by both state and federal statutes in July 1949, the GSMFC is an organization of the five states (Texas, Louisiana, Mississippi, Alabama, and Florida) whose coastal waters are the Gulf of Mexico. It has as its principal objective the conservation, development, and full utilization of the fishery resources of the Gulf of Mexico to provide food, employment, income, and recreation to the people of the United States. One of the most important functions of the GSMFC is to serve as a forum for the discussion of various challenges and programs of marine resources management, industry, research, etc. and to develop a coordinated approach among state and federal partners to address those issues for the betterment of the resource for all who are concerned. The GSMFC has a long history of successfully coordinating and administering cooperative, regional programs such as the Southeast Area Monitoring and Assessment Program (SEAMAP), Interjurisdictional Fisheries Program (IJF), Sportfish Restoration Program (SFRP), Fisheries Information Network (FIN), Economics Program (EP) and the Marketing, Traceability and Sustainability components of the Oil Disaster Recovery Program (ODRP). One of the reasons the GSMFC has been so successful is that it is a vertically-integrated organization that provides products and services that satisfy a common need to both its state and federal partners throughout the Gulf of Mexico. In addition, the GSMFC has sole-source authority, under the Magnuson Fishery Conservation and Management Act, Title IV, Sec 402(d), which will expedite the distribution of funds and quickly allow these important activities to commence. Outlined below are the various activities, by GSMFC program, that can be accomplished if the requested funding is provided. It is important to note that these activities will augment the existing long-term work (totaling $5,530,000) already being conducted and funded through the GSMFC. The total annual cost for all of the proposed GSMFC activities is $2,418,000. The duration of this proposed project is 10 years. With inflationary increases over a ten-year time period, the total cost of this project is $27,578,000. Existing & Proposed Annunal Fundng Request, bu Program (existing, proposed): Interjurisdictional Fisheries Program ($230,000, $434,000), Sportfish Restoration Program ($200,000, $834,000), Fisheries Information Network ($5,100,000, $1,150,000); Grand Annual Total ($5,530,000, $2,418,000). Interjurisdictional Fisheries Program (IJF) Introduction: The Interjurisdictional Fisheries Act (IFA) of 1986, as amended (Title III, P.L. 99-659), was established by Congress to: (1) promote and encourage state activities in support of the management of interjurisdictional fishery resources; and (2) promote and encourage management of interjurisdictional fishery resources throughout their range. Overview of Current Interjurisdictional Fisheries Activities: The IJF Program is the cornerstone of the fishery management programs for the states and has provided the support for long-term databases for shrimp and juvenile finfish in the Gulf of Mexico, which would otherwise not be available. In recent years, it has provided for regional planning efforts, by states, to manage nearshore resources similar to the Magnuson Fishery Cons rvation and Management Act of 1976. In essence, the IFA is to the states what the Magnuson Act is to the nation and the benefits of sound management under these acts do not accrue separately. The IFA is probably the single most important Congressional act to professionalize the states' scientific staff within the marine resource agencies. Proposed Activities: Activity 1. Expand Existing Management Plan Development: Task 1 - Creation of Management Plan Specialist Position. The GSMFC's IJF program must hold technical task force meetings to complete its current FMP workload in a timely fashion. At any point in time, the IJF staff is either developing or revising three or four FMPs simultaneously. FMPs initiated in a given year are carried over and completed in subsequent years; thus more than one management planning effort is ongoing in each year of the program. There currently is not adequate staff to maintain all the FMPs that are out-of-date and begin development for those species identified by the states not yet under regional management. A Management Plan Specialist position is needed to assist in the development of additional FMPs, profiles and revisions. Task 2 - Support Task Forces and Subcommittees. Following completion of the FMPs, task forces and subcommittees need to be maintained and kept active to ensure new and relevant issues in each IJF fishery are identified, review the status of the fisheries on a regular basis as required in the FMP process, and to coordinate regional management strategies that match the dynamics of these fisheries. Task 3 - Coordination of Fish "Age-And-Growth" Activities. The GSMFC continues the coordination of fish "age-and-growth" activities in the region through the Otolith Workgroup, in support of the Fisheries Information Network (FIN). The biological sampling activities under FIN are in direct support of both state and federal stock assessments which are in the FMP development process. There is a need to de velop additional methodologies and standardized techniques for species common to the five Gulf States. Task 4 - Support of Law Enforcement Committee. The GSMFC's IJF program has always supported its Law Enforcement Committee as funds have permitted. These activities continue with only administrative support and include participation with the Gulf of Mexico Fishery Management Council. The ability to provide financial support for GSMFC enforcement-related activities is severely limited. Task 5 - Support of Habitat Activities. The Habitat Program, which directly contributes to the development of FMPs under IJF, links the states' habitat components with fishing activities. The Habitat Program also coordinates and provides input to local and regional development activities that have an impact on important fisheries habitats. With additional funding, this program would provide distinct habitat descriptions and GIS output on the distribution of life history stages associated with specific life history requirements and habitat components of fisheries under current and future IJF management. Activity 2. Creation of a Stock Assessment Program (GDAR): Task 1 – Implementation of the GDAR Program. The Gulf Data, Assessment, and Review (GDAR) is intended to support the development of inshore, regional assessments required in the Commission's fishery management plans (FMPs). The GDAR is designed to mirror the federal assessment process (SEDAR - Southeast Data, Assessment, and Review) to develop reliable fishery stock assessments for the Gulf of Mexico not evaluated through the federal SEDAR program. GDAR relies on the expertise available in the state marine agencies to develop an assessment through a transparent, open process. The completed stock assessments undergo a rigorous and independent scientific review to ensure consistent and appropriate use of all the available data pertinent to a specific fishery and establish population targets and thresholds for regional l management. Upon completion of each assessment, the results will be incorporated into the FMP for use in future management by the five Gulf States' marine agencies based upon the goals determined and recommended by the TTFs and various species subcommittees in the FMP. Each assessment requires three meeting components which include the associated TTF and state marine agency analysts. Assessments are completed using three workshops; 1) the Data Workshop (DW) where datasets are documented, analyzed, and reviewed and the data required for conducting assessment analyses are compiled and standardized. 2) The Assessment Workshop (AW) where quantitative population analyses are developed and refined and population parameters are estimated. 3) The Review Workshop (RW) where a panel of independent experts reviews the data and final assessment model and recommends the most appropriate values of critical population measures. Task 2 - Support for GDAR/Creation of Stock Assessment Scientist Position. The GSMFC has created a program through IJF that mirrors the federal SEDAR (Southeast Data Assessment and Review) program in an effort to complete regional assessments of state managed species. The IJF Program is presently combining the GDAR (Gulf Data, Assessment, and Review) with the TTF meetings, but as more assessments are needed, the ability to continue funding GDAR is questionable. To assist with assessments and the GDAR Program, the GSMFC needs to create a Stock Assessment Scientist position to develop the regional stock assessments and assist the states with their analytical activities. This individual would coordinate and process the states' fishery data and work with the Stock Assessment Team to develop and integrate new models for stock assessment in the Gulf. Task 3 - Support of Stock Assessment Team. The GSMFC's Stock Assessment Team currently has no funding for regional stock assessments in support of FMP development. In addition, there is not a way to pro...	Texas, Louisiana, Mississippi, Alabama, Florida	$ 27,578,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Gulf of Mexico Community-based Restoration Partnership	The Gulf of Mexico Community-based Restoration Partnership (GCRP) is a regional, multi-year partnership that was established in 2001 between the NOAA Community-based Restoration Program (CRP), the EPA Gulf of Mexico Program Gulf Ecological Management Sites (GEMS) Program, and the Gulf of Mexico Foundation. The purpose of the partnership is to strengthen conservation efforts by supporting on-the-ground projects to restore coastal marine habitats, benefit living marine resources, and foster local stewardship of the sites. This successful collaboration will help to expand restoration of habitats that are critical to the sustainability of natural resources in the Gulf of Mexico, and to continue to expand public education and outreach efforts to broaden participation in restoration activities, further developing a conservation ethic at the community level. To date, the GCRP has funded 76 community-based restoration projects. These projects occurred in a number of habitat types. In total, more than $3 million has been funded by the Gulf of Mexico Foundation towards these restoration projects, of which an additional $5.5 million has been leveraged in matching contributions from project partners. This match includes nearly 50,000 contributed volunteer hours. In total, more than 15,000 acres of coastal habitat have been restored as part of these partnership projects. A multi-agency steering committee works effectively to guide the partnership in soliciting and developing projects, reviewing and selecting projects for funding, ensuring required permits and assurances are acquired, and monitoring project progress and compliance. There is a broad diversity of groups involved in the partnership projects, including school children and other community volunteers, universities, nonprofit groups, business and industry, and coastal planning organizations, such as NEPs and NERRs. Collaboration between the partners, many of which have their own public outreach programs to link with the GCRP, will result in long-term stewardship of the restored resources and help generate a community conservation ethic. The GMF will lead further development of the GCRP in a manner that best addresses a regional approach to restore coastal marine habitats and benefit the natural resources of the Gulf of Mexico. Our goal is to take action towards reversing the downward trend in habitat loss and increase the attention on the growing need to preserve and protect America's Gulf Coast.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 1,500,000	Public
Gulf of Mexico Ecosystem Assessment: The Role of and Possible Oil Spill Impacts to Menhaden as a Keystone Species	Description: This multi-year, interdisciplinary research project would aim to clarify questions about the role of Gulf menhaden in the ecosystem and whether and how its population and ecosystem were affected by BP Deepwater Horizon oil. The resulting models and information could improve estimates of menhaden productivity and guide fisheries management decisions that bear on recovery of menhaden from any oil-related injuries. Link to Injury: Menhaden's offshore spawning and subsequent egg/larval drift into the estuaries in the northern Gulf coincided with the DWH oil disaster. Juvenile menhaden and oil would have been in the estuary at the same time. Therefore, it is likely that menhaden in one or more life history stage was exposed to the oil or chemical dispersants. Brown pelican and other species whose diets include menhaden were injured. Benefit and Rationale: An ecosystem assessment is needed to better understand the role and productivity of menhaden in the Gulf of Mexico and to what extent that DWH oil may affect the future health and ecological role of its population. Gulf menhaden is a significant part of Gulf of Mexico's base food web. Menhaden eggs, larvae, and young of-the-year are a major forage source for many economically important finfish. Upwards of 95 percent of the brown pelican's diet can be Gulf menhaden. The revenue generated by this fishery is of great economic importance to the Gulf of Mexico, especially to Louisiana. Recommendations made in an October 2011 stock assessment for Gulf menhaden provide an excellent starting point for the types of research needed for an ecosystem assessment. For example, the stock assessment recommends research to examine menhaden reproductive biology, predator/prey relations, genetics, and natural mortality through tagging studies. These studies are important components of an ecosystem assessment. Other: The Exxon Valdez oil spill injured Pacific herring and pink salmon in Prince William Sound and likely contributed to the long-term collapse of the herring population in that region. As a result, the Sound Ecosystem Assessment (SEA) project was designed to determine the root causes of their decline and elucidate the factors that driver their productivity. Between 1994 and 1999, the SEA program yielded an ecosystem level understanding of factors influencing juvenile pink salmon and Pacific herring survival in Prince William Sound. Multiple models were developed that better explained the relationships between such elements as the environment, predation and the associated food webs.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Gulf of Mexico Fishery Management Restoration Priorities	At the October 29 - November 1, 2012 Gulf Council Meeting in Gulfport Mississippi, the Gulf of Mexico Fishery Management Council (hereafter Council) discussed data needs to prioritize for restoration activities in response to the Deepwater Horizon oil spill. The Council discussed potential impacts to important stocks, critical habitat, and humans due to lost fishing opportunities etc. The Council requests that upon settlement or through early restoration the following activities are given the highest priority: • Increase and fund frequency and number of stock assessments. • Enhance and fund fishery independent surveys, both federal and state. • Work with MRIP to decrease the frequency to two week waves for high profile species. • Develop and fund a more robust observer program. • Enhance/create and fund oyster restoration projects and coastal reef fish habitat. • Development of and funding for data collections programs for the head boat and for-hire sector and a charter boat electronic data collection system. • Research and fund projects on barotrauma tools for reductions in bycatch mortality. Each of these activities are critical to improving conservation and management efforts of federally managed fish species and associated habitat necessary to provide maximum benefit to the nation as required by the Magnuson-Stevens Fishery Conservation and Management Act.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
GULF OF MEXICO HATCHERY AND FISHERIES RESTORATION CONSORTIUM	Problem: The Deepwater Horizon Oil Release (DWH) caused environmental and economic damage to fisheries in the northern Gulf of Mexico. America must employ novel and effective approaches to restore both economic and environmental wellbeing of the affected fisheries. In addition, habitat destruction caused by hurricanes and other man-made causes (over-fishing, erosion and spills) have led to significant decrease in Gulf fish populations during the last decade. Solution: Marine aquaculture of key species can be employed to restore fisheries through restocking and to restore economic vitality through technology transfer and stimulation of small businesses resulting in job creation. This effort should be highly collaborative involving institutions in all five Gulf States as well as other national and international institutions, public and private, with significant hatchery technologies. Implementation Team: Gulf of Mexico Hatchery and Fisheries Restoration Consortium, Gulf Coast Research Laboratory/University of Southern Mississippi (GCRL; lead institution), University of Texas Marine Science Institute (UTMSI), Louisiana University Marine Consortium (LUMCON), Auburn University (AU) - Mote Marine Laboratory (MML), University of Maryland- Baltimore (UMB). These institutions are leaders in marine aquaculture and stock enhancement research, implementation, and technology transfer for the northern GOM. The consortium is built on established relationships and will employ the highest quality science and economic approaches to implement, and transfer the technology to raise significant numbers of fish for fishery restoration and to stimulate private sector small business development. In addition to the implementation team, the consortium has established scientific, governmental agency and commercial advisory teams. Implementation Plan: The technology for aquaculture and fishery restoration of marine fish varies among species. This necessitates the collaborative involvement of these 6 leading institutions that have conducted research on over 10 of the most economically and ecologically important Gulf fish species. Among the species are those for which the technology to implement stocking, technology transfer, and business stimulation already exists. The species targeted for immediate implementation of stocking and technology transfer include Red Drum, Spotted Sea Trout, Red Snapper, White Shrimp, Bull Minnows, Croaker, Florida Pompano, Cobia, Greater Amberjack and Southern Flounder. Projected Results: The work of the consortium will result in advanced technologies for use by Gulf States fishery agencies and private industry. Similar efforts in the Mediterranean Sea led to a $1 Billion industry in 10 years. The 2007 NOAA aquaculture plan projects 75,000 jobs created for every million tons of seafood produced by aquaculture. It is estimated that aquaculture of Gulf fish species would double the seafood output of the Gulf of Mexico ($700 Million in 2008). Additionally the recreational fishing industry (>$12 Billion in 2008) would realize expanded employment and business opportunities as natural populations are restocked with hatchery produced fingerlings.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 60,000,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Gulf of Mexico Molecular Biology Initiative	Establish a regional laboratory that focuses on providing enterprise-level, high-throughput molecular biological analytical services to support southeast region environmental management programs. The laboratory would serve as a Center of Excellence, regional resource, and collaborative partnership/focal point for federal, state, and local governments, academic institutions, and the private sector. This project would offset reductions in employment owing to the Deepwater Horizon oil spill, reduce the costs associated with processing environmental samples to support restoration and resource management, and serve as a center of advanced technologies in the region. Molecular biology (which involves such areas as Environmental DNA, RNA:DNA ratios, mitochondrial DNA for close kin analyses, DNA barcoding for identifying species, stomach contents, invasive detections, etc.) has become a mature and important transformational technology that is underutilized in fisheries and the southeast. These techniques can help streamline species identifications, reveal the actual species a given animal has consumed, assess the physiological condition of an organism, estimate how many females contributed to a given year class and perhaps what the population size is. They can allow us to monitor changes in diversity, shifts on gene frequencies arising from climate-drive selection, and provide better information on just what lives in the Gulf ecosystem (i.e., we don't know all the vertebrates that occur in the Gulf, let alone the inverts). These products are the core informational needs required for Ecosystem Based Fisheries Management, the development of food webs and useful ecosystem models, and detecting the impacts from accidents and climate change. This information would enable much more advanced approaches to restoration, monitoring, and ecosystem status. The primary objective of this project is to establish a regional capability – a dedicated laboratory - similar to that provided by the Canadian Centre for DNA Barcoding. The project would be a partnership across stakeholders and would have as primary missions: 1) advancing the technological capabilities of the region; 2) integration with marine, estuarine, and coastal monitoring, assessment, and management programs; 3) achieving cost reduction and better data for monitoring programs; 4) and training to move the southeast region to the forefront of applied environmental molecular biology in the United States.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 50,000,000	Public
Gulf of Mexico Molecular Biology Initiative	Establish a regional laboratory that focuses on providing enterprise-level, high-throughput molecular biological analytical services to support southeast region environmental management programs. The laboratory would serve as a Center of Excellence, regional resource, and collaborative partnership/focal point for federal, state, and local governments, academic institutions, and the private sector. This project would offset reductions in employment owing to the Deepwater Horizon oil spill, reduce the costs associated with processing environmental samples to support restoration and resource management, and serve as a center of advanced technologies in the region. Molecular biology (which involves such areas as Environmental DNA, RNA:DNA ratios, mitochondrial DNA for close kin analyses, DNA barcoding for identifying species, stomach contents, invasive detections, etc.) has become a mature and important transformational technology that is underutilized in fisheries and the southeast. These techniques can help streamline species identifications, reveal the actual species a given animal has consumed, assess the physiological condition of an organism, estimate how many females contributed to a given year class and perhaps what the population size is. They can allow us to monitor changes in diversity, shifts on gene frequencies arising from climate-drive selection, and provide better information on just what lives in the Gulf ecosystem (i.e., we don't know all the vertebrates that occur in the Gulf, let alone the inverts). These products are the core informational needs required for Ecosystem Based Fisheries Management, the development of food webs and useful ecosystem models, and detecting the impacts from accidents and climate change. This information would enable much more advanced approaches to restoration, monitoring, and ecosystem status. The primary objective of this project is to establish a regional capability – a dedicated laboratory - similar to that provided by the Canadian Centre for DNA Barcoding. The project would be a partnership across stakeholders and would have as primary missions: 1) advancing the technological capabilities of the region; 2) integration with marine, estuarine, and coastal monitoring, assessment, and management programs; 3) achieving cost reduction and better data for monitoring programs; 4) and training to move the southeast region to the forefront of applied environmental molecular biology in the United States.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 50,000,000	Public
Gulf Saver Solutions® wetlands restoration initiative	Example: Restoration of 500 acres of oil soiled wetlands working with WLF at Pass Loutre wildlife management area, Venice, LA. Many other sites/projects are scoped as well that would benefit from Gulf Saver bags. (www.gulfsaversolutions.com) Gulf Saver Bags is a package of native marsh grasses with its own supply of natural nutrients and billions of oil eating micro-organisms to protect, feed and support marsh grasses plugged into the Bag, to take root, survive and flourish. Gulf Saver Bags also support an accreting environment by slowing down the water, which allows sediment to drop, and adding nutrient-rich biomass to the soil. Gulf Saver Bags provide for greater stabilization, higher survivability and integration of diverse species back into challenging wetland sites, and in particular in areas where dredging has been done and material for berms and terracing have been deposited. Gulf Saver Bags offer an innovative technology and application designed to increase project success of habitat and wetland restoration. Gulf Saver Bags are assembled and deployed by volunteers coordinated by well established organizations like Common Ground Relief, Inc. and A Solution for Habitat and Wetland Restoration. Gulf Savers wetlands initiatives and programs also provide opportunities for collaborations with environmental scientists and agencies, community based volunteer organizations and school groups providing wetlands education and awareness. Regulatory Acceptance and Endorsed by: Louisiana Department Wildlife and Fisheries, National Oceanic & Atmospheric Administration, U.S Fish and Wildlife Service, LSU Dept. of Oceanography & Coastal Science, US Army Corps of Engineers, Restore Americas Estuaries, Common Ground Relief Inc., Coalition to Restore Coastal Louisiana, Global Green, New Orleans For the Bayou, Rebirth. For more information: www.gulfsaversolutions.com	Louisiana	$ 1,000,000	Public
GulfCoastRestaurants.com Website	Promote tourism in the Gulf Coast Region on GulfCoastRestaurants.com through featured content-rich restaurant and chef profiles of the restaurants along the Gulf Coast that prepare and serve fresh Gulf Seafood. The Restaurant profiles will include details of the Gulf seafood dishes they serve and the origin of the seafood used to prepare it.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Gulf-wide Investigation of Juvenile Gulf Sturgeon Dynamics and Estuarine Habitat Use	A multitude of restoration projects have been proposed within the footprint of estuarine critical habitat for the federally protected Gulf Sturgeon (GS), thereby triggering regulatory provisions of the Endangered Species Act. Estuaries serve as winter foraging habitat for juvenile sturgeon, yet relatively little is known about the spatiotemporal patterns of estuarine habitat use, or the degree of preference for mesohabitats such as oyster reefs, seagrass beds, or mud flats. This information is critical for guiding projects through the Federal regulatory process, and for determining effective strategies for estuarine restoration to benefit the GS. Also unknown are patterns of recruitment, growth, and survival of juvenile GS, yet this information is fundamental to quantifying the success of Gulf-wide restoration efforts. Following an approach recently demonstrated in the Apalachicola River system, we propose to conduct a multi-year assessment of 1) the spatiotemporal trends in estuarine habitat use by juvenile GS via sonic telemetry and habitat mapping, and 2) trends in Age-1 juvenile sturgeon recruitment, growth, genetics, and survival using proven fisheries techniques across the following 5 GS populations and estuaries: Pearl, Pascaguola, Escambia, Apalachicola, and Suwannee. Most importantly, this project will provide the data necessary to evaluate the impact of restoration projects proposed within the critical estuarine habitat of GS. Also of great importance, this project will establish the necessary baseline for determining whether restoration projects succeed at increasing the production of Gulf Sturgeon, and/or improving the growth rates and survival of juvenile GS in populations affected by the Gulf Oil Spill - the ability to directly measure the effect of restoration projects is critical. This project will also reveal the effective number of spawning adults that successfully contribute to the next generation. This metric will help to evaluate the out come of restoration activities like fish passage/barrier removal projects. This project will be coordinated by a dedicated USFWS biologist, and executed through a cooperative partnership with state, federal, and academic institutions across the northern Gulf of Mexico. The project will leverage the resources of existing projects involving passive telemetry arrays, such as those currently deployed in Lake Pontchartrain and the Pearl River system. Funding for this project will provide the resources and will yield the knowledge and commitments necessary to continue monitoring juvenile GS in these systems into the future, thereby achieving the ultimate goal of assessing effects attributable to Gulf-wide restoration efforts over the long-term. Furthermore, the project will greatly advance our understanding of juvenile GS dynamics and environmental relationships within estuarine habitats, a key objective for recovery of this federally-protected, iconic species.	Mississippi, Louisiana, Florida	$ 1,150,000	Public
Houma's 1st Adaptive Park	Houma's 1st Adaptive Park will be a park for ALL children, regardless of disability can access. Children who are in wheelchairs, have walkers or braces, and those children who are 'typical' can come and play. The park offers ramps with handrails, activity panels along the sides of the structure, monkey bars, climbing walls, short and tall slides, etc. There is something for every child! As a mom of 2 handicap children, this project is near and dear to my heart. They deserve a chance to play and have fun with other children.	Houma, Terrebonne Parish, Louisiana	$ 140,000	
Hwy 11/I-10	Improved parking, kayak launch, and shoreline fishing access	Irish Bayou Area - Orleans	$ 250,000	LDWF Fisheries (CSA)
Hwy 90	Hwy 90 Boat Launch improvements to existing launch (Pier 90) located near the St. Charles/Jefferson parish line	Hwy 90 Boat Launch - St. Charles	$ 1,340,000	Wallop-Breaux - St. Charles Parish
I-10 Bridge/Lake Charles	I-10 boat ramp could be put in consideration as it is largely due for some major repair work; existing ramp does not have the slope needed to launch more than a flat bottom vessel; upgrading this launch would be very beneficial for many users	Lake Charles - Calcasieu Parish, Louisiana	$ 1,000,000	LDWF Fisheries (CSA)
Impact of Exotic/Invasive Scale on Estuarine Phragmites Marsh on Delta NWR	The Mississippi River birds foot delta provides habitat for a wide array of estuarine and open ocean dependent species of birds, fish, and invertebrates. Hydrologic disruptions and coastal erosion of the estuarine marshes have led to large losses of this important habitat. This loss is expected to increase and accelerate with the recent arrival of an invasive scale insect which attacks Roseau cane (Phragmites spp.). Roseau cane is the dominant vegetation type over many tens of thousands of acres on Delta National Wildlife Refuge (refuge) and throughout large portions of coastal Louisiana. These marshes stabilize and protect the muck soils found in many areas and consist of a matrix of both submerged aquatic vegetation and emergent marsh vegetation. These habitats provide spawning and nursery habitat for a number of coastal and open ocean species of fish and invertebrates including several commercially important species such as white and brown shrimp and blue crab. Project is in an area and marsh type directly impacted by the Gulf Spill. This project would build upon a three (3) year study completed in the fall of 2016 which tracked the growth and health of Roseau cane in select areas within the refuge. These areas have recently been invaded by the scale insect and represent a unique opportunity to track the fate and potential recovery of Roseau cane through both pre- and post-infestation data. Project would provide for 2 aerial overflights to map extent and possible future spread of impacted areas. It would also provide for the collection and analysis of 3 years of vegetation data designed to track the health, growth, fate, and possible early recovery rates of impacted marshes. Initial study was funded by private industry and through in-kind contributions of NOAA and the USFWS. Contributions toward initial study included: Private Industry - $100,000.00; NOAA - In-kind services of personnel for field investigation, project design, sampling protocols review; USFWS - in-kind services of personnel	Bird's Foot Delta, Louisiana	$ 100,000	Public
Improving Gulf fisheries.	Improving fisheries by growing plankton. How to do that? Bringing up deep waters that are inherently rich in nutrients, which in turn will feed phytoplankton at the bottom of the food chain at the surface. Surface waters are low in dissolved silica (~1uM), having been used up by the phytoplankton, and then rises below the photic zone (>200uM). Phosphates are low (<0.1uM) in surface waters, and rise to ~1.5uM depending upon which body of water: Pacific, Atlantic, Gulf. This excludes phosphate run-off near coast. Nitrates are similarly low at the surface (<2uM), and rise to 15-20uM below the photic zone. The chemical equation for the ocean (phytoplankton mostly) is 106CO2 + 16HNO3 + H3PO4 + 122H2O + trace elements and vitamins --> C106-H263-O110-N16-P + 138O2 ("The Oceanic Phosphorus Cycle", by Adina Paytan, and Karen McLaughlin in 2007). Phosphate is rate limiting ingredient, then nitrogen. Dissolved silica doesn't show here but is quite important for siliceous diatoms. If ocean water from let's say around 1-2km is pumped up, it would feed phytoplankton and thereby aid all fisheries (fish, and all plankton eaters, corrals, shellfish). I propose that oil rigs in abatement (after oil production, but before they are destroyed, work with Bureau of Safety and Environmental Enforcement), those in 1km or deeper water, be used. Power for the rig will come from Gulf currents (~30cm/s in top 300m) and be used to power air compressors. High pressure hoses will be needed to pipe the compressed air down to 1-2km. Pressure needed is ~100atm/km and is quite reasonable. Put the equivalent of aquarium bubblers on the end of the air hose. Attach the air hose to one of the mooring lines for the oil rig. This will 1) aerate/oxygenate the anoxic deep water; 2) entrain deep water to the surface. Smaller bubbles entrain more water and oxygenate better. One side effect is the coldness from the deep water will lower humidity in the Gulf, which will lessen hurricane strength since they are powered by humidity (correlated to surface temperatures). A second side effect will be the increased dimethyl sulfide produced by more phytoplankton (upon their eventual death) which is a cloud condensation nuclei (CCN). There is a possibility of more cloud cover downwind from where the plankton growth will be. A third side effect will be absorption of CO2 into biomatter. There are other ways to bring the deep water to the surface, and using compressed air is the least expensive, upfront cost method until it is a proven method. There are other ways such as using a "siphon", with a tube going down 1km brought up into the top 300m. We allow the low-pressure wake of the tube from the Gulf current to siphon the waters up with no power needed to move the water. That tube will cost more upfront, however.	Louisiana, Texas	Not provided with submission	Public

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Project Name	Project Description	Location	Cost ($)	Submission Source
Increase amount of assessments for potentially impacted finfish species	Proposed Restoration Project: Conduct more frequent stock assessment updates for overfished or near overfished Gulf finfish species and first-time stock assessments for lesser known, unassessed finfish species that were potentially impacted by the Deepwater Horizon (DWH) oil disaster. The information will be used to inform adaptive management of fisheries and promote recovery of populations impacted by DWH. Link to Injury: Many commercially and recreationally fished species in the Gulf of Mexico were exposed to oil or dispersants during the DWH disaster. As a result, potentially injured reef fishes, highly migratory pelagics, and sharks require closer monitoring for the next several years in order to help managers better track population status and trends and set catch quotas consistent with recovery from the DWH disaster. Benefit and Rationale: Finfish contribute to regional seafood sales totaling $17 billion and support a thriving recreational fishing industry, which generates nearly $10 billion in economic activity and supports 92,000 jobs in the Gulf of Mexico. Therefore, knowing the status of finfish populations through assessments is critical for effective management of fisheries and maintaining the health of the ecosystem and the fishing-related industries that depend on it. The 2010 DWH disaster may have affected the year-class strength of exposed Gulf fish species by reducing survival of eggs and larvae, or it could have reduced the spawning population itself through lethal or sub lethal impacts. Sub-lethal exposure to oil and dispersants could, for instance, compromise the immune system of affected fish, and signs of compromised immunity in the form of external lesions and abnormal markings on fish (e.g., red snapper) have been documented by researchers at LSU and USF. The population status of Gulf species is assessed through the Southeast Data, Assessment and Review (SEDAR) process, which is the stock assessment process established by the South Atla ntic, Gulf of Mexico, and Caribbean Fishery Management Councils. These three Councils are all served by the Southeast Fisheries Science Center within NOAA Fisheries. All three Councils rely heavily on SEDAR assessments for generating science-based management advice for NOAA Fisheries. However, due to the large volume of managed species in the Southeastern U.S., only a small fraction of managed species are assessed in any given year, and many have never been assessed. Assessed species are managed through multi-year population projections in years between assessments, but episodic events such as hurricanes, red tides, or oil spills can affect the population in ways that can reduce the usefulness of the population size projections, potentially leading to inappropriate management decisions. For species that are nearing an overfished condition or are overfished, the DWH disaster may have further negatively affected population health. More frequent status updates are needed to ensure that these species do not become overfished or if a species is already overfished that rebuilding is on track. There are currently four species in the Gulf that are in rebuilding plans: red snapper, gag grouper, greater amberjack, and gray triggerfish. More frequent assessment updates for gag grouper may have been able to prevent the population from deteriorating from a near overfished condition in 2005 to severely overfished in 2009 (due to a 2006 episodic mortality event that reduced the spawning stock biomass by 18 percent). More frequent status updates may have also been able to detect the lack of progress in greater amberjack rebuilding and prevent missing the rebuilding deadline. Species impacted by DWH that have not been assessed present a unique challenge to fishery managers because less is known about their population status and how DWH might have affected populations. Managers need accurate population size estimates to detect changes in abundance that might be influenced by sub- lethal effects resulting from DWH. This information will facilitate adaptive management and recovery and help managers prevent overfishing while achieving optimum yield. Specifically, an evaluation of available data-poor assessment methods and application of the most suitable ones to unassessed, undermanaged Gulf species is needed. An additional need is a method for annually setting catch limits for these species that is based on feedback control to adjust for errors in our perception of population status and changes in abundance trends. Alternative catch setting methods, based either on results from simple assessment methods or empirical data, can be tested using simulations through the management procedure approach. Employing this approach would enable managers to choose the method that is expected to best meet management goals and to respond appropriately to any changes in population trends that may arise from DWH impacts. Description: Annual or biennial update assessments would be performed for previously assessed, managed Gulf species that have been determined to be overfished or are nearing an overfished condition. These updates would be done in house by the Southeast Fisheries Science Center or responsible state management agency without the physical, public workshop required by the more involved “standard” or “benchmark” assessment. Doing more frequent update assessments will require additional stock assessment expertise as well as additional data processors and analysts. For species requiring more frequent assessments, updating the data time series that go into the model would become a routine annual process that is performed by the responsible data curators. For minor, unassessed species, a series of workshops modeled after the SEDAR process would be held to evaluate current assessment methods for data-limited fisheries and apply the appropriate one(s) to Gulf fish species with unknown status. This project would consist of a workshop for assembling avai lable data, a series of webinars for applying and evaluating alternative assessment methods, a series of webinars for constructing and testing alternate management procedures (empirical and model-based), and another workshop for review of the process. To produce the best results, these workshops would incorporate many of SEDAR’s characteristics such as transparency, openness to public participation and independent review and would involve the Center for Independent Experts (CIE). A university with relevant expertise and capacity would lead this project, with the involvement of federal, state, university, and NGO scientists, fishery managers and local fishery representatives. Every five years over a 10-year period, webinars and a workshop will be held to review and, if necessary, adjust management procedures.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 150,000,000	Public
Increase the pace, quality and permanence of voluntary land and water conservation through the Partnership for Gulf Coast Land Conservation	The Partnership for Gulf Coast Land Conservation project: The Partnership for Gulf Coast Land Conservation (PGCLC) is a new coalition of local, regional state and national land conservation organizations devoted to advancing land and water conservation in the Gulf of Mexico region. This initiative is organized under the auspices of the non-profit Land Trust Alliance (Alliance) and is patterned after other successful land trust coalitions across the country. Today our membership consists of 25 national, regional and local land trusts operating in the Gulf States. The Partnership's mission is to work together across the five Gulf of Mexico states to increase the pace, quality and permanence of voluntary land and water conservation in the coastal region. Land trusts are community-based non-profit organizations that work with landowners to permanently conserve forests, rivers, farms, ranches and other natural areas critical to a sustainable environment and healthy, thriving communities. Through this project, the Partnership proposes to: 1. Increase the effectiveness and efficiency of land trusts in the Gulf Region. 2. Develop and promote a public policy agenda which will reduce the barriers to private sector conservation efforts and increase funding for acquisition and restoration. 3. Develop collaborative projects that will enable the land trust community and supporters to implement landscape scale conservation measures in the region. Collaborative projects may be built around water quality, critical habitat, or other criteria. 4. Participate in landscape-scale conservation planning in collaboration with other conservation partners (resource agencies and other non-government organizations) that prioritizes habitat for endangered and threatened species, improvements to water quality, connectivity to other protected lands, trust resources and important cultural and recreational features. 5. Participate in and coordinate our efforts with other ongoing conservation planning and implementation activities through entities such as the Gulf of Mexico Alliance and the Gulf of Mexico Foundation and others.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 1,000,000	Public

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Project Name	Project Description	Location	Cost ($)	Submission Source
Increased Catch and Effort Reporting for the Gulf of Mexico's Marine Recreational Fishery Based on 1-month waves (Increased Catch and Effort Reporting Waves)	Recreational anglers lost access to a considerable portion of federal and state waters in the northern Gulf that were closed to fishing during the BP oil disaster. Fishery closures amount to lost ecosystem services or human uses of resources that the Natural Resource Trustees are required to estimate and offset through appropriate compensatory restoration projects. One strategy for compensating the angling public for lost fishing access is making investments in fishery management tools that help keep fishery resources healthy and available to anglers. One such tool is the Marine Recreational Fisheries Statistics Survey (MRFSS), which collects data on recreational fisheries data used to estimate total catch. The public can be compensated for lost access to fishing grounds during the 2010 Deepwater Horizon BP oil spill by establishing a one month survey reporting waves versus the current two month reporting waves of MRFSS. A more timely reporting system would benefit the public by lowering the likelihood of overfishing and accountability measures (i.e., penalties), which if triggered, could result in a shorter fishing season. Increased data collection and reporting periods will lead to more precise and timely catch estimates. MRFSS in the Gulf of Mexico does not produce timely fishery catch and effort estimates required by managers. The MRFSS catch and effort estimates are based on a two month data collection waves with estimates produced up to 45 days after the end of a wave. For reporting to be on one month waves, with sufficient precision for management, an increase in sampling will need to occur. MRIP proposes to meet this goal; however a concurrent increased funding allotment has not been secured. Survey costs, on average, will need to double from the current level of funding. The National Research Council's 2006 Review of Recreational Fisheries Survey Methods, recommended for one month reporting of catch and effort estimates be implemented. The Marine Recreational Information Program (MRIP) is redesigning the MRFSS survey to accomplish this task. As an example, the red snapper season, as currently defined, closes well before the estimates are produced. The current estimation methodology has inadvertently allowed the recreational fishery to overharvest red snapper in twelve of the last twenty years, and has triggered fishery accountability measures; such as shorter red snapper seasons for recreational anglers. A timely and accurate recreational data reporting system will allow fishery managers to be proactive in the Gulf of Mexico, improving their ability to predict fishing trends and prevent overfishing.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 10,000,000	Public
Integrated Approach to Wetland Damage Assessment, Vegetation Monitoring, and Restoration Tracking in the Gulf of Mexico	Problem Statement: Tidal wetlands bordering the Gulf of Mexico, including Federal wetlands in National Wildlife Refuge (NWR) areas, are at risk of being impacted by the oil that continues to wash ashore. A comprehensive and accurate determination of the impact over vast remote areas is not feasible with traditional survey methods. In order to identify and implement the most cost-effective solutions necessary for remediation/restoration; a unified, systematic approach using airborne remote sensing coupled with land-based restoration technologies can be implemented to 1) efficiently identify the extent of impacted wetlands, 2) effectively guide the remediation/restoration process from planning to completion, and 3) provide a calibrated measurement of the effectiveness of the remediation/restoration efforts over the long-term. Proposed Solution: SpecTIR proposes to provide comprehensive monitoring and restoration services along the Gulf coast using a proven combination of commercially available aerial remote sensing applications and innovative assessment and monitoring techniques that will promote program efficiency and cost-effectiveness. The team will use a scalable, phased approach that will identify impacted wetlands and allow for the prioritization, planning, and performance of restoration efforts. Additionally, the proposed methodology will provide a consistent and scientific means for accurate and quantitative post-restoration monitoring. The first phase of the proposed approach is to provide a baseline for restoration by collecting airborne hyperspectral imagery or, in the case of many Gulf coast NWR wetlands, assessment of the hyperspectral data already collected prior to impact from oil. Guided by initial analysis of the airborne data, ground truthing verification and validation of the wetlands will then be performed. SpecTIR will provide the existing 2000 sq. km of pre-oil, baseline hyperspectral data collected from Gulf coast NWR areas prior to the oil entering the wetlands. The use of hyperspectral imagery for the discovery of hydrocarbons in the wetlands has been proven in the NASA funded VNIR study of an oil spill in Swanson Creek MD in 2000. The current instruments now include the SWIR portion of the spectra which brings an even higher degree of accuracy to the identification of the vegetative stress and community structure. Data and analysis will be collected into a GIS platform and be disseminated online to effectively guide restoration planning and implementation. Post restoration remote sensing monitoring will be performed to track changes in restoration success relative to the baseline data as well as coincidently identified non-impacted sites. This data will be supported with ground truthing, data verification, and sampling by qualified field teams. Once the levels of impact to the wetland vegetation has been ascertained and prioritized, the information can be used to assist in the formulation of remediation and restoration plans. Going forward, progress can be monitored with the identical methodologies and technologies used in the initial assessment.	Louisiana, Mississippi, Alabama, Florida	$ 3,000,000	Public
Intracoastal City	Kayak launch and pier	Intracoastal City - Vermilion	$ 750,000	LDWF Fisheries
Introduction and Evaluation of New Designs of Propellers and Nozzles in the Gulf Shrimp Fishery for Enhanced Efficiency and Fuel Economy	A combination of increased operating expenses and reduced ex-vessel prices for catch has created a perfect storm of economic hardship in the Gulf Shrimp Fishery. The fishing industry has worked to reduce costs of operation, but unfortunately, few new avenues for this exist. One major cost to the shrimp industry is fuel and there are potential avenues to reduce fuel consumption aboard vessels. One of these is improved propellers and nozzles for propulsion. A recent collaborative evaluation aboard one vessel by Texas A&M Sea Grant researchers and a shrimp company showed that fuel consumption was reduced by approximately 28% when replacing a traditional Kaplan propeller with a Rice Speed Propeller and match Speed Nozzle. These results closely resembled that of a similar study performed in Australia where 25% fuel savings was achieved. An older study showed a 5% reduction in fuel by changing only a Kaplan style propeller with a skewed propeller design without modification of the propeller nozzle. The scope of this project will involve rigging out several collaborating vessels throughout the Gulf of Mexico with new designs of propellers and nozzles (different from the traditional Kort nozzle). Evaluations of fuel savings potential during actual fishing conditions will be performed utilizing fuel flow meters. As many offshore trawlers are now encountering fuel bills of over $200,000 per year, demonstrations with this new technology could provide significant savings to the industry and contribute to our nation's goal to reduce fuel consumption. The results of this project will be shared with the fishing industry throughout the Gulf through printed reports, local workshops, and through direct contact with industry.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 750,000	
Island Road Launch	Island Road boat launch renovation; PAC WMA has two boat launches - one of the launches, Island Road boat launch, is in a state of disrepair and needs a number of renovations to make it serviceable. This project would completely renovate and enhance this launch.	Pointe-aux-Chenes WMA - Terrebonne	$ 3,000,000	LDWF Wildlife (WMA)
Island Road Piers	Island Road Fishing Piers; Island Road is a small two lane road connecting highway 665 to the Isle de Jean Charles - southern boundary of the Ensminger/Songe marsh management unit on Pointe-aux-Chenes WMA in Terrebonne Parish. This project would provide safe roadside parking in conjunction with public fishing piers.	Pointe-aux-Chenes WMA - Terrebonne	$ 3,000,000	LDWF Wildlife (WMA)
Joe's Cove	Kayak launch and roadside fishing	Joe's Cove - Cameron	$ 250,000	LDWF Fisheries
Joyce Wildlife Management Area	Historical modification: The building of a railway and a parallel highway bisected wetlands eliminating the east to west flow of water through the Joyce Wildlife Management area and surrounding wetlands. Additionally, the dredging of a slough canal adjacent to the management area blocked input of freshwater from the upland watershed with the placement of the spoil on the south side. Benefits and or goals include: reconnection of freshwater flow to the Joyce WMA and surrounding wetlands, removal of nutrients from wastewater treatment plants upstream, and improvement of current delivery system to include water control structures for flood/drawdown pulsing. Type of restriction impeding or preventing historical hydrological flows: Road Railroad. Design strategy to address issue: Water control structures (i.e., gates and weirs). Top three ecological benefits: Improved habitat longevity and sustainability, adaptation or accommodation of sea level rise, and improved ground water and surface water quality.	Tangipahoa Parish, Louisiana	$ 250,000	Public

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Project Name	Project Description	Location	Cost ($)	Submission Source
Keelboat Island Living Shoreline Stabilization Project	Project Description: Coastal Environments, Inc and partners propose to fabricate and install bio-induced oyster reefs to stabilize eroding shoreline and help restore and sustain valuable and sensitive estuarine ecosystems on Keelboat Island in the Biloxi Marsh estuary. This project will stabilize up to 750' of shoreline by creating intertidal oyster reef habitat using a cost-efficient and effective vertical breakwater technology called ReefBlk and cultch application. The ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that provides both shoreline protection and habitat for estuarine organisms. As oyster growth progresses and the reef unit becomes more dense, the bioengineered structure dampens and dissipates wave energy and protects the estuarine marsh from erosion. The applied cultch provides additional shoreline armoring and habitat for spat attachment and oyster reef development. Keelboat Island received extensive oiling and was under STR cleanup until completion in April of 2011. Over 142,000 lbs. of oil and oiled debris was removed from the island. Keelboat is recognized as a historic rookery by the Louisiana Department of Wildlife and Fisheries. ReefBlk living shoreline and erosion control methods are currently inducing the growth of bioengineered and self-sustainable living oyster reefs that expand both linearly and vertically to buffer wave action and retard erosion along estuarine shorelines in Texas, Louisiana, Alabama and Florida. High vertical profile oyster reefs also enhance species habitat diversity and provide oyster larvae for recruitment to adjacent pubic oyster grounds, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. CEI proposes to design, fabricate and install a patented artificial oyster reef system, ReefBlk along the eastern edge of Keelboat Island to forestall further erosion within a well art iculated erosional zone and to create a lagoon-like condition to encourage marine nursery activity. The overall goals of the project include reef construction, shoreline stabilization and armoring, marsh regrowth and faunal utilization. The project includes installation of approximately 750' of ReefBlk units and the application of #57 concrete aggregate as cultch 4-8" thick to a distance between 50-100' from the shoreline. The project can be developed and implemented in shovel-ready fashion. CEI's experience obtaining permits for The Nature Conservancy's Lake Eloi ReefBlk project and establishing landowner protocols combined with easily expandable current ReefBlk operations in Hopedale, LA, ensures rapid approval and implementation of the project. The fabrication and staging for this project will occur in St. Bernard Parish, creating jobs to offset the negative impacts of the Deepwater Horizon Spill to the fisheries industry of the region. This project is one of a number of critical living shoreline projects for St Bernard Parish described more generally under NOAA's NRDA project list as "Use induced high vertical profile oyster reefs to stabilize critical areas of shoreline erosion, and to enhance habitat conditions with living shoreline geometries". It will also be a part of the overall scope of education and research contemplated for the Oyster Research Center at Hopedale which is also listed under NOAA NRDA projects.	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 300,000	Public
Lake Charles Science Center and Educational Complex (Lake Charles SCEC)	The proposed Science Center and Educational Complex (SCEC) project would maintain some elements from the original LMFERSC Early Restoration project in the form of a dedicated venue for public outreach and educational activities on State-owned property in Lake Charles, Louisiana. The SCEC project would use NRDA funds to construct, operate, and maintain a venue to provide public education and outreach on a variety of recreational activities. The mission of the SCEC would be to provide fisheries extension, access, outreach, and education to the public. The public visitation and outreach components of the SCEC would provide a visitor center building featuring display aquaria showcasing Louisiana's diverse aquatic habitats, an aquatic animal touch tank, interactive educational displays, welcome desk for visitor sign-in and outreach materials, and public restrooms. Additionally, outdoor elements of the project would be focused around a stocked and managed one-acre fishing pond, and would include a covered outdoor pavilion overhanging the fishing pond to provide ADA-compliant youth fishing opportunities, nature trail, educational signage, natural landscaping, plaza and walkways, other outdoor educational areas including hunter safety range, visitor parking, site utilities, and roadwork.	Lake Charles, Calcasieu Parish, Louisiana	$ 7,000,000	LDWF
Lake Eloi and Lake Athanasio Living Shoreline Stabilization Project	Coastal Environments, Inc and partners propose to fabricate and install bio-induced oyster reefs to stabilize Lake Eloi shoreline and help restore and sustain valuable and sensitive estuarine ecosystems. Shoreline stabilization will be accomplished through both the attenuation of wave energy utilizing ReefBlk vertical profile oyster reefs and shoreline armoring utilizing aggregate cultch. The vertical profile ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that expands linearly and vertically. This reef dampens and dissipates wave action thereby retarding erosion and undercut of the marsh platform. ReefBlk also enhances species habitat diversity and provides oyster larvae for recruitment to adjacent oyster grounds, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. ReefBlk technology is successfully in use along estuarine shorelines in Texas, Louisiana, Alabama and Florida. The use of cultch substrate provides immediate shoreline armoring and similarly induces oyster growth which serves to create long-term armoring through sub-tidal and shoreline oyster shell accretion and deposition within the project area. This form of natural armoring occurs throughout the Biloxi Marsh area. The project will stabilize approximately 3.43 miles of eroding shoreline by strategic alignment of ReefBlk units and the application of #57 concrete aggregate as cultch 4-8" thick to a distance between 50-100 from the shoreline. Given appropriate bottom conditions, alignment of the ReefBlk units will create a lagoon-like habitat in a portion of the protected area to facilitate overall marine nursery activity. Cultch would be used strategically to forestall erosion at the most critical points within the project footprint, estimated at 10-20% of the total project shoreline. Project implementation is recommended as a critical measure to preve nt the northern encroachment of open water conditions deep into the heart of the Biloxi Marsh should the project shorelines continue to erode at present rates. This project is shovel ready and will integrate with The Nature Conservancy's and NOAA's Lake Eloi ReefBlk project now underway. Permits for the proposed project has already been approved for the installation of ReefBlk. Staging and logistics can be implemented immediately upon grant receipt by expanding the current ReefBlk operation at Hopedale, LA. This project will be a part of the overall scope of education and research contemplated for the Oyster Research Center at Hopedale, which is also listed under NOAA NRDA projects.	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 5,250,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Lake Fields Hydrologic Restoration	Lake Fields is located due west of Lockport, south of U.S. Highway 90, and north of the Gulf Intracoastal Waterway in Lafourche Parish and is approximately 2,000 acres in size. Prior to the early 1960s, Lake Fields was known for clear water, profuse submergent vegetation, and excellent sport fish and waterfowl populations. However, sport fish and waterfowl populations have declined dramatically in the lake proper in association with declining water quality and physical habitat. The lake is currently characterized by low water clarity, high nutrient levels, periodic algal blooms, and a virtual absence of ecologically important submergent aquatic vegetation. The deterioration of the Lake Fields ecosystem can largely be attributed to major physical modifications in the watershed. During the 1800s, Lake Fields was a semi-isolated freshwater lake with a small and undeveloped watershed and surrounded by continuous fresh marsh. Upper watershed water via Bayou Dumar and upper Bayou Folse once largely bypassed Lake Fields by flowing into Bayou Folse and eventually into Company Canal south of Lake Fields (see www.lafourchegfc.org/preservefigures.html). Bayou Dumar entered Lake Fields in the northwest corner, but a significant portion of Bayou Dumar capacity flowed into Commercial Canal and then into lower Bayou Folse. By the 1960s, however, various hydrological and physical changes rerouted an increased proportion of flow entering Lake Fields from lower Bayou Folse to the east and from Bayou Dumar to the north. Several specific physical watershed modifications contributed to this increased inflow into Lake Fields. The first was the erosion / subsidence of the west bank of lower Bayou Folse, which created a substantial opening into Lake Fields. The second was the decrease in water depths and water capacity of lower Bayou Folse due to the accumulation of sediments and organic materials. The decrease in the flow capacity of lower Bayou Folse significantly altered dra inage basin hydrology: a significant portion of water from upper Bayou Folse was diverted through Commercial Canal into Bayou Dumar and eventually Lake Fields; and, more upper Bayou Dumar flowed southward directly into Lake Fields rather than through Commercial Canal into lower Bayou Folse. The increased inflow of nutrient-laden, poor quality water from the upper watershed resulted in immediate and long-term adverse impacts on water quality and physical habitats in Lake Fields. Periodic algal blooms and a dramatic decline in submergent aquatic plants occurred as water became more turbid and nutrient enriched. The Lafourche Parish Game and Fish Commission is promoting a restoration plan to improve water quality and increase submergent vegetation in Lake Fields, which will result in increased sports fish and waterfowl populations. The initial restoration plan included several different components. One major component involved the dredging of lower Bayou Folse south of Commercial Canal to deepen the channel and increase flow capacity; this component will be completed in the near future through a cooperative project with the North Lafourche Levee District. However, several additional projects are needed to further restrict the inflow of degraded water into Lake Fields: - Restriction of the large opening into Lake Fields through the western shoreline of lower Bayou Folse - Restriction of the channel in lower Bayou Dumar to redirect water flow into Commercial Canal, Bayou Folse, and Company Canal Plantings of appropriate emergent vegetation are recommended to stabilize the spoil.	Lafourche Parish, Louisiana	Not provided with submission	Public
Lake Fortuna/Machais Living Shoreline Stabilization Project	Coastal Environments, Inc and partners propose to fabricate and install bio-induced oyster reefs to stabilize shoreline situated in Lakes Fortuna and Marchais and to help restore and sustain valuable and sensitive estuarine ecosystems. Shoreline stabilization will be accomplished through both the attenuation of wave energy utilizing ReefBlk vertical profile oyster reefs and shoreline armoring utilizing aggregate cultch. The vertical profile ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that expands linearly and vertically. This reef dampens and dissipates wave action thereby retarding erosion and undercut of the marsh platform. ReefBlk also enhances species habitat diversity and provides oyster larvae for recruitment to adjacent oyster grounds and leases, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. ReefBlk technology is successfully in use along estuarine shorelines in Texas, Louisiana, Alabama and Florida. The use of cultch substrate provides immediate shoreline armoring and similarly induces oyster growth which serves to create long-term armoring through shoreline oyster shell accretion and deposition within the project area. This form of natural armoring occurs throughout the project area. This project will stabilize up to 2.81 miles of eroding shoreline by strategic alignment of ReefBlk units and the application of #57 concrete aggregate as cultch 4-8" thick to a distance between 50-100 from the shoreline. Cultch would used strategically to forestall erosion at the most critical points within the project footprint, estimated at 15-40% of the total project shoreline. Given appropriate bottom conditions, alignment of the ReefBlk units will create a lagoon-like habitat in particular locations. This project will work in concert with a currently funded ReefBlk project in Lake Marchais to prevent the erosional loss of marsh islands that obstruct the northward encroachment of open water conditions into fragile interior shoreline estuary of the historic Bayou Terre aux Boeufs distributary marsh. This project is shovel ready and will integrate with The Nature Conservancy's and NOAA's Lake Fortuna/Machais project now underway. Permit approval has already been received for the proposed project for installation of ReefBlk under the permit obtained for The Nature Conservancy/NOAA project. Staging and logistics can be implemented immediately upon grant receipt by expanding the current ReefBlk operation at Hopedale, Louisiana. This project is one of a number of critical living shoreline projects for St. Bernard Parish described more generally under NOAA's NRDA project list as "Use induced high vertical profile oyster reefs to stabilize critical areas of shoreline erosion and to enhance habitat conditions with living shoreline geometries".	Breton Sound, Louisiana	$ 4,800,000	Public
Lake Hermitage Marsh Creation Additional Increment	The Lake Hermitage Marsh Creation - NRDA Early Restoration Project involves the creation of marsh within a project footprint known as the "Lake Hermitage Marsh Creation Project" developed for and funded through the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Program. This proposal substitutes approximately 104 acres of created brackish marsh for approximately 5-6 acres of earthen terraces that would otherwise have been constructed within the CWPPRA project boundary. CWPPRA provides over $80 million per year for planning, design and construction of coastal restoration projects in Louisiana. Each year, a list of projects is selected for implementation, and funds are approved for engineering and design. The Lake Hermitage Marsh Creation Project (BA-42) was funded in 2006 as part of CWPPRA Priority Project List #15. The Lake Hermitage Marsh Creation Project is located within the Barataria Hydrologic Basin in Plaquemines Parish, Louisiana, to the west of the community of Pointe a la Hache, and northwest of the community of Magnolia (Figure 5). This basin was identified as a priority area for coastal restoration, and has been the focus of extensive study and project design and implementation. The primary goals of the Lake Hermitage Marsh Creation base CWPPRA Project are (1) to restore the eastern Lake Hermitage shoreline to reduce erosion and prevent breaching into the interior marsh and (2) to re-create marsh in the open water areas south and southeast of Lake Hermitage. Specific objectives of the CWPPRA project are to: (1) create 549 acres of marsh by filling open-water areas and fragmented marsh with dredged material; (2) restore approximately 6,106 linear feet of the eastern Lake Hermitage shoreline; and (3) create 5 acres of emergent habitat by constructing 7,300 linear feet of earthen terraces. The proposed terrace field consists of approximately 104 acres. Throughout the engineering and design phases of the CWPPRA project, the project team considered incorporating an additional 104 acres of marsh creation in the footprint of the terrace field. However, due to funding constraints, the project team completed final design of the CWPPRA project with the 7,300 linear feet of earthen terraces (Figure 6). The Lake Hermitage Marsh creation - NRDA Early Restoration Project is designed to create that additional 104 acres of brackish marsh in lieu of the earthen terraces included in the final design of the base CWPPRA project (Figure 7). Marsh areas would be constructed entirely within the base project's terrace boundary. Sediment would be hydraulically dredged from a borrow area in the Mississippi River, and pumped via pipeline to create new marsh in the project area. Over time, natural dewatering and compaction of dredged sediments should result in elevations within the intertidal range which would be conducive to the establishment of emergent marsh. The 104-acre fill area would be planted with native marsh vegetation to accelerate benefits to be realized from this project. The estimated cost to implement the Lake Hermitage Marsh Creation - NRDA Early Restoration Project is $13,200,000.	Plaquemines Parish, Louisiana	$ 13,200,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Lake Hermitage Marsh Creation Additional Increment	The Lake Hermitage Marsh Creation - NRDA Early Restoration Project involves the creation of marsh within a project footprint known as the "Lake Hermitage Marsh Creation Project" developed for and funded through the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Program. This proposal substitutes approximately 104 acres of created brackish marsh for approximately 5-6 acres of earthen terraces that would otherwise have been constructed within the CWPPRA project boundary. CWPPRA provides over $80 million per year for planning, design and construction of coastal restoration projects in Louisiana. Each year, a list of projects is selected for implementation, and funds are approved for engineering and design. The Lake Hermitage Marsh Creation Project (BA-42) was funded in 2006 as part of CWPPRA Priority Project List #15. The Lake Hermitage Marsh Creation Project is located within the Barataria Hydrologic Basin in Plaquemines Parish, Louisiana, to the west of the community of Pointe a la Hache, and northwest of the community of Magnolia (Figure 5). This basin was identified as a priority area for coastal restoration, and has been the focus of extensive study and project design and implementation. The primary goals of the Lake Hermitage Marsh Creation base CWPPRA Project are (1) to restore the eastern Lake Hermitage shoreline to reduce erosion and prevent breaching into the interior marsh and (2) to re-create marsh in the open water areas south and southeast of Lake Hermitage. Specific objectives of the CWPPRA project are to: (1) create 549 acres of marsh by filling open-water areas and fragmented marsh with dredged material; (2) restore approximately 6,106 linear feet of the eastern Lake Hermitage shoreline; and (3) create 5 acres of emergent habitat by constructing 7,300 linear feet of earthen terraces. The proposed terrace field consists of approximately 104 acres. Throughout the engineering and design phases of the CWPPRA project, the project team considered incorporating an additional 104 acres of marsh creation in the footprint of the terrace field. However, due to funding constraints, the project team completed final design of the CWPPRA project with the 7,300 linear feet of earthen terraces (Figure 6). The Lake Hermitage Marsh creation - NRDA Early Restoration Project is designed to create that additional 104 acres of brackish marsh in lieu of the earthen terraces included in the final design of the base CWPPRA project (Figure 7). Marsh areas would be constructed entirely within the base project's terrace boundary. Sediment would be hydraulically dredged from a borrow area in the Mississippi River, and pumped via pipeline to create new marsh in the project area. Over time, natural dewatering and compaction of dredged sediments should result in elevations within the intertidal range which would be conducive to the establishment of emergent marsh. The 104-acre fill area would be planted with native marsh vegetation to accelerate benefits to be realized from this project. The estimated cost to implement the Lake Hermitage Marsh Creation - NRDA Early Restoration Project is $13,200,000.	Plaquemines Parish, Louisiana	$ 13,200,000	Public
Lake Hermitage Marsh Creation Additional Increment	The Lake Hermitage Marsh Creation - NRDA Early Restoration Project involves the creation of marsh within a project footprint known as the "Lake Hermitage Marsh Creation Project" developed for and funded through the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Program. This proposal substitutes approximately 104 acres of created brackish marsh for approximately 5-6 acres of earthen terraces that would otherwise have been constructed within the CWPPRA project boundary. CWPPRA provides over $80 million per year for planning, design and construction of coastal restoration projects in Louisiana. Each year, a list of projects is selected for implementation, and funds are approved for engineering and design. The Lake Hermitage Marsh Creation Project (BA-42) was funded in 2006 as part of CWPPRA Priority Project List #15. The Lake Hermitage Marsh Creation Project is located within the Barataria Hydrologic Basin in Plaquemines Parish, Louisiana, to the west of the community of Pointe a la Hache, and northwest of the community of Magnolia (Figure 5). This basin was identified as a priority area for coastal restoration, and has been the focus of extensive study and project design and implementation. The primary goals of the Lake Hermitage Marsh Creation base CWPPRA Project are (1) to restore the eastern Lake Hermitage shoreline to reduce erosion and prevent breaching into the interior marsh and (2) to re-create marsh in the open water areas south and southeast of Lake Hermitage. Specific objectives of the CWPPRA project are to: (1) create 549 acres of marsh by filling open-water areas and fragmented marsh with dredged material; (2) restore approximately 6,106 linear feet of the eastern Lake Hermitage shoreline; and (3) create 5 acres of emergent habitat by constructing 7,300 linear feet of earthen terraces. The proposed terrace field consists of approximately 104 acres. Throughout the engineering and design phases of the CWPPRA project, the project team considered incorporating an additional 104 acres of marsh creation in the footprint of the terrace field. However, due to funding constraints, the project team completed final design of the CWPPRA project with the 7,300 linear feet of earthen terraces (Figure 6). The Lake Hermitage Marsh creation - NRDA Early Restoration Project is designed to create that additional 104 acres of brackish marsh in lieu of the earthen terraces included in the final design of the base CWPPRA project (Figure 7). Marsh areas would be constructed entirely within the base project's terrace boundary. Sediment would be hydraulically dredged from a borrow area in the Mississippi River, and pumped via pipeline to create new marsh in the project area. Over time, natural dewatering and compaction of dredged sediments should result in elevations within the intertidal range which would be conducive to the establishment of emergent marsh. The 104-acre fill area would be planted with native marsh vegetation to accelerate benefits to be realized from this project. The estimated cost to implement the Lake Hermitage Marsh Creation - NRDA Early Restoration Project is $13,200,000.	Plaquemines Parish, Louisiana	$ 13,200,000	Public
Lake Road	Kayak launch and/or fishing pier	Lacombe - St. Tammany	$ 250,000	LDWF Fisheries (CSA)

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Lead By Example -- Use Non-Petroleum Motor Fuels to Prevent Future Oil Spills	Every ship, boat, truck, car and aircraft engaged in the response to this oil spill and all restoration activities to date have used vehicles powered by a liquid petroleum-based motor fuel. This fact is not only ironic, but symbolic of the fundamental challenge faced by Florida citizens who would prefer to not be a party to future oil spills. This restoration effort can, and should, demonstrate how the risk of future leaks, spills and releases of petroleum-hydrocarbons can be minimized, if not completely eliminated, by the use of commercially available natural gas and electric motor fuels in all types of vehicles. This action is relevant because, under current federal policy and industry practices, boaters and drivers in Florida have no choice but to purchase and use a liquid petroleum-based motor fuel to power all of their motor vehicles. Non-petroleum motor fuels, such as methane and electricity, are cheaper, cleaner and widely available, but are not easily used to power motor vehicles or boats. This means that restoration activities will contribute to the risk of a future oil spill and will do nothing to mitigate the risk of future spills. In effect, this contradicts Administration policy that instructs federal agencies to take action, where possible, to reduce petroleum consumption and reduce pollution created by the use of fossil fuels. When used to power motor vehicles alternative motor fuels, such as methane and electricity, completely eliminate the risk of hydrocarbon leaks, spills and releases from the supply chain and use in the vehicle; risk of petroleum releases are eliminated, both during routine operations and in the event of an accident. I propose to develop a program to advise recipients of monies under this program that use of natural gas and electric motor fuels in most types of vehicles is both technically feasible and, in many applications, commercially available from local vendors. Use of these fuels, however, requires education and behavior change. To change behavior I propose that specifications for funded projects that use of boats, cars, trucks and heavy equipment include the requirement that those vehicles be powered by a non-petroleum motor fuel when technically feasible. Natural gas and electricity is commercially available throughout the Gulf Region. Given sufficient demand, natural gas and electric motor fuels can be supplied to land or marine vehicles used to support administrative and restoration work. Many types of land vehicles powered by electricity or natural gas are commercially available; some of these vehicles operate in the Florida Panhandle today. Suppliers are standing by, waiting, for the opportunity to make these vehicles fuels available to help restore Gulf resources. Marine engines can be modified to operate on natural gas; natural gas motor fuels can be stored on boats in either compressed or liquid form. There are no technical barriers to using natural gas to power boats; only perception. Natural gas retails at prices that are 50% to 75% cheaper than the price of gasoline or diesel fuel. Natural gas is now the fuel of choice for waste trucks, transit buses and other high-fuel consuming vehicles. In the marine sector, natural gas has become the fuel of choice for a variety of work boats, including harbor craft and ocean going ferry boats. Tampa Bay Watch operated a natural gas outboard 15-years ago. There are absolutely no technical barriers to the use of this non-petroleum motor fuel. The only barrier to the use of natural gas motor fuels is perception that this non-petroleum motor fuels is not practical or available; in other words, barriers are cultural, institutional and bureaucratic. Cultural, institutional and bureaucratic caused the Deepwater Horizon disaster; these are the very behaviors that these monies are intended to overcome. Widespread use of cheaper, cleaner, domestically produced natural gas and electric motor fuels and vehicles will create jobs, save consumer's money, stimulate local economies and break the market power of OPEC, thus enhancing the economic security of this Nation.	Florida	Not provided with submission	Public
Linear Wetlands Park	Located along Breakwater Drive on the south shore of Lake Pontchartrain in the historic maritime district of West End in New Orleans, the non-profit organization - The Friends of West End - seeks to construct a linear wetlands park in conjunction with the Municipal Yacht Harbor Management Corporation and the Lake Pontchartrain Basin Foundation. Consisting of dredge and spoil material used to construct a marsh ecosystem that would benefit the health of Lake Pontchartrain and downstream waterways by creating a new shoreline breeding habitat. Further, the project would include a boardwalk and educational kiosks seeking to educate the New Orleans public on the need for a healthy Lake Pontchartrain. This project has been approved via a master planning process coordinated by the Regional Planning Commission.	New Orleans, Orleans Parish, Louisiana	$ 15,000,000	Public
Little Lagoon Multiple Site Living Shoreline Restoration	Living shoreline quantity and quality in Little Lagoon has been severely impacted by ever increasing population density and property modifications such as bulkheads and piers. Coastal expert Scott Douglas has estimated over 50% of Little Lagoon has a hardened shoreline. Of the remaining 50% of Little Lagoon that remains unhardened, 2/3 can be found within the boundary of Bon Secour National Wildlife Refuge (BSNWR). Ultimately, the Lagoon is showing signs of stress due to the reduction of natural shorelines, inadequate flushing, high bacteria levels in parts of the Lagoon, and increasingly frequent and dense harmful algal blooms (HABs) throughout the Lagoon. Nutrient sources are significant and should be remediated. Flushing is part of the solution but another is nutrient removal via natural vegetation and filter feeders, such as mussels, that can both be found in functioning living shorelines. Shoreline loss/erosion is another chronic issue for properties along the Lagoon. Although efforts to keep oil out of the Lagoon during the Deepwater Horizon (DWH) oil spill were successful, some unintended consequences were noted. Heavy rain fall during the latter part of the multiple pass closure period resulted in high water and infrastructure damage (sea walls/bulkheads, piers, roads, etc.). An opportunity exists to improve water quality in the lagoon, return shorelines to a natural state, repair roads/shorelines and "showcase" methods to improve the health of the Lagoon and remediate problems. Little Lagoon Preservation Society, the City of Gulf Shores, and the BSNWR would like to work in partnership to conduct several shoreline restoration projects: 1) restore 0.3 miles of shoreline along the south west corner and the south shore of the Lagoon within the BSNWR and on State owned water bottom. Pine Beach Road is nearly in the water along that portion of the Lagoon due to shoreline erosion and few viable options exist to move/repair the road due to adjacent Alabama beach mouse and wetland habitats. Pine stumps and degraded shoreline vegetation in the water and along that waterfront are ample evidence of eroding shoreline. Restoration would include a combination of evaluation, planning and implementation of a living shoreline project. The specifics of the living shoreline project would be finalized during the evaluation and planning process. However, the living shoreline restoration project is likely to include, but is not limited to, shoreline grass planting (Spartina alterniflora and Juncus roemerianus), wave attenuation structure (reef balls), a graded bottom slope, and possibly mussel seeding in the shoreline grasses. 2) Construct a living shoreline at the City of Gulf Shores property at Moe's Landing Boat Launch. The water front there also is severely eroded and parts of it are hardened with deteriorating bulkheads. The same or a similar restoration method would be used at the Moe's Landing Boat Launch site. Both the Moe's Landing and BSNWR sites would provide very visible "showcases" of natural shoreline restoration for the public and could be a catalyst for future return of more hardened shorelines in the Lagoon to a natural state.	Bon Secour NWR, Alabama	$ 950,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Live Oak Bay Living Shoreline Stabilization and Oyster Enhancement Project	The project will stabilize a marsh/shell ridge that forms a protective reach for the northern Drum Bay shoreline and is under severe erosional threat of segmentation. It is an important geologic framework element for the conservation of the Conkey Cove remnant ridge complex. The complex is among the most important of the barrier island chain in St. Bernard Parish. Contiguous light to moderate oiling stretched for over seven miles along the complex's shoreline. The project will stabilize approximately 1900' of shoreline by creating intertidal oyster reef habitat using ReefBlk units and the application of #57 concrete aggregate as cultch 4-8" thick to a distance between 50-150' from the shoreline. The ReefBlk units and cultch function as substrate for oyster spat attachment and allow growth of an intertidal reef. This project can be considered 75% shovel ready. Staging and logistics for the project can be implemented immediately upon grant and permit approval by expanding the current ReefBlk operation at Hopedale, LA now servicing The Nature Conservancy project for Lake Eloi. A standard template for permitting and landowner protocols has been established as an outcome of the Lake Eloi project and thus permitting can be expected to proceed without undue delay. Coastal Environments, Inc and partners will fabricate and install bio-induced oyster reefs to stabilize shorelines and help restore and sustain valuable and sensitive estuarine ecosystems in the Biloxi Marsh. This project will stabilize the shoreline by restoring intertidal oyster reef habitat using a cost-efficient and effective vertical breakwater technology called ReefBlk. The ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that provides both shoreline protection and habitat for estuarine organisms. As oyster growth progresses and the reef unit becomes more dense, the bioengineered structure dampens and dissipates wave energy and prot ects the estuarine marsh from erosion. These proven living shoreline and erosion control methods are currently inducing the growth of bio-engineered and self-sustainable living oyster reefs that expand both linearly and vertically to buffer wave action and retard erosion along estuarine shorelines in Texas, Louisiana, Alabama and Florida. High vertical profile oyster reefs also enhance species habitat diversity and provide oyster larvae for recruitment to adjacent oyster grounds and leases, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. The use of cultch to armor the shoreline through oyster shell accretion and deposition within the ReefBlk area will add to the proven benefits of ReefBlk. Fabrication and staging for the projects will occur in St. Bernard Parish creating jobs to offset the negative economic impact suffered by the commercial fisheries industry of the parish. The oyster is the keystone organism for the estuary, and the vertical reefs will contribute spat to nearby oyster leases and increase the robustness of the marine habitat in general. This project will be a part of the overall scope of education and research contemplated for the Oyster Research Center at Hopedale, which is also listed under NOAA NRDA projects. The project is a specific element of the shoreline stabilization NRDA request submitted by The Nature Conservancy.	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 800,000	Public
LL&E South LaFourche Marsh Restoration and Levee Protection Porject	North Carolina based Restoration Systems (RS) proposed a very promising project to the South Lafourche Levee District that can feasibly be implemented for Natural Resource Damage Assessment compliance in 180 days from Notice to Proceed. The project described is the LL&E South Lafourche Marsh Restoration and Levee Protection Project. RS is a 'Full-Delivery', bonded restoration and mitigation banking company. The company has 22,000 acres of restored, preserved and enhanced wetlands and ecosystems at 40 locations in seven states. In Plaquemines Parish, RS is permitting the Jesuit Bend Wetland Mitigation and Coastal Protection Mitigation Bank. That project is identified in the Master List of restoration projects under consideration for Trustee finding pursuant to the BP oil spill Early Restoration Agreement. RS has the right to acquire permanent conservation servitudes on the project areas upon completion of the five year-monitoring phase, or before if required. The company has agreed to allow Restoration Systems to make this proposal contingent on contract completion which is expected within the next month. Habitat improvement activities will be bonded and monitored for success over a five-year period or longer if required by the Trustees. RS has completed nearly 35 successful projects bonded for success in a similar manner. The company will utilize only A+ Rated surety companies which require substantial capital and assurance of implementation according to contract. The project is on the wet-side of the east and west banks of the Parish levees protecting the South Lafourche community and surrounding area. This area, easily visible on attached satellite photographs, has converted from marsh and cypress swamp over the last century to shallow, open water areas. Phase One has approximately 650 acres of marsh restoration. Phase Two has approximately 636 acres of marsh restoration and Phase Three has approximately 560 acres of marsh restoration. In order to convert the site to its historic condition, RS will permit the dredge, pump, and placement of material into the restoration area from sources previously permitted for dredging located near each phase. The placement and planting with natural and appropriate vegetation will provide a natural barrier to storm and wave attenuation at the toe of the Parish levee, which is now open water. Perhaps more importantly for the Trustees, the restoration will also re-establish a number of important and increasingly threatened sporting opportunities and historic ecological communities for local citizens and visitors; including Essential Fish Habitat and nursery for recreational and non-game fish, shrimp, shellfish and other aquatic species. The project is immediately adjacent to CWPPRA's PPL21 Bayou L'Ours Terracing project and will compliment the work that location. Figure 1 shows the planned Bayou L'Ours project location, the area of which is also shown as RS Exhibit 'B'. Also included are other photos of representative projects in the area with the same landowner. The implementation of this project has the support of the South Lafourche Levee District and also enthusiastic local citizen support. It is literally in the backyard of thousands of Lafourche residents whose recreational opportunities are increasingly limited by degradation of this significant habitat before and as a result of the Deepwater Horizon spill. Please let Restoration Systems know what additional information regarding this project that I can provide to the Trustees Council or other appropriate parties.	Lafourche Parish, Louisiana		Public
Long term acoustic monitoring of colonial water birds and shorebirds	Colonial water birds, including several listed species and species of local and regional concern, nest in large colonies along the shorelines and islands of the entire Gulf coast. These colonies are typically established within proximity to good foraging sites in suitable nesting substrate (trees, shrubs, ground) that are not excessively disturbed and provide protection from, or absence of, predators. Threats to these colonies include human disturbance, overcrowding, nesting habitat degradation, and depredation. Changes in water levels and water chemistry due to climate change presents and additional consideration when managing and protecting colonies. Colony collapse can occur if foraging sites collapse which is often tied directly to water levels at critical rearing stages. Water levels can also affect colony access by humans and by predators. Typical surveys are expensive due to the human resource needs and aerial survey needs. While these surveys are necessary, they provide snapshots of colony activity and do not provide accurate timing of events over long (decades) monitoring periods. Particularly in light of climate change, slight changes in the timing of nesting and fledgling could have profound population effects over the long term. Acoustic monitoring of colonies provides a cost-effective, continuous (24 h) record of all colony activities. Acoustic cues can pinpoint episodic events such as colony predators (not all of which occur during observable, daylight hours) and natural or human disturbance; or it can provide timing information on arrival, colony establishment, chick feeding, and abandonment. Additionally, there have been several studies that have demonstrated that colony abundance can be correlated to acoustic activity. We recommend establishing a long term acoustic monitoring program in each of the Gulf states that will supplement ongoing surveys to better establish strong correlations between traditional survey methods and acoustic methods. The program can be modified as necessary to include additional colonies, areas that are under-surveyed, or areas that are part of a restoration program. A minimum of four colonies (two tree/shrub nesting and two ground nesting) in each Gulf state will be instrumented with 1 to 3 (depending on colony size) autonomous acoustic recorders prior to nesting season. Recording will be continuous until collection after nesting season. At least four sites will be equipped with iPAM™ software such that near real-time data will be sent to a web-based user portal where events can be monitored. Acoustic data will be processed for ambient sound levels, spectral content, episodic acoustic events over the average ambient levels and vocal behavior. Environmental data, survey data, and acoustic data will be analyzed for correlations specific to nesting success or failure at each site and as a whole along the Gulf Coast. We propose an initial 5-year, 5-state, 20-site program. This long term approach provides for continuous monitoring and increases sampling effort during nesting seasons throughout the Gulf Coast.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 580,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Louisiana Gulf Coast Oyster Shell Recycling	The objective of this project is to develop a cost-effective program on the Louisiana Gulf Coast to recycle oyster shell from consumers (restaurants, shucking houses, oyster fisherman, individuals who purchase oysters by the sack, etc.) that can then be used to restore and enhance shellfish habitat destroyed or damaged as a result of the Deepwater BP Oil Spill. An effective program will require educating consumers on the importance of recycling and encouraging their participation in a program that recycles oyster shell for use in replenishing natural oyster beds and stabilizing shorelines. Suitable substrate is critical to developing a viable reef, and the substrate material (cultch) preferred by oyster larvae is oyster shell. Since the early 1900's, agencies of the various Gulf states have been depositing cultch material, mainly native shell, on public oyster grounds to build and enhance reefs. Currently a significant amount of the shell produced by consumers is deposited in landfills. Because much more shell is removed from public oyster grounds than is returned for habitat development and enhancement, the Gulf of Mexico is experiencing a shell deficit. This project is designed to reduce that deficit by recycling shell that would otherwise end up in landfills. The additional recycled shell will then be available for current or future oyster reef and shoreline restoration projects. Developing a cost-effective program to recycle shell for use in reef-building will be crucial to coastal restoration projects in the Gulf of Mexico. Similar programs have already produced positive results in Chesapeake Bay as well as in coastal areas of North Carolina, South Carolina, New Hampshire, and Texas. The project proposed here will use information from those state programs to develop an effective program for recovering oyster shell produced by Louisiana Gulf Coast consumers.	Louisiana	$ 8,000,000	Public
Louisiana Reef Restoration	Approximately 85% of the world's natural oyster reefs have been lost, while the remaining natural reefs are considered the most imperiled marine habitat on earth. Although oyster reefs in the Gulf of Mexico are characterized as being in "fair" condition (50-89% lost), the loss of ecosystem services has nonetheless been significant. Complete elimination of oyster reefs, or reduction of height and structural integrity of remaining oyster reefs, has contributed to increased wave energy and shoreline loss in many of Louisiana's productive bays. Additionally, the loss of structurally complex oyster reefs has significantly reduced available habitat used for foraging and refuge of a number of recreationally and commercially important fish and invertebrate species. This project will create approximately 74.8 miles (more accurate that the estimate of 91 miles given on this site) of substrate upon which oyster larva can attach, grow, and reproduce. The three locations of these reefs are the Biloxi Marshes in St. Bernard Parish, sites at the northern and southern end of Barataria Bay, and two locations in Terrebonne Bay. In Louisiana, TNC has installed nearly three miles of artificial oyster reef and is currently building just over an additional mile along coastal shoreline as part of three proof-of-concept projects. These projects, located in Vermilion and Barataria Bays and the Biloxi Marshes, began in 2010 with the goals of demonstrating oyster reef viability, coastline protection/accretion, fisheries response, and cost effectiveness. These projects are rigorously monitored with a standard protocol that allows for cross-project comparison. Constructed reefs are growing oysters and reducing wave energy reaching the shoreline; initial observations indicate that sediment is beginning to accrete between the reefs and shoreline. The requested funding would allow for the construction of 74.8 additional miles of oyster reef, which would enhance estuarine productivity and protect hundreds of acres of coastal marshes. Given that we will be using proven technologies and contractors have significant unused capacity to take on projects of this scale, actual deployment of reef structures could begin within six months of notification of funding. Existing reef monitoring programs could be expanded to include a subset of reefs constructed through this funding. Artificial oyster reef installation in Louisiana Cameron, Terrebonne & St. Bernard Parishes, LA protection/accretion, fisheries response, and cost effectiveness. These projects are rigorously monitored with a standard protocol that allows for cross-project comparison. Constructed reefs are growing oysters and reducing wave energy reaching the shoreline; initial observations indicate that sediment is beginning to accrete between the reefs and shoreline. The requested funding would allow for the construction of 70 additional miles of oyster reef, which would enhance estuarine productivity and protect hundreds of acres of coastal marshes. Given that we will be using proven technologies and contractors have significant unused capacity to take on projects of this scale, actual deployment of reef structures could begin within six months of notification of funding. Existing reef monitoring programs could be expanded to include a subset of reefs constructed through this funding. Oyster reefs were one of the most affected near-shore marine resources as a result of the spill. This project proposes to significantly increase the amount of oyster reef habitat while simultaneously providing important marsh and fisheries benefits. The proposed project would place artificial oyster reef/shoreline protection projects in five coastal parishes: St. Bernard, Plaquemines Jefferson, Lafourche and Terrebonne. The Biloxi Marsh portion is proposed as a significant expansion of the Conservancy's existing reef restoration project and all locations will protect strategically important coastal islands and marshes that serve as a first line of defense for interior marshes and uplands in all five parishes.	Louisiana	$ 77,000,000	Public
Marine Finfish Hatchery for Stock Enhancement of Important Recreational Species Affected by the Oil Spill (Marine Finfish Hatchery)	Provide funds to construct and operate a Marine Finfish Hatchery for the culture and release of important marine finfish species such as spotted seatrout, red drum, flounder and blue fin tuna. The uncertainty about the effects of the oil spill on the impact of the eggs and larvae of the 2010 spawn in the Gulf necessitate the need for stock enhancement of these important recreational fish species.	Louisiana	$ 50,000,000	Public
Marine Mammal Aerial Outreach Banners	The use of aerial banners (small plane pulling long banner) to relay important educational messages to target audiences has proven an effective outreach tool; banners can be used to educate beach-goers and motorized & non-motorized (jet skis, surfers, paddle boarders, etc.) vessel operators about presence of marine mammals and laws protecting them in the Southeast U.S. This project will reduce injury, harm, and mortality to bottlenose dolphins by reducing illegal feeding and harassment activities because target audiences will become aware that these activities are harmful and illegal. The project may also reduce injury and mortality of marine mammals from vessel collisions by making vessel operators aware of the presence of whales and way to avoid vessels strikes. A banner with the message "Don't Feed Wild Dolphins, It's Illegal" has been flown over areas where this harmful and illegal dolphin interaction is known to occur but also in areas where there are large numbers of tourist. These banners have reached over 300,000 people during one flight alone; this is common during spring break and other peak seasons. Banners have also been used when whales are seen close to shore and in areas where there are large numbers of motorized or non-motorized vessels near whales; the banners have made vessel operators aware of the presence of the whale(s) to avoid vessel strikes and harassment. This project involves flying aerial outreach banners in 10 coastal areas throughout Texas, Louisiana, Mississippi, Alabama, and Florida where illegal feeding and harassment activities are known to occur. The customized banners will educate people below to make them aware that these activities are harmful and illegal. Banners will be flown on 10 days each year per location; season, historic tourism numbers, and events will be considered when choosing which days the banners are flown. Banners would also be flown at times when other marine mammals (i.e.. orcas, Bryde's whales) are seen within practical flight distance from shore and in areas where vessels are near to inform those vessel operators of the presence of whales and tips on how to avoid them.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 180,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Marine Mammal Conservation Print Ads in Tourism & Trade Magazines	Print ads in tourism magazines can sometimes be effective in reaching large audiences with the desire to interact with marine mammal in the wild. Unfortunately, magazines offering discounted or probono ad space usually means small ads in the back of a magazine that will most likely be overlooked. This project includes funding a contract with a marketing agency to produce and coordinate full or half page color ads with premium locations within the tourism and trade magazine that are widely distributed throughout Texas, Louisiana, Mississippi, Alabama, and Florida. Large colorful ads would attract readers and ensure these important messages are conveyed to target audiences. By choosing tourism and specific trade magazines to reach target audiences, this project will: - Reduce injury and mortality to bottlenose dolphins from hook-and-line fishing gear by educating fisherman about ways to avoid interactions with dolphins while fishing and provide them with Dolphin Friendly Fishing Tips. - Increase bottlenose dolphin survival though better understanding of cause of illness and death as well as early detection and intervention of anthropogenic and natural threats because this audience would know how to help a stranded, injured or entangled marine mammal and to report these animals to the appropriate stranding network immediately. - Reduce injury, harm, and mortality to bottlenose dolphins by reducing illegal feeding and harassment activities because audiences will better understand the harm and consequence of these activities. They will learn how to recognize dolphin behaviors that are signs of harassment and also how to responsibly view dolphins in the wild. - Reduce injury and mortality of marine mammals from vessel collisions by educating mariners about marine mammal viewing guidelines and precautions they can take to avoid vessel strikes.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 500,000	Public
marine sea oil spill cleanup	Through cleanup marine oil spills, like the one in Nigeria Niger delta bonga oil spills, chevron Nigeria oil spills, Niger delta Nigeria oil spills, using modern technology, if giving me the opportunity, I will done the beat of it…	???	$ 800,000,000	Public
Marsh loss in Barataria Bay due to the Deepwater Horizon Oil Spill	Substantial coastal wetland loss caused by the Deepwater Horizon (DWH) oil spill were not included Natural Resource Damage Assessment. Studies published in 2016 and 2017 proved that DWH oiling dramatically heightened shoreline erosion, erosion magnitude increased with oiling severity, and oil related erosion distinctly differed from storm related shoreline erosion. These first-time findings were provided by a designed operational mapping system which used Synthetic Aperture Radar (SAR) data within a remote sensing and GIS processing structure. That system delivered a holistic representation of spatial and temporal trends of shoreline lateral movement that were not obtainable from ground measurements. A separate study also published in 2016 uncovered a pattern of backshore marsh density decrease that aligned spatially with shorelines that were heavily oiled the previous year. These results document substantial wetland loss due to DWH oil spill and possible latent detrimental response of marsh exposed to moderate oiling. While the mapping demonstration was highly successful, the extent and temporal duration were limited. The goal of this proposed project is to fully document marsh degradation and loss due to DWH oil in Barataria Bay from 2010 to 2016, and to chronic and storm erosion. In order to accomplish that goal, the project region will be extended from the northeast corner to include all of Barataria Bay exposed to DWH oil in 2010. The first project objective is to compile all needed field and image data to carry-out all mapping. SAR images used to conduct the previous studies were collected yearly of the Bay from 2009 (pre-spill year without storms) to 2016. Yearly SAR marsh density mapping will be based on calibrations performed with 2010 to 2012 field data collections. The second objective is to produce high-fidelity 2-m ground resolution SAR images that are then mosaicked to form yearly 2009 to 2016 georeferenced maps of the Bay. The third objective is to produce yearly SAR-based shoreline vectors and calculate a reference vector from which to measure shoreline movement throughout the Bay. The fourth objective is to setup and apply a GIS procedure for automated measurement of shoreline lateral movement from year to year. The fifth objective is to create yearly maps of marsh density and year-to-year change maps. Produced maps, tables and analyses will substantially increase the direct morphological impacts of the oil spill, expanding the possibilities of long-term environmental consequences. The comprehensive accountability of marsh degradation and loss will directly record the vulnerability and resilience of natural coastal wetlands to man-made and natural disasters and chronic and storm erosion. This direct record will increase the ability to anticipate and better protect the wetlands from immediate and long-term consequences promoting sustainability of the coastal ecosystem.	Barataria Bay, Louisiana	$ 550,000	Public
Marsh/Shoreline Remediation & Restoration	Our solution for remediation, restoration and recovery is a holistic offering. In the plan, we include berm stabilization and sustainable, natural land building. Marshlands remediation and stabilizing are part of our plan. Our solutions include "dead zone" control. Our plan addresses pressing needs of: Fishing Industry (generally and specifically) Ecological Systems Marine Habitats and we include a variety of services to other stakeholders. Our plan works sustainably because we cooperate with nature, applying services, techniques, product, and Gulf Coast experience. Materials: USACE approved "biodegradable units" (24' x 28') filled with RZHO blends which absorb and adsorb hydrocarbons. In the approved containers, RZHO microbial values continually protect plant life, joining forces with existing in-situ decomposers. The "biodegradable units" are plugged with native marsh grasses and trees. The RZHO protects the sensitive pneumatophores of black mangrove to allow survival, should they be subject to contamination. Methodology: Units are strategically placed along shorelines at the water line, stabilized to endure tidal dynamics. The high performance grasses and trees are able to stand strong, owing to the physical design of the containers and the container content. In some areas of deployment, we use biodegradable stakes which maintain strength and hold for several months, allowing strong rooting and grow-in for the plants. With a 100% of proven growth.	Mississippi, Louisiana		Public
Marshland Purification Project	By using shallow water boats equipped with sprayers and tanks, apply EPA approved bioremediation agents, BAAD Bugs (generic is Biorem 2000) and Oil Digester if need be into any oil soiled marsh land areas without disrupting the natural habitat in any way. Test for hydrocarbon presence in a week and reapply if necessary. The project may be implemented under our guidance, using employees from the State, Federal or Local government, displaced BP workers or displaced fishermen. The bioremediation agent is the only agent that is from all naturally occurring microbes from the ocean, is completely safe for animals and humans and remediates on impact. Estimated cost is 5000 dollars per acre plus testing, including labor and boat usage.	Louisiana	Not provided with submission	Public
Maurepas	Lake Maurepas Access Improvements; components include improved parking, boat ramp, wetland walk/boardwalk	Lake Maurepas - St. John the Baptist	$ 250,000	LDWF Fisheries - Sea Grant - LSU (School of Landscape Architecture)
Maurepas Swamp/ Joyce WMA - Lake Maurepas Land Protection Effort (Lake Maurepas Land Protection Effort)	16,000 +/- acres of critically important Louisiana coastal wetlands within the Lake Maurepas/Pontchartrain Basin. The three targeted tracts are a link into the green infrastructure network already in place across this landscape/basin. The protection of this acreage will not only provide multiple public benefits, but it will complement at least two multi-million dollar restoration projects to restore hydrology, being led by the U. S. Army Corps of Engineers, and the Louisiana Office of Coastal Protection & Restoration within the Maurepas Swamp.	Lake Maurepas and Pontchartain Basin, Louisiana	Not provided with submission	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Mechanically Produced Thermocline (Hurricane Barrier)	The Gulf of Mexico is expected to be oxygen depleted for the next ten years due to the accelerated bacterial activity feeding on the oil in the deep. We propose a system to oxygenate the surface waters and increase the available food at the bottom of the food chain by promoting phytoplankton growth. The 'Mechanically Produced Thermocline Based Ocean Temperature Regulatory System' is a system to pump cold water from a depth sufficient enough to produce a thermocline on the surface of the ocean. The difference in temperature and salinity between the surface water and the water pumped up from the deep keeps the two from mixing. The temperature and salinity differences between the water from a depth of 2000 to 3000 ft. and the water on the surface in most tropical and subtropical seas is sufficient to create a thermocline. The system to create the thermocline consists of a floating pump surrounded by a separation barrier, with a feed tube attached to the bottom of the pump. The pump in the system that we have designed is powered by ocean currents, but the concept is not limited to the use of our pump. The pump we have designed is a floating vessel with turbines set into each of its two sides. The turbines are directly geared to an impeller. The impeller pumps water from the top of the column of water in the feed tube. The feed tube is open at the bottom. The water that is replacing the water that is being pumped is coming up from depths up to 2000-3000 ft. The water that is pumped off of the top of the column of water overflows the pump and is caught by the separation barrier. The feed tube is a flexible membrane that is seamed into the shape of a tube which is open on each end. The feed tube is suspended from the bottom of the pump and hangs down into the deep water. The feed tube is kept open with rings which are attached to the inside of the tube at regular intervals. The tube is kept in a vertical position by lines which are attached to the bottom of the pump, hang down the length of the tube, inside the tube, and are attached to a weighted ring, which is attached to the bottom of the feed tube. The separation barrier is a flexible membrane attached to the perimeter of the pump, above the level of the turbines. The separation barrier extends out to an inflated ring, to which it is attached. The separation barrier catches the water that is pumped up. The separation barrier prevents mixing of the pumped up water and the water below it. The barrier allows the water to flow out smoothly over the surface of the water as the pumped up water overflows the inflated ring. The thermocline is beneficial in many ways. The mass of cold water promotes phytoplankton growth, increasing food available for fish. The increased growth of phytoplankton sequesters CO2 which can then be consumed by zoo-plankton in the form of carbohydrates. The zoo-plankton sequesters the carbohydrates into calcium carbonates and calcium bicarbonates. The calcium carbonates and bicarbonates sink and are sequestered into the depths of the ocean, potentially for thousands of years. A larger scale thermocline can be created by the use of multiple pumps in strategic groupings. These large-scale created thermoclines can be positioned to work as a cold water barrier to hurricanes and tropical storms.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 82,500,000	Public
Mermentau	Mermentau River access improvements; components include renovated boat launch, parking, fishing pier, restroom, and walking trail	Mermentau River - Cameron Parish, Louisiana	$ 250,000	LDWF Fisheries - Sea Grant - LSU (School of Landscape Architecture)
Middle Pearl	Improvements to launch and parking	Middle Pearl Boat Launch - St. Tammany Parish, Louisiana	$ 250,000	LDWF Fisheries (CSA)
Migratory Species Studies	Expand Gulf of Mexico Migratory Species Pathways Mapping and Conservation Project with emphasis on migratory connectivity modeling, threats assessment, and the identification of habitat restoration needs including pelagic habitat. a. Objectives: Understand the most significant migratory pathways of fish, Sea Turtles, Marine Mammals, and birds in the Gulf of Mexico large marine ecosystem, and the habitats that their populations need to continue being viable; identify the most important threats to those pathways and habitats. b. Species group/habitat: Fish and Water Column Invertebrates, Sea Turtles, Marine Mammals. c. Description: Migratory species rely on multiple habitats to complete their life cycles. This project should: i. Assess the threats to species while migrating (along their pathways) in the Gulf of Mexico ii. Develop an optimized habitat portfolio using GIS and migratory connectivity models that identify the essential habitats to maintain migratory species populations throughout their life cycle and to guide habitat restoration and protection. iii. Support technological advancements in the development of biological tracking and oceanographic monitoring networks, such as acoustic monitoring networks, gliders including the development of migratory movement tracking networks and infrastructure across the Gulf. To do that it should fund: current or new establishment of scientific and management networks of practitioners assessing the movements of marine organisms (e.g., iTAG network of acoustic telemetry) and synthesis of a collaborative strategy for a Gulf of Mexico Animal Tracking Network. The project continues work previously completed and published by The Nature Conservancy to map the migration routes of 26 bird, fish, marine mammal and turtle species in the Gulf of Mexico (Brenner et al. 2016). We believe that this research revealed the great importance of species migration to the Gulf ecosystem as well as the importance of continuing to com pile and analyze migratory pathways as an important decision-making tool for Gulf restoration. This project would accomplish the next phase of this work with particular emphasis on threat assessment and identification of the most critical migratory pathways for protection for their habitats. (Brenner, J., C. Voight, and D. Mehlman, 2016 Migratory Species in the Gulf of Mexico Large Marine Ecosystem: Pathways, Threats, and Conservation. The Nature Conservancy, Arlington, VA. 93 pp.)	Texas, Louisiana, Mississippi, Alabama, Florida	$ 1,200,000	Public
Mitigation of Polluted Waters through Filtration by Mussel Clusters	This project consists of mitigation of polluted waters through filtration by mussel clusters.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Mitigation Plan for Leaking Oil and Gas Infrastructure to Compensate for Open Ocean Injuries	This restoration project would protect open ocean as well as nearshore species injured by the Deepwater Horizon oil spill (DWH) from continuing and future oil and gas releases from the hundreds of oil and gas wells and pipelines in the Outer Continental Shelf (OCS) and nearshore areas of the Gulf of Mexico. Some of these installations are leaking periodically or chronically, and others may soon begin to leak. Present and future chronic or episodic leakage from wells and pipelines may affect critical habitats that are already stressed from the larger impacts from the Macondo MC252/Deepwater Horizon (BP) spill, or may even reverse the benefits of restoration projects conducted in the aftermath of that spill. Protection and conservation of habitats and living coastal and marine resources is an essential part of the DWH Natural Resource Damage Assessment (NRDA) Final Restoration Plan for the Gulf of Mexico. One approach to restoration is to actively manage to protect against threats. This project identifies a major threat and a methodology to prioritize mitigation efforts that will most reduce the threat. The project involves analyzing risk from abandoned, orphaned, and currently-active wells and associated pipelines by quantifying the probabilities and causal mechanisms of releases, along with the ongoing and potential future ecological effects of releases in metrics analogous to those used for the DWH injury quantification, allowing benefits of remediation to be measured. Conducting a systematic risk assessment will provide a means to identify wells and pipelines that present the greatest risk, as well as those where responsible parties cannot be identified, so that they can be prioritized for monitoring, mitigation, and remediation efforts. Preventing releases of oil that forms slicks and sheens would be beneficial to early life history stages of fish and invertebrates (e.g., eggs and larvae of tunas, mahi, snappers, sea trouts), among the most vulnerable of open ocean biota, as well as wildlife (birds, mammals, sea turtles). Assessment of leakage probability for each of the wells and pipelines would be based on expert analyses of available data on well characteristics (e.g., well age, water and well depth, operator(s) through time, hydrocarbon encounter, hydrocarbon characteristics, brine production, acid gas production, completion status, reservoir pressure and temperature through time, geological formation, drive mechanism, tree and wellbore type, and original well type [e.g., exploratory]). Potential effects of discharges of oil and/or gas of different rates and volumes will be analyzed by oil fate and effects modeling, injury quantification and scaling, such as those conducted for NRDA. These metrics, and the protection of offshore and coastal species most injured by the DWH, provides a strong nexus for compensatory restoration.	Louisiana	$ 700,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Modification of the Pearl River Navigation Project to Restore Access to Spawning Habitat for Gulf Sturgeon. Phase I: Engineering, Design, and Transfer of Ownership from United States Army Corps of Engineers.	The Pearl River Navigation Project (PRNP) was completed in 1956. It includes three navigation locks, two low-head dams, and an overflow. The project is currently non-functional. The primary objective for this project is to remove the two low head dams associated with the project that have blocked access to critical spawning habitat in the Pearl and Bogue Chitto Rivers for the past 60 years and severely limit reproductive success of Gulf sturgeon. These structures represent the most significant impediment to recovery for one of the most depressed Gulf sturgeon populations in the Gulf of Mexico. As long as these structures remain in place, the Pearl River Gulf sturgeon population will remain in decline and likely unsustainable. Removing those dams can re-establish reproductive resilience and has been the top recovery action sought by USFWS Fisheries Program, The Louisiana Department of Wildlife and Fisheries (LDWF), recovery scientists, and many NGOs for decades. It represents a logical and strategic restoration effort that is sustainable, minimizes uncertainty, and can be reasonably translated into a quantifiable increase in Gulf sturgeon numbers attributable to this action. The project has a great deal of potential to transform other features of the existing navigation project so that they provide economic and recreational benefits to the surrounding communities. The LDWF intends to improve and maintain the defunct navigation channel as showcase recreation area for fishing, watersports and access to the Bogue Chitto NWR. Improved safety is also a welcome benefit since multiple accidents have resulted in more than five lost lives due to the dangerous navigation conditions created by the dams. Commercial and recreational fishermen traverse the dams in order to access large segments of the river that would be completely and safely accessible if these structures were removed. As many as 18 other locally and regionally migratory species would benefit from the renewed acc ess to upstream resources that are currently out of reach. Public access via the rivers would be re-established for much of the Bogue Chitto National Wildlife Refuge and the Pearl River Wildlife Management Area where it is currently limited due to the dams. In 2016 the US Congress officially “decommissioned” the project and directed the USACE to transfer ownership of the entire project to a willing recipient. The LDWF was integral in de-authorization and has interest in ownership of the project. This proposal requests funds and Open Ocean TIG support to complete engineering and design to remove two dams, including OPA and NEPA compliance, public scoping, preparation of appropriate hydrodynamic, geomorphic, and toxicological assessments, as well as all relevant permits. It will establish a predicted area of impact and characterize the nature of physical and environmental change associated with dam removal. It will also provide for assessments to define the potential influence that those changes might have on private property, municipalities, commercial interests, and ecological function. Conceptual alternatives will also be developed for compatible recreational features associated with the transformation of the project. Implementation of the project will ultimately depend on the successful transfer of ownership to a willing recipient. The LDWF has actively pursued ownership throughout this process and remains the apparent future owner of the bulk of the current project features and holdings. Phase I will include coordination among USACE, the State of Louisiana, and the Federal Trustees in developing a strategic plan for transfer of ownership of the project to the state of Louisiana. It will also include design specifications for the securely modifying the remaining structures to prevent failure and to ensure public safety.	Pearl River, Louisiana	$ 2,000,000	Public
Montegut Reef	Montegut Fishing (Vertical/Erosion protection) Reef; directly south of the alignment of the Morganza to the Gulf Levee. Primary purpose would be to provide shoreline protection to nearby levees, but would also offer additional fishing opportunities once constructed.	Pointe-aux-Chenes WMA - Terrebonne	$ 500,000	LDWF Wildlife (WMA)
N&P pollution control, and restoring clean water	We have a "SLOW", dissolving-in-water 1 kilo log, which can be dropped by helicopter or by hand into any water area. The log contains a patented formula of Fertilizer, which allows the DIATOMS to bloom and become the dominant algae and clean up the water. 1 log will clean approx. 1 million gallons.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
New Marketing Tool for BP to Generate Sales For Local Merchants and Consumers Along Gulf Coast	We have a new viral marketing platform to submit to your PR/Marketing Department for review. The program will help the merchants realize a tool that will help them generate sales and is cost effective for your firm. The merchant will offer a discount for their business on behalf of BP! This Platform developed for The New Economy, works in conjunction with a client's website or Facebook page, handles mobile marketing (free mobile app), provides tools for print publications (auto generates QR Codes), video commercial Indexed on search engines and social media broadcasting. Bp will be able to regulate a discount offer the merchant can promote to market their business. This marketing tool can be branded to BP and also to the merchant's business. Please contact Ken Dugas at 985-518-1388 oe email us for more information info@mediaadgroup.com	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Northern Gulf of Mexico Super Project	Goal of the project is to enhance habitat and augment wild stocks through an aquaculture base project. To bring together all of the current educational resources of the Gulf Coast to create an educational mecca for ocean studies programs. To create a large consortium of stake holders in the Gulf to share resources that can be received through the restoration efforts and BP funding to super utilize and maximize the restorative process. Currently, there are near 700 projects requesting funding from the BP settlement grants that have been allocated. Many of these projects are redundant, not in the materials or siting, but in the logistical requirements needed to complete them. I believe that in combining asset requirements, and through proper scheduling and project resources, that it will be possible to greatly reduce cost, while increasing efficiency and longevity of the selected projects. Working in unison will also encourage communication and cooperation between all the separate entities involved. Example; after reading through the project lists, there are no less than 100 separate projects that either stipulate the acquisition of a vessel through purchase, or leasing a vessel for a specified period of time. Some of these are purely scientific research endeavors, others are involved in delivery or deployment of reef materials. Vessels are an expensive proposition for any project, in most cases they are the most important and expensive line item, in any project. To let them sit idle is to still incur the cost, while representing a loss of valuable production time. Leasing a vessel gains that vessel for a preset period, but for long term ongoing projects, represents cost with no equity. To utilize one vessel capable of the versatility of handling a multitude of projects and tasks, would increase efficiency on many levels. Having the ability to load modular equipment on to a deck, complete the project, return, and in a matter of hours be refitted for a completely different project, and the duties that are included, would mean that the funding dollars that would have only served one particular endeavor, can now accomplish twenty. Resources to manage the vessel are kept to a minimum, crew familiarity with the vessel is at a maximum, and in turn operating and maintenance cost are reduced as well, substantially. The funding not duplicated on repetitive vessels would mean the amount of separate projects could be quadrupled with the same amount of funding. This would ensure that the restorative effort gains the most from each dollar put forth, and would also give the a larger amount of projects the longevity they need to be accomplished. Using the network of sharing the vessels would create, different projects and groups would also be exposed to each other and be able to share both data, and expertise gathered through the entire restoration projects course. Extending the beneficial cycle of the restorative effort indefinitely to aide in the education of the coming generation most affected by this spill.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 120,000,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Nutrient Reduction Pilot Projects in the Mississippi Valley	The Nature Conservancy is engaged in a large scale project to reduce nutrient inputs to the Mississippi River. The project is a multi-faceted effort involving TNC Chapters in the whole Mississippi Basin. In this portion of the project we would conduct one or more nutrient reduction pilot projects in the Mississippi Valley as prototypes for reducing nutrient flows into the Gulf and, thus, the size of the Dead Zone a. Objective: Demonstrate cost-effective and practical methods of agricultural nutrient reduction that can be replicated in the Mississippi Valley. b. Species group/habitat: Fish and Water Column Invertebrates, Marine Mammals. c. Description: Evidence suggests that the Gulf Dead Zone impacts the health of Fish and water column invertebrates and, potentially, marine mammals in a large area south and west of the Mississippi River Delta. The Dead Zone is caused primarily by agricultural nutrients flowing into the Mississippi River and then into the Gulf. While there have been long-standing efforts to reduce nutrient runoff, progress in reducing the size and duration of the Dead Zone is not evident. The Nature Conservancy is currently involved in activities across the entire Mississippi Valley to reduce nutrients. Large-scale pilot projects are needed to demonstrate new on-field and edge of field reduction techniques. In addition, there is increasing evidence that floodplain and wetland restoration removes nutrients in tributary rivers. This project would create a large-scale pilot project on a Mississippi tributary in Louisiana or Mississippi to test a broad range of strategies for nutrient reduction that could be measured, described, and then be replicated elsewhere.	Mississippi Valley	Not provided with submission	Public
Oak Ridge	There is a pumping station adjacent to the Oak Ridge Boat Launch, behind the Oak Ridge Community Park in Golden Meadow, which pumps rainwater into a dead-end canal just east of Catfish Lake (popular fishing spot). This project would develop shoreline fishing opportunities (i.e., fishing pier) in conjunction to this pumping station location.	Golden Meadow - Lafourche	$ 250,000	LDWF Fisheries (CSA)
Ocean floor Recovery Project	Build large vacuum cleaners to pipe up the oil that is laying just below the ocean floor. The oil can be pumped and filtered into tankers. It's right there. Scoop it up. It's money in the bank. I don't want a dime. I would just like to give money made to 5 charity's and the people who clean up the gulf...	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
OIL RE MEDIATION	I have a Product called Oil Digester that was approved to remediate tar balls, oil, Toxins etc. from the Gulf. Go to web site (www.bioremediationinc.com) and this will give you more information on the green products we sell. This is a microbe that turns into water and carbon dioxide. Will not harm animal life nor human life. I discussed with Senator Crowe to get a coalition together with Bio Companies and work together to remedy this situation.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Old Hwy 1	Parking improvements with improved shoreline access and/or fishing pier	Leeville - Lafourche	$ 250,000	LDWF Fisheries
Open water restoration for nesting fisheries, water birds, and foraging waterfowl	Construct a dedicated dredge fill of open water lands on private lands west of Lake Rd with possible terrace inclusion. Plant marsh grasses in new fill area and on terraces. Interior ponding and, to a lesser extent shoreline erosion, are the major causes of wetland loss in the project area. From 1974 to 1990 marsh loss rates averaged approximately 35 acres/year. Those high loss rates are associated with hydrologic alterations which allowed saltwater to penetrate the fresher marshes. In addition, the passage of Hurricane Katrina also contributed to the loss of as much as 3.6 square miles of wetlands within the project area. During the transition to a more brackish plant community coupled with the storm events of 2005, large ponds have formed. A narrow strip of land separates those ponds from Lake Pontchartrain. Although the shoreline erosion rates are relatively low, the shoreline is already breached in several areas, and marsh loss in the interior ponds is expected to increase as the shoreline is breached. The primary goal is to re-create marsh habitat in the open water areas and nourish adjacent deteriorating marsh. This project will afford the communities along the north shore, such as Lacombe, storm surge protection. The project size could be scaled differently if needed. Borrow material might be taken from Lake Pontchartrain. The area can support a large number of wintering waterfowl, including horned grebe and common loon, various gulls, terns, herons, egrets, and rails. The area has been designated as an Important Bird Area by the American Bird Conservancy. Restoring these marshes in private lands within Big Branch Marsh NWR along the north shore will help to protect fish and wildlife trust resources dependent on marsh habitats, particularly at-risk species such as the diamondback terrapin, black rail, reddish egret, brown pelican and the Louisiana eyed silk moth; and migratory waterfowl which are dependent on those marsh habitats. Contai ment dikes would be constructed to achieve target elevations. Up to 16 million cubic yards could be used in the area to create marsh habitat to fill a target elevation of 1.4 feet NAVD88.	St. Tammany Parish, Louisiana	$ 21,000,000	Public
Operating costs for Hopedale Oyster Reef and Fishing Grounds Restoration Center	During the BP Oil event it was found necessary to establish a temporary center for the Unified Command at Hopedale, LA to coordinate and implement emergency measures. Hopedale is literally at the end of the road and the jumping off area for the vast eastern St. Bernard Estuarine area. At the peak of the response 2,500 people were working at the center. It was a small city with hundreds of boats and vehicles. At the end of the crisis, the center was de-mobilized. As we move into the evaluation and restoration phase of the oil event as well as into other environmental restoration projects in the area such as the Mississippi River Gulf Outlet (MRGO) ecosystem restoration program, it has become apparent that a smaller command and marshalling center is needed at Hopedale. Use of the command center building constructed during the oil spill is being made available as an oyster and fishing grounds restoration center by the owners. It will serve as a staging area for NRDA evaluation, restoration, and remediation and ongoing environmental research and restoration of oyster reefs and fishing grounds. In addition to the St. Bernard Parish coastal restoration program, a number of non-government conservation organizations, including The Nature Conservancy and the Audubon Society, have expressed interest in utilizing the facility for research, sponsored restoration projects, educational programs and field trips. It is anticipated that universities and colleges in Southeastern Louisiana will utilize the facility, as well as state agencies such as the Louisiana Department of Wildlife and Fisheries. The facility will become a tangible focal point for coastal restoration No such facility presently exists in the tidal area of the coastal zone east of the Mississippi river. The large fully functional building is being provided without rental charges. However, operating expenses are needed for utilities, janitorial and routine maintenance, security, etc. are needed.	Hopedale, St Bernard Parish, Louisiana	$ 200,000	Public
Outreach, Implementation and Assessment: Using Descending Devices to Reduce Post-release Mortality of Reef Fishes in the Gulf of Mexico Recreational Fishery (Descending Devices)	This proposed project will provide descending devices to recreational anglers (private and for-hire) and conduct educational outreach on best practices and the proper use of these devices throughout the Gulf of Mexico. In addition, the Southeast Region Head boat Survey (SRHS) will implement a monitoring and fish tag/recapture program on head boats participating in the survey in order to collect information on the utility, effectiveness and impacts of descender devices on post-release mortality in the Gulf of Mexico head boat fishery. Recreationally important species with high release mortality, including: red snapper, gag grouper, vermilion snapper, red grouper; as well as strictly regulated species such as goliath grouper, speckled hind, Warsaw grouper and Nassau grouper, will be the focus of this program. Additionally, the effectiveness of descending devices on reducing dolphin depredation will be evaluated. In order to raise public awareness on the problem of fish barotrauma and the benefits of using descending devices, outreach will be conducted at boat shows, fishing tournaments, fishing clubs, and civic events from FL to TX. Outreach will include distributing educational DVDs “Down scope: Saving Snapper and Grouper from Barotrauma” and descending devices to anglers that may otherwise not obtain or purchase these items. The implementation and monitoring component of this project incorporates a design that includes the SRHS electronic logbook (eLog) system, SRHS dockside sampling and at-sea observers. In addition to utilizing existing SRHS infrastructure and capabilities, the addition of at-sea observers will provide: total number of fish discarded, lengths of fish from a subsample of discards, number of fish descended on devices, and the ability to tag a subsample of fish descended and fish not descended, for subsequent analysis of recapture rates. Partners in this project include Sea Grant, Gulf States Marine Fisheries Commission, recreational fishing associations, and state agencies. This collaboration ensures regional coverage and makes this project well-suited for promoting best practices and the proper use of descending devices, along with monitoring and evaluating the impacts on reducing post-release mortality and improving post-release mortality estimates.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 4,550,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Pointe-aux-Chenes Wildlife Management Area Fishing Piers (PAC Fishing Piers)	Pointe-aux-Chenes fishing piers; this project would provide safe roadside parking in conjunction with public fishing piers.	Pointe-aux-Chenes WMA - Terrebonne Parish, Louisiana	$ 500,000	LDWF Wildlife (WMA)
PAC Pirogue Launch	Montegut Pirogue Launch; Develop a launch for small vessels like pirogues and kayaks on the Montegut Management Unit of the WMA	Pointe-aux-Chenes WMA - Terrebonne Parish, Louisiana	$ 300,000	LDWF Wildlife (WMA)
PAC Pirogue Pull-Overs	Create pirogue pull-overs for Montegut and PAC units	Pointe-aux-Chenes WMA - Terrebonne Parish, Louisiana	$ 100,000	LDWF Wildlife (WMA)
PAC S1&S2	Pointe Aux Chenes WMA - Montegut Unit S1 (West) and S2 (East) access improvements; construct boat docks/fishing piers and walkway at water control structures to allow for safe fishing opportunities.	Pointe-aux-Chenes WMA - Terrebonne Parish, Louisiana	$ 500,000	LDWF Wildlife (WMA)
Pass a Loutre Wildlife Management Area Access Improvements (PAL Access)	Recreational access enhancements to WMA	Pass-a-Loutre - Plaquemines Parish, Louisiana	$ 100,000	LDWF Wildlife (WMA)
PAL Campgrounds	Projects - Public campground improvements to WMA	Pass-a-Loutre - Plaquemines Parish, Louisiana	$ 1,500,000	LDWF Wildlife (WMA)
Palmetto Island	Addition of a fishing pier into the Vermilion River at the Palmetto State Park boat launch	Palmetto Island State Park - Vermilion Parish, Louisiana	$ 350,000	LDWF Fisheries (CSA) Suggestion - State Parks Collaboration
Patout Bayou	A small fishing pier at the Patout Bayou public launch with a covered pavilion/restroom facility would allow shore fishing access into the bayou. The public routinely uses the boat launch dock there for fin fishing and crabbing.	Patout Bayou - Iberia Parish, Louisiana	$ 250,000	LDWF Fisheries (CSA)
Pelagic Longline Fishing Vessel and Permit Buyback in the Gulf of Mexico	The Gulf of Mexico is the only known spawning area for the western population of Atlantic bluefin tuna and the Deep Water Horizon spill occurred at the peak of the spawning season covering approximately 20% of the historic spawning area. The Gulf is home to dozens of other marine fish and wildlife that were impacted by the spill. All of these species are impacted by the pelagic longline (GOM PLL) fishery which encounters approximately 80 non-target marine species, including endangered sea turtles, and depleted sharks, bluefin tuna, and billfish. Government catch data from 2007-2009 indicates the fishery killed 43,245 non-target animals, including 6,009 lancet fish, 5,844 dolphinfish, 2,747 escolar, 1,745 sharks and rays, 858 wahoo, 794 billfish (marlin, sailfish, spearfish), 612 bluefin, and 169 bigeye tuna, and interacted with 137 leatherback and 17 loggerhead sea turtles. Actual mortality is much greater as only an average of 22% of the hooks set were observed, e.g., an estimated 423 bluefin are killed annually. A voluntary vessel and permit buyback program for the GOM PLL fleet would, depending on participation, significantly reduce the mortality caused by the fishery and help mitigate spill damage to bluefin and other finfish. To spur participation, establishment of a gear transition program would provide remaining PLL fishermen with funding and training to switch from PLL to green stick and swordfish buoy gear which would allow fishermen to continue targeting yellowfin tuna and swordfish, while significantly reducing bycatch mortality of other species. Finally, new rules to prohibit the use of PLL fishing gear in the Gulf would ensure that surface longlining does not return and negate the biological benefits achieved through a buyback and gear transition. The cost of a complete buyout of the fishery's 84 vessels and permits will depend on the structure of the buyout program. The environmental benefits of eliminating all PLL fishing in the GOM are more straightforward to calculate. According to government data, more than 14,415 animals would be protected annually by eliminating PLL; including overfished, protected, and otherwise depleted marine species, including 50 leatherbacks, 6 loggerheads, 552 sharks, and 265 billfish. Ending this source of mortality will promote the recovery of these and other animals that suffered injury because of the oil spill. This concept enjoys the support of PLL fishermen, recreational anglers and environmentalists.	Florida, Texas, Louisiana	Not provided with submission	Public
Pelagic Longline Gear and Vessel Transition Program in the Gulf of Mexico	The Gulf of Mexico is the primary spawning ground of the western Atlantic bluefin tuna population, a stock depleted to just 55 percent of the 1970 level. The oil spill occurred at the peak of the 2010 spawning season in the bluefin's northeastern Gulf spawning hotspot. Scientists estimate that the spill degraded 10 to 50 percent or more of the bluefin's known Gulf of Mexico habitat and further study has since confirmed that the spill damaged Atlantic bluefin tuna health, particularly among the early life history stages. The Gulf of Mexico pelagic longline fishery results in harmful bycatch of bluefin tuna and approximately 80 other species, including billfish, endangered sea turtles, and depleted sharks. Government catch data from 2007-2009 indicates the fishery killed 43,245 non-target animals, including 6,009 lancet fish, 5,844 dolphinfish, 2,747 escolar, 1,745 sharks and rays, 858 wahoo, 794 billfish (marlin, sailfish, spearfish), 612 bluefin, and 169 bigeye tuna, and interacted with 137 leatherback and 17 loggerhead sea turtles. Actual mortality is much greater as only an average of 22% of the hooks set were observed. Based on their shared habitat preferences with bluefin tuna, it is possible that many of these species also suffered similar interactions with and injury from the spill. A voluntary pelagic longline gear and vessel transition program can help mitigate such impacts to the benefit of Gulf fishermen. The program will provide fishermen with selective alternatives to PLL, including green stick gear and swordfish buoy gear, as well as training and financial assistance to help them learn to fish and optimize application of these gears in the Gulf of Mexico. Fishermen would also have the opportunity to retire their current PLL fishing vessels in favor of smaller, more fuel efficient boats more appropriate for use with the alternative gears. These efforts would be complemented by a strong monitoring program to record catch, effort, and economic data, an d, ultimately, to measure the benefits of this project over time. This concept enjoys broad support from PLL fishermen, recreational anglers, and environmentalists. Project Cost: The cost of the project depends on how many Gulf of Mexico pelagic longline fishermen participate. The cost of a gear transition is undetermined at this time. The estimated cost for a vessel transition is approximately $450,000 to $550,000 per vessel.		Not provided with submission	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Pilot Project Linking Offshore to Onshore Water Quality Monitoring	Coastal Louisiana's ecosystems are affected by various stressors, including wetland loss, riverine nutrient loading, hypoxia, oil pollution and climate change. For example, an estimated quarter of Louisiana's wetlands have been lost due to a variety of natural and anthropogenic factors, including erosion caused by the Deepwater Horizon oil spill (DWH; McClenachan et al. 2013, Turner et al. 2016). Large summertime hypoxic zone in the Louisiana's coastal waters causes large-scale spatial population displacements and reduction in growth and reproduction rates of commercially important fish and shrimp species (Craig et al. 2001, Rabalais et al. 2001, Justice et al. 2017). Further, the DWH oil spill caused negative health effects on fish (Dubansky et al. 2013, Incardona et al. 2013), shifts in phytoplankton and microbial communities (Ozhan et al. 2014), and possible stimulation of harmful algal blooms (Bargu et al. 2016). Louisiana's Coastal Master Plan (CPRA 2017) identified a number of river diversion projects that could have multiple potential restoration benefits, including mitigation of wetland loss, improvement of offshore water quality (including mitigation of hypoxia) through enhanced wetland nutrient retention, and protection of wetlands from oil exposure. However, currently there is no monitoring in place to assess water quality changes in the Louisiana nearshore coastal region (barrier islands to shelf). This region is a key intersect for the interactive effects of multiple ecosystem change drivers (e.g., restoration projects, riverine nutrient loading, hypoxia, oil pollution, climate change) on living resources in the North-Central Gulf of Mexico. The objective of this project is to fill the critical water quality monitoring gap by establishing a monitoring transect extending from Barataria Pass, Louisiana, to the inner shelf. Extending the monitoring to this region is vitally important for understanding of: 1) baseline conditions, 2) inshore to offshore w ater quality dynamics, 3) changes in extent and severity of hypoxia, and, 4) far-field effects of restoration projects. This project will serve as a pilot project to investigate the connection between inshore and offshore water quality across a federal-state boundary. The project will monitor nitrogen (NO3, NH4, TN), phosphorous (PO4, TP), silicate (SiO3), dissolved oxygen, temperature, salinity, chlorophyll a, total suspended solids, turbidity, and pH (see map). The monitoring transect will be an open-water complement to the CPRA's estuarine SWAMP program (Hijuelos and Hemmerling 2016). The transect will provide, on an expanded scale, data for isohaline mapping of water quality parameters, and will be invaluable for calibration and validation of riverine, estuarine and coastal numerical models to support management decisions and adaptive management of water quality and fish resources.	Barataria Bay, Louisiana	$ 3,000,000	Public
Port Sulphur	Civic Drive fishing pier (Wallop Breaux proposed project); Improvement to makeshift boat launch (CSA suggested project)	Port Sulphur - Plaquemines	$ 150,000	Wallop-Breaux - Plaquemines Parish; LDWF Fisheries (CSA)
Presence, Potential Sources, Behavior and Fate of Endocrine Disrupting Chemicals in Northern Gulf of Mexico Estuarine Systems	This project will conduct the first detailed sediment, surface water, suspended organic matter, and sediment pore water assessment of northern Gulf of Mexico estuarine systems to identify the presence, potential sources, and physicochemical mechanisms controlling the behavior and fate of complex mixtures of known or suspected endocrine disrupting chemicals (EDCs) in these systems. EDCs are natural or synthetic compounds which, even at trace exposure levels, can alter early development in vertebrates and invertebrates and cause serious effects later in life or even in successive generations. Known or suspected EDCs include many compounds used in or produced during oil and gas exploration/production; some of the more recalcitrant compounds associated with raw crude oil are known/suspected EDCs. EDCs can easily pass into ecological systems and are often persistent; moreover, the consequences of exposure are markedly different from how we usually think of exposure to environmental contaminants. At the levels found in natural systems, EDCs do not destroy cells or attack DNA. Rather, they target a developing organism's chemical messengers (hormones) and the messaging network (endocrine system). Organisms living in estuaries are particularly vulnerable to the effects of EDCs, mainly because estuaries are natural sinks for contaminants transitioning from terrestrial to marine ecosystems. Estuaries are among the most productive biomes on earth; nearly 50% of the world's population lives or works in close proximity to estuaries. Consequently, estuaries are under increasing threat from both natural and anthropogenic stressors (including EDCs). Little is known about the types, behavior, and ultimate fate of the vast number of potential EDCs entering estuaries, although it is known that some EDCs are present in these systems and that some estuarine organisms show signs of EDC exposure. Very few field-based studies have considered EDC behavior and fate in estuaries. Of these, most have considered a limited number of sampling locations, a single sampling event, or both. Moreover, most did not consider mixtures of EDCs likely to be encountered in estuaries, nor were their methods of chemical analysis capable of detecting or quantifying EDCs at trace levels. Also, none considered sediment pore water as a partitioning phase, and none attempted to quantitatively link EDC partitioning behavior to spatiotemporal distributions of multiple EDCs within real estuarine systems. The proposed project will significantly advance our abilities to detect and quantitate mixtures of EDCs at trace concentrations in complex estuarine samples and will provide the first quantitative mechanistic evidence linking the behavior of EDC mixtures (transport and partitioning) to their fate (spatiotemporal accumulation, sequestration, and resuspension) as a function of dynamic estuary system conditions (hydrodynamics, water quality parameters, physicochemical conditions of partitioning phases). The results of this project will provide the first detailed, data-driven assessment of the scope of EDC contamination in northern Gulf of Mexico estuarine systems, provide a basis for examining ecological and human risks posed by EDCs in these ecosystems, and inform potential restoration actions to address these risks.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 2,000,000	Public
Printing and Distribution of Marine Mammal Conservation Outreach Materials & Signs (Marine Mammal Outreach Materials & Signs)	Partners currently assist NOAA Fisheries with the distribution of dolphin conservation outreach materials and signs installation throughout the Gulf States. While these efforts are appreciated, outreach is inconsistent and often opportunistic; therefore lacking in many areas. This project would fund a full-time educator (2 years) to implement a thorough distribution plan and coordinate the installation of 800 dolphin conservation signs throughout Texas, Louisiana, Mississippi, Alabama, and Florida. The educator would document all distribution efforts and plot the installation of all signs on a map. By distributing outreach materials at fishing piers, marinas, businesses, tourism & education centers and at events, and by installing signs on waterways, piers, docks, and in marinas, this project will: - Reduce injury and mortality to bottlenose dolphins from hook-and-line fishing gear by educating fisherman about ways to avoid interactions with dolphins while fishing and provide them with Dolphin Friendly Fishing Tips. - Increase bottlenose dolphin survival though better understanding of cause of illness and death as well as early detection and intervention of anthropogenic and natural threats by informing audiences about how to help a stranded, injured or entangled marine mammal and to report these animals to the appropriate stranding network immediately. - Reduce injury, harm, and mortality to bottlenose dolphins by reducing illegal feeding and harassment activities because audiences will better understand the harm and consequence of these activities. They will learn how to recognize dolphin behaviors that are signs of harassment and also how to responsibly view dolphins in the wild. - Reduce injury and mortality of marine mammals from vessel collisions by educating mariners about marine mammal viewing guidelines and precautions they can take to avoid vessel strikes. Outreach materials include: (pdf of these materials: http://sero.nmfs.noaa.gov/protected_resou rces/outreach_and_education/index.html) - Protect Dolphins brochures - Southeast U.S. Marine Mammal and Sea Turtle Viewing Guidelines brochures - Marine Mammal Viewing Guidelines/ How to Help a Stranded Marine Mammal cards - Dolphin Viewing Guidelines stickers - How Can You Help a Stranded Marine Mammal? Southeast U.S. Marine Mammal Stranding Network brochures - Dolphin & Whale 911 App/ SEE & ID Dolphins & Whales App cards - Dolphin Friendly Fishing and Viewing Tips/ Don't Feed Wild Dolphins cards - Cast with Care cards and stickers Signs include: (pdfs of these signs: http://sero.nmfs.noaa.gov/protected_resources/section_7/protected_species_educational_signs/index.html) - Save Sea Turtles and Dolphins - Help Stranded Marine Mammals - Protect Wild Dolphin (Harassment) - Don't Feed Wild Dolphins - Dolphin Friendly Fishing Tips	Texas, Louisiana, Mississippi, Alabama, Florida	$ 275,000	Public

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Project Name	Project Description	Location	Cost ($)	Submission Source
Project Space Mop	There are still vast underwater plumes of oil in the gulf to this day, killing everything in their path as they migrate around. These plumes are vast in size, and should not be underestimated as to their continued devastating effect on gulf wildlife ecosystems. The remaining oil in the gulf needs to be completely accurately mapped using NASA satellite imaging and environmental deflecting technology. With accurate maps in hand, then crews need to be dispatched to go underwater with long siphons and siphon up the oil plumes to waiting tankers that will take the oil ashore for reprocessing. This reclaimed oil can be used to help fill the national strategic oil reserve and help to drive the price of fuel down a bit. Once the oil is all "mopped up" then biologists can go into the areas that were saturated and assess the true environmental damage and remedies.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 200,000,000	Public
Proposed Emergency Seagrass Restoration	Per descriptive information in documents entitled "A Concise Environmental Assessment (EA) for Emergency Restoration of Seagrass Impacts from the Deepwater Horizon Oil Spill Response", the following ideas can address and deal with the "Overview of OPA - Emergency Restoration Requirements" (para. 2.3.1 - Items # (3) and (5). I am suggesting that Aquatic Weed Harvester equipment be considered to methodically remove aquatic weeds & vegetation (i.e. - seagrass) that has been impacted by the oil spill and continues to contain oil residues. This process is not to "dig out" the weeds, but to harvest those weeds that continue to maintain oil residues...essentially, HARVESTING those designated weeds without impacting their root systems, thus allowing them to continue to thrive and grow, but without the oil residues on the newly growing vegetation. Aquatic weed harvesting is a known technology and can be accomplished at a reasonable cost. Item 3.2.1 - Description of Proposed Action. The Aquatic Weed Harvesters are basically shallow draft (under 12 inches), twin-pontoon (catamaran type) boats are propelled by twin hydraulically driven/reversible/variable speed paddle wheels. The weeds to be harvested are cut by reciprocating sickle knives (they can cut up to 12 ft. wide and to variable depths of 6 ft.), and the weeds then land on and come up open mesh wide conveyors, then load into the vessels storage areas, where they can be further accumulated via storage bed conveyors. Once fully loaded, the Harvester can back up to shore areas, where they can be matched up & aligned w/ conveyorized Shore Conveyors that move the harvested weeds to dump trucks, etc. for off site removal. The entire operation will "avoid causing the same kind of damage to the seagrasses that response boats caused". Item 3.2.2 - Site Identification and Characterization. This Item indicates "depth contours of less than one meter depth", certainly within the operating capability of the Weed Harvesters. The operator's elevated position enable a clear sight of the areas to be harvested, thus virtually eliminating the likelihood of injury to the seagrass beds...i.e. this is a very methodical operation. Considering that areas to be harvested are tidal, the Harvesters pontoons can be outfitted w/ hydraulically powered cleats to enable the vessel to operate during periods of very shallow tide.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 500,000	Public
Protect Wild Dolphin Billboards	This project will reduce injury, harm, and mortality to bottlenose dolphins by reducing illegal feeding and harassment activities because residents and visitors would become aware that these activities are harmful and illegal. Billboards would be used to reach large audiences with important educational messages on highly traveled roads taken by residents and visitors to coastal areas throughout Texas, Louisiana, Mississippi, Alabama, and Florida. Billboard advertisements have the largest impact on the greatest number of people and are the most cost effective method for reaching target audiences. This project includes design, print, install, and rent for media space for billboards. Billboard would convey brief but important educational messages and images about the harm in illegally feeding and harassing wild dolphins. Locations of 20 billboards will be determined by traffic patterns and distance to popular coastal area where illegal feeding and harassment has been known to occur. Billboards will be maintained in these 20 locations for 2 years to ensure constant and consistent educational messaging in a cost effective manner.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 530,000	Public
Rabbit Island restoration	The purpose of the Rabbit Island West Cove Calcasieu Lake Beneficial Use Restoration Project is to provide improved habitat for nesting birds in the West Cove of Calcasieu Lake in Calcasieu Parish, Louisiana through the beneficial use of dredged material. Rabbit Island has historically been a rookery for a large number of pelicans and colonial birds and serves as the westernmost rookery in the state of Louisiana. This restoration will ensure Rabbit Islands remains a viable rookery for the brown pelican as well as other nesting birds. It has been observed that nests on Rabbit Island frequently fail from flooding by tides and waves. Higher tidal amplitudes from larger volumes of water coming up the Calcasieu Ship Channel are a primary cause for the more frequent flooding on Rabbit Island. Part of the flooding is also due to larger wind-generated waves caused by increased fetch as more marsh is lost along the fringe of West Cove. The low elevation and lack of shrubbery on the island causes pelicans to nest on the ground and periodic high water drowns the nests, resulting in failed breeding attempts. The amplified tides are the primary cause for the more frequent flooding on Rabbit Island. The erosion has also been expedited by previous hurricane storm surges, subsidence, sea-level rise, wave processes, and low topography at or below sea level. These impacts have diminished the Island's historic topographic elevation and shoreline characteristics to the point that the Island's ability to function as a viable rookery is in jeopardy. Features of the Rabbit Island Restoration project for the Brown Pelican will include: nearness to open water; separation from the mainland; approximately 20% of nesting areas with dune/shrub habitat; and approximately 2500 feet of shoreline protection. The topography of the island will be elevated and contoured to include those features critical to successful nesting of pelican and colonial birds. This habitat will add an important dimension to the resources of the lake, and will help to broaden the range of nesting areas for the brown pelican. When the restoration is complete, Rabbit Island will be not only the western-most rookery but also the premier rookery for the brown pelican in the state of Louisiana, adding significant habitat for the pelican and other colonial birds and helping to preserve these valuable resources. By using dredged spoil from the Calcasieu Ship Channel, elevations on the Island will be raised and the topography sculpted to enhance the nesting areas and build a world class rookery for colonial birds and the brown pelican. In 2003 it was observed that there were 8 nests of pelicans on Rabbit Island that resulted in 5 young birds. In 2010, 500 nests produced over 1,000 young. Over 100 rehabilitated pelicans impacted by the Deepwater Horizon incident have been relocated to Rabbit Island. Daily morning monitoring of the status of these rehabilitated birds indicate that 1,000 to 3,000 pelicans are using the island for refuge. Thousands of shoreline and colonial birds also benefit from the refuge and habitat provided by Rabbit Island. Implications: The use of dredged spoil from the Calcasieu Ship Channel, elevations on the island can be raised and the topography can be sculpted to enhance the nesting areas and build a world class rookery for colonial birds and the brown pelican. Restoration of the island adds an important dimension to the resources of the Calcasieu Lake, helps broaden the range of nesting areas for the brown pelican, and is an excellent example of the beneficial use of dredged material. With many barrier island nesting grounds under attack due to coastal erosion and environmental impacts, the Rabbit Island rookery will be even more important in demonstrating the value of beneficial use of dredge material.	Rabbit Island, Cameron Parish, Louisiana	$ 7,000,000	Public
Rat's Nest Rd	At the end of Northshore Blvd (Rat's Nest Road) at Lake Pontchartrain in Slidell; parking and improved shoreline access	Slidell - St. Tammany	$ 250,000	LDWF Fisheries (CSA)

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Project Name	Project Description	Location	Cost ($)	Submission Source
Rawhead Island Living Shoreline Protection Project	Project Description: Coastal Environments, Inc and partners propose to fabricate and install bio-induced oyster reefs to stabilize shorelines and help restore and sustain valuable and sensitive estuarine ecosystems and to prevent segmentation of Rawhead Island and exposure of fragile shoreline to open water and tidal erosion. Rawhead Island is recognized by the Louisiana Department of Wildlife and Fisheries as a historic bird rookery. This project will stabilize approximately 1700' of shoreline by installing cost-efficient and effective vertical breakwater technology called ReefBlk. The ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that provides both shoreline protection and habitat for estuarine organisms. As oyster growth progresses and the reef unit becomes more dense, the bio-engineered structure dampens and dissipates wave energy and protects the estuarine marsh from erosion. Additionally, concrete aggregate cultch may be spread 4-8 inches deep from a point approximately 50' offshore up to the bank with the typical marsh edge sub-tidal undercut filled by cultch or bags of cultch to prevent sloughing of marsh edge. Preliminary Data: Salinity: 12.3ppt, Depth and Bottom Consistency Measurements: Shoreline 0.8ft Hard (Break in Shoreline) 5ft 1.2ft Hard 25ft 2.5ft Med Hard 50ft 2.9ft Med Hard 100ft 4.2ft Med Soft. These proven living shoreline and erosion control methods are currently inducing the growth of bio-engineered and self-sustainable living oyster reefs that expand both linearly and vertically to buffer wave action and retard erosion along estuarine shorelines in Texas, Louisiana, Alabama and Florida. High vertical profile oyster reefs also enhance species habitat diversity and provide oyster larvae for recruitment to adjacent oyster grounds and leases, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. The overall goals of the project include reef construction, shoreline stabilization, marsh regrowth, and faunal utilization. Fabrication and staging for the projects will occur in St. Bernard Parish, creating jobs to offset the negative economic impact suffered by the commercial fisheries industry of the parish. The oyster is the keystone organism for the estuary, and the vertical reefs will contribute spat to nearby oyster leases and increase the robustness of the marine habitat in general. Organization Name: Coastal Environments Inc for St. Bernard Parish. This project also falls within the goals and objectives of The Nature Conservancy as submitted under NRDA for Louisiana. Activity(s): Protection, Restoration, Maintenance/Management. Habitat(s): Subtidal (Nearshore/Offshore), Marine/Estuarine Wetlands. Status Property/Resource Acquisition: Procedure and legal requirements established in previous projects; would initiate upon request or with approval of project. Project Planning/Design: Preliminary water bottom, salinity and geological analysis performed. Project Permitting: Procedure and legal requirements established in previous projects; would initiate upon request or with approval of project. Time to Implementation: 3-5 months. Time to Project Completion: 1-2 years. Included in Master Plan? Yes. Cost/Estimated Cost: US $1,200,000 Funding Available: Partners: Organization - The Nature Conservancy as potential partner	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 1,200,000	Public
Reduce Harm to Dolphins by Determining Scope of Hook and Line Fishing Gear Interactions and Fishermen Attitudes	Fishing interactions between hook-and-line (rod and reel) gear and bottlenose dolphins occur throughout the Gulf and are increasing (Powell & Wells 2011; Shippee et al. 2011). Rod and reel gear is used by either for-hire fishing vessels (e.g., charter and head boats) or anglers. Dolphin interactions with the gear largely result from dolphins taking the bait or catch directly off a hook (e.g., depredation) or eating discarded fish (e.g., scavenging) (Powell & Wells 2011; Read 2008; Zollett & Read 2006). These behaviors are likely propagated by illegal feeding of wild dolphins which teaches the animals to associate anglers with food (Christiansen et al. 2016). Interactions may result in lost or damaged gear and fishermen frustration from dolphin depredation and scavenging behaviors. For dolphins, it may cause lethal injuries from fishing gear entanglements or ingestions, and related mortalities (e.g., fisher retaliation by shooting). Based on Gulf stranding data records from 2002-2015, 97 bottlenose dolphins stranded with hook-and-line gear attached (NOAA National Marine Mammal Health and Stranding Response Database unpublished data; accessed 2 May 2016). Stranding numbers may be up to three times higher because only a portion of animals that strand are detected and recovered (Peltier et al. 2012; Wells et al. 2015; Williams et al. 2011). There have also been federally investigated and prosecuted cases of fishermen retaliating against dolphins out of frustration for the dolphin's depredation behaviors (Vail 2016; Department of Justice 2007). Therefore, this project will reduce lethal impacts to dolphins from hook-and-line fishing related interactions known to occur within Gulf waters by: (1) Conducting systematic surveys to determine the magnitude and extent of dolphin and hook-and-line gear interactions and characterize the nature of these interactions (e.g., mapping fishery effort distribution, identifying factors leading to dolphin-gear interactions, detecting hot-spot sites, etc.). (2) Conducting social science studies (e.g., surveys, focus groups, interviews) to characterize fishermen's attitudes and perceptions towards dolphins and fishing gear interactions, their likelihood to take various actions (both preventative and retaliatory) and their responses to various outreach messages and approaches. This project will survey anglers and for-hire boat captains/owners and their patrons. It will include fishermen fishing from both vessels and piers, fishing in a variety of habitats (i.e., coastal and estuarine), and targeting various fish species using different gear configurations in all coastal Gulf state waters. Project results will help identify what gear factors may increase the likelihood of interactions, the frequency of dolphin and gear interactions and approximate risk of lethal injury from interactions, and whether there are hot-spot areas where interactions are more likely to occur. We will then work with stakeholders to identify, develop, and evaluate conservation measures to reduce interactions (e.g., potential gear or fishing practice modifications, safe and effective deterrence techniques, etc.). This project will enhance survivorship and resiliency of bottlenose dolphins by reducing lethal impacts resulting from fishing interactions between dolphins and rod and reel fishing gear. Repeating systematic surveys, social science studies and evaluating stranding data may be used for project monitoring.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 1,200,000	Public
Reducing Bycatch of Marine Mammals in Commercial and Recreational Fisheries	Marine mammal bycatch refers to any marine mammal adversely affected as a result of being unintentionally entangled, entrapped, ensnared, or caught by nets, lines, traps, or hooks, or otherwise impacted by fishing gear. Bycatch is the greatest direct cause of marine mammal injury and death in the United States and around the world. Bycatch of marine mammals in Gulf of Mexico commercial fisheries has the potential to prevent the recovery and restoration of marine mammals that have been reduced as a result of the Deepwater Horizon oil spill, including bottlenose dolphin (all stocks), Atlantic spotted dolphins, pantropical spotted dolphins, pygmy sperm whales, Risso's dolphins, and short-finned pilot whale. Fisheries of particular concern include the menhaden purse seine, shrimp trawl, shark gillnet, pelagic longline, reef fish, and charter boat/head boat fisheries. Studies are needed in the following areas: • The identification of measures that can be used to reduce bycatch of marine mammals in high priority Gulf of Mexico commercial and recreational fisheries while maintaining the economic viability of those fisheries. Measures to investigate and test could include, but are not limited to, alternative fishing gear and fishing methods, time-area restrictions, and removal of lost or derelict fishing gear (i.e., traps, pots, and gillnets). • Ways to create economic incentives for reducing marine mammal bycatch through, for example, incentive-based fishery bycatch measures. • The ecological effects of fishing on marine mammals, their prey species, and the Gulf of Mexico marine ecosystem.	Texas, Louisiana, Mississippi, Alabama, Florida		Public

Project Name	Project Description	Location	Cost ($)	Submission Source
Reducing Red Snapper Discards Using a Collaborative Fishermen's Quota Bank	This project uses an existing Quota Bank to quantify and avoid red snapper bycatch in the commercial grouper-tilefish fishery. The Deepwater Horizon event harmed red snapper, resulting in 55-220 tons of foregone production through direct kills and in longer-term injuries, from decreased reproduction to tissue lesions. Commercial fishermen are working with managers to protect red snapper while the spill's impacts play out. But it'll be difficult to rebuild this fishery without a complete accounting for bycatch in the quota system. This project provides up-to-date data about red snapper bycatch to incorporate into quota-setting. Together with commercial fishermen, managers can proactively reduce red snapper killed through bycatch so the population can continue to recover from the spill. Red snapper managers lack reliable data on red snapper bycatch in the grouper-tilefish fishery, instead extrapolating from observer and self-reported data. This is problematic in light of commercial grouper-tilefish discards. Since red snapper's historical base was in the western Gulf, some eastern Gulf fishermen can't get allocation to retain their red snapper catch. Since discard mortality rates for commercial hook/line fisheries are 55-95%, this means red snapper quotas don't cover all red snapper killed. In order to set quotas accurately and maintain a positive rebuilding trajectory, bycatch in the commercial grouper-tilefish fishery must be accounted for. By quantifying bycatch and discards, this project ensures these dead snapper count toward the quota and are no longer wasted catch. The PDARP specifies that quota banks "can help return injured natural resources and services to baseline and compensate for interim losses by reducing reef fish discards." In 2015, the Gulf of Mexico Reef Fish Shareholders' Alliance launched the first and only Quota Bank in the Gulf. The Quota Bank partners with qualified grouper fishermen in the Eastern Gulf to cover their red snapper bycatch and assist young red snapper fishermen. There is a growing nationwide movement of permit banks. The Cape Cod Fisheries Trust, in partnership with UMass Dartmouth, proved their scallopers had minimal flounder bycatch in a newly-opened area. Permit banks in three fishing towns provide quota to cover bycatch and spatial management plans through the California Ground Fish Collective. Evidence suggests Collective fishermen have less bycatch than non-participants. The Maine Coast Fishermen's Association's building a "risk pool" to help fishermen avoid and account for cod catch. While quota banks are new to the Gulf, they're a well-established tactic for helping fishermen address bycatch. This project uses the Quota Bank to quantify and avoid red snapper bycatch in the grouper-tilefish fishery. It provides up to 100,000 lbs. of red snapper allocation to fishermen to cover bycatch, incentivizing participation in bycatch reduction programs, like gear research/modification and hotspot identification, and collecting bycatch data through electronic video monitoring, electronic logbooks, effort-level data collection, and NMFS observer coverage. This is a big incentive- many grouper-tilefish fishermen see discards as a serious inefficiency they're eager to address. The study provides managers with accurate, timely bycatch data. By leasing quota to cover bycatch so red snapper aren't discarded, incidental mortality will decrease, leaving fewer unknown variables for managers. In 2016, the Quota Bank leased nearly 60,000 pounds of red snapper to 20 fishermen in the Gulf. That's nearly 60,000 pounds of red snapper folded into catch shares, no longer discarded at sea. Because mortality levels are so high for commercial hook/line fisheries, if it weren't for the Quota Bank, those 60,000 pounds of red snapper likely would've died and wouldn't have been covered by the quota. The Quota Bank will train participating fishermen in best practices and develop ways to address their bycatch.	Eastern Gulf of Mexico	$ 8,500,000	Public
Reef Fish Restoration	Fishermen along the Louisiana coast are seeing far less juvenile red snapper, as well as fewer juveniles in the grouper fishery since the BP oil spill of 2010. Because of the increased incidence of lesions and other problems we are seeing in the Gulf of Mexico, I feel the NRDA program should have a policy to ensure the health of these fish stocks. Considering the issues of hatchery programs and other ideas which seem to have produced no positive results, some fishermen along the Gulf coast propose that NRDA lease a percentage of reef fish for a five year period. The current IFQ system allows leasing allocation of these fish to participants who are not commercial fishermen. Not harvesting these fish would allow them time to reproduce. This would be very conducive to restoring the health of our fishery in the Gulf of Mexico for the future of the United States.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Reef Fish Restoration	Fishermen along the Louisiana coast are seeing far less juvenile red snapper, as well as fewer juveniles in the grouper fishery since the BP oil spill of 2010. Because of the increased incidence of lesions and other problems we are seeing in the Gulf of Mexico, I feel the NRDA program should have a policy to ensure the health of these fish stocks. Considering the issues of hatchery programs and other ideas which seem to have produced no positive results, some fishermen along the Gulf coast propose that NRDA lease a percentage of reef fish for a five year period. The current IFQ system allows leasing allocation of these fish to participants who are not commercial fishermen. Not harvesting these fish would allow them time to reproduce. This would be very conducive to restoring the health of our fishery in the Gulf of Mexico for the future of the United States.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Reef Innovations Reef Ball regional Production Sites	Restore Act has created a wide area, multi-county combination of projects that are: restoring coastal habitat, creating oysters or restoring oysters, creating new snorkeling reefs, improving coastal living shoreline and adding deep water habitats along the coast of the Gulf of Mexico. Many projects have been proposed to deploy artificial reef modules with various objectives, rather than each community, county or non-profit organization having to work out a purchasing agreement this project would provide local jobs building the Reef Ball modules for deployment. The Reef Ball Regional Production Site is designed, to create local jobs, and reduce the overall cost of production and delivery of reef modules thus becoming more cost efficient. Rather than numerous projects having to handle the purchases of product, they would be allotted a portion of the production from the RPS. If production exceeds the immediate demand, product would be stockpiled for distribution over the next several years. This project provides employment for 4 to 6 local laborers over 3 to 10 years, and provide a continuous supply of reef modules to be used by the 24 impacted counties in Florida. Depending on the quantity of product that is needed, state funds from the 5 States could support production at additional Reef Ball Regional Production sites, thus reducing the delivery cost even more. Reef Innovations has years of experience setting up worldwide remote production sites. Reef Innovations would be responsible for setting up, and the quality control of Reef Ball production site using local labor. Funds drawn from the grant would be the amount of the sales price of the actual number of modules produced during that week. Reef Innovations would contract from a labor force of local workers. Reef Innovations would set up and manage the production site. Monitoring Projects supplied with Reef Balls will be monitored recording items such as site location objectives. Verification of deployment site, numbers of units and objectives. 1. All sites using Reef Balls are expected to provide monitoring. A link to monthly summaries by the organization in charge of the project will be made available during the first year and a yearly survey summary provided for the next 5 years. 2. Reef Innovations will maintain the right to monitor on a yearly basis or have it monitored by their designee. Results of the monitoring of each project site will be compiled for presentations at the 5 and 10 year mark. 3. A database will be established to be available for research and evaluation. Technical Feasibility 1. Building Reef Balls close to the deployment site can reduce the unit cost when projects are using large quantities of Reef Balls. 2. This is the most feasibly way to provide Reef Ball modules to various areas around the 5 Gulf State. 3. By stockpiling the modules for distribution to approved environmental groups, county Artificial Reef, and Breakwater projects this can become an ongoing project lasting many years. Production Sites and Use of Reef Balls will 1. make the communities a better place to live and help to restore the health of the Gulf of Mexico. 2. add local ownership to the projects 3. allow ecosystem services to obtain materials as projects are placed on the table Creation and preservation of jobs because of the Reef Ball Production Site 1. 4 - 6 local labor workers per site and a Reef Innovations foreman for quality control. 2. Increased work for a Concrete Company, Drivers and support personnel 3. The community economic benefits will include house rental, grocery stores, restaurants, barge and boat operators, etc. 4. Product from the site will benefit fishing, as well as in some projects adding resilience to shoreline, or increasing relief for oyster restoration projects. Supplemental materials are available by contacting Larry Beggs Larry@reefinnovations.com	Texas, Louisiana, Mississippi, Alabama, Florida	$ 3,340,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Removal of derelict gear and marine debris in Northern Gulf of Mexico (Derelict Gear and Marine Debris Removal)	Implement a large scale project for removal of floating, partial or fully submerged derelict fishing gear or other human-caused marine debris across the northern Gulf of Mexico that could otherwise cause harm to marine life. Use contractors to identify, via aircraft and/or vessel, areas that may accumulate debris or are known to have existing debris (or survey boat/ship captains and crew that frequent the Gulf). Could follow program logistics such as those used in Florida http://myfwc.com/media/316331/stepscrabtrapcleanup.pdf with a larger scale effort. Create a temporary hotline for recreational boaters to call in location coordinates if they encounter a large source of debris. Use additional contractors with collection vessels (some with divers and/or ROVs) and barges to coordinate a large scale removal effort out of multiple ports over a short amount of time (few days or weeks?). Include a caveat that the removal of debris should only occur if it will not cause more harm to the environment or animals. Ensure quality data collection for debris type, amount, etc. This could be a long-term mitigation project with annual repetition. It could also be coordinated with a large scale public beach cleanup effort.	Texas, Louisiana, Mississippi, Alabama, Florida		Public
Research and Outreach to Understand and Minimize Human-Dolphin Interactions	Many areas of the Gulf coast are populated with both tourists and bottlenose dolphins. Interactions between people and dolphins are damaging to the dolphin's natural behavior and put both humans and dolphins at risk for illness, injury, and death. When humans interact with (closely approach and feed) bottlenose dolphins, it causes them to become "conditioned". When dolphins are conditioned, they withdraw from their natural behaviors necessary for survival and instead beg from people for food. Panama City, Florida, is an example of one area where commercial tour operators and recreational boaters regularly interact with dolphins. Commission-funded research has found that interactions between people and dolphins have increased in Panama City over the past 15 years despite education, outreach, and pulsed enforcement efforts. Scientific studies are needed to understand the factors causing an increase in human-dolphin interactions in the Gulf and to identify measures that can effectively minimize those interactions. Those studies should focus on areas such as Panama City where dolphin-watch tours are offered or where human-dolphin interactions routinely occur. Increased outreach efforts are needed to emphasize the harm caused by feeding and harassment of bottlenose dolphins. Those efforts should be directed at tour operators, commercial and recreational fishermen, and recreational boaters, particularly in areas like Panama City with documented high levels of human-dolphin interactions. Economic incentives for responsible tour operations should be encouraged through programs such as Dolphin Smart (http://sanctuaries.noaa.gov/dolphinsmart/). Federal and State enforcement officers should work with resource managers to develop and implement a consistent and effective enforcement strategy targeted at intentional harassment events and repeat offenders.	Texas, Louisiana, Mississippi, Alabama, Florida		Public
Restoration of Mesophotic and Deep Sea Reefs using novel method, and maximum cost efficiency	Deep sea and mesophotic reefs were negatively impacted by the DWH spill. Restoring populations of corals, and other important fish habitat structure-forming benthic fauna is a massive undertaking, given the geographic area to be restored in the deep sea. Reef restoration using coral transplants, artificial structures, or both has been attempted in tropical (shallow) reefs with limited success. Coral restoration in the deep sea, or mesophotic zones, present even greater challenges and potential costs because of the inaccessibility and equipment required to work in the 50-1,000 meter seafloor. In order to overcome these challenges and maximize the potential impact of restoration costs, new technologies need to be developed and implemented, from site selection and transplanting, to logistics, and monitoring. Coramyd is a patent pending technology that integrates artificial reef structures, which are non-toxic, and can replace hundreds, or even thousands of corals within a week of ship time. The artificial reef structures used in Coramyd are not prone to corrosion and can provide means of deploying coral transplants efficiently and successfully in large numbers. Structures are resistant to currents and are less likely to snag fishing gear than other artificial reef structures. Structures are seeded with coral transplants and are lowered to the seafloor using a small crane. Project scope is limited to restoration of populations of corals which were impacted by DWH spill over areas with specially sensitive and valuable fish populations. Please contact for more details and methods.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 3,260,000	Public
Restoration through education: raising awareness about the largest habitats of the Gulf of Mexico - the deep-sea (Deep-Sea Education)	The deep sea (>200 m) represents by far the largest habitat of the Gulf of Mexico, yet it is often overlooked by resource managers, scientists and the general public, who are often unaware that rich and diverse ecosystems can thrive in deep water environments under the right conditions. While deep sea ecosystems are out of sight and out of mind to most people, they are not immune to anthropogenic impacts, as they are threatened by oil and gas exploration, deep-sea trawling and ocean acidification much more than their shallow-water counterparts. Improving the management, conservation and protection of the Gulf of Mexico will ultimately require an increased appreciation for the value of its ecosystems by diverse stakeholders, and education and outreach are integral to this effort. We therefore propose to conduct a coordinated outreach and education campaign to raise awareness about deep sea ecosystems of the Gulf of Mexico. The campaign will target both informal, as well as formal educators at the K-12 level, via the development of educational films, curricula, lesson plans and seminars. Through this targeted campaign we seek to bring the deep sea of the Gulf of Mexico into classrooms nationwide, and thereby help restore the largest ecosystem of the Gulf.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 1,000,000	Public
Restore bird islands (rookeries) with combination of cultch spreading and induced high vertical profile oyster reefs.	A number of St. Bernard Parish's water bird nesting areas were oiled. Bird island can be restored using cultch spread and induced high vertical profile oyster reefs as described above. The Audubon Society has expressed an interest in undertaking restoration of bird islands in the area and being an active participant in the Hopedale Oyster Reef Restoration Center. It is proposed that this restoration be supported by BP funding with active participation of the Audubon Society.	St. Bernard Parish, Louisiana	$ 2,000,000	Public
Restore historic Gulf Sturgeon spawning grounds	Remove the sills on Bogue Chitto River at the Pearl River lock and dam canal and on Pearl River at Pools Bluff. If there is too much political pressure to not remove them, install fish ladders capable and practical for adult Gulf Sturgeon to move upstream of the sills to return to historic spawning grounds. There were over 28 individuals killed as a result of theTemple Inland release. Temple Inland or any purchaser of the mill including International Paper should fund the entire project.	Bogue Chitto River, Louisiana	$ 3,000,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Restoring critical habitats in the Gulf of Mexico Marine Protected Area Network	In April 2011, the Rookery Bay National Estuarine Research Reserve (RBNERR) hosted a two-day workshop in Naples, Florida with funding support from NOAA's Marine Protected Area (MPA) Center, that brought representatives from four key agencies managing MPAs in the Gulf together to discuss collaborative efforts. NOAA's NERRs and NMS, and DOI's NPS and NWRs were represented. Outcomes of the workshop included a commitment from the Gulf MPA partners to work together to build a framework for regional response to catastrophic events such as the Deepwater Horizon spill, share information and technology relating to climate science, and to seek regional opportunities to advance common stewardship goals of MPAs such as habitat restoration. A regional approach to restoring critical marine and coastal habitats within the Gulf of Mexico MPA Network has significant benefits: -Gulf MPAs already have long-term monitoring and GIS capabilities that can effectively track changing environmental conditions correlating with restoration success, such as water quality. -Gulf MPAs have on-the-ground programs in place designed to provide protection and increase awareness of the need to conserve resources, such as law enforce, education, outreach and training, visitor use management, and active community-based volunteer programs. -Gulf MPAs have a diverse range of critical marine and coastal habitats within their designated boundaries (e.g. corals, seagrasses, oyster reefs, mangroves, saltmarshes) including offshore submerged resources, that link directly to the life cycles and migratory patterns observed in economically important marine species including various species of sportfish, shrimp, and crabs. Envisioned is a three-year regional collaborative restoration project that builds on the strengths of the newly established Gulf of Mexico MPA Network noted above. RBNERR, with support from NOAA, is currently working on developing the initial framework and communications/training support for the Gulf Network. The proposed regional habitat restoration project would have three components: (1) Year I: Gulf MPAs will work collaboratively within the Network to identify high priority habitats suitable for restoration that meet criteria for regional linkages, and develop a regional scope of work for restoring habitats within 8 - 10 MPAs. (2)Year II: Gulf MPAs initiate site restoration projects, engaging community volunteers as appropriate and monitoring progress. (3) Year III: Gulf MPAs complete site restoration projects, continue monitoring efforts, and conduct targeted outreach to raise awareness of value of restored Gulf habitats.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 50,000	Public
Restoring leatherback sea turtle abundance by reducing negative interactions with fisheries	Fisheries interact with sea turtles at a disproportionate rate in the northern Gulf of Mexico (nGOM) because the nGOM is extremely productive for a variety of commercially important species (e.g., tunas, snappers, and others), and recent satellite telemetry research has shown that the nGOM is a high-use foraging area for leatherback sea turtles (Aleksa et al. in prep). In the Atlantic, sea turtles often interact with open ocean fronts; however, it has been recognized that the temperature difference at the front can spatially separate turtle foraging and fishing effort, with turtles concentrated on the warm side and fishing on the cold side, thereby reducing sea turtle bycatch, with no adverse effects on fish catches (NOAA unpublished data). A similar process could be occurring in the nGOM, but we currently do not know how the turtles behave in relation to oceanographic parameters. One critical step towards reducing negative interactions between sea turtles and fisheries is to better describe how their movements and behaviors are coupled to physical and biological oceanographic conditions. Leatherback sea turtles, in particular, have wide-ranging, open ocean habitats, but recent analysis of satellite tracking data suggests that they forage in areas close to the shelf edge and slope, presumably because there are higher concentrations of food in these areas (Fossette et al. 2010; Aleksa et al. in prep). These areas also strongly overlap spatially with pelagic longline fishing effort (Garrison and Stokes 2014). Leatherbacks exclusively consume gelatinous animals (also known as “jellies”), but jellies are notoriously difficult to sample accurately because they are destroyed in plankton nets, and many zooplankton surveys do not extend into the shelf-slope transition zone that the turtles consistently inhabit. Here, we propose to use a mesozooplankton imaging system, known as the In Situ Ichthyoplankton Imaging System (ISIIS), to map the vertical and horizontal distribute ions of gelatinous animals, along with synoptic measurements of physical oceanographic parameters, to determine what kinds of habitats and ocean conditions are utilized by leatherback sea turtles. We will couple this information to real-time tracks of leatherback sea turtles in the area and define the types of behaviors displayed by the turtles in the different oceanographic habitats. This detailed information on the turtle habitat use patterns and oceanographic drivers can then be applied to slightly modify shipping or fishing tracks that will reduce the probability of accidental collisions or entanglement and snaring in pelagic longline fisheries (e.g., bycatch), ultimately reducing anthropogenic turtle mortality with negligible impact on economic and fishing activities. The results from this project will produce detailed descriptions of where leatherbacks forage in relation to the distribution of potential prey items. This has direct applications to policy, particularly the precise location of pelagic longline fishing activity that will maximize catch while minimizing the chances to accidentally encounter a leatherback sea turtle. The dataset produced by the ISIIS will be analyzed for gelatinous animals and larval fishes. In addition to these research activities, the image data are complex and contain information on multiple trophic levels, which will create opportunities for researchers interested in all aspects of marine plankton ecology in this physically dynamic oceanographic that has little related field data. Specifically, the data will show the exact location of larval fishes and their relationship to other zooplankton, which would provide insights into the fisheries oceanography of the shelf slope frontal region in the nGOM. We also plan to partner with the University of Southern Mississippi Marine Education Center to give public talks and seminars about the coupling of oceanography to sea turtles and other charismatic animals in the nGOM.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 2,400,000	Public
Restoring the offshore, open ocean seagrass beds of the Chandeleur Islands	Seagrasses are variably and sometimes negatively affected by exposure to oil, likely depending on the duration and directness of the exposure (Fonseca et al. 2017). During the DWH event, the offshore seagrass beds of the Chandeleur Islands were subjected to extensive and direct oiling that resulted in over 100 acres of probable seagrass loss (Kenworthy et al. 2017). Those losses, coupled with ongoing instability of the Chandeleur Islands (Handley et al. 2007) and attempts at stabilization (http://www.mississippiriverdelta.org/files/2015/11/Chandeleur-Isl-Post-berm-Rpt-UNO_Apr_27_2015v3_withApendix-FINAL.pdf), albeit short-lived, provide an opportunity to test new technology that has been developed and applied for the creation of seagrass habitat in wave-dominated environments in order to provide longer-lasting resource stability. Here, we propose to install specially engineered, free-standing wave attenuation devices designed for high wave environments and maintaining vertical position (i.e., not dependent on supporting seafloor) to provide a lasting nucleus of physical stability, especially on southern on portions of the Chandeleur Island chain where oiling impacts to seagrasses occurred. Using previous and ongoing assessments of both island stability (e.g., Thomson et al. 2010) and seagrass dynamics and open ocean wave modeling, we will emulate an approach utilized in North Carolina where we placed a large break in a dynamic and patchy seagrass environment to create wave attenuation and foster seagrass bed coalescence and stability, sand accretion, and marsh and beach formation. By combining this novel technology with the strong foundation of information regarding the status and dynamics of the Chandeleur Island chain, we will select appropriate, replicate areas for application of the permanent shoreline stabilization structure and design appropriate assessment and monitoring to report on performance, generating dozens of acres of new seagrass habitat. Through careful surveys and application of regional restoration knowledge, final site selection will seek to enhance a variety of habitat types that also confer physical stability, such as mangrove and marshes to act in concert with the seagrasses and wave attenuation structures. Creation of new, stable seagrass acreage in this most oceanic of seagrass beds in the Gulf of Mexico will support a wide variety of wildlife, including foraging seabirds, fishes and invertebrates, many of which are economically prized both recreationally and commercially in the Chandeleur Island chain. References: Fonseca, M.S., Piniak, G. and Cosentino-Manning, N. 2017. Effect of the Cosco Busan oil spill on the ecology of eelgrass, Zostera marina in San Francisco Bay. Marine Pollution Bulletin. http://www.sciencedirect.com/science/article/pii/S0025326X1630950X Handley, L., Altsman, D., and DeMay, R., eds., 2007, Seagrass Status and Trends in the Northern Gulf of Mexico: 1940–2002: U.S. Geological Survey Scientific Investigations Report 2006–5287, 267 p. This reference includes a section on the Chandeleurs Kenworthy WJ, Cosentino-Manning N, Handley L, Wild M, Rouhani S (2016) Seagrass response following exposure to Deepwater Horizon oil in the Chandeleur Islands, Louisiana (USA). Mar Ecol Prog Ser. https://doi.org/10.3354/meps11983 Thomson, G., Miner, M., Wycklendt, A., Rees, M. Swigler, D., 2010. MRGO Ecosystem Restoration Feasibility Study – Chandeleur and Breton Islands. Boca Raton, Florida: Coastal Planning & Engineering, Inc. 96p. (Report prepared for USACE under contract to URS)	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 3,500,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Rockefeller Piers	Create new recreation and observation piers for birding, fishing, and crabbing opportunities.	Rockefeller Wildlife Refuge - Cameron/Vermilion	$ 100,000	LDWF Wildlife (WMA)
Rockefeller Signage	Create signage for informational outreach display for recreational users of the Refuge	Rockefeller Wildlife Refuge - Cameron/Vermilion	$ 30,000	LDWF Wildlife (WMA)
Sabine National Wildlife Refuge (Sabine NWR)	Kayak launch and roadside fishing	Sabine Wildlife Refuge - Cameron	$ 250,000	LDWF Fisheries
SAV-E: SAV Establishment plan.	SAV (submersed aquatic vegetation) are #1 for fisheries habitat. While a focus in fisheries resources has been on marshes and marsh edge as valuable habitat, abundance of nekton is even higher in SAV (Rozas and Minello). This resource does not receive planning, restoration, or grant support mainly because it has not been inventoried in the muddy waters of the northern Gulf coast (Merino et al.). Whereas other states that have inventoried sea grasses, recognize and support their fishery resource through state management plans, the northern Gulf state most affected by the oil spill has not. Louisiana, having the majority of the nations deltas, has the greatest potential for SAV that would aid in water quality and fisheries habitat. These functions are well recognized and supported in the Chesapeake Bay area. These functions help offset those caused by oil spills, both the DWH and future events. 1.) Survey the resource 2.) Convene a panel of experts to establish a plan, based on the areas and opportunities of need 3.) Provide guidance for community-based restoration on execution 4.) Get the state and restoration in the northern gulf to implement the plan along with other restoration programs, such as the CWPPRA, LCA, and CIAP.	Louisiana	Not provided with submission	Public
Saving the Gulf Coast one bale at a time.	We are a Louisiana Non-Profit 501(c)(3) Corporation (pending) devoted to preservation and reclamation of the Gulf Coast. We have developed and perfected the use of locally grown hay and wheat straw to mitigate, prevent, and ultimately reverse coastal erosion. Our process not only stops erosion, it also restores nesting and colonization sites for the countless species of birds that are native to the Louisiana Gulf Coast, including the Brown Pelican. When fully deployed, our process will clean and restore existing habitats while literally creating new wildlife havens to be enjoyed by future generations. Our process uses round hay bales produced by American farmers and delivered by American truckers. The environmental benefits of using hay instead of toxic chemical dispersants are plainly obvious. Hay is the only truly "green" solution available to preserve, restore and reclaim our Gulf coast. Hay has incredible natural absorption capacity and has proven ability to stop and even reverse coastal soil erosion. We propose to purchase large quantities of hay and wheat straw from regional farmers, paying them a favorable price-per-ton for delivery to established distribution points along the Gulf Coast. 1000 pound plus round hay bales will serve as barriers along the coastal areas and wetlands around the gulf region. Our market research shows a fully adequate supply of hay is readily available. In particular, there is 200,000 to 400,000 acres of winter wheat planted in Louisiana alone each year. We would like to create a market for the farmers by baling the straw that is leftover after the wheat is harvested. This leftover straw is usually just burned in the field. LSU and the Wildlife and Fisheries Department have expressed interest in coming in behind our barriers to plant marsh grasses and mangrove trees. They feel that they will get an additional 2-3 years of protection from our plan. In time the wicking of the hay will collect and create sediments and for m a natural barrier. This plan is just a larger scale of what is used in construction sites along the highway systems when small square bales are used to control erosion. Our ultimate goal is to provide a lucrative market for hay grown and produced by American Farmers and to use that hay for cleaning, preserving and reclaiming our treasured Gulf Coast. In turn, any profits earned will be donated to other coastal and wildlife preservation organizations and agriculture related organizations.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 250,000	Public
Seawall Lights	Installation of light poles and safety lights along Reaches 4 and 5 of the south shore seawall, which would enhance night fishing opportunities for the south shore of Lake Pontchartrain.	New Orleans - Orleans	$ 330,000	Wallop-Breaux - Non-Flood Assets Management Authority
Shell Beach	Shell Beach Access Improvements; components include additional parking, fishing pier, observation tower, and wetland walking trail	Shell Beach - St. Bernard	$ 750,000	LDWF Fisheries - Sea Grant - LSU (School of Landscape Architecture)
Shine Light	The idea is based on a research article which underscores the importance of light penetration in productive lakes(ref 1). Since many lakes and water bodies suffer from limited light penetration due to pollutants, natural conditions or external factors like oil spills, we need to think about "reversing " it. The idea "Shine Light" proposes to rectify the situation by shining light underneath the lake using solar concentrators-fiber optic systems. We can station floating "Shine Light" systems which provide pockets of light underneath the water (like an under water light house) .In addition, this system can be used to aerate the water as well, providing a local environment for the microorganisms to thrive, and drive the natural lake ecosystem.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 250,000	Public
SIPHON	As the dispersants were expected to sink oil sediments, I recommend using existing filtration systems with an adaptation to filter sea waters at its greatest depths.	Texas, Louisiana, Mississippi, Alabama, Florida		Public
Sodium Percarbonate dead zone oxygen replacement	Dispense Sodium Percarbonate tablets into the area that will become the season's dead zone just as the rainy season washes the nutrients into the area. Each tablet would represent a missing plant on the seabed and supply dissolved oxygen for a month. Similar to salting the highway in winter this inexpensive "oxygen pill" might keep the fisheries and related industries open. Stop dropping these pills when the annual algae bloom finishes it's cycle. Drop fiz fiz oh what a cheap relief it is. (http://www.runyoutech.com/percarbonate_spec.html)	Dead Zone, Louisiana	$ 10,000,000	Public
South Shore Harbor	The project would develop facilities at the South Shore Harbor Marina, which is located on the south shore of Lake Pontchartrain in New Orleans. The project would include creation of additional transient boat facilities consisting of enlarging and upgrading the existing bath house, building a laundry facility, and a transient lounge/office center.		$ 200,000	
Southeast Corner	Kayak launch and roadside fishing	Southeast Corner - Cameron	$ 250,000	LDWF Fisheries

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Spill oil picking up System	The project is intended to prevent large spread of spill oil in the case of an offshore accident. For the project, the equipment has been designed that all together make a system protecting, actually, it limits the spill oil to spread over large surface all around an accident place. We have started from the point of view that offshore accidents are always possible to occur. More or less, we are witnesses after an accident occurs that impacts to environments are inevitable and restoration projects cost very much and take long time. Here we have designed and composed a system that do limit on oil spread, then make it possible to pick up all oil, up to the last drop in the literal sense of the word. This works even at a rough sea, gales and so. How to achieve the goals and perform the actions from the statement above? That is the matter what this Project deals with. The word Project denotes both the System and its application. How to manage with picking up of the spread oil in all sea conditions? The principle used in the System is not to defeat a rough sea, but opposite to take advantage of the sea forces. The meaning is to work together with the sea. To stress importance and efficiency of the Project, freely said, it is a long-term seen strategy. By using the high professional approach to the problem and composition of, already on market, existing and new designed equipment the Project finds how to cope with permanent existing problem which threats to destroy the environment. It is harm that this system has not been applied at Mexico Gulf accident. There will not be so much impact as it was. If the rig were surrounded from beginning of the accident by sufficient long booms of this system there would not be oil spread. The description of the system is available quickly. All described parts of equipment are presented on simplified drawings. For this moment, here, we line up briefly only the equipment list. More information we will present after you, or some other institution show an interest for it. System description Part one 1 Bordering devices, the booms (Very special design) 2 Anchor 3 Buoy and inflation device 4 Floating Pump 5 Hoses 6 Wet oil processing (separate oil and water) 7 Hunter Boat 8 Oil Boat 9 Spilt Oil Part two 1. Strategy and realization 2. Information about an accident 3. Monitoring and getting start 4. Crew Part three 1. Scope of supply 2. Know-How The system is very interesting for use in many other purposes: clearing of harbors, wet oil processing ... Due to the System is subject of a patent protection procedure we do not give any more written details in this suggestion. But we are very ready to do in live our fully presentation on request. You are kindly asked to give us an opportunity to do the presentation. We are confident that after such one presentation we'll do a deal. We are looking forward for your response, Sincerely yours Marko Kljaic Please open the following link! (https://www.dropbox.com/s/glveqksvlnpbmec/SOPS%20-%201115%20r1%202.pdf?dl=0)	Texas, Louisiana, Mississippi, Alabama, Florida	$ 3,000,000	Public
Statewide Artificial Reefs	This proposed project would fund the enhancement of eleven existing multi-purpose artificial reef sites located across Louisiana's coastal basins to provide enhanced recreational opportunities for anglers throughout Louisiana. The objective would be to develop aquatic habitat to benefit a variety of aquatic species, which would also serve as easily accessible and productive sites to provide increased opportunities for recreational anglers. Reef sites would be developed through the Louisiana Artificial Reef Program, and would include enhancement through the addition of new reef materials, at a variety of existing inshore and nearshore reef sites. The NRDA funds would include provisions for planning, construction, monitoring, and contingencies; however, the NRDA funds would also be used to leverage additional matching funds through various LDWF partnerships and collaborations.	Louisiana	$ 6,000,000	LDWF Fisheries
Submerged Aquatic Vegetation Enterprise (SAV-E)	We propose a Submerged Aquatic Vegetation (SAV) center to provide nearshore habitat stock. Scalable and flexible, the concept can be adopted across several restoration types, and linked to numerous funds due to implications to wildlife, water quality, shoreline, research, mapping, monitoring, and others. For example, when marsh is created, SAV is often buried in the shallow waters that are replaced with marsh. Both SAV and marsh are EFH for several species and life stages. Perceived as sparsely and erratically occurring for the non-marine species where marsh is created, the impacts to SAV are unmitigated for those actions. So, adding a harvest pre-construction, and/or planting post construction would tie to habitat restoration projects both from NRDA funds, but also with any existing program, so it could be implemented immediately. A suggested primary objective is to establish and maintain a source of SAV species for such use; expand the species being grown (mostly Vallisneria Americana, which was most damaged by the DWH spill), and maintain a seed source. Specific objectives are (1) Harvest SAV from marsh construction locations prior to marsh construction, and seed from Rockefeller Refuge Ruppia-managed units, (2) Harvest Ruppia maritime plants from Rockefeller, and transplant to Jean Lafitte, (3) Maintain SAV in tanks, and propagate with growth chambers, and (4) Provide plant source within 3 years for repeat planting events at Chandeleur Is. and/or Jean Lafitte. This project will also select and initiate annual surveys of a subset of sites for long-term monitoring/observation from those of a recently completed 3-year baseline survey of the northern gulf of Mexico that included 384 sites with 38% plant presence. This project addresses multiple restoration types including wetlands, coastal, and nearshore; habitat on federal lands; nutrient reduction; water quality; fish and water column inverts; submerged aquatic veg; sea turtles: marine mammals: and birds due to the broad use of SAVs. The activity will address impacts through restoration (create, enhance or restore an injured resource or habitat); protection (shoreline stabilization, remove from threat of other restoration activates and relocate the habitat); maintain and manage the habitat; and education of any targeted group about how SAV tie to all resources damaged.	Louisiana, Mississippi, Alabama, Florida	$ 3,000,000	Public
Submersible concrete barge surge breaker project along East Biloxi Marshes Shoreline Barrier Zone, Pilot	One solution to the construction of artificial barrier islands and breakwaters in high wave energy areas is the use of submersible concrete barge technology. The St. Bernard Parish Government, in a resolution of May 18, 2010, proposing construction of the East Biloxi Marshes Shoreline Barrier Zone in the BP oil impacted area supports the use of submersible concrete barge surge breakers as a major component of the barrier. While the merits of this approach are recognized, it is yet to be tested. Because of the urgency for finding a practical, cost effective solution to construction of barriers this pilot project is proposed. A local manufacturer has custom-designed and built submersible concete barges as platforms for oil and gas field production facilities for decades. The barges are built of reinforced concrete on a land-based drydock and floated to the operation site where they are submerged and rest on the bottom of the gulf, coastal bays or lakes. A crushed rock bed is usually placed on the water bottom at the deployment site. It is not uncommon, after decades of service, to re-float a barge, update the production equipment and use the barge at a new location. Some of the barges have been in operation for more than 40 years and the barges have survived surge and waves from the most severe storms. Large barges are 200 x 70 x 14 feet and can be floated in 6 feet of water. A vertical extension can be added above the barge to increase its effective height for blocking surge and waves. For applications in the construction of the East Biloxi Marshes Shoreline Barrier smaller 80 x 24 x 15 feet barges equipped with an additional 3 foot high breakwall and a draft of 5.5 feet may be used. Advantages of the barges are that they can be standardized for efficient manufacture at an onshore facility. They can be moved to deployment areas through inland navigation channels by tug boats. They can usually be placed without dredging an access channel. They do not sink into the substrate. They are supportive of oyster growth and other marine encrusting organisms. If conditions change, the barges can be floated and re-deployed. The barges are a cost effective alternative to the use of heavy rocks, massive concrete structures, and dredging of buried sand deposits.	Biloxi Marsh, St. Bernard Parish, Louisiana	$ 4,500,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Sustaining Alabama's Working Waterfront through Oyster Aquaculture	Auburn University has partnered with Mississippi-Alabama Sea Grant Consortium and Alabama Cooperative Extension to launch off-bottom oyster farming in Alabama. Here we propose to expand this effort to include a large number of coastal residents, pursuing oyster farming both as environmentally and economically sustainable jobs as well as contributing significant numbers of oysters to restoration projects throughout the coastal waters of Alabama. 1. Enhancement of public oyster reefs by seeding with juvenile oysters: Provide 50 million juvenile oysters per year (set on varying sizes of cultch) for seeding onto public oyster beds to enhance the public fisheries within Alabama, raised by local oyster farmers and in partnership with Alma Bryant High School's aquaculture program. Within 5 years, 250 million juvenile oysters will be added to public oyster beds in the region. For context, public reefs have a density of 2-5 oysters per square meter or 8,000-20,000 oysters per acre. The intent of this project is to assist state resource agencies in implementing existing oyster management strategies where a percent of the oysters on public reefs are harvested and the remainder provide critical fisheries habitat. Assuming 20% survival to market size, this stock enhancement could yield over 6,000 daily limits of eight sacks (AL limits) per year (with 200 market size oysters per sack), providing much needed income to the region, while also providing environmental services. The enhancement of natural oyster reef structure and oyster abundance will also will provide for critical ecosystem services through improved water quality, increased biodiversity and creation of more diverse habitat. In addition to educating high school students and creating jobs for watermen at nursery sites, the oyster seed produced at a state supported hatchery will be transitioned to the private sector. 2. Development of off-bottom oyster aquaculture in the region: Establish 2, 100-acre oyster aquaculture parks in Alabama, where watermen are provided start-up grants to produce adult oysters for the food market and juvenile oysters to supplement oyster reef restoration. The two parks will support 40 independently operated 5-acre oyster farms capable of generating at least $2.5 million per year of combined income within 5 years through sales of premium oysters. These oysters command higher prices than those oysters traditionally produced from the oyster reefs in Alabama thereby providing greater income for the oyster producers and also reducing pressure on natural oyster resources. Initial research suggests that a 5-acre operation would allow an oyster farmer to raise 400,000 oysters per year; potentially yielding a gross annual income (with a conservative 80% survival) of over $80,000. This would be a significant increase in annual income for the typical oyster catcher who might currently earn $20,000/year. Regionalization: We strongly encourage the implementation of these approaches throughout the Gulf region. Parallel efforts are currently underway in Louisiana where Louisiana Sea Grant has partnered with Louisiana State University. The proposed work has environmental benefits, is economically viable and culturally compatible.	Alabama, Louisiana	$ 12,500,000	Public
Sustaining Louisiana's Seafood industry and preserving ecosystem services through Oyster Culture Budget: $15 million over 5 years	Louisiana Sea Grant and the Louisiana Department of Wildlife and Fisheries recently reestablished the State's oyster larvae and seed production facility to replenish the natural oyster populations damaged by storms and the BP spill and to launch off-bottom oyster farming in Louisiana. We would like to expand this effort to include a large number of coastal residents, interested in pursuing oyster farming both as environmentally and economically sustainable jobs as well as contributing significant numbers of oysters to restoration projects throughout the coastal waters of Louisiana. Our goal is to establish several land based oyster seed production facilities (nurseries) and several water based Enterprise Zones. Participating coastal residents will be provided training and start-up grants to produce oysters for the coastal restoration and for the food market. Participants will be paid to produce juvenile oysters (seed) for introduction onto public oyster grounds, private oyster leases and in areas closed to shellfish harvest, but where the oyster reef ecosystem services are needed. Within 5 years, 500 million juvenile oysters will be added to public and private oyster beds in the region. The intent of this project is to assist State resource agencies in restoring the oyster populations that were lost due to the BP oil spill mitigation efforts and related freshwater events. The enhancement of natural oyster reef structure and oyster abundance will provide for critical ecosystem services through improved water quality, increased biodiversity and creation of more diverse habitat. In addition to creating jobs for participants at nursery sites, the oyster seed produced at a state supported hatchery will be transitioned to the private sector. Oyster farming will also be encouraged through this program by establishing a State program for off bottom culture of oysters. We will establish several water-based Enterprise Zones in coastal Louisiana for the off bottom farming of oysters; fisherman will be provided start-up grants to produce adult oysters for the food market. The Zones will support independently operated 5-acre oyster farms capable of generating additional income through sales of premium oysters. These resultant large single oysters command prices at the higher end of the current market thereby providing greater income for the oyster producers and also reducing pressure on natural oyster resources. Regionalization: We strongly encourage the implementation of this approach throughout the Gulf region. Parallel efforts are currently underway in Alabama where Mississippi/Alabama Sea Grant has partnered with us over the past several years in the refinement oyster hatchery and nursery operations as well as pilot off bottom culture. The proposed work has environmental benefits, is economically viable and culturally compatible.	Louisiana	$ 15,000,000	Public
Targeted Enhancement of the Chandeleur Island Chain: An ecosystem approach	As a result of the Deepwater Horizon oil spill (hereafter the Spill), marine and estuarine ecosystems from Louisiana to Florida, and potentially beyond, were at risk of exposure to and injury from oil discharged from the wellhead as well as injury from a wide variety of Response actions (e.g., chemical dispersants, booming, berm construction, in-situ burning, organized cleanup activities) (PDARP). Within Louisiana, this and related injury was well documented throughout the Breton National Wildlife Refuge specifically within the Chandeleur Island chain. The refuge comprises one of the state's most ecologically diverse coastal communities (e.g., expansive sea grass beds , isolated beaches, abundant seasonal prey base, wide-ranging bird nesting opportunities) which broadly supports a host of endemic and migratory birds and other wildlife species (Appendix A), many of which Trustees documented as impacted in relation to the Spill (PDARP). Examples include: 1.) Critical wintering habitat for various endangered and threatened piping plover subspecies and important wintering and stopover habitat for the threatened red knot; 2.) Only known breeding location of Chandeleur gull (Herring and Kelp Gull hybrid); 3.) Supports the largest breeding colonies of sandwich terns in the world ; and 4.) A primary wintering ground for redheads which forage in GOM sea grass beds. Further, this barrier island chain serves as an important nursery and foraging habitat for many living coastal and marine resources such as birds, turtles, marine mammals, finfish, shellfish and invertebrates (PDARP, Section 5.3.1). Given these and many other beneficial ecological services, Louisiana Trustees propose implementation of multiple restorative approaches within a targeted section of the Chandeleur Island chain; a strategy that clearly addresses the Trustees' overall goal of replenishing and protecting living and coastal resources impacted by the Spill (PDARP). Under a Memorandum of Understanding, Louisiana Department of Wildlife and Fisheries (LDWF) and the United States Fish and Wildlife Service (hereafter FWS or the Service) manage several state-owned barrier islands are managed as part of Breton NWR. Proposed Restoration for Open Ocean TIG Building on previous and more recent efforts, Louisiana Trustees propose targeted sediment renourishment (~140 acres) within the southern end of the Chandeleur island chain to create a variety of barrier island habitats including beach, dune, and back barrier marshes. Collectively these restoration approaches support stated restoration goals to address bird injury by facilitating additional production opportunities (e.g. terns, skimmers, pelicans, reddish egret, Chandeleur gull etc.), restoring and protecting habitats on which injured birds (e.g. piping plover, red knot, redhead, etc.) heavily rely upon (e.g., beaches, dunes, sea grass beds, back barrier marshes, etc.) within an area that has historically provided some of greatest avian benefits within the entire Gulf of Mexico (PDARP, Section 5.5.12.1, Remsen et al., 2015). Further, the proposed restoration location will provide additional protection and enhancement for New Harbor Island; the state's easternmost brown pelican and reddish egret rookery and, a potential future restoration location to further address Louisiana's expansive bird injury. In tandem with these efforts, vegetative plantings and sand trapping techniques (e.g. sand fencing) will be implemented within the restoration location as a means to bolster habitat diversity and the island's overall lifespan. Such projects and restoration approaches have been shown to result in positive sand accumulations (up to 4') in some locations, providing short-term elevation increases and thereby creating safer bird nesting areas. Further, these approaches will provide enhancement of critical bird habitats including the Chandeleurs' ecologically valuable sea grass beds.	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 30	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Testing and Assessment of Archaeological Sites Impacted by the Deepwater BP Oil Spill	More than a year after the Deepwater BP Oil Spill, the immediate and long-term impacts on archaeological sites in the coastal zone remain unknown. Archaeological sites are unique and endangered sources of information on several thousands of years of human-environmental interactions along the Gulf Coast. Monitoring and remediation have documented the presence of oil at many sites, but there has been no systematic attempt to assess the effects on archaeological resources or conservation. Restoration of coastal landscapes and ecosystems will further impact archaeological sites, which are intrinsic cultural components of the natural environment. Testing and assessment of previously recorded sites in Terrebonne, Lafourche, Jefferson, Plaquemines, and St. Bernard parishes will address the impacts on archaeological resources in terms of archaeometric techniques such as neutron activation analysis, absorbed residue analysis, and accelerator mass spectrometry, taphonomic and site formation processes, and archaeological conservation. Sites to be assessed will be selected from those impacted by the Deepwater BP Oil Spill and recorded as potentially eligible for listing on the National Register of Historic Places. Field methods will consist of systematic surface collection, mechanized and hand-operated coring and augering, and excavation of 1-by-1-meter test units to record stratigraphic profiles and obtain archaeological samples. The goals of restoration will be served through damage assessment and recommendations of best methodologies for remediation and conservation.	Louisiana	$ 180,000	Public
The complete picture using high resolution digital imagery	High resolution digital Imagery has the ability to fill data gaps and research needs in a wide variety of subject areas in a very quick and efficient way. In the past 9 months, 3 surveys have been carried out in the New York offshore planning area, an area covering 43,000 km^2. Two of those surveys have complete datasets georeferenced and partially available to view through a publicly available web portal (https://remote.normandeau.com/nys_public_data.php). Information in the public view includes locations of over 15,000 birds, their flight height and direction of travel when flying, and locations and direction of travel of over 2,000 marine mammals, 600 turtles, 1,000 large bony fish, 900 cartilaginous fish, and nearly 7,000 fish shoals. All are mapped and information is available to be filtered by species, making it possible to associate species presence with sea depth and other important covariates. Jellyfish are visible in the imagery, and also collected and mapped are images of boating traffic. In the fall survey, active gill net, trawler, commercial shell fishing, and recreational vessels were identified and mapped. Although these are not available in the public view, they contribute a key piece of the puzzle of what is where and why. These kinds of data are exactly what are needed in the Gulf of Mexico to form a complete picture of how the Gulf is being used. Data collected now can be used to monitor the future success or failure of the many projects that are currently targeted to improve the overall health of the ecosystem and maintain and increase the diversity and density of animals using the Gulf of Mexico. This is the basis of this project idea. A BOEM study completed in 2013 (https://www.boem.gov/ESPIS/5/5272.pdf) found that turtle densities were under-recorded by between 4x and 10x when data were collected by visual methods using low altitude aircraft or boats. Primary reasons for this were repulsion from the survey vessel (i.e. the animals dived), and opacity of the water column from an oblique view (boat observers can't see down). The behavior of marine mammals is also influenced by vessel traffic. The same study found that estimated densities of dolphins were potentially inflated by attraction to the boat survey vessel. The camera technology available today provides massive megapixel sensors and allows for ultra high resolution, revolutionizing imagery as an efficient data collection method. The recent New York study is identifying over 90% of birds to species, and even finding flight heights for around 70% of flying birds (https://remote.normandeau.com/docs/NYSERDA%20Fall%202016_Taxonomic%20Analysis%20Summary%20Report.pdf). Marine mammal and turtle identifications are also high, with success influenced primarily by subsurface depth obscuring important diagnostic features of similar species (i.e. beaked whales). It takes 9 days to collect data across the New York offshore planning area (https://remote.normandeau.com/nys_overview.php). Vast areas of the Gulf of Mexico could have essential, very detailed data collected very quickly and efficiently. The use of high altitude (1,360 feet) and high resolution (1.5 cm or better) allows detailed surveys to be provided across state and federal borders, with results highlighting patterns across the entire Gulf of Mexico. Using zigzag transect design and stopping at strategic coastal airport locations en route, the entire area from Florida to Texas could be relatively easily and quickly surveyed depending on the percent coverage deemed appropriate. Multiple seasonal surveys in a year would allow observation of variations in interseasonal and interannual density, diversity and distribution as well as identifying hotspots of foraging activity, prey locations, and anthropogenic use. The method would provide much needed data in places where data are not only sparse but frequently absent.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 5,000,000	Public
The Development of The Advanced Real Time GNSS and Physical Atmosphere and Ocean Observing System within the Gulf of Mexico	The Development of The Advanced Real Time GNSS and Physical Atmosphere and Ocean Observing System within the Gulf of Mexico' - Conrad Blucher Institute for Surveying and Science, Texas A&M University -Corpus Christi, University Corporation for Atmospheric Research - Boulder, CO and Center for Space Research University of Texas at Austin. Introduction: The ability to observe our environment in real time significantly increases our capacity to anticipate and respond to changing conditions that may increase the risk of injury and property damage. The installation of a network of instrumentation clusters is proposed for the Gulf of Mexico. The primary instrument of each cluster will be a geodetic quality Global Navigation Satellite System (GNSS) receiver. Observations derived from this network will promote research on ocean-atmosphere interactions; hurricane intensity forecasting; sea level and coastal subsidence monitoring; and storm surge modeling. Each of these topics was given high priority in a recent survey of the oil and gas industry operating in the Gulf. It is anticipated that equipment can be deployed on both fixed and floating platforms, significantly improving the observational capability of the region. The deployment of this instrumentation on offshore platforms would allow these research topics to be addressed and combined in a unified measurement system throughout the Gulf region. Advances in GNSS analysis techniques now enable the continuous positioning of mobile instrumentation to less than a few centimeters. The precision of this measurement can be used for continuous monitoring of sea surface height, tides, and wave motion. The addition of both temperature thermistor strings and underwater acoustic instrumentation provides a link to sea surface temperatures and ocean bathymetry. These same analysis techniques are able to measure the delay of GNSS signals as they pass through the atmosphere. This delay can then be related to the integral of atm ospheric water vapor. This establishes a link between the sea surface temperatures and the latent heat in the atmosphere that contributes to hurricane intensity changes. The recent environmental disaster following the sinking of the Deepwater Horizon offshore drilling rig has highlighted the need for more ocean observing systems to better measure the physical processes occurring in the Gulf of Mexico. Scientific measurements in this harsh offshore environment are difficult to obtain and cannot be undertaken without access to the large number of offshore platforms owned and operated by the offshore industry. This white paper proposes a partnership between the private offshore industry and the scientific community to collect critical physical data to enhance our knowledge of the atmospheric and oceanographic processes that drive the forces that interrupt our ability to manage the vast economic and natural resources of the Gulf of Mexico. A collaborative research group, consisting of academic and governmental researchers, has expressed interest in the establishment of this Gulf network. The members of the group have diverse expertise and research interests, ensuring that there would be broad application of these data if available. Scientific Applications: A report by the American Geophysical Union (AGU) after the 2005 hurricane season summarized some of the fundamental research and observational capability that is relevant to the Gulf. Topics that were addressed in this report include hurricane intensity forecasting, storm surge modeling, and subsidence monitoring. A short synopsis is provided on how each of these topics would benefit from this network. Atmospheric interactions and hurricane intensity forecasting: GNSS observations can be analyzed to provide integrated precipitable water vapor (PW) es timates of the atmosphere. These measurements provide continuous monitoring of atmospheric PW and are insensitive to rain and clouds. PW estimates are now routinely being used at NOAA to improve precipitation forecasts in the continental U.S. Estimates of PW within the Gulf would provide a strong link between ocean temperatures and atmospheric water vapor. An illustration of this is shown in Figure 2 for data collected on the island of St. Maarten in the Caribbean. This figure shows the PW estimates obtained from a GNSS station on the island and the sea surface temperature	Texas, Louisiana, Mississippi, Alabama, Florida	$ 16,000,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
	(SST) around the island. It is clear from this comparison that the two fields are highly correlated. This implies that the local SST in the region has a significant influence on the total column water vapor, not just surface humidity just above the surface. Assimilation studies for two specific hurricanes, Dean in 2007 and Gustav in 2008, have been extensively studied. Both show a positive improvement in the forecast of minimum surface pressure with the three-dimensional variation assimilation of PW into the Weather Research and Forecasting (WRF) model. Assimilation results are shown in Figure 3 (Dean) and Figure 4 (Gustav). The WRF model is running with a 12-km horizontal resolution and is initialized using the GFS analysis fields. Both cases show an improvement of approximately 20 hPa (1 hPa = 100 Pa SI units of pressure) when the PW data are assimilated into the model. A simulation experiment with stations distributed in the Gulf of Mexico has shown further improvement in intensity forecasts, highlighting the need for routine atmospheric observations in the Gulf. The color-coded numbers represent the location of continuously operating GNSS stations and the in tegrated water vapor in the atmosphere above each station. The more water vapor, the more latent heat available that the storm can use to strengthen and intensify. Incorporating these data into the Weather Research and Forecast (WRF) model improved the prediction of hurricane strength, as shown by the time series of minimum surface pressure shown on the right. The forecast without GPS observations is shown in blue, with observations in maroon, and the observed minimum surface pressure is shown in red. The addition of GPS instrumentation into the Gulf of Mexico is expected to further improve hurricane intensity forecasts. Storm Surge Modeling: The data and research will be based on the operation of the coastal observation network managed by the Texas A&M University-Corpus Christi (TAMUCC) Division of Nearshore Research (DNR) [Michaud, 2001]. The core of the network is composed of the 25 Data Collection Platforms of the Texas Coastal Ocean Observation Network (TCOON) and the 7 water level monitoring platforms of the National Ocean Service National Water Level Observation Network in Texas. Other platforms include the Houston/Galveston PORTS stations, the Sabine PORTS stations, and the Port of Corpus Christi Real Time Navigation System (RTNS), three of the largest U.S. ports by tonnage. The overall network presently consists of 30 active stations and is the largest coastal ocean observation network in the Gulf of Mexico (see figure 1). It should be emphasized that all aspects of the operation of this network including instrumentation, measurement procedures, maintenance, and data management follow NOS equipment and instrumentation, data quality control, maintenance and operation procedures, and standards. Principal investigator, Dr. Gary Jeffress, is the director of the TAMUCC unit overseeing all aspects of the network operations. Other project participants manage the operation of the network an d design and implement associated predictive and now-casting models. The network archives and publishes in real-time or near-real time the following time series: water levels, wind speeds, wind directions, barometric pressures, water and air temperatures, dissolved oxygen, salinity, water currents and wave climates depending on the station. Data transfers are completed via Free wave packet radio, GOES satellite communications, and Internet Protocol Modems depending on the station location. The data is accessed through the World Wide Web, at http://lighthouse.tamucc.edu/, and through dedicated phone lines. The operation and management of the network is entirely based on the World Wide Web. The underlying software has been developed at DNR over the past fifteen years [Michaud, 2001] using open source technologies such as Linux and Perl, with the advantage that DNR is not subject to changes in proprietary systems and has the flexibility to replace and evolve software components as new technologies become available. In the past five years data intensive modeling techniques have also been developed to take advantage of the flow of real time data. Models based on Artificial Neural Networks (ANN) and Statistical techniques are presently implemented to provide predictions of water levels [Tissot, 2005] as well as other parameters such as water temperature. Background on ANN Modeling and Hind-casting: The concept of artificial neural networks (ANN) emerged in the sixties as scientists aimed at emulating the functioning of the brain. After the development in the late eighties of efficient training techniques ANNs have become powerful modeling tools especially for non-linear systems. The other main advantages and key characteristics of ANNs for this application are their generic modeling capacity, their robustness to noisy data, and their ability to deal with high dimensional data. The range of ANN applications span a growing number of fields including an increasing...			
The Gulf Restoration Fund	The Gulf Restoration Fund supports organizations and individuals working on the restoration of the coastal and marine ecosystems of the Gulf of Mexico. The Gulf of Mexico is the ninth largest body of water in the world and home to over 15,000 different species of plants and animals. While the damages and impact of the BP Deepwater Horizon explosion and subsequent spill are still being assessed, this fund focuses on the other 80% of the Gulf that has been destroyed by decades of coastal development projects, agricultural runoff, overfishing and pollution.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
the Marinovich Proposal	WHY Pertaining to the adult shrimp coming out of the gulf. Protect the adult shrimp coming out of gulf to spawn so they will be will able to reproduce without be caught up by trawl. Change (tweak) the shrimp laws, close the season from last week in march, do not open until last week in June, re-close in August, not re-opened until end of the third week of September. This may fix a FAILING INDUSTRY and bring back multitudes of jobs (INCREASE shrimp population, CUT DOWN ON DRAG TIME for fisherman which will make trip shorter and less fuel...(More shrimp for fish to eat for red snapper, speckled trout)	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
this is a submission test 2 Now I changed the title	Look I changed a bunch of stuff!!!	Florida, Louisiana	Not provided with submission	Public
Treasure Bay Living Shoreline Stabilization Project	The project will stabilize approximately 3300' of shoreline by creating intertidal oyster reef habitat using ReefBlk units and the application of #57 concrete aggregate as cultch 4-8" thick to a distance between 50-100' from the shoreline. The ReefBlk units and cultch function as substrate for oyster spat attachment and allow growth of an intertidal reef. The project shoreline received heavy oiling in the MC 252 event. This project will stabilize impacted shoreline of this critical geologic framework feature which influences hydrologic conditions in the highly productive oyster grounds of Christmas Camp Lake and Treasure Bay; it also buffers the southern Biloxi Marsh from open water conditions and provides storm surge protection for St. Bernard Parish. This project can be considered 75% shovel ready. Staging and logistics for the project are in place at the current ReefBlk operation at Hopedale, Louisiana now servicing The Nature Conservancy project for Lake Eloi and Lake Fortuna. Coastal permits obtained and landowner protocol agreements developed for The Nature Conservancy's nearby Lake Eloi project create a simple template to obtain the necessary permits for this project within four months. All current production activities can be expanded quickly to implement this project. Coastal Environments, Inc and partners will fabricate and install bio-induced oyster reefs to stabilize shorelines and help restore and sustain valuable and sensitive estuarine ecosystems in the Biloxi Marsh. This project will stabilize the shoreline by restoring intertidal oyster reef habitat using a cost-efficient and effective vertical breakwater technology called ReefBlk.The ReefBlk units function as a substrate for oyster spat attachment and allow growth of an intertidal oyster reef that provides both shoreline protection and habitat for estuarine organisms. As oyster growth progresses and the reef unit becomes more dense, the bioengineered structure dampens and dissipates wave energy and protects the estuarine marsh from erosion. These proven living shoreline and erosion control methods are currently inducing the growth of bio-engineered and self-sustainable living oyster reefs that expand both linearly and vertically to buffer wave action and retard erosion along estuarine shorelines in Texas, Louisiana, Alabama and Florida. High vertical profile oyster reefs also enhance species habitat diversity and provide oyster larvae for recruitment to adjacent oyster grounds and leases, thus increasing an area's economic value as related to commercial and recreational fishing, oyster harvesting and ecotourism. The proposed use of cultch to armor the shoreline through oyster shell accretion and deposition within the ReefBlk area will add to the proven benefits of ReefBlk. The oyster is the keystone organism for the estuary, and the vertical reefs will contribute spat to nearby oyster leases and increase the robustness of the marine habitat in general. Fabrication and staging for the project will occur in St. Bernard Parish creating jobs to offset the negative economic impact suffered by the commercial fisheries industry of the parish. This project will be a part of the overall scope of education and research contemplated for the Oyster Research Center at Hopedale, which is also listed under NOAA NRDA projects. The project is a specific element of the shoreline stabilization NRDA request submitted by The Nature Conservancy.	Chandaleur Sound, St. Bernard Parish, Louisiana	$ 900,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Treat Subsurface Contamination	In wetlands, oil exists below the surface of the sediments. Inject MicroSorb microbes into subsurface to degrade oil. Below beaches, oil is floating on the groundwater. With horizontal drilling, injection wells and recovery wells can be placed. Inject MicroSorb microbes with seawater into the injection wells. Mobilize the oil and recover oil in recovery wells. Separate oil and use recovered water to mix with microbes and inject into injection wells. If there are still oiled oyster beds, install parallel aeration systems on each side of the bed. Inject MicroSorb microbes onto the beds. The aeration systems will supply oxygen to the microbes and improve the growth of oysters. The microbes will destroy remaining oil. In deep water where there are plumes on the seabed, install an aeration system and apply MicroSorb microbes. MicroSorb Environmental Products, Inc. is in part owned by Oppenheimer Biotechnology, Inc. The Oppenheimer Formula was the best microbial product in the BP Biochem Strike Team Report on NCPPL products conducted by Dr. Portier of LSU. The Oppenheimer Formula is capable of destroying PAHs as well as light ends in crude oil. I have a patent pending on subsurface aeration systems. Oil in sediments, on oyster beds and in subsurface plumes can be treated and destroyed more quickly than nature can provide. If you would like more information, please contact me. William E. Baird, PE MicroSorb Environmental Products, Inc. 104 Long water Drive, Norwell, MA wbaird65@aol.com	Texas, Louisiana, Mississippi, Alabama, Florida		Public
Upgrades to the Electronic Logbook Program for the Offshore and Inshore Commercial Shrimp Fishery for a 5-Year Period	Project: Upgrade the Gulf of Mexico shrimp fishery electronic logbook (ELB) program in order to improve the precision of shrimp fishing temporal-spatial effort and estimation of red snapper and sea turtle bycatch in the shrimp fishery. Specifically, this project will purchase new ELB units and make program enhancements necessary to expand ELB coverage up to 100 percent of the offshore shrimp fleet and a higher percentage of the inshore shrimp fleets for a period of 5 years. Link to Deepwater Horizon Oil Spill Injury: In 2010, the estuarine and offshore waters upon which shrimp species depend were oiled, offshore and nearshore shrimp fisheries were closed and visibly oiled sea turtles were collected alive and dead from northern Gulf. Sharp declines in shrimp catch in SE Louisiana in 2011 may be related to habitat damage or adult or post-larval mortality caused by exposure to Deepwater Horizon oil or chemical dispersants used to break up oil. In addition, red snapper with lesions and other signs of a compromised immune system have been documented in the oil spill impact area, though cause and effect are not yet established. Benefit and Rationale: Inshore and offshore shrimp fisheries in the Gulf of Mexico are known to interact with sea turtles and juvenile red snapper. These two species' populations may have been detrimentally affected by the DWH oil spill in 2010. Sea turtle strandings in the Gulf of Mexico increased significantly since 2010 and have continued to rise since the BP oil disaster. More than 5,000 dead or weakened turtles washed ashore, or have been stranded, since the BP oil disaster. More than 460 sea turtles were found visibly oiled during oil spill response efforts and an unknown number died as a direct result of the disaster. ELB analysis provides fine-scale spatial data that can help identify sea turtle/shrimp fishery interaction hot spots. These data can assist managers in reducing the number of interactions and related sea t urtle mortalities through such means as time/area closures while potentially avoiding broad management measures like complete fishery closure. Shrimp fishing effort data recorded by ELBs are also a proxy for estimating red snapper bycatch mortality in the offshore shrimp fishery. Bycatch mortality estimates are important for determining whether management measures are needed to help red snapper populations exposed to oil recover from potential injury. The long-term effects of oil and chemical dispersants on shrimp species or their habitat remain unknown. Tracking the location and catch per unit of effort of shrimp can help scientists and fishery managers better understand trends in abundance and possible relationships between areas of low catch and oiled estuarine habitats. Expanding ELBs to the entire offshore fleet and making them available on a voluntary basis to a greater portion of the inshore fleet will improve the precision of sea turtle bycatch estimates needed to facilitate and track recovery of impacted sea turtle populations in the Gulf of Mexico. The recent increase in offshore shrimp fishing effort and potentially higher number of sea turtle interactions that could result also underscore the importance of ELBs in estimating sea turtle bycatch for developing mitigation and recovery strategies going forward. Description: Implemented through a joint reef fish/shrimp management plan amendment in February 2008, a statistically valid sample of shrimp vessel permit holders are randomly selected and must report shrimp fishing effort via an ELB. A simple ELB that records spatio–temporal fishing effort is currently used by approximately one-third of the federally permitted offshore shrimp fleet. Researchers have found these devices to be a reliable method for estimating sea turtle interaction and red snapper bycatch mortality in the Gulf of Mexico offshore shrimp fishery. NOAA has been making the ELBs available to members of the inshore shrimp fleet. A bout 150 inshore shrimp vessels use ELBs on a voluntarily basis. Upgrading this program to expand coverage in the offshore and inshore fleets will generate a wealth of fine scale spatial data. These data will allow scientists to better characterize the shrimp fishery's effort and classify overlapping areas of fishing effort in regards to sea turtle and juvenile red snapper habitat areas. Determination of where and when this fishery interacts with sea turtle and red snapper populations may allow more fine-scale management of the fishery (versus the need for broader management measures) while reducing bycatch mortality, which in turn would offset injuries caused by the oil spill and help affected populations recover more rapidly.	Texas, Louisiana, Mississippi, Alabama, Florida	$ 6,650,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Use induced high vertical profile oyster reefs to stabilize critical areas of shoreline erosion, and to enhance habitat conditions with living shoreline geometries	The St. Bernard Parish Government has in place a cooperative project with The Nature Conservancy, an international non-profit conservation organization, to fabricate, deploy and monitor 2.15 miles of induced high vertical profile oyster reefs in the Oyster Zone of the Eastern St. Bernard Estuarine Ecosystem. The currently funded 2.15-mile portion of the project is part of a larger action for which a permit was acquired for construction of 4.54 miles of artificial reef along segments of shoreline in Lake Fortuna, Lake Machais, Lake Athanasio, Lake Eloi and Eloi Bay. The project was selected for American Recovery and Reinvestment Act funding by NOAA as part of the Gulf of Mexico marine habitat stimulus program in 2009. Emplacement of the artificial reef in St. Bernard Parish was delayed by the BP Macondo event, but was re-started in May, 2011 and is being mobilized from Hopedale. The NOAA-TNC project is intended to be the beginning of a far reaching reef building program for the Eastern St. Bernard Estuarine Ecosystem. The project employs a reef building technique utilizing ReefBlkTM that has been proven in projects from Texas to Florida. Individual reef units consist of a welded frame of steel rods that form a triangular column. The nits are 5 feet along each leg of the triangle and are typically 2 feet high, but may be higher depending on site conditions. The frames hold 9 aquaculture type mesh containers (e.g. bags). When filled the 9 bags hold 300 pounds of shell. The welded frame weight 70 pounds for a total individual ReefBlkTM unit weight of 370 pounds. The units are typically placed in a saw-tooth pattern parallel to an eroding shore or bank. The units immediately reduce wave energy and turbidity. Oyster larvae become attached to the shells in the ReefBlkTM, where they become spat that grow rapidly. Under average favorable conditions the oysters grow rapidly and within 12 to 18 months the oysters in one unit produce approximately one ton of new shell. Sediment usually collects behind the new reef. ReefBlkTM units have a solid frame, which when interlocked form a stable structure with a broad footprint. They are light in weight when deployed, but gain weight and stability from rapid oyster growth. The units have a large reef face to mass ratio, with approximately 50 square feet of reef exposure. This feature has the dual advantage of not requiring large volumes of shell, and providing maximum habitat for marine organisms. Because the cultch shell is loosely packed, water and food flows through the reef unit panels accelerating oyster growth and providing favorable habitat for innumerable species of reef attracted organisms. The ReefBlkTM structure provides shelter for larger fish. The individual units are like Lego pieces in that they can be configured for different erosion control and estuarine sculpturing applications. Most importantly the ReefBlkTM units provide a favorable framework onto which living oysters can grow and produce large volumes of shell. Some shells remain on and around the unit and the shells become cemented together to produce a true high vertical profile living reef. Other living oysters and shells are ejected by growth or beak off from the units and are carried toward shore by waves and tides resulting in development of cluster growths of living oysters or an accumulation of finer shell particles that accumulate along the inner shoreline as beaches and oyster banks. One of the most effective geometries for the induced reefs is the "barrier and lagoon." The centerline of the reef is parallel to the shore and 75 to 100 feet from it. Small tidal gaps, 25 to 30 feet wide are left in the reef at intervals of about 110 feet. As trapped sediment and shell accumulates behind the reef tombolos join the reef segments with the shore leaving oval lagoons about acre in extent, where submerged aquatic grass beds can be planted. Shell beaches develop along the shore behind d the lagoons. This design creates a wide range of habitat diversity for oysters, larval shrimp and finfish, crabs, shore birds and wading birds, small mammals, and mature finfish and shellfish. The oysters in the induced reefs are not for harvest, however oyster farmers like the reefs because by reducing erosion they reduce turbidity, which may smother growing oysters in the bottom beds. They also produce billions of free swimming larvae, many of which settle on neighboring oyster beds in leased oyster plots that are harvested. Recreational fishermen love the reefs, as they attract finfish. Construction of artificial oyster reefs using ReefBlkTM units has advanced beyond the demonstration phase to the production phase. Nine projects have been completed successfully in Texas, Louisiana, Alabama and Florida. The first phase of the NOAA-TNC project in Louisiana involved installation of 1,200 ReefBlkTM units (6,000 feet) on the bay side of Grand Isle.	St. Bernard Parish, Louisiana	$ 4,000,000	Public
Use of drone and geo-referenced full motion video (FMV) to maintain cost-effective long term surveillance of stranding events within coastal marsh and shoreline habitats.	Post-DWH spill, significant efforts were expended to detect and identify injured or dead marine wildlife. Much of the potentially oiled wildlife was located within marsh habitats where access was difficult and routine monitoring nearly non-existent. There was question regarding some records, of marine mammals in particular, as to whether the increase in stranding records was the result of oil spill effects or an increased level of search effort. This project proposes to establish a remote survey methodology along roughly 500km of remote marsh and shoreline habitat that are not routinely surveyed by any systematic means or has a low potential of public encounters where stranding reports would be expected. The project will systematically produce a standardized methodology using fixed-wing and multirotor drones equipped with full motion video (FMV) cameras which allows accurate geographic mapping from video taken at any angles (i.e., the image does not need to be taken directly below the camera to be geo-referenced). Establishing this methodology will accomplish three goals: 1) it will provide baseline information regarding stranding events in the deep marsh regions of LA; 2) it will establish, optimized, standardized methodologies of remote surveying and data delivery that can be incorporated for long term monitoring of marine mammal and bird populations in remote regions; and 3) it will provide a proven method to employ for impact surveillance in any future disasters, natural or man-made.	Breton and Chandaleur Sounds, Louisiana	$ 580,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
USING DREDGED SEDIMENTS TO REMEDIATE OIL-CONTAMINATED COASTAL MARSHES	The BP Horizon oil spill resulted in millions of gallons of oil being discharged into the Gulf of Mexico. Despite the best efforts of many, oil remains in vast areas of Louisiana's wetlands. Removing oil from these fragile wetlands is a difficult, if not impossible, task. One viable alternative is to cover oil-contaminated wetlands and shallow sediments with clean dredged sediment. Sediment can be sprayed across the wetland surface in thin layers with conventional dredging technology or pumped into the upper reaches of the marsh and used to restore any damage associated with ingress. Both are proven approaches for marsh restoration with numerous examples of success. Sequestered in the salt and brackish marshes will reduce, and possibly eliminate, impacts to inland fresh and intermediate marshes that are more difficult, if not impossible, to clean using other technologies. Additionally, wetlands along Louisiana's coast have been subsiding due to the lack of marsh accretion; thus, the addition of sediment has other potential advantages. Previous research has shown that coastal wetlands revegetate quickly (within a single growing season) when covered with dredged sediments of modest thicknesses. There is also well-established science demonstrating the effectiveness of covering contaminated sediments with a clean sediment cap to isolate contamination, preventing transport and ecological exposure. A synthesis of existing information suggests that placing dredged sediments on the wetlands should be an effective remedial approach. The general approach of using dredged sediments to nourish and raise wetlands is also well established. There are many successful examples of using dredged sediment to beneficially augment existing wetlands or establish viable wetlands in areas where the pre-existing bathymetry was too deep. There are, however, unique characteristics of the Louisiana Coast that will require further study. These include viable dredged sediment sources (spa tial and temporal availability, sediment quality, etc.), logistics of dredged sediment transfer, innovative sediment retention measures, placement measures to minimize sediment loss, best application rates for oil sequestration, ecological sustainability and marsh longevity, and monitoring programs to evaluate best practices. Capping has also been successful at isolating contaminated sediment at many sites, but this particular application requires some additional study. These include testing different depths of mud layers for their effectiveness of immobilizing the oil and restoring natural benthic communities, the effect of dense vegetation on contaminant isolation effectiveness, enhanced degradation that might result from the plant root mass, and the potential for additives to expedite oil degradation below the cap layer. Project Summary: This project will provide a comprehensive assessment of the use of dredged sediments for restoring oil contaminated marsh. It will evaluate important logistical components including sources and volumes of available sediment, sediment transfer and placement, sediment spraying, and equipment availability. The project will also evaluate and test innovative sediment retention measures. Several modular designs have recently been proposed that also allow for ecological exchange, but these designs have not been tested. Field and laboratory tests will also be conducted on the effectiveness of dredged sediment caps to isolate contamination with thick vegetation, the role of vegetation in long-term biodegradation of the trapped oils, the thickness of sediment layers necessary to isolate contamination while allowing the marsh to quickly recover, and the value of biodegradation enhancement beneath the cap. Project Benefits: This project will provide the basis for using dredged sediment to rapidly restore the ecological function of Gulf Coast marshes. The results of this effort will help guide the development of a comprehensive, effective, and timely restoration plan through reliable information on the applicability of this approach and the availability of sediment to implement it. The project will provide a roadmap for navigating the logistics of obtaining sediment, transferring it to the site, placement approaches, and retention alternatives. Most importantly, the project will provide reliable data on the ability of sediment to safely sequester the surface oils from the environment and estimate the design life for that sequestration.	Florida, Alabama, Mississippi, Louisiana	Not provided with submission	Public
Venice	Roadside parking and fishing access (kayak launch/roadside fishing/fishing pier) near Yellow Cooton Bay in the Venice area	Yellow Cotton Bay - Plaquemines	$ 500,000	LDWF Fisheries (CSA)
West Cove	Kayak launch and roadside fishing	West Cove - Cameron	$ 250,000	LDWF Fisheries
West End Park Lagoon Habitat	Located in historic West End Park in New Orleans, the East Lagoon is in need of shoreline stabilization, stocking and culvert repair to re-establish water transit between itself and Lake Pontchartrain.	New Orleans, Orleans Parish, Louisiana	$ 200,000	Public
West Grand Terre Beach Nourishment and Stabilization	The objectives of the proposed West Grand Terre Beach Nourishment and Stabilization project are to restore and enhance dune and back barrier marsh habitat to provide storm surge and wave attenuation, thereby addressing the issues of gulf shoreline erosion, diminished storm surge protection, and subsidence of back barrier marshes. This project is estimated to build 12,700 feet of beach and dune with an area of 235 acres. In addition, up to 66 acres of back barrier marsh will be restored and a rock revetment will be constructed to protect the restored marsh. The project will increase the width of the island and maintain shoreline integrity through the introduction of sediment in order to increase island longevity. The project will promote community resilience and reduce risk to infrastructure by providing storm surge and wave attenuation and will protect and restore nesting and migratory bird habitat, including wintering habitat of the endangered piping plover (Charadrius melodus, Haig and O-ring 1985). Restoration of West Grand Terre will also protect Fort Livingston, which was constructed in 1841 and is listed on the National Register of Historic Places. West Grand Terre is also recognized as a State Commemorative Area and will protect Grand Isle, the only inhabited barrier island in Louisiana.	West Grand Terre Island, Jefferson Parish, Louisiana	$ 65,000,694	Public
West Whiskey Island Shoreline Protection	Install 1,548 Geo-TECH-Jetty Units above the water line, (as determined by official government determinations). Our Geo-TECH-Jetty units are filled with dredged material sourced from near the installation. Within a prepared area on top of the Geo-tech containers are Root-Zone Humus-filled, (RZHO), biodegradable containers. The RZHO-filled containers are planted with mature native marsh grasses and other select native plants. Our specialized method, proven in several previous deployments, ensures highly energetic and sustained plant growth, while providing shoreline force and sea-rise protection. Once set in place the Geo-TECH-Jetty units are stabilized with XX heavy duty PVC pipe, driven down 7 feet for firm hold, there are stainless steel rings on the bottom of units in three locations for PVC pass through. The PVC stabilization devices are designed so that they can be retrieved at a future time, when it may be determined that plant rooting and accretion has been achieved and our “hold” feature is no longer needed. Our proven methods allow for replacement of rock as stabilization means. Using our proven methods, we ensure rapid reestablishment of habitat. Shellfish, fin-fishes, invertebrates, and other vital coastal organisms are able to reestablish populations. Installing our Geo-TECH-Jetty units, we accomplish rapid rebuilding of the entire food-web, by providing the multiple benefits. (1) We provide protection from sea-rise. (2) We ensure rapid establishment of native plants along shorelines, making possible rapid habitat establishment. (3) Our methods assure accretion, as the long, well-set units of Geo-TECH-Jetty prevent erosion. (4) The Geo-TECH-Jetties also provide protection from surface and sub-surface oil encroachment on shorelines and into adjacent marshes. (5) Shoreline areas of land, (marshes or barrier island shores), behind the rows of Geo-TECH-Jetty units are filled with dredged material has our process continues, the filled RZH and RZHO are applied to ensure fertility. The Geo-TECH-Jetty is set in place from barges. Our Geo-TECH-Jetty Placement System makes it possible for us to position units efficiently, one in front of the other, and over lapping with space between them allowing existing habitat to continue functions as installation is accomplished. If it is decided that marsh or shoreline is not to be filled in some areas where Geo-TECH-Jetties are being installed, our units are set next to each other and can be used to serve as solid shoreline protection without back-filling.	West Whiskey Island, Terrebonne Parish, Louisiana	$ 2,990,560	Public

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Project Name	Project Description	Location	Cost ($)	Submission Source
Wetlands Education Project	Audubon Nature Institute will develop the Wetlands Education Project to share the importance of coastal wetlands loss and the impact on the environment, emphasize coastal restoration and protection priorities, and encourage students to take action to improve the environment. The new educational program will be shared with classrooms across the country and will highlight that “Louisiana’s wetlands loss is the nation’s wetlands loss.” The biggest conservation threat in the U.S. is virtually unknown outside of most coastal areas of the country. The Wetlands Education Project will raise awareness of this critical issue and is the key to sustaining the state’s rich natural bounty, fueling and moving the nation—and preserving coastal Louisiana. The Wetlands Education Project builds on Audubon Nature Institute’s successes in sharing wetlands-themed standards-based education programs that educate the public about the value of coastal and wetland habitats. The Wetlands Education Project includes three components: curriculum focused on coastal environments for students of all ages, reaching a broad, diverse audience; educator guides that dive deep into conservation, creating opportunities for hands-on, interactive experiences for learners of all ages; and virtual teacher professional development and classroom programs around the country to have in-classroom access to coastal and wetland educational content. Increased awareness through the Wetlands Education Project will support national efforts to preserve coastal and wetlands habitats, benefiting coastal communities and the entire country. The Wetlands Education Project’s curriculum will raise awareness about various coastal habitats and introduce students to native species, conservation projects, and natural and human-created hazards to these habitats. With a focus on making an impact across broad, diverse audiences of all ages, the program will foster an appreciation and respect for wildlife and a lifetime commitment to improving the environment by encouraging hands-on learning, creativity, teamwork, and a sense of stewardship towards the environment. Audubon Nature Institute is a leader in family entertainment in southern Louisiana and has been offering education programming for more than 25 years. Audubon’s education initiatives reach tens of thousands of people each year, inspiring passion for nature and instilling a sense of environmental responsibility.	Louisiana	$ 800,000	Public
Wetlands Plant Nursery	Founded in 2007, Bayou Rebirth is a non-profit whose mission is coastal restoration and education through action oriented and volunteer-driven programs. These programs include wetland plant nurseries, wetlands restoration plantings, interdisciplinary educational programs, rain garden installation and neighborhood nurseries. All of these components complement and drive our main mission of coastal restoration. The Mississippi River and South Louisiana's deltaic wetlands are a vital nursery habitat for wildlife and migratory birds, and fill critical cultural, economic, and protective roles for inland communities and the nation. Coastal Louisiana loses an average of 34 square miles of marshland per year, thus it is vital to carry out restoration projects. Bayou Rebirth is a conduit through which local residents, students, and visiting volunteers learn about and participate directly in the restoration of our wetlands. In order to perform the activities stated above it is necessary that we are able to grow our own plant materials, which is why Bayou Rebirth is looking to create a new nursery. This nursery will be used by Bayou Rebirth to grow out approximately 20,000 plugs of native marsh grasses and 4,000 hardwood trees that will either be transplanted by Bayou Rebirth into Southeastern Louisiana's wetlands. The new nursery will provide the facilities to grow all plant materials used in Wetlands Restoration Program, in which volunteers will be able to germinate trees from collected seeds and propagate marsh grasses at over double the current propagation rate. Over time, this nursery will increase Bayou Rebirth's capacity so that it will no longer need to purchase plants from outside vendors, thus significantly lowering overhead and increasing the sustainability of Bayou Rebirth. This nursery is intended to be part of the Urban Farm and Nursery Program at the Federal City in Algiers. Bayou Rebirth will be assembling and maintaining a wetland plant nursery on 2 acres (87,120 sq. feet). This program was born out of the decision of the federal government to reduce the footprint of their Naval Support facilities and repurpose the surrounding federal land to private businesses, housing, parks, schools and projects like the wetlands nursery. Other projects include urban farms and a tree nursery. The goals of these other projects are to increase food access and security, provide a platform for environmental education and workforce development, and promote coastal and urban ecological restoration. Bayou Rebirth fulfills a fundamental part of the program's goals and will use this nursery to assist in their mission of coastal restoration and environmental education, by providing much needed native plant materials as well as an interactive classroom, with which local and out-of-town volunteers can be taught creatively and productively. This nursery will benefit the native wetlands surrounding New Orleans, while providing the opportunity for natives and non-natives alike to partake in a hands-on wetlands restoration.	Algiers, Orleans Parish, Louisiana	$ 46,500	Public
WHARF	Wetland Harbor Activities Recreational Facility; Development of multi-use facilities for recreational access of nearby areas including Bayou Segnette	Westwego - Jefferson Parish, Louisiana	$ 250,000	Public
Williams Blvd	Kayak launch and roadside fishing	Williams Blvd - Jefferson Parish, Louisiana	$ 250,000	LDWF Fisheries
Woodlands Trail - Greenway Corridor Project (031105-262)	Woodlands Trail - Greenway Corridor Project was first entered into the Regional Restoration Program data base in March 2005 (See previous information and additional local, regional and national partnerships). Woodlands Conservancy has worked for the past decade to promote smart growth and preserve, restore and enhance habitat for wildlife and neotropical migratory birds in the peninsula formed by Orleans and Plaquemines Parish. The focus of Woodlands Trail - Greenway Corridor Project was to acquire 189 acres of land in Orleans Parish and conduct Ecosystem Restoration for resident wildlife and neotropical migratory birds. On December 19, 2012, Woodlands Conservancy acquired this 190 acre tract of land and has begun restoration planning with USFWS. The current modification of this project is to reduce the number of acres to be acquired to 16 which will provide a connection to managed land in Plaquemines Parish and increased community access in Orleans. Additionally, the project is being modified to include the Wetlands Education and Research Center complex to: a) serve as a visitor welcome facility for those recreating on lands owned and/or managed by Woodlands, b) provide a jumping off point for field trips and environmental education activities for K-12 students and provide a site for undergraduate intern students seeking service learning activities in environmental science/disaster recovery and c) provide a physical home to house our long-term wetland restoration and applied research efforts directed at halting invasive species and reforesting this region of coastal Louisiana. The funding requested includes a contribution of 3 million to the Woodlands Conservancy Endowment Fund at the Greater New Orleans foundation to ensure restoration management and education funds in perpetuity. Restoration Description: The forested land that is the subject of this project proposal was severely impacted by Hurricane Katrina. Although it remains forested, the area is in need of invasive vegetation removal and enhancement of habitat by reforesting with native species. USFWS, State Private Lands Coordinator's office has committed technical and financial assistance as a Federal partner to Woodlands Conservancy to implement restoration work for bird habitat. Monitoring of rehabilitation and enhancement activities will be done by both USFWS and Woodlands Conservancy in partnership with California State University Channel Islands, Oregon State University and local educational institutions with whom Woodlands has worked for the past several years. Data provided by the Louisiana Department of Wildlife and Fisheries shows resident and migratory birds that utilize this habitat. The previously submitted birding survey shows birds identified at the Woodlands site along with notations of those species identified as Species of Conservation Concern in Louisiana Comprehensive Wildlife Conservation strategy (Wildlife Action Plan), those identified as Species of Continental Importance by Partners in Flight as well as those oiled birds captured live and/or found dead following the Deepwater Horizon blowout. Woodlands will work with the Mayor's Office of Environmental Affairs and Louisiana Culture, Recreation and Tourism to develop an interpretive program to educate others of the project's value for mitigation for natural resource impacts, flyway enhancement, science and research, coastal education, storm retention, water quality, recreation and habitat for wildlife.	English Turn, Orleans Parish, Louisiana	$ 8,680,000	Public

Appendix A: Project Universe

Project Name	Project Description	Location	Cost ($)	Submission Source
Woodlands Trail - Interpretive Center (031105-264)	Woodlands Conservancy has worked with Louisiana State University, School of Architecture, Office of Community Design and Development for the past three years to plan and design an Interpretive Center and Interpretive program elements for Woodlands Trail and Park. Complimented by a regional greenway corridor for wildlife and resident and neotropical migratory birds, the Interpretive Center will be located within one of Southeastern Louisiana's last remaining coastal forests on land that is currently 6-miles from open Gulf water. With the current rate of wetland loss in combination with the increase in expected hurricane activity and sea level rise, the location is well-suited to provide an amenity for locals and tourists in this growing community. The Interpretive Center is designed to have low or no carbon footprint and will be a teaching structure in both its state-of-the-art design as well as the contents which it will house. Water will be warmed by power grids and bathroom facilities will be self-contained. Power grids will provide energy for the entire interpretive center and it's outside lighting. The physical structure will be located adjacent to a constructed wetland area that will provide habitat for area wildlife and migratory birds. The structure overlooks a canal that provides a large viewing area for wildlife and birds. The canal also provides an area for fishing for local visitors. The interpretive program will include educational print and displays focusing on the function and value of wetlands, eradication of non-native, invasive species, cultural and military history of the area, environmental history and mitigation restoration activities and functions. The facility will serve as a site for education and recreation activities. Costs include construction: $1,429,850 and program development and operation: $600,000.	English Turn, Orleans Parish, Louisiana	$ 2,029,850	Public
Woodlands Trail - Phase I (031105-261)	Woodlands Trail - Phase I was first entered into the Regional Restoration Program data base in March 2005 identified as: Woodlands Trail - Phase I (031105-261) (See previous information and additional local, regional and national partnerships). Woodlands Conservancy, a nonprofit 501(c)(3) organization, previously known as Woodlands Trail and Park, Inc. (Fed. Tax I.D: 72-1506708) has worked for the past decade to promote smart growth and preserve, restore and enhance habitat for wildlife and neotropical migratory birds in the 10,000-acre peninsula formed by Orleans and Plaquemines Parish. The focus of Woodlands Trail - Phase I continues to include funding needs for Operations and Maintenance (150K x 10 years) and Ecosystem Restoration ($600K spread over five year period; afterward it would fall into a maintenance phase) on 609-acres known as Woodlands Trail and Park Bird Sanctuary. Woodlands Conservancy has spent over a half of a million dollars on this project to develop hiking trails, conduct ecosystem restoration work, and to develop an interpretive program and other property improvements on property dedicated for the development of Woodlands Trail by a Plaquemines Parish Government Ordinance in 2002. Considering that land ownership is currently in dispute on a portion of the property, acquisition, based on market value is being added to this project 4,567,000 (actual cost subject to appraisal meeting federal standards). Restoraton Benefits: The devastation wrought by Hurricane Katrina raised the awareness that water flows inward from the river and thereby increased the level of understanding that it is imperative that we preserve low-lying areas as open space to encourage development on higher, i.e., safer ground. In the peninsula formed by Orleans and Plaquemines Parish, smart growth is still possible. The Woodlands Trail and Park Bird Sanctuary in Plaquemines Parish is connected to public land owned by the federal government that connects to the City of New Orleans Wilderness Park. Woodlands Conservancy's restoration work on the 609-acres will ensure healthy, vital habitat for wildlife and both resident and neotropical migratory. Acquisition will ensure that this habitat will serve wildlife, migratory birds and the community's right to enjoy this natural area in perpetuity. With the nation's highest wetland loss being that of coastal forests being lost to conversion to development and fragmentation degrading its habitat value, the time for action is critical. In an effort to enhance the habitat for wildlife and migratory birds, assessment and ecosystem restoration work was initiated in 2007. Annual assessments have been conducted for five years and treatment was initiated in 2010 with funding from Barataria-Terrebonne National Estuary Program and other private sources. Phase II of Ecosystem Restoration will encompass 60-acres to be initiated in April 2011 with funding from the National Wildlife Federation Oil Spill Relief Fund. Phase III will target Ecosystem Restoration adjacent to trails and waterways with funding resulting from a recent consent decree resulting from Clean Water Act violations (SEP). The benefits of continuing the restoration on these 609-acres includes: - Provides a vital habitat corridor for neotropical migratory birds whose "refueling" areas along the coast have been damaged by the Deepwater Horizon well blowout - The low-lying area serves as a filtering ground for pollution and a natural sponge to absorb storm water runoff - The greenway area will be restored in order to continue serving as a wind buffer to protect the surrounding residences and businesses - Provides an "outdoor classroom" for educating school children and the public at large of the function and value of wetlands - Provides a low-impact educational and recreational facility that connects to the MRT - Provides a quality of life characteristic that attracts Fortune 500 executives who are considering relocating to a new community	English Turn, Orleans Parish, Louisiana	$ 6,667,000	Public
Worldwide Consortium For Any DANGEROUS MANUFACTURING PROCESSES	1% FROM EACH COMPANY TO FUND RESEARCH AND TO BE ABLE TO STOP CONTAIN OR DIFFUSE DANGEROUS SITUATIONS THAT CAN BECOME HARMFUL TO THE PLANET AND ITS BEINGS i.e.. Valdez Oil Spill, Fukashima, BP, Chernoble, 3 mile island..... For the future of this planets sake.	Texas, Louisiana, Mississippi, Alabama, Florida	Not provided with submission	Public
Yellow Cotton Bay	Kayak launch and pier	Plaquemines Parish, Louisiana	$ 400,000	LDWF

Appendix B

Alternatives' Screening
Step 2 and Step 3

Appendix B: Alternatives Screened in Step #2 (**Table B-1**) and Step #3 (**Table B-2**)

Table B-1. Alternatives screened in Step #2, with project source and screening result

Project Name	Office of Fisheries Projects	Wallop-Breaux Projects	Office of Wildlife Projects	Public Submissions (from Federal and State Portals)	Screening Result
AD WMA Access			X		Carried Forward
AD WMA Campgrounds			X		Carried Forward
Addressing Marine Debris				X	Carried Forward
Atchafalaya NWR				X	More clearly aligned with "Federally Managed Lands" Restoration Type
Avery Island	X				Carried Forward
Bayou Dularge	X				Carried Forward
Belle Chasse		X			Carried Forward
Berwick		X			Carried Forward
Big Branch Marsh NWR				X	More clearly aligned with "Federally Managed Lands" Restoration Type
Blue Crab Trap Removal				X	Carried Forward
Bohemia	X				Carried Forward
Bonnet Carre	X				Carried Forward
Breakwater Park West End				X	Carried Forward
Bubba Dove	X				Carried Forward
Bucktown	X				Carried Forward
Cameron	X				Carried Forward
Cane Bayou	X				Carried Forward
Chef Menteur to Rigolets				X	Would not provide sufficient benefit to recreational fishing use services
Chef Pass	X				Carried Forward
Chitimacha		X			Carried Forward
Conservation Educational Outreach Program				X	Would not provide sufficient benefit to recreational use services and more appropriate conducted by another TIG (FL)
Davis Pond	X				Carried Forward
Deatonville	X				Carried Forward
Deep-Sea Education				X	More appropriately conducted by another TIG (Open Ocean)

Table B-1. Alternatives screened in Step #2, with project source and screening result (continued)

Project Name	Office of Fisheries Projects	Wallop-Breaux Projects	Office of Wildlife Projects	Public Submissions (from Federal and State Portals)	Screening Result
Delcambre	X				Carried Forward
Derelict Gear and Marine Debris Removal				X	Carried Forward
Des Allemands		X			Carried Forward
Descending Devices				X	Carried Forward
Dolphin Conservation Mobile Education/ Outreach Exhibit				X	More clearly aligned with Marine Mammals Restoration Type
Dulac	X				Carried Forward
Elmer's Island Access	X				Carried Forward
Empire	X				Carried Forward
Enhancements to Charter Surveys				X	Carried Forward
Enhancements to Private Surveys				X	Carried Forward
Field of Dreams				X	Would not provide sufficient benefit to recreational fishing use services
FishSmart: Snapper and Grouper				X	Carried Forward
Fort Jackson	X				Carried Forward
Fort Macomb	X				Carried Forward
Fort Pike	X				Carried Forward
Fourchon	X				Carried Forward
Freshwater Bayou	X				Carried Forward
GOM Marine Sanctuaries				X	More appropriately conducted by another TIG (Open Ocean)
Grand Isle LDWF Lab	X				Carried Forward
Grand Isle Pier			X		Carried Forward
Grand Isle State Park	X				Carried Forward
Houma's 1st Adaptive Park				X	Would not provide sufficient benefit to creational fishing use services
Hwy 11/I-10	X				Carried Forward
Hwy 90		X			Carried Forward
I-10 Bridge/Lake Charles	X				Carried Forward
Increased Catch and Effort Reporting Waves				X	Carried Forward

Table B-1. Alternatives screened in Step #2, with project source and screening result (continued)

Project Name	Office of Fisheries Projects	Wallop-Breaux Projects	Office of Wildlife Projects	Public Submissions (from Federal and State Portals)	Screening Result
Intracoastal City	X				Carried Forward
Island Road Launch			X		Carried Forward
Island Road Piers			X		Carried Forward
Joe's Cove	X				Carried Forward
Lake Charles SCEC	X				Carried Forward
Lake Maurepas Land Protection Effort				X	Would not provide sufficient benefit to recreational fishing use services
Lake Road	X				Carried Forward
Linear Wetlands Park				X	Carried Forward
Marine Finfish Hatchery				X	Original hatchery project – not carried forward
Marine Fish Hatchery with Concrete Barge Growout				X	Carried Forward
Marine Mammal Aerial Outreach Banners				X	More clearly aligned with Marine Mammals Restoration Type
Marine Mammal Conservation Print Ads				X	More clearly aligned with Marine Mammals Restoration Type
Marine Mammal Outreach Materials & Signs				X	More clearly aligned with Marine Mammals Restoration Type
Maurepas	X				Carried Forward
Mermentau	X				Carried Forward
Middle Pearl	X				Carried Forward
Montegut Reef			X		Carried Forward
Oak Ridge	X				Carried Forward
Old Hwy 1	X				Carried Forward
PAC Fishing Piers		X			Carried Forward
PAC Pirogue Launch		X			Carried Forward
PAC Pirogue Pull-Overs		X			Carried Forward
PAC S1&S2		X			Carried Forward
PAL Access		X			Carried Forward
PAL Campgrounds		X			Carried Forward
Palmetto Island	X				Carried Forward
Patout Bayou	X				Carried Forward
Port Sulphur		X			Carried Forward

Table B-1. Alternatives screened in Step #2, with project source and screening result (continued)

Project Name	Office of Fisheries Projects	Wallop-Breaux Projects	Office of Wildlife Projects	Public Submissions (from Federal and State Portals)	Screening Result
Protect Wild Dolphin Billboards				X	More clearly aligned with Marine Mammals Restoration Type
Rat's Nest Rd	X				Carried Forward
Reef Ball® Dock and Sea Wall Habitat				X	Carried Forward
Reef Fish Restoration				X	Carried Forward
Research and Outreach to Understand and Minimize Human-Dolphin Interactions				X	More clearly aligned with Marine Mammals Restoration Type
Rockefeller Piers			X		Carried Forward
Rockefeller Signage			X		Carried Forward
Sabine NWR	X				Carried Forward
Seawall Lights		X			Carried Forward
Shell Beach	X				Carried Forward
South Shore Harbor	X				Carried Forward
Southeast Corner	X				Carried Forward
Statewide Artificial Reefs	X				Carried Forward
Venice	X				Carried Forward
West Cove	X				Carried Forward
West End Park Lagoon Habitat				X	Carried Forward
Wetlands Education Project				X	Would not provide sufficient benefit to recreational fishing use services
Wetlands Plant Nursery				X	Would not provide sufficient benefit to recreational fishing use services
WHARF				X	Carried Forward
Williams Blvd	X				Carried Forward
Woodlands Trail - Greenway Corridor Project				X	Would not provide sufficient benefit to recreational fishing use services
Woodlands Trail - Interpretive Center				X	Would not provide sufficient benefit to recreational fishing use services
Woodlands Trail - Phase I				X	Would not provide sufficient benefit to recreational fishing use services
Yellow Cotton Bay	X				Carried Forward

Table B-2. Alternatives screened in Step #3, with project cost estimate and screening result

Project Name	Cost Estimates	Screening Result
AD WMA Access	$1,500,000	Medium
AD WMA Campgrounds	$7,800,000	Medium
Addressing Marine Debris	$10,000,000	Medium
Avery Island	$250,000	Medium
Bayou Dularge	$250,000	Medium
Belle Chasse	$200,000	High
Berwick	$270,000	High
Blue Crab Trap Removal	$10,000,000	Medium
Bohemia	n/a	Low
Bonnet Carre	$250,000	Medium
Breakwater Park West End	$50,000,000	Medium
Bubba Dove	$500,000	Medium
Bucktown	$1,750,000	Medium
Cameron	$250,000	Medium
Cane Bayou	$250,000	Medium
Chef Pass	$250,000	Medium
Chitimacha	$570,000	High
Davis Pond	$500,000	Medium
Deatonville	$250,000	Medium
Delcambre	$250,000	Medium
Derelict Gear and Marine Debris Removal	n/a	Medium
Des Allemands	$1,110,000	Medium
Descending Devices	$4,550,000	Medium
Dulac	$400,000	Medium
Elmer's Island Access	$6,000,000	High
Empire	$400,000	Medium
Enhancements to Charter Surveys	$5,000,000	Medium
Enhancements to Private Surveys	n/a	Medium
FishSmart: Snapper and Grouper	$20,000,000	Medium
Fort Jackson	$500,000	Medium
Fort Macomb	$250,000	Medium
Fort Pike	$250,000	Medium

Table B-2. Alternatives screened in Step #3, with project cost estimate and screening result (continued)

Project Name	Cost Estimates	Screening Result
Fourchon	$250,000	Medium
Freshwater Bayou	$250,000	Medium
Grand Isle LDWF Lab	$250,000	High
Grand Isle Pier	$1,000,000	High
Grand Isle State Park	$250,000	Medium
Hwy 11/I-10	$250,000	Medium
Hwy 90	$1,340,000	High
I-10 Bridge/Lake Charles	$1,000,000	Medium
Increased Catch and Effort Reporting Waves	$10,000,000	Medium
Intracoastal City	$1,000,000	Medium
Island Road Launch	$3,000,000	High
Island Road Piers	$3,000,000	High
Joe's Cove	$250,000	Medium
Lake Charles SCEC	$7,000,000	High
Lake Road	$250,000	Medium
Linear Wetlands Park	$15,000,000	Medium
Marine Fish Hatchery	$2,000,000 - $50,000,000	Low
Maurepas	$250,000	Medium
Mermentau	$250,000	Medium
Middle Pearl	$250,000	Medium
Montegut Reef	$2,600,000	Medium
Oak Ridge	$250,000	Medium
Old Hwy 1	$400,000	Medium
PAC Fishing Piers	$500,000	High
PAC Pirogue Launch	$300,000	High
PAC Pirogue Pull-Overs	$100,000	High
PAC S1&S2	$500,000	High
PAL Access	$100,000	High
PAL Campgrounds	$1,500,000	High
Palmetto Island	$250,000	Medium
Patout Bayou	$250,000	Medium
Port Sulphur	$150,000	High
Rat's Nest Rd	n/a	Low
Reef Ball® Dock and Sea Wall Habitat	$1,000,000	Medium

Table B-2. Alternatives Screened in Step #3, with project cost estimate and screening result (continued)

Project Name	Cost Estimates	Screening Result
Reef Fish Restoration	n/a	Low
Rockefeller Piers	$100,000	High
Rockefeller Signage	$30,000	High
Sabine NWR	$250,000	Medium
Seawall Lights	$330,000	High
Shell Beach	$250,000	Medium
South Shore Harbor	$330,000	Low
Southeast Corner	$250,000	Medium
Statewide Artificial Reefs	$6,000,000	High
Venice	n/a	Low
West Cove	$250,000	Medium
West End Park Lagoon Habitat	$200,000	Medium
WHARF	n/a	Medium
Williams Blvd	$250,000	Medium
Yellow Cotton Bay	$400,000	Medium

Appendix C

NEPA Resource Guidelines

Table 6.3-2. Guidelines for NEPA impact determinations in the Final PDARP/PEIS.

Resource	Impact Duration	Impact Intensity Definitions		
		Minor	Moderate	Major
Physical Resources				
Geology and Substrates	Short-term: During construction period. Long-term: Over the life of the project or longer.	Disturbance to geologic features or soils could be detectable, but could be small and localized. There could be no changes to local geologic features or soil characteristics. Erosion and/or compaction could occur in localized areas.	Disturbance could occur over local and immediately adjacent areas. Impacts to geology or soils could be readily apparent and result in changes to the soil character or local geologic characteristics. Erosion and compaction impacts could occur over local and immediately adjacent areas.	Disturbance could occur over a widespread area. Impacts to geology or soils could be readily apparent and could result in changes to the character of the geology or soils over a widespread area. Erosion and compaction could occur over a widespread area. Disruptions to substrates or soils may be permanent.
Hydrology and Water Quality	Short-term: During construction period. Long-term: Over the life of the project or longer.	Hydrology: The effect on hydrology could be measurable, but it could be small and localized. The effect could only temporarily alter the area's hydrology, including surface and ground water flows. Water quality: Impacts could result in a detectable change to water quality, but the change could be expected to be small and localized. Impacts could quickly become undetectable. State water quality standards as required by the Clean Water Act could not be exceeded. Floodplains: Impacts may result in a detectable change to natural and beneficial floodplain values, but the change could be expected to be small, and localized. There could be no appreciable increased risk of flood loss including impacts on human safety, health, and welfare. Wetlands: The effect on wetlands could be measurable but small in terms of area and the nature of the impact. A small impact on the size, integrity, or	Hydrology: The effect on hydrology could be measurable, but small and limited to local and adjacent areas. The effect could permanently alter the area's hydrology, including surface and ground water flows. Water quality: Effects to water quality could be observable over a relatively large area. Impacts could result in a change to water quality that could be readily detectable and limited to local and adjacent areas. Change in water quality could persist; however, it could likely not exceed state water quality standards as required by the Clean Water Act. Floodplains: Impacts could result in a change to natural and beneficial floodplain values and could be readily detectable, but limited to local and adjacent areas. Location of operations in floodplains could increase risk of flood loss, including impacts on human safety, health, and welfare.	Hydrology: The effect on hydrology could be measurable and widespread. The effect could permanently alter hydrologic patterns including surface and ground water flows. Water quality: Impacts could likely result in a change to water quality that could be readily detectable and widespread. Impacts could likely result in exceedance of state water quality standards and/or could impair designated uses of a water body. Floodplains: Impacts could result in a change to natural and beneficial floodplain values that could have substantial consequences over a widespread area. Location of operations could increase risk of flood loss, including impacts on human safety, health, and welfare. Wetlands: The action could cause a permanent loss of wetlands across a widespread area. The character of the wetlands could be changed so that the functions typically provided by the wetland could be permanently lost.

Resource	Impact Duration	Impact Intensity Definitions		
		Minor	Moderate	Major
		connectivity could occur; however, wetland function could not be affected and natural restoration could occur if left alone.	Wetlands: The action could cause a measurable effect on wetlands indicators (size, integrity, or connectivity) or could result in a permanent loss of wetland acreage across local and adjacent areas. However, wetland functions could only be permanently altered in limited areas.	
Air Quality	Short-term: During construction period. Long-term: Over the life of the project or longer.	The impact on air quality may be measurable, but could be localized and temporary, such that the emissions do not exceed the Environmental Protection Agency's (EPA's) *de minimis* criteria for a general conformity determination under the Clean Air Act (40 CFR § 93.153).	The impact on air quality could be measurable and limited to local and adjacent areas. Emissions of criteria pollutants could be at EPA's *de minimis* criteria levels for general conformity determination.	The impact on air quality could be measurable over a widespread area. Emissions are high, such that they could exceed EPA's *de minimis* criteria for a general conformity determination.
Noise	Short-term: During construction period. Long-term: Over the life of the project.	Increased noise could attract attention, but its contribution to the soundscape would be localized and unlikely to affect current user activities.	Increased noise could attract attention and contribute to the soundscape including in local areas and those adjacent to the action, but could not dominate. User activities could be affected.	Increased noise could attract attention and dominate the soundscape over widespread areas. Noise levels could eliminate or discourage user activities.
Biological Resources				
Habitats	Short-term: Lasting less than two growing seasons. Long-term: Lasting longer than two growing seasons.	Impacts on native vegetation may be detectable, but could not alter natural conditions and could be limited to localized areas. Infrequent disturbance to individual plants could be expected, but would not affect local or range-wide population stability. Infrequent or insignificant one-time disturbance to locally suitable habitat could occur, but sufficient habitat could remain functional at both the local and regional scales to maintain the viability of the species. Opportunity for increased spread of non-native species could be detectable but	Impacts on native vegetation could be measureable but limited to local and adjacent areas. Occasional disturbance to individual plants could be expected. These disturbances could affect local populations negatively but could not be expected to affect regional population stability. Some impacts might occur in key habitats, but sufficient local habitat could retain function to maintain the viability of the species both locally and throughout its range. Opportunity for increased spread of non-native species could be detectable and	Impacts on native vegetation could be measurable and widespread. Frequent disturbances of individual plants could be expected, with negative impacts to both local and regional population levels. These disturbances could negatively affect range-wide population stability. Some impacts might occur in key habitats, and habitat impacts could negatively affect the viability of the species both locally and throughout its range. Actions could result in the widespread increase of non-native species, resulting in broad and permanent changes to native

Resource	Impact Duration	Impact Intensity Definitions		
		Minor	Moderate	Major
		temporary and localized and could not displace native species populations and distributions.	limited to local and adjacent areas, but could only result in temporary changes to native species population and distributions.	species populations and distributions.
Wildlife Species (Including Birds)	Short-term: Lasting up to two breeding seasons, depending on length of breeding season. Long-term: Lasting more than two breeding seasons.	Impacts to native species, their habitats, or the natural processes sustaining them could be detectable, but localized, and could not measurably alter natural conditions. Infrequent responses to disturbance by some individuals could be expected, but without interference to feeding, reproduction, resting, migrating, or other factors affecting population levels. Small changes to local population numbers, population structure, and other demographic factors could occur. Sufficient habitat could remain functional at both the local and range-wide scales to maintain the viability of the species. Opportunity for increased spread of non-native species could be detectable but temporary and localized, and these species could not displace native species populations and distributions.	Impacts on native species, their habitats, or the natural processes sustaining them could be measureable but limited to local and adjacent areas. Occasional responses to disturbance by some individuals could be expected, with some negative impacts to feeding, reproduction, resting, migrating, or other factors affecting local population levels. Some impacts might occur in key habitats. However, sufficient population numbers or habitat could retain function to maintain the viability of the species both locally and throughout its range. Opportunity for increased spread of non-native species could be detectable and limited to local and adjacent areas, but could only result in temporary changes to native species population and distributions.	Impacts on native species, their habitats, or the natural processes sustaining them could be detectable and widespread. Frequent responses to disturbance by some individuals could be expected, with negative impacts to feeding, reproduction, migrating, or other factors resulting in a decrease in both local and range-wide population levels and habitat type. Impacts could occur during critical periods of reproduction or in key habitats and could result in direct mortality or loss of habitat that might affect the viability of a species. Local population numbers, population structure, and other demographic factors might experience large changes or declines. Actions could result in the widespread increase of non-native species resulting in broad and permanent changes to native species populations and distributions.
Marine and Estuarine Fauna (Fish, Shellfish, Benthic Organisms)	Short-term: Lasting up to two spawning seasons, depending on length of season. Long-term: Lasting more than two spawning seasons.	Impacts could be detectable and localized but small. Disturbance of individual species could occur; however, there could be no change in the diversity or local populations of marine and estuarine species. Any disturbance could not interfere with key behaviors such as feeding and spawning. There could be no restriction of movements daily or seasonally. Opportunity for increased spread of non-native species could be detectable but	Impacts could be readily apparent and result in a change in marine and estuarine species populations in local and adjacent areas. Areas being disturbed may display a change in species diversity; however, overall populations could not be altered. Some key behaviors could be affected but not to the extent that species viability is affected. Some movements could be restricted seasonally. Opportunity for increased spread of non-	Impacts could be readily apparent and could substantially change marine and estuarine species populations over a wide-scale area, possibly river-basin-wide. Disturbances could result in a decrease in fish species diversity and populations. The viability of some species could be affected. Species movements could be seasonally constrained or eliminated. Actions could result in the widespread increase of non-native species resulting in broad and permanent changes to native

Resource	Impact Duration	Impact Intensity Definitions		
		Minor	Moderate	Major
		temporary and localized and these species could not displace native species populations and distributions.	native species could be detectable and limited to local and adjacent areas, but could only result in temporary changes to native species population and distributions.	species populations and distributions.
Protected Species	Short-term: Lasting up to one breeding/growing season. Long-term: Lasting more than one breeding/growing season.	Impacts on protected species, their habitats, or the natural processes sustaining them could be detectable, but small and localized, and could not measurably alter natural conditions. Impacts could likely result in a "may affect, not likely to adversely affect" determination for at least one listed species.	Impacts on protected species, their habitats, or the natural processes sustaining them could be detectable and some alteration in the numbers of protected species or occasional responses to disturbance by some individuals could be expected, with some negative impacts to feeding, reproduction, resting, migrating, or other factors affecting local and adjacent population levels. Impacts could occur in key habitats, but sufficient population numbers or habitat could remain functional to maintain the viability of the species both locally and throughout their range. Some disturbance to individuals or impacts to potential or designated critical habitat could occur. Impacts could likely result in a "may affect, likely to adversely affect" determination for at least one listed species. No adverse modification of critical habitat could be expected.	Impacts on protected species, their habitats, or the natural processes sustaining them could be detectable, widespread, and permanent. Substantial impacts to the population numbers of protected species, or interference with their survival, growth, or reproduction could be expected. There could be impacts to key habitat, resulting in substantial reductions in species numbers. Results in an "is likely to jeopardize proposed or listed species/adversely modify proposed or designated critical habitat (impairment)" determination for at least one listed species.

Resource	Impact Duration	Impact Intensity Definitions		
		Minor	Moderate	Major
Socioeconomic Resources				
Socioeconomics and Environmental Justice[a]	Short-term: During construction period. Long-term: Over the life of the project or longer.	A few individuals, groups, businesses, properties, or institutions could be affected. Impacts could be small and localized. These impacts are not expected to substantively alter social and/or economic conditions. Actions could not disproportionately affect minority and low-income populations.	Many individuals, groups, businesses, properties, or institutions could be affected. Impacts could be readily apparent and detectable in local and adjacent areas and could have a noticeable effect on social and/or economic conditions. Actions could disproportionately affect minority and low-income populations. However, the impact could be temporary and localized.	A large number of individuals, groups, businesses, properties, or institutions could be affected. Impacts could be readily detectable and observed, extend over a widespread area, and have a substantial influence on social and/or economic conditions. Actions could disproportionately affect minority and low-income populations, and this impact could be permanent and widespread.
Cultural Resources	Short-term: During construction period. Long-term: Over the life of the project or longer.	The disturbance of a site(s), building, structure, or object could be confined to a small area with little, if any, loss of important cultural information potential.	Disturbance of a site(s), building, structure, or object not expected to result in a substantial loss of important cultural information.	Disturbance of a site(s), building, structure, or object could be substantial and may result in the loss of most or all its potential to yield important cultural information.
Infrastructure	Short-term: During construction period. Long-term: Over the life of the project or longer.	The action could affect public services or utilities but the impact could be localized and within operational capacities. There could be negligible increases in local daily traffic volumes resulting in perceived inconvenience to drivers but no actual disruptions to traffic.	The action could affect public services or utilities in local and adjacent areas and the impact could require the acquisition of additional service providers or capacity. Detectable increase in daily traffic volumes (with slightly reduced speed of travel), resulting in slowed traffic and delays, but no change in level of service (LOS). Short service interruptions (temporary closure for a few hours) to roadway and railroad traffic could occur.	The action could affect public services or utilities over a widespread area resulting in the loss of certain services or necessary utilities. Extensive increase in daily traffic volumes (with reduced speed of travel) resulting in an adverse change in LOS to worsened conditions. Extensive service disruptions (temporary closure of one day or more) to roadways or railroad traffic could occur.
Land and Marine Management	Short-term: During construction period. Long-term: Over the life of the project or longer.	The action could require a variance or zoning change or an amendment to a land use, area comprehensive, or management plan, but could not affect overall use and management beyond the local area.	The action could require a variance or zoning change or an amendment to a land use, area comprehensive, or management plan, and could affect overall land use and management in local and adjacent areas.	The action could cause permanent changes to and conflict with land uses or management plans over a widespread area.

Resource	Impact Duration	Impact Intensity Definitions		
		Minor	Moderate	Major
Tourism and Recreational Use	Short-term: During construction period. Long-term: Over the life of the project or longer.	There could be partial developed recreational site closures to protect public safety. The same site capacity and visitor experience could remain unchanged after construction. The impact could be detectable and/or could only affect some recreationists. Users could likely be aware of the action but changes in use could be slight. There could be partial closures to protect public safety. Impacts could be local. There could be a change in local recreational opportunities; however, it could affect relatively few visitors or could not affect any related recreational activities.	There could be complete site closures to protect public safety. However, the sites could be reopened after activities occur. There could be slightly reduced site capacity. The visitor experience could be slightly changed but still available. The impact could be readily apparent and/or could affect many recreationists locally and in adjacent areas. Users could be aware of the action. There could be complete closures to protect public safety. However, the areas could be reopened after activities occur. Some users could choose to pursue activities in other available local or regional areas.	All developed site capacity could be eliminated because developed facilities could be closed and removed. Visitors could be displaced to facilities over a widespread area and visitor experiences could no longer be available in many locations. The impact could affect most recreationists over a widespread area. Users could be highly aware of the action. Users could choose to pursue activities in other available regional areas.
Fisheries and Aquaculture	Short-term: During construction period. Long-term: Over the life of the project or longer.	A few individuals, groups, businesses, properties, or institutions could be affected. Impacts could be small and localized. These impacts are not expected to substantively alter social and/or economic conditions.	Many individuals, groups, businesses, properties, or institutions could be affected. Impacts could be readily apparent and detectable in local and adjacent areas and could have a noticeable effect on social and/or economic conditions.	A large number of individuals, groups, businesses, properties, or institutions could be affected. Impacts could be readily detectable and observed, extend over a widespread area, and could have a substantial influence on social and/or economic conditions.
Marine Transporta-tion	Short-term: During construction period. Long-term: Over the life of the project or longer.	The action could affect public services or utilities, but the impact could be localized and within operational capacities. There could be negligible increases in local daily marine traffic volumes, resulting in perceived inconvenience to operators but no actual disruptions to transportation.	The action could affect public services or utilities in local and adjacent areas, and the impact could require the acquisition of additional service providers or capacity. Detectable increase in daily marine traffic volumes could occur (with slightly reduced speed of travel), resulting in slowed traffic and delays. Short service interruptions could occur (temporary delays for a few hours).	The action could affect public services utilities over a widespread area resulting in the loss of certain services or necessary utilities. Extensive increase in daily marine traffic volumes could occur (with reduced speed of travel), resulting in extensive service disruptions (temporary closure of one day or more).

Resource	Impact Duration	Impact Intensity Definitions		
		Minor	Moderate	Major
Aesthetics and Visual Resources	Short-term: During construction period. Long-term: Over the life of the project or longer.	There could be a change in the view shed that was readily apparent but could not attract attention, dominate the view, or detract from current user activities or experiences.	There could be a change in the view shed that was readily apparent and attracts attention. Changes could not dominate the viewscape, although they could detract from the current user activities or experiences.	Changes to the characteristic views could dominate and detract from current user activities or experiences.
Public Health and Safety, Including Flood and Shoreline Protection	Short-term: During construction period. Long-term: Over the life of the project or longer.	Actions could not result in 1) soil, ground water, and/or surface water contamination; 2) exposure of contaminated media to construction workers or transmission line operations personnel; and/or 3) mobilization and migration of contaminants currently in the soil, ground water, or surface water at levels that could harm the workers or general public. Increased risk of potential hazards (e.g., increased likelihood of storm surge) to visitors, residents, and workers from decreased shoreline integrity could be temporary and localized.	Project construction and operation could result in 1) exposure, mobilization and/or migration of existing contaminated soil, ground water, or surface water to an extent that requires mitigation; and/or 2) could introduce detectable levels of contaminants to soil, ground water, and/or surface water in localized areas within the project boundaries such that mitigation/remediation is required to restore the affected area to the preconstruction conditions. Increased risk of potential hazards to visitors, residents, and workers from decreased shoreline integrity could be sufficient to cause a permanent change in use patterns and area avoidance in local and adjacent areas.	Actions could result in 1) soil, ground water, and/or surface water contamination at levels exceeding federal, state, or local hazardous waste criteria, including those established by 40 CFR § 261; 2) mobilization of contaminants currently in the soil, ground water, or surface water, resulting in exposure of humans or other sensitive receptors such as plants and wildlife to contaminant levels that could result in health effects; and 3) the presence of contaminated soil, ground water, or surface water within the project area, exposing workers and/or the public to contaminated or hazardous materials at levels exceeding those permitted by the federal Occupational Safety and Health Administration (OSHA) in 29 CFR § 1910. Increased risk of potential hazards to visitors, residents, and workers from decreased shoreline integrity could be substantial and could cause permanent changes in use patterns and area avoidance over a widespread area.

[a] Evaluation of potential environmental justice issues will be fully address in future tiered documents.

Appendix D

USACE Wetland Determination Letter

DEPARTMENT OF THE ARMY

NEW ORLEANS DISTRICT, CORPS OF ENGINEERS

P.O. BOX 60267

NEW ORLEANS, LOUISIANA 70160-0267

May 11, 2001

REPLY TO
ATTENTION OF:

Operations Division
Surveillance and Enforcement Section

EXPIRED

20-010-1930

Mr. R. Regan Brown
Arabie Environmental Solutions
Post Office Box 928
Lake Charles, Louisiana 70602

Dear Mr. Brown:

Reference is made to your request, on behalf of Lundy & Davis, L.L.P., for a U.S. Army Corps of Engineers' (Corps) jurisdictional determination on property located in Section 15, Township 10 South, Range 8 West, Calcasieu Parish, Louisiana (enclosed map). Specifically, this property is identified as a 206-acre tract, south of Prien Lake Road and east of LA Highway 14.

Based on review of recent maps, aerial photography, soils data, and information provided with your request, we have determined that this property is not in a wetland subject to Corps' jurisdiction. A Department of the Army (DA) permit under Section 404 of the Clean Water Act will not be required for the deposition or redistribution of dredged or fill material on this site. However, a DA permit will be required if you propose to deposit dredged or fill material into the unnamed drain.

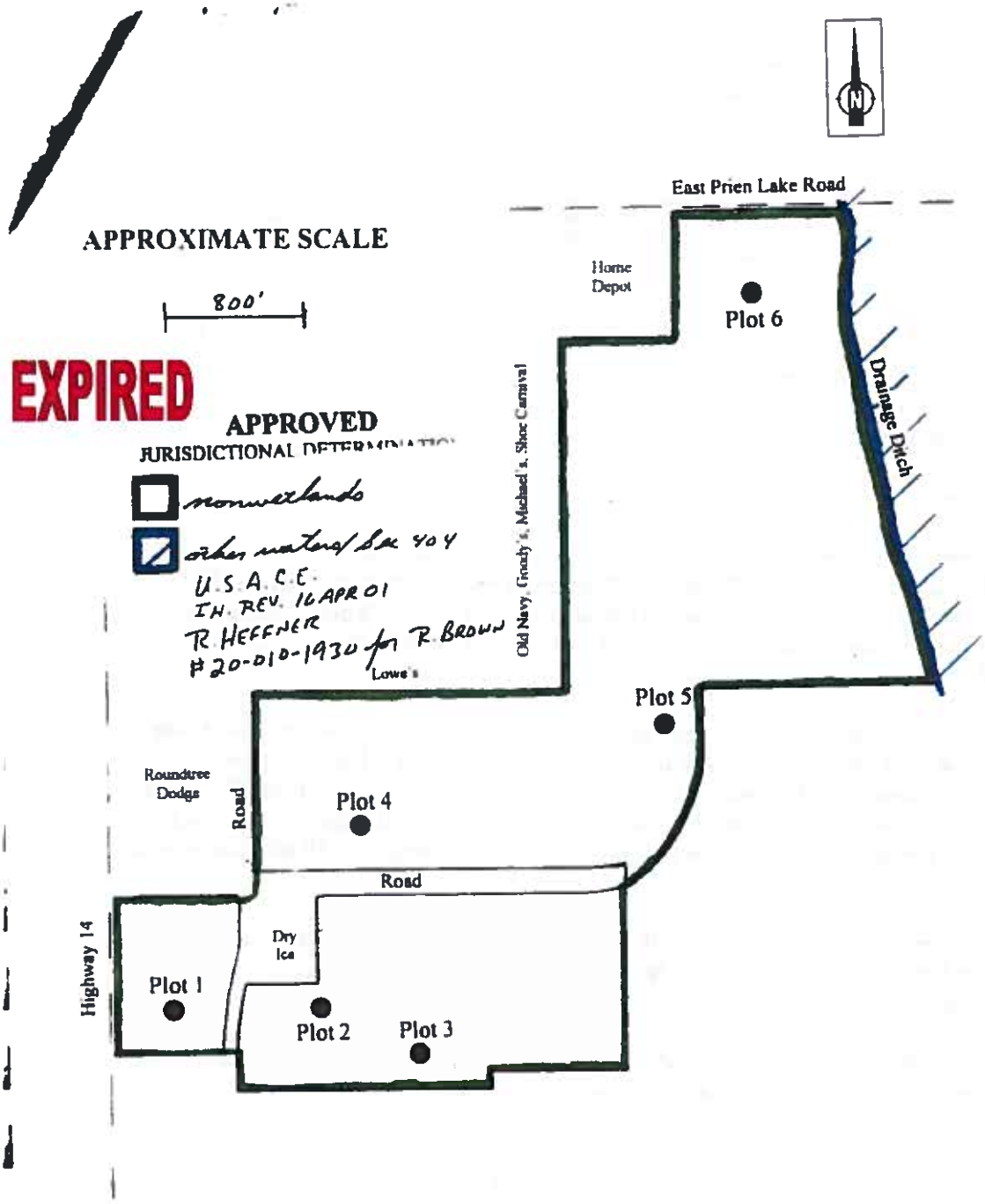
You and your client are advised that this approved jurisdictional determination is valid for a period of 5 years from the date of this letter unless new information warrants revision prior to the expiration date.

Should there be any questions concerning these matters, please contact Mr. Robert Heffner at (504) 862-2274 and reference our Account No. 20-010-1930.

Sincerely,

Ronald J. Ventola
Chief, Regulatory Branch

Enclosures



ARABIE ENVIRONMENTAL SOLUTIONS, INC.
FIGURE 2
SITE DIAGRAM
WETLANDS DELINEATION
POWER CENTRE TRACT
LUNDY & DAVIS, L.L.P.
LAKE CHARLES, LOUISIANA

Appendix E

Monitoring and Adaptive Management Plan

Appendix E

Monitoring and Adaptive Management Plan

A monitoring plan for each project was developed and is included in the sections below. The restoration objective of this RP/EA is to restore a portion of the lost recreational use in Louisiana caused by the DWH oil spill by enhancing recreational opportunities in Louisiana. This would be accomplished by improving the public's accessibility and enjoyment of natural resources through the various alternatives proposed. Monitoring and adaptive management plans will include measurable methodologies and parameters for data collection, identification of key uncertainties, and tracking of compliance with appropriate regulations.

1.1 Elmer's Island

Restoration Approaches: This restoration project type involves the restoration approaches of enhancing public access to natural resources for recreational use and enhancing recreational experiences.

1.1.1 Project Summary

This project encompasses a suite of elements and services that would enhance recreational access and experiences at Elmer's Island Refuge, in Grand Isle, Louisiana. Currently, the refuge is managed as a natural area, and is devoid of public amenities. Access to the beach from Highway 1 is provided through a crushed stone roadway, maintained by the Louisiana Department of Wildlife and Fisheries (LDWF), which ends at a large parking area adjacent to the beach. Prior to the Caminada Headland Beach and Dune Restoration Project (CAM II), beach driving was allowed from this access point; however, beach driving is no longer allowed post-CAM II. While beach fishing is available along the refuge's entire shoreline, the most popular surf fishing location is near Caminada Pass, which is located over 1.5 miles from the main parking area. There are roadside fishing opportunities, as well as undeveloped footpaths that offer additional shoreline fishing access. Small boats and kayaks can also be launched from some shoreline areas, but these improvised launches are not maintained.

The refuge is managed to provide habitats for protected species, while simultaneously providing recreational opportunities for the public all year round. As such, the proposed recreational use restoration projects seek to develop improved access opportunities, while minimizing negative impacts to the natural resources and in some cases actually improving aquatic habitats. The proposed Elmer's Island project alternative would entail development of the final design specifications, and the implementation of the following features and scope of activities:

- Completion of engineering and design to allow for project construction;
- Systematic execution of all project construction activities including contractor oversight;
- Improvement of aquatic hydrology through the installation of culverts under the access road;

- Enhancement of access features by improvements to currently improvised parking areas and kayak/small-boat launches;
- -Development of a contracted shuttle service from the main parking area to facilitate beach access points;
- Repair of breach/washout location to allow foot traffic to additional fishing areas;
- Improvements to dedicated birding area, including walking paths and observation area;
- Development of educational outreach materials to complement the Restoration project;
- Long-term operational costs (15 years), including routine trash collection and removal;
- Long-term maintenance costs (15 years) associated with project upkeep, including routine and emergency road repairs; and
- Monitoring and Adaptive Management, including monitoring of project implementation and recreational usage monitoring;

These projects build upon the current usage of the property, incorporating restoration techniques that would improve and enhance recreational opportunities and direct access. The entrance road (Elmer's Island Road) is the only way in or out, and requires frequent maintenance, such as grading and the addition of limestone. Occasionally, after strong tropical storms or hurricanes, the road needs emergency maintenance – repairs requiring closure of the refuge, due to road access damage. Litter and debris on the beach and the access road decrease the recreational value of the refuge; routine trash removal would improve the recreational experience. Improved parking areas with ample kayak launches would provide access for anglers and naturalists to the interior marshes and the canals throughout the property. For the first year, the shuttle service would ferry the public from the existing parking area east, towards Caminada Pass. After the first year, operation of the shuttle service would be evaluated to determine if the shuttle service would service the beachfront westward of the existing parking lot, or remain operational only east of the existing parking area. Repairing the breach would allow pedestrians access to an area that was once heavily used for fishing. Installing a series of culverts under the access road would lead to an overall enhancement of the interior marsh ecosystem through hydrologic reconnection, which would in turn benefit a variety of sportfish and prey species, leading to improved recreational experiences. Building walking trails, bird blinds, and observation decks would increase birding opportunities. Educational signage would complement the Restoration project by adding informational features to the Refuge.

1.1.2 Restoration Goals and Project Restoration Objectives

The overall goals of the proposed project are to restore for lost recreational use along the Louisiana coast and to improve the public's accessibility and enjoyment of Louisiana's coastal resources. The specific objective for this restoration project is to provide and enhance public access to natural resources for enhanced recreational experiences at Elmer's Island. The specific performance criteria for this project are to: (1) ensure Elmer's Island access enhancement

elements are designed, constructed, and implemented as described; and (2) identify future changes in visitation associated with the new project elements.

1.1.3 Roles and Responsibilities

The LDWF (through its staff and/or contractors) would be responsible for ensuring that the project elements are designed and constructed according to plans, and to ensure that construction activities comply with the full set of environmental permit conditions.

Additionally, LDWF would be responsible for developing a series of contracts to provide a shuttle service for visitors to facilitate access to the beach from the main parking area. As such, LDWF would be responsible to executing and monitoring the contract and selected contractor to ensure the shuttle service operates according to established BMPs that would minimize negative impacts to natural resources.

Lastly, LDWF would be responsible for collecting and providing annual information on the total number of visitors to Elmer's Island. Following construction, LDWF would be responsible for the long-term (15 years) operations and maintenance of the restoration project.

1.1.4 Project Monitoring

The proposed monitoring for this restoration project on Elmer's Island, which includes a suite of elements, is organized by objectives. Monitoring parameters for each project objective are listed below. For each of the identified monitoring parameters, information is provided on the monitoring methods, timing and frequency, sample size, and sites. In addition, performance criteria for each parameter are identified (if applicable), including example corrective actions that could be taken if the performance criteria are not met. The parameters listed below may or may not be tied to performance criteria and/or corrective actions.

Monitoring Objective #1: Ensure the Elmer's Island access enhancement project is designed, constructed, and implemented according to plans and permitting requirements.

- Was the project implemented according to plans and permitting requirements?

  Parameter #1: Level of construction to terms of contract and permit requirements

  - Method: review design plans, contractor reports, conduct on-site inspections, and compare construction drawings to as-built specifications
  - Timing and frequency: monitoring would occur during all design stages and construction activities from start to completion; the project is expected to be implemented within a two-year time frame (design: 6-8 months; construction: 12-16 months)
  - Sample size: dependent on frequency and duration of design and construction activities
  - Sites: Elmer's Island Refuge
  - Performance criteria: Elmer's Island access enhancement restoration project is designed, constructed, and implemented according to plans and permitting requirements

- Corrective action: resolution with contractor(s) such that all contract terms and permit requirements are met

Monitoring Objective #2: Develop and implement contracted shuttle service for enhancing recreational access to the beach

- Was the shuttle service implemented according to BMPs and plan requirements?

  Parameter #1: Development and oversight of contract to implement shuttle service

  - Method: develop contract through state bidding process, review contract proposals and plans, contractor reports, conduct on-site inspections, and review GPS tracts to ensure the shuttle service is operating in the correct areas
  - Timing and frequency: monitoring would occur throughout the period of shuttle service operation over the life of each iterative contract (State contracts can only span 3 years maximum), thus allowing for adaptive management of the shuttle service operations and monitoring needs
  - Sample size: dependent on frequency and duration of shuttle activities (e.g., none during winter months, more during busy summer months)
  - Sites: Elmer's Island Refuge
  - Performance criteria: Elmer's Island shuttle service access enhancement restoration project is implemented according to plan requirements including any and all BMPs and guiding policies
  - Corrective action: resolution with contractor(s) such that all contract terms and requirements are met

Monitoring Objective #3: Identify future changes in visitation associated with the new project elements.

- Is there an identifiable increase in visitation associated with the new project elements?

  Parameter #1: Level of public use

  - Method: gate counts via automated counters (e.g., vehicle pressure sensors on road) and visual observations (e.g., single pass count of vehicles and estimations of total people and recreational activities being undertaken)
  - Timing and Frequency: counts would be conducted to estimate daily visitor use before, during, and after restoration construction activities. Automated counters would be deployed immediately after project acceptance to develop a baseline gate count (i.e., number of vehicles entering/exiting Elmer's Island daily), and would be maintained through post-construction monitoring. Visual observations would be conducted three times per month, one randomly selected weekday and two randomly selected weekend days, in conjunction with automated counter deployment. Usage monitoring would be

conducted for five years, beginning with initial deployment during pre-construction phase.

- Sample size: equal to the number of visitors annually for gate counts; 36 visual observations per year for 5 years
- Sites: Elmer's Island Refuge
- Performance criteria: Identifiable increase in visitation following implementation of the new restoration elements and services

Additional monitoring may also occur before, during, and after construction to satisfy compliance requirements and to help ensure restoration activities do not pose detrimental effects to natural resources.

1.1.5 Monitoring Schedule

The schedule for the project monitoring is shown in **Table 1**, separated by monitoring activity.

Table 1: Monitoring Schedule

Monitoring Parameters	Monitoring Timeframe		
	Prior to construction	During construction	Post - construction
Level of design and construction to terms of contract and permit requirements	X	X	X
Shuttle Service	X	X	X
Amount of visitation	X	X	X

1.1.6 Reporting and Data Requirements

Once all data have been reviewed for accuracy and completeness, they will be submitted to the Restoration Project Database. Data will be made publicly available through the DIVER Explorer Interface.

Reporting will occur once at Year 0 and annually during remaining years. Reports will be in the form of brief narratives encompassing project updates, visitor estimations, gate counts, and ongoing activities.

2.2 Lake Charles SCEC

Restoration Approaches: This restoration project type involves the restoration approaches of improving public access to natural resources for recreational use, providing outreach and education, and enhancing recreational experiences.

2.2.1 Project Summary

The mission of the SCEC would be to enhance stakeholder involvement by providing fisheries extension, access, outreach, and education to the public. The public visitation and outreach components of the center would provide dedicated indoor and outdoor spaces for public education on fisheries management activities and restoration programs. Outdoor elements of the project would provide additional possibilities for public education, along with opportunities to appreciate and enjoy nature. The proposed SCEC project alternative would entail development of the final design specifications, and the implementation of the following features and scope of activities:

- Visitor Science Center building, which would feature display aquaria showcasing Louisiana's diverse aquatic habitats, an aquatic animal touch tank exhibit, interactive educational displays, welcome desk for visitor sign-in and outreach materials, and public restrooms;
- Covered outdoor pavilion positioned over the fishing pond to provide ADA-compliant youth fishing opportunities, and other outreach activities; and
- Outdoor Educational Complex featuring a youth/outreach fishing pond, nature trail, educational signage, natural landscaping, outdoor plaza and sidewalks, other outdoor educational areas including hunter safety range, visitor parking, site utilities, and roadwork.

Construction of the SCEC may include a small water supply well to provide freshwater for the fishing pond and the visitor center tank systems. Exact design specification would be determined in the final design process. The pond would be managed by LDWF to showcase native populations and educate about fisheries management topics. The pond would be managed by LDWF staff, and would be stocked with popular recreational species through the LDWF Hatchery Program.

The LDWF would provide staffing to undertake operation and maintenance of this facility, but the implementation of the SCEC would be a collaborative undertaking utilizing volunteers to facilitate activities throughout its operational life. The NRDA funding would be applied to develop the final design, all permitting and construction activities, implementation monitoring, a portion of the operating and maintenance costs for the SCEC, and for long term utilization monitoring of the restoration project in the form of visitor logs and surveys.

2.2.2 Restoration Goals and Project Restoration Objectives

The overall goals of the proposed project are to restore for lost recreational use along the Louisiana coast and to improve the public's accessibility and enjoyment of Louisiana's coastal resources. The specific objective for this restoration project is to provide and enhance public education and outreach about Louisiana's natural resources, while offering additional recreational access and extension activities in Lake Charles. The specific performance criteria for this project are to: (1) all SCEC elements are designed, constructed, and implemented as described; and (2) visitation increases following implementation of the new project elements.

2.2.3 Roles and Responsibilities

The LDWF (through its staff and/or contractors) would be responsible for ensuring that the project elements are designed and constructed according to plans, and to ensure that construction activities comply with the full set of environmental permit conditions.

Additionally, LDWF would be responsible for collecting and providing annual information on the total number of visitors to the SCEC. Following construction, LDWF would be responsible for the long-term operations and maintenance of the restoration project.

2.2.4 Project Monitoring

The proposed monitoring for this restoration project in Lake Charles, which includes a suite of elements, is organized by objectives. Monitoring parameters for each project objective are listed below. For each of the identified monitoring parameters, information is provided on the monitoring methods, timing and frequency, sample size, and sites. In addition, performance criteria for each parameter are identified (if applicable), including example corrective actions that could be taken if the performance criteria are not met. The parameters listed below may or may not be tied to performance criteria and/or corrective actions.

Monitoring Objective #1: Ensure the SCEC project is designed, constructed, and implemented according to plans and permitting requirements.

- Was the project implemented according to plans and permitting requirements?

  Parameter #1: Level of construction to terms of contract and permit requirements

  - Method: review design plans, contractor reports, conduct on-site inspections, and compare construction drawings to as-built specifications
  - Timing and frequency: monitoring would occur during all design stages and construction activities from start to completion; the project is expected to be implemented in an approximately two-year time frame (design: 6-10 months; construction: 12-16 months)
  - Sample size: dependent on frequency and duration of design and construction activities
  - Sites: Lake Charles SCEC
  - Performance criteria: The SCEC restoration project is designed, constructed, and implemented according to plans and permitting requirements
  - Corrective action: resolution with contractor(s) such that all contract terms and permit requirements are met

Monitoring Objective #2: Identify future changes in visitation associated with the new project elements.

- Is there an identifiable increase in visitation associated with the new project elements?

  Parameter #1: Level of public use

- Method: complete daily visitor logs and maintain records of event scheduling for outreach activities
- Timing and Frequency: visitor logs would be collected daily, and scheduled outreach activities would also be documented; this utilization information would be reported annually for five years after project implementation
- Sample size: equal to the number of visitors annually
- Sites: Lake Charles SCEC
- Performance criteria: Identifiable increase in visitation following implementation of the restoration elements and services

2.2.5 Monitoring Schedule

The schedule for the project monitoring is shown in **Table 2**, separated by monitoring activity.

Table 2: Monitoring Schedule

Monitoring Parameters	Monitoring Timeframe		
	Prior to construction	During construction	Post - construction
Level of design and construction to terms of contract and permit requirements	X	X	X
Amount of visitation			X

2.2.6 Reporting and Data Requirements

Once all data have been reviewed for accuracy and completeness, they would be submitted to the Restoration Project Database. Data would be made publicly available through the DIVER Explorer Interface.

Reporting would occur once at Year 0 and annually during Years 1–5. Reports would be in the form of brief narratives encompassing project updates, visitor estimations, and ongoing activities.

3.3 Statewide Artificial Reefs

Restoration Approaches: This restoration project type involves the restoration approaches of improving public access to natural resources for recreational use and enhancing recreational experiences.

3.3.1 Project Summary

This Restoration project would utilize $6 million of NRDA funds to enhance eleven existing coastal artificial reef sites (nine inshore and two nearshore) by adding new reef material to

increase the habitat complexity of the reef complex, while also providing increased recreational fishing opportunities for the public. The development of these reef enhancement projects is guided by the Louisiana Inshore and Nearshore Artificial Reef Plan (LDWF, 2015), which is implemented through the LDWF under the oversight of the Louisiana Artificial Reef Council (R. S. 56: 639). The reef sites for enhancement are all established reef sites, and in many cases were sites that were approved by the Council for expansion (inshore planning areas) to facilitate enhancement opportunities.

Monitoring of this Restoration project would be multi-faceted and integrated with the operations of the Louisiana Artificial Reef Program as administered through the LDWF. Monitoring would include all reef design and deployment activities, permit compliance issues, post-deployment biological and environmental monitoring, and human dimension surveys. Artificial reefs require monitoring to assure compliance with permit conditions and other applicable regulations, and to assess performance to confirm that the goals and objectives of the reef design are being achieved.

Post-deployment artificial reef monitoring is conducted to evaluate reef performance over time, with three main objectives: 1) determine presence/absence of aquatic animals including plants, invertebrates, and fish; 2) measuring subsidence or reef materials and water quality parameters over time; and 3) conducting human dimension surveys to assess utilization, awareness, and economic impact. Information obtained through monitoring would help evaluate the performance of reef sites and individual components, improve the management of existing reef sites, and help guide the program to aid in future reef design and site selection. LDWF would oversee monitoring activities for this Restoration project, through a combination of funding sources. Additional funding for monitoring activities beyond NRDA would be coordinated by LDWF through either the Louisiana Artificial Reef Trust Fund, or other Department funding streams.

3.3.2 Restoration Goals and Project Restoration Objectives

The overall goals of the proposed project are to restore for lost recreational use along the Louisiana coast and to improve the public's accessibility and enjoyment of Louisiana's coastal resources. The specific objective for this restoration project is to provide and enhance public access to natural resources for enhanced recreational experiences at a variety of artificial reef sites located in each of Louisiana's coastal basins. The specific performance criteria for this project are: (1) the artificial reefs are constructed and implemented as designed and according to the permit; and (2) survey recreational utilization associated with the project elements.

3.3.3 Roles and Responsibilities

The LDWF (through its staff and/or contractors) would be responsible for ensuring that the project elements are constructed and implemented according to plans, and to ensure that construction activities comply with the full set of environmental permit conditions.

After construction, LDWF would be responsible for conducting monitoring to describe the environmental and biological performance of the reef, while also collecting estimations on artificial reef usage via human dimension/satisfaction surveys. Following construction, LDWF would be responsible for complying with any marking requirements set forth as a result of the restoration project.

3.3.4 Project Monitoring

The proposed monitoring for this restoration project, located statewide, is organized by objective. Specific locations include a suite of reef sites distributed across each of Louisiana's coastal basins. Monitoring parameters for each project objective are listed below. For each of the identified monitoring parameters, information is provided on the monitoring methods, timing and frequency, sample size, and sites. In addition, performance criteria for each parameter are identified (if applicable), including example corrective actions that could be taken if the performance criteria are not met. The parameters listed below may or may not be tied to performance criteria and/or corrective actions.

Monitoring Objective #1: Ensure the artificial reef enhancements are constructed and implemented according to plans and permitting requirements.

- Was the project implemented according to plans and permitting requirements?

  Parameter #1: Level of construction to terms of contract and permit requirements

  - Method: review design plans, contractor reports, conduct on-site inspections, and compare post-deployment as-built to plan specifications. Post construction monitoring would also include biological and environmental sampling of each reef site.
  - Timing and frequency: monitoring would occur during all design stages and construction activities from start to completion; the project is expected to be implemented within one year based on time to contract out projects. Post-deployment monitoring would be conducted annually for five years.
  - Sample size: eleven artificial reef site enhancement projects
  - Sites: eleven artificial reef sites located statewide
  - Performance criteria: artificial reef enhancements are constructed and implemented according to plans and permitting requirements
  - Corrective action: resolution with contractor(s) such that all contract terms and permit requirements are met

Monitoring Objective #2: Identify public utilization associated with the new project elements.

- Is there an identifiable increase in visitation following implementation of the new project elements?

  Parameter #1: Level of public use

  - Method: human dimension surveys combining efforts of the LDWF Socio-Economic Section and Fisheries LA CREEL monitoring system
  - Timing and Frequency: survey would be conducted prior to project implementation and one-year post-construction
  - Sample size: unknown; possibly tied to saltwater fishing license holders
  - Sites: statewide; survey would be conducted to assess artificial reef utilization

- Performance criteria: Increased utilization of and/or visitor satisfaction with Louisiana's artificial reef sites, particularly those associated with the restoration elements and services

3.3.5 Monitoring Schedule

The schedule for the project monitoring is shown in **Table 3**, separated by monitoring activity.

Table 3: Monitoring Schedule

Monitoring Parameters	Monitoring Timeframe		
	Prior to construction	During construction	Post - construction
Level of design and construction to terms of contract and permit requirements	X	X	X
Amount of visitation	X		X

3.3.6 Reporting and Data Requirements

Once all data have been reviewed for accuracy and completeness, they would be submitted to the Restoration Project Database. Data would be made publicly available through the DIVER Explorer Interface.

Reporting would occur in two increments, but would be submitted on a systematic basis. The first report would occur after the construction of the artificial reef site enhancements, and would include as-built surveys and construction details. The second report would be submitted two years post construction, and would include results of a public survey executed one-year post restoration which would seek to assess artificial reef utilization and visitor satisfaction. Additionally, this final report would also provide summary reports and brief narratives for each reef site encompassing project updates, usage estimations, and ongoing activities.

4.4 Pointe aux Chenes – Island Road Fishing Piers

Restoration Apporaches: This restoration project type involves the restoration approaches of enhancing public access to natural resources for recreational use and enhancing recreational experiences.

4.4.1 Project Summary

This Restoration project would utilize $3 million from NRDA to fund the construction of five small parking lots with adjoining fishing piers along Island Road (Figure XX). The project elements would primarily provide for enhanced recreational fishing and crabbing opportunities, yet it would also offer infrastructure for non-consumptive activities like birding, photography, and nature watching. The Island Road Fishing Piers project alternative would entail the development

of the final design specifications, construction, and the implementation of the following features and scope of activities:

- Five vehicle pull-overs;
  - 124'x 25'
  - Sheet pile walls to reinforce parking areas adjacent to roadway
  - Filled areas utilizing dirt and/or limestone
- Paired fishing piers at each vehicle pull-over;
  - 56' in length and 8'wide
  - Fiberglass grating suspended from wooden pilings and frame
- Long-term (15 years) operations and maintenance, including the development and distribution of outreach materials and trash collection/removal services; and
- Long-term monitoring activities to oversee project implementation and assess recreational usage of the Restoration project.

The LDWF CNR division has built a number of docks and piers at our Coastal WMAs and Refuges. These projects are in high demand by the public and always well received and used by the public at large. We have built a variety of styles of docks over the years and have found that fiberglass grating over a timber frame is to date the best design. This design is cost effective as compared to concrete and steel. It also has low maintenance costs as compared to timber decking and steel members in a high salinity high energy environment.

In addition to final design and project construction, a portion of the total NRDA funds for this project would go towards operations (including the development and distribution of outreach materials), maintenance (including trash collection and removal), and monitoring activities. Recreational use would be monitored with randomized visual count surveys, which would begin as early as possible to establish a pre-Restoration baseline, and continue over time. Any additional operations, maintenance, and monitoring costs required above the NRDA funds would be incurred by LDWF through its various operational funding streams.

4.4.2 Restoration Goals and Project Restoration Objectives

The overall goals of the proposed project are to restore for lost recreational use along the Louisiana coast and to improve the public's accessibility and enjoyment of Louisiana's coastal resources. The specific objective for this restoration project is to provide and enhance public access to natural resources for enhanced recreational experiences on Island Road in the PACWMA. The specific performance criteria for this project are: (1) the Island Road fishing pier elements are designed, constructed, and implemented as described; and (2) increase in visitation following implementation of the new project elements.

4.4.3 Roles and Responsibilities

The LDWF (through its staff and/or contractors) would be responsible for ensuring that the project elements are designed and constructed according to plans, and to ensure that construction activities comply with the full set of environmental permit conditions.

Additionally, LDWF would be responsible for collecting and providing annual information on the total number of recreational users on Island Road in PACWMA. Following construction, LDWF would be responsible for the long-term operations and maintenance of the restoration project.

4.4.4 Project Monitoring

The proposed monitoring for this restoration project on Island Road in PACWMA, which includes a suite of elements, is organized by objectives. Monitoring parameters for each project objective are listed below. For each of the identified monitoring parameters, information is provided on the monitoring methods, timing and frequency, sample size, and sites. In addition, performance criteria for each parameter are identified (if applicable), including example corrective actions that could be taken if the performance criteria are not met. The parameters listed below may or may not be tied to performance criteria and/or corrective actions.

Monitoring Objective #1: Ensure the PAC Island Road fishing piers project is designed, constructed, and implemented according to plans and permitting requirements.

- Was the project implemented according to plans and permitting requirements?

  Parameter #1: Level of construction to terms of contract and permit requirements

  - Method: review design plans, contractor reports, conduct on-site inspections, and compare construction drawings to as-built specifications
  - Timing and frequency: monitoring would occur during all design stages and construction activities from start to completion; the project is expected to be implemented within a one-year time frame (design: 2-3 months; construction: 6-8 months)
  - Sample size: dependent on frequency and duration of design and construction activities
  - Sites: Island Road on PACWMA
  - Performance criteria: Island Road fishing piers restoration project is designed, constructed, and implemented according to plans and permitting requirements
  - Corrective action: resolution with contractor(s) such that all contract terms and permit requirements are met

Monitoring Objective #2: Identify future changes in visitation associated with the new project elements.

- Is there an identifiable increase in visitation following implementation of the new project elements?

  Parameter #1: Level of public use

- Method: visual observations (e.g., single pass count of vehicles and estimation of total individuals) to estimate the total number of recreational users of Island Road in the PACWMA
- Timing and Frequency: counts would be conducted to estimate visitor use before, during, and after restoration construction activities. Surveys would be conducted in a manner that offers six observations per month (2 randomized weekend surveys and 4 randomized weekday surveys).
- Sample size: 72 visual observations per year for a total of 5 years, beginning with pre-construction monitoring
- Sites: Island Road on PACWMA
- Performance criteria: Identifiable increase in visitation following implementation of the restoration elements and services

4.4.5 Monitoring Schedule

The schedule for the project monitoring is shown in **Table 4**, separated by monitoring activity.

Table 4: Monitoring Schedule

Monitoring Parameters	Monitoring Timeframe		
	Prior to construction	During construction	Post - construction
Level of design and construction to terms of contract and permit requirements	X	X	X
Amount of visitation	X	X	X

4.4.6 Reporting and Data Requirements

Once all data have been reviewed for accuracy and completeness, they would be submitted to the Restoration Project Database. Data would be reported annually on estimated usage extrapolated from the monitoring survey data. Monitoring would begin one-year pre-construction to establish a baseline, and continue for four years' post-construction (five years total). Reports would be in the form of brief narratives encompassing project updates, visitor estimations, and ongoing activities.

Appendix F

Coastal Zone Consistency Response Letter

JOHN BEL EDWARDS
GOVERNOR

THOMAS F. HARRIS
SECRETARY

State of Louisiana

DEPARTMENT OF NATURAL RESOURCES

OFFICE OF COASTAL MANAGEMENT

June 5, 2018

James Bove
Attorney Advisor
Office of General Counsel
US Environmental Protection Agency
Washington, D.C. 20460
Via email: Bove.James@epa.gov

RE: **C20170242,** Coastal Zone Consistency
Louisiana Trustee Implementation Group (LA TIG)
Direct Federal Action
Draft Restoration Plan and Environmental Assessment #2, Provide and Enhance Recrecreational Opportunities: Elmers Island Access, Island Road Piers, Lake Charles Science Center & Educational Complex, and Statewide Artificial Reefs Projects.
Coastwide, Louisiana

Dear Mr. Bove:

The above referenced projects have been reviewed for consistency with the Louisiana Coastal Resources Program in accordance with Section 307 (c) of the Coastal Zone Management Act of 1972, as amended. The projects, as proposed in the application and subsequent revisions, are consistent with the LCRP. Additional consistsency review will be required at such time as the projects are finalized and become ready for implementation..

If you have any questions concerning this determination please contact Jeff Harris of the Consistency Section at (225) 342-7949 or jeff.harris@la.gov.

Sincerely,

/S/ Charles Reulet
Administrator
Interagency Affairs/Field Services Division

CR/SK/jdh

cc: Megan Terrell, Office of the Governor
Dave Butler, LDWF
Doug Jacobson, USEPA
Timothy Landers, USEPA
Gale Bonanno, USEPA

Appendix G

Finding of No Significant Impact

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
from Implementation of the
Louisiana Trustee Implementation Group Final Restoration Plan/Environmental Assessment #2: Provide and Enhance Recreational Opportunities

Introduction

The "Louisiana Trustee Implementation Group Final Restoration Plan/Environmental Assessment #2: Provide and Enhance Recreational Opportunities" (RP/EA #2) fulfills both the requirements under the Oil Pollution Act (OPA) and the implementing regulations and the National Environmental Policy Act (NEPA). It was prepared by the Louisiana Trustee Implementation Group (LA TIG) to partially address injuries to natural resources and services in the Louisiana Restoration Area caused by the *Deepwater Horizon* (DWH) oil spill using Natural Resource Damages procedures as set forth in the DWH post-settlement Consent Decree.[1]

In accordance with OPA, and as set forth in the DWH Consent Decree and as described in the DWH Trustees' 2016 Programmatic Damage Assessment and Restoration Plan/Programmatic Environmental Impact Statement (PDARP/PEIS), the LA TIG includes five Louisiana state trustee agencies and four federal trustee agencies: the Louisiana Coastal Protection and Restoration Authority (CPRA); the Louisiana Department of Natural Resources (LDNR); the Louisiana Department of Environmental Quality (LDEQ); the Louisiana Oil Spill Coordinator's Office (LOSCO); the Louisiana Department of Wildlife and Fisheries (LDWF); the United States Department of Commerce, represented by the National Oceanic and Atmospheric Administration (NOAA); the United States Department of the Interior (USDOI), represented by the United States Fish and Wildlife Service (USFWS) and National Park Service (NPS); the United States Department of Agriculture (USDA); and the United States Environmental Protection Agency (EPA).

The RP/EA #2 tiers from the PDARP/PEIS, which is a programmatic document developed by the DWH Trustees to guide and direct the DWH oil spill restoration effort. The PDARP/PEIS was prepared in accordance with OPA, NEPA, Council on Environmental Quality (CEQ) NEPA regulations, and the NEPA procedures and guidance applicable to federal Trustees. The PDARP/PEIS includes a portfolio of Restoration Types that addresses the diverse suite of injuries that occurred at both regional and local scales. Consistent with that programmatic restoration plan, the RP/EA #2 focuses on implementing projects

[1] On April 4, 2016, the Court entered the final Consent Decree negotiated among BP and the Trustees. The Consent Decree settles damages, including natural resource damages as defined under the Oil Pollution Act (OPA) of 1990, in a federal case arising from matters related to the DWH oil spill: *United States v. BPXP et al., Civ. No. 10-4536, centralized in MDL 2179, In re: Oil Spill by the Oil Rig "Deepwater Horizon" in the Gulf of Mexico, on April 20, 2010 (E.D. La.)*

in the Louisiana Restoration Area to address one of the five overarching goals set forth in the PDARP/PEIS (Provide and Enhance Recreational Opportunities).

Lead and Cooperating Agencies

The Council on Environmental Quality's NEPA implementing regulations (40 CFR §§ 1500-1508) require a federal agency to serve as lead agency to supervise the NEPA analysis when more than one federal agency is involved in the same action (40 CFR § 1501.5(a)). The LA TIG designated EPA as the lead agency responsible for NEPA analysis for the RP/EA #2. Each of the other federal and state co-Trustees is participating as a cooperating agency pursuant to NEPA (40 CFR § 1508.5) and the "*Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the Deepwater Horizon (DWH) Oil Spill"* (page 27, and Appendix F, pages 2 and 3).

Public Participation

On December 20, 2017, the LA TIG published a Notice of Availability (NOA) of the LA TIG Draft RP/EA #2 in the *Federal Register* and *Louisiana Register*. The notices encouraged the public to review and comment on the Draft RP/EA #2 during the 30-day comment period that ran through January 19, 2018. The public was also notified of the availability of the Draft RP/EA #2 for comment at the following website:

- http://www.gulfspillrestoration.noaa.gov/restoration-areas/louisiana

Comments were accepted via an online public comment portal, in person, and U.S. Postal Service mail. The NOA also announced a public meeting scheduled for January 17, 2018, in Baton Rouge, Louisiana. However, due to icy weather conditions in Baton Rouge, the January 17 public meeting was cancelled and rescheduled, and held on January 24 in New Orleans. As a result, the EPA published a second NOA in the *Federal Register* on January 26. The notice reopened the comment period through February 2, 2018, to allow the LA TIG to consider additional comments from the public, including those provided at the rescheduled January 24 public meeting. Notification to the public of the rescheduled public meeting and reopening of the comment period through February 2 was also provided at the websites identified above.

In response to public comments received on the Draft RP/EARP/EA #2, the LA TIG prepared a Draft Supplemental Restoration Plan and Environmental Assessment for the Elmer's Island Access Project Modification (Supplemental RP/EA) to evaluate two boardwalk alignments and a beach access shuttle service. The additional boardwalk alignments included a boardwalk crossing the lagoon farther east than the original alignment and a boardwalk that would originate near an existing parking area and run parallel to the beach. A Notice of Availability of the Supplemental RP/EA was published in the Federal Register on May 21, 2018. The LA TIG hosted a public meeting on May 22, 2018, in New Orleans, and the public comment period for the Supplemental RP/EA closed on June 20, 2018. The notices encouraged the public to review

and comment on the Supplemental RP/EA during the 30-day comment period that ran through June 20, 2018. The public was also notified of the availability of the Supplemental RP/EA for comment at the following website:

- http://www.gulfspillrestoration.noaa.gov/restoration-areas/louisiana

Comments were accepted via an online public comment portal, in person, and U.S. Postal Service mail. The NOA also announced a public meeting scheduled for May 22, 2018, in New Orleans, Louisiana.

The LA TIG received submissions from private citizens, state and local agencies, and non-governmental organizations. The LA TIG reviewed the comments and considered them prior to finalization of the RP/EA #2. Chapter 7 of the RP/EA #2 provides further detail on the public comment process, including a summary of all public comments received on the Draft RP/EA #2, the Supplemental RP/EA, and the LA TIG's responses.

Adoption of the RP/EA #2 NEPA analysis by Federal Agency members of the LA TIG

Each federal agency on the LA TIG must make its own independent evaluation of the NEPA analysis in support of its decision-making responsibilities. In accordance with 40 CFR § 1506.3(a) and the SOP (Appendix F, Page 4), each of the federal agencies participating on the LA TIG has reviewed the RP/EA #2, found that it meets the standards set forth in its own NEPA implementing procedures, and accordingly has adopted the RP/EA #2 NEPA analysis.

Description of Proposed Actions and Alternatives

NEPA and the CEQ NEPA regulations require the federal agency decisionmaker to consider the environmental effects of the Proposed Action and a reasonable range of alternatives, including the No Action Alternative (42 USC § 4332; 40 CFR § 1502.14). The RP/EA #2 describes the screening process for 263 projects and sequential application of screening criteria used to identify 4 alternatives carried forward for detailed OPA/NEPA analysis as well as a No Action alternative (Table 1). Additionally, for Elmer's Island, the LA TIG considered an alternative boardwalk alignment located behind the dune and a beach shuttle service, to address the public's concerns (see Supplemental RP/EA). Based on the analysis of the original proposed boardwalk alignment, the behind-the-dune boardwalk alignment, and the beach shuttle service, the beach shuttle service was chosen to replace the boardwalk as a feature in the LA TIG's preferred alternative for Elmer's Island. The LA TIG has determined that implementation of the preferred alternatives and project elements associated with those alternatives (Proposed Action) best meets the OPA selection criteria and supplemental criteria developed by the TIG.

Table 1. Alternatives Analyzed in the RP/EA #2

Alternative	Preferred/ Not Preferred
Provide and Enhance Recreational Opportunities	
Elmer's Island Access (with Shuttle Service)	Preferred
Elmer's Island Access (with original boardwalk alignment)	Not Preferred
Elmer's Island Access (with behind the dune Boardwalk)	Not Preferred
Statewide Artificial Reefs	Preferred
Lake Charles Science Center and Educational Complex	Preferred
Island Road Piers	Preferred
No Action	Not Preferred

Alternatives Analyzed to Provide and Enhance Recreational Opportunities

Elmer's Island Access

This project would improve the recreational access opportunities on the Elmer's Island Wildlife Refuge operated by Louisiana Department of Wildlife and Fisheries. This area was heavily impacted by the DWH spill, and recreational access has been further restricted as the result of the Caminada II restoration project (i.e., driving on beach no longer allowed). A suite of different project elements, varying in scope and location, were considered in optimizing the proposed alternative. This included consideration of boat and kayak launches and locations, parking areas of various size and location, culvert siting, different boardwalk configurations, and a beach shuttle service. Consultations with local, state, and federal government, as well as stakeholders helped shape the project elements and long-term operational plan. This recreational fishing access project, also provides for improved birding and other recreational opportunities. Selected project elements include: improving aquatic hydrology through the installation of culverts under the access road; enhancing access by creating improved parking at one location and small boat launches at two locations; operating a beach shuttle service to facilitate beach access points; repair of a breach/washout location to allow foot traffic to additional fishing areas; improving dedicated birding areas, including walking paths and observation area; education and outreach materials; long-term operations, including routine trash collection and removal; and long-term monitoring of recreational usage of Elmer's Island. Not selected project elements included a beach access boardwalk with two possible alignments: a lagoon boardwalk and a behind-the-dune boardwalk. Estimated budget for this project is $6 Million, which would be allocated for final design and construction, as well as long-term operations, maintenance, and monitoring.

Statewide Artificial Reefs

This project would enhance a series of eleven artificial reef sites across each of Louisiana's coastal basins, including some sites located in areas heavily impacted by the DWH spill. Initial

project iterations considered enhancements to up to 15 existing reef sites as well as the possibility of adding new sites. However, process and cost efficiencies and site prioritization and optimization strategies were identified through adaptive resource management. Thereby, the final number of reef sites for enhancement was settled upon at 11, based on cost considerations and on the current reef site permit status and thus ability to implement strategic enhancements in the most expedient of timeframes. In addition to providing habitat for a diversity of aquatic animals, artificial reef enhancement would provide widely distributed access opportunities across the Louisiana coast. Estimated budget for this project is $6 Million, which would be allocated for deployment of reef materials and monitoring of enhancement activities at inshore and nearshore artificial reef sites in each of Louisiana's coastal basins.

Lake Charles Science Center and Educational Complex

This project would retain many elements of the previously considered Louisiana Marine Fisheries Enhancement, Research and Science Center Early Restoration project, in the same general area of the state, but in a much more accessible location at a currently undeveloped site in the Lake Charles city limits. A Science Center open for public visitation would feature display aquaria, touch tank, and educational displays. The Educational Complex would feature a stocked and managed pond offering youth and ADA-accessible recreational fishing opportunities. Other project elements include integrated fisheries and wildlife educational and outreach features, along with a nature trail and hunter safety range. This educational and outreach focused restoration project also provides recreational access and collaborative extension opportunities. The original estimated budget for this project was $10 Million, but operational and design efficiencies were identified through project optimization analysis. This included consideration of facility layout of the pond and parking features, design elements of the visitor center and fishing pavilion, and the optimization of long-term operations and maintenance. This resulted in a revised estimated cost of $7 Million, which would be allocated for final design and construction, as well as long-term operations, maintenance, and monitoring.

Island Road Piers

This project would develop a series of five road-side pullovers/parking areas with adjoining fishing piers to enhance fishing opportunities by creating safe recreational areas on the most heavily utilized Wildlife Management Area in the state. This recreational fishing access project has undergone preliminary design to ensure expedient implementation. This design analysis considered various locations, sizes and configurations of parking areas/piers along Island Road, as well as the life cycle costs associated with different construction materials. Estimated budget for this project is $3 Million, which would be allocated for final design and construction, as well as long-term operations, maintenance, and monitoring.

No Action

Under the no action alternative, no additional recreational use opportunities restoration would be provided or enhanced using DWH NRDA funding at this time. The Trustees would allow no action processes to occur, which could result in one of four outcomes for recreational opportunities: 1) status quo, 2) partial recovery, 3) no recovery, or 4) further deterioration.

Analysis Summary

Section 4.0 of the RP/EA #2 provides the analysis needed to assess the significance of the impacts of the Proposed Action, which is to implement the four preferred alternatives and associated project elements described and analyzed in the RP/EA #2.

In the RP/EA #2, the LA TIG addressed NEPA requirements by tiering from environmental analyses conducted in the Final PDARP/PEIS, evaluating existing analyses, and preparing environmental consequences analyses for projects as appropriate. The RP/EA #2 evaluated both beneficial and adverse impacts of the Proposed Action. Project implementation will provide many benefits to recreational users within the general public.

The analysis included in the RP/EA #2 supports the following conclusions:

- The Proposed Action is not expected to result in significant adverse effects on public health or safety. The restoration measures/management activities will provide long-term beneficial impacts for improved recreational access, and best management practices will be implemented on a site-specific basis to mitigate the potential for adverse effects to occur to public health and safety during implementation.
- The Proposed Action will have no significant adverse impacts to unique characteristics of the geographic areas. The Proposed Action is not expected to have any significant adverse effects on wetlands, floodplains, municipal water sources, ecologically critical areas, wild and scenic river corridors, park lands, wilderness, wilderness research areas, research natural areas, inventoried roadless areas, national recreation areas, or prime farmlands, particularly on a regional basis.
- The effects of the Proposed Action on the quality of the human environment are not controversial. The Proposed Action is supported by the public. Where concerns were raised over initially proposed project elements for one project alternative, that input was factored into revised project elements which are supported by the public. No public comments indicated opposition to the Proposed Action.
- The Proposed Action neither establishes a precedent for future LA TIG actions with significant effects nor represents a decision in principle about a future consideration. Future LA TIG actions will be determined through separate planning processes.
- The Proposed Action will not result in significant adverse cumulative impacts. As discussed in the RP/EA #2, the Proposed Action is intended to provide and enhance recreational

opportunities. Though some minor, primarily short-term adverse effects may occur in some locations during construction activities, the cumulative effects of these actions on the quality of the human environment are not expected to be regionally significant.

- Based on information in the RP/EA #2, the Proposed Action is not expected to threaten a violation of federal, state, or local laws, or requirements imposed for environmental protection. However, projects will be monitored appropriately, and approaches and designs may be applied, adopted, or modified from other similar projects as deemed necessary.
- The Proposed Action will not adversely affect vulnerable marine or coastal ecosystems as documented in Section 4 of the Final RP/EA #2. Many of the project elements (such as the artificial reefs and Elmer's Island culverts) are expected to improve wetland, estuarine, and marine aquatic habitat.
- The Proposed Action is not expected to adversely affect biodiversity or ecosystem functioning (e.g., benthic productivity, predator-prey relationships, etc.) as documented in Section 4 of the Final RP/EA #2.
- The Proposed Action is not expected to result in the introduction or spread of a nonindigenous species. All projects with an identified potential for invasive species colonization include provisions for invasive species management and best practices to minimize the risk of the introduction or spread of nonindigenous species.
- The Proposed Action is expected to be in compliance with all applicable federal laws and regulations relevant to the preferred projects. A summary of the status of the federal regulatory compliance reviews and approvals (as of July 2, 2018) is described in the table below. For all projects in which the compliance status is labeled as complete, no significant or adverse effects were found. Environmental reviews and consultations not yet completed, will be finalized prior to the initiation of the relevant project activities.

Table 6-1. This table reflects the current status of federal regulatory compliance reviews and approvals.

Alternative	Bald and Golden Eagle Protection Act (USFWS)	Coastal Barrier Resources Act (CRA) (USFWS)	Coastal Zone Management Act (CZMA)	Endangered Species Act (ESA) Section 7 (NMFS)	Endangered Species Act (ESA) Section 7 (USFWS)	Essential Fish Habitat (EFH) (NMFS) (	Marine Mammal Protection Act (MMPA) (NMFS)	Marine Mammal Protection Act (MMPA) (USFWS)	Migratory Bird Treaty Act (MBTA) (USFWS)	National Historic Preservation Act (NHPA)	Rivers and Harbors Act/Clean Water Act (USACE permit)
Elmer's Island Access	Complete	Complete	Complete	Complete	In Progress	Complete	Complete	Complete	Complete	In Progress	In Progress
Statewide Artificial Reefs	Complete	Complete	Complete	In Progress	Complete	Complete	Complete	Complete	Complete	In Progress	Complete
Lake Charles Science Center and Educational Complex	Complete	Complete	Complete	N/A	Complete	N/A	N/A	N/A	Complete	In Progress	In Progress
Island Road Piers	Complete	Complete	Complete	Complete	Complete	In Progress	Complete	Complete	Complete	In Progress	Complete

Date:

Signature:

DETERMINATION

Based on the information presented in this document and the analysis contained in the RP/EA #2, it is hereby determined that implementation of the Restoration Plan will not significantly impact the quality of the human environment, as described above. Therefore, an EIS will not be prepared.

SEPARATE ELECTRONIC SIGNATURE PAGE FOR EACH TRUSTEE BELOW_____

[Decision Makers] NEED LIST