6. Environmental Consequences and Compliance with Other Laws

What Is in This Chapter?

This chapter describes the predicted consequences, or effects, of implementing PDARP/PEIS restoration alternatives proposed in Chapter 5, Restoring Natural Resources, on the physical, biological, and socioeconomic environment. **Table 6.1-1** presents the location of required PEIS elements in this Final PDARP/PEIS.

Table 6.1-1. Location of required PEIS elements in this document.

PEIS Required Elements (40 CFR § 1502.10, Recommended Format)	**Location of Element in This Document**
Cover sheet	Cover sheet of this Final PDARP/PEIS
Summary	Chapter 1, Introduction and Executive Summary
Table of contents	Follows the cover sheet, cover, Letter to Reviewers, and *Deepwater Horizon* Oil Spill Natural Resource Trustees Resolution 15-2 for this Final PDARP/PEIS
Purpose of and need for action	Chapter 5, Section 5.3.2, NEPA Statement of Purpose and Need
Alternatives including proposed action	Chapter 5, Sections 5.5 through 5.8
Affected environment	Chapter 3, Ecosystem Setting Chapter 4, Sections 4.4 through 4.10, particularly Introduction and importance of the resource and conclusions and key aspects of the injury for restoration planning Chapter 6, Section 6.2, Approach to Affected Environment
Environmental consequences	Chapter 6, Section 6.4, Evaluation of Environmental Consequences of Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative)
List of repositories	Chapter 6, Section 6.18, DWH Final PDARP/PEIS Repositories
List of preparers	Chapter 6, Section 6.19, List of Preparers
Appendices	Appendix 6.A, Appendix 6.B, Appendix 6.C, Appendix 6.D

This chapter is organized as follows:

- **Intent of the Chapter (Section 6.1):** What is the intent of this chapter?
- **Approach to Affected Environment (Section 6.2):** How did the Trustees assess the affected environment, in terms of the overall ecological setting, the specific resources known to be injured by the spill, and the resources potentially affected by the restoration approaches evaluated in this Final PDARP/PEIS?
- **Approach to Evaluation of Environmental Consequences (Section 6.3):** What is the approach to considering environmental consequences, including definitions of impact determinations and their significance, using resource-specific criteria for the determinations?

- **Evaluation of Environmental Consequences of Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative) (Section 6.4):** What are the environmental consequences of the preferred alternative, evaluated by physical, biological, and socioeconomic resources, and how are impacts on the physical, biological, and socioeconomic environments evaluated for each of the 39 restoration approaches identified in Chapter 5?
- **Evaluation of Direct and Indirect Environmental Consequences for Other Alternatives (Section 6.5):** What is the range of environmental consequences associated with these alternatives and how do the alternatives compare?
- **Cumulative Impacts (Section 6.6):** What are the potential cumulative impacts of the alternatives and how are they assessed?
- **Cooperating Agencies (Section 6.8):** Who are the cooperating agencies involved in preparing and implementing this PDARP/PEIS?
- **Compliance with Other Applicable Authorities (Section 6.9):** What are the primary laws and executive orders relevant to the PDARP/PEIS at this programmatic level?
- **Sections 6.10 through 6.13:** What are other required findings under NEPA in terms of unavoidable adverse impacts, the relationship of short-term uses of the human environment and the maintenance and enhancement of long-term productivity, and irreversible and irretrievable commitment of resources?
- **Consideration of the Effects of Climate Change (Section 6.14):** How is climate change considered in this analysis?
- **Best Practices (Section 6.15):** What are best practices that could be implemented to further reduce potential effects on various resources on a project-specific basis?
- **Environmental Justice Considerations in Future Restoration Planning (Section 6.16):** What are environmental justice considerations that should be included in future restoration plans?
- **NEPA Considerations and Tiering Future Restoration Planning (Section 6.17):** How will NEPA analyses for future restoration plans be tiered relative to this PDARP/PEIS?
- **DWH Final PDARP/PEIS Repositories (Section 6.18):** To whom were copies of this Final PDARP/PEIS sent?
- **List of Preparers (Section 6.19):** Who prepared this Final PDARP/PEIS?
- **References (Section 6.20):** What references are cited in this chapter?
- **Best Practices (Appendix 6.A):** What are examples of potential mitigation measures and best practices that could be implemented to further reduce potential effects on various resources on a project-specific basis?

- **Additional Actions for Consideration in Cumulative Impacts Analysis (Appendix 6.B):** What are examples of cumulative actions that are ongoing in the Gulf of Mexico?
- **Trustees' Correspondence (Appendix 6.C):** What correspondence documents review, compliance and determinations related to National Environmental Policy Act cooperating agency status, Coastal Zone Management Act federal consistency, Endangered Species Act Biological Opinion consultation, and Clean Air Act Section 309 environmental review?
- **Other Laws and Executive Orders (Appendix 6.D):** What are the federal laws and executive orders that may be relevant to regulatory compliance for future projects?

6.1 Intent of the Chapter

Actions undertaken by federal Trustees to restore natural resources or services under the Oil Pollution Act (OPA) are subject to the National Environmental Policy Act (NEPA), 42 USC § 4321, *et seq*., and the regulations guiding its implementation at 40 CFR § 1500 (see 15 CFR § 990.23). NEPA and its implementing regulations set forth a process of environmental impact analysis, documentation, and public review for federal actions. NEPA provides a mandate and a framework for federal agencies to consider environmental effects[1] of their proposed actions[2] and to inform and involve the public in their environmental analysis and decision-making process. Preparation of an environmental impact statement (EIS) is required for a major federal action "significantly affecting the quality of the human environment" (42 USC § 4332[C]).

Effects

There are two types of effects: 1) direct effects, which are caused by the action and occur at the same time and place, and 2) indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, as well as related effects on air and water and other natural systems, including ecosystems.

Environmental Impact Statement (EIS)

"[A] detailed written statement as required by section 102(2)(C) of the National Environmental Policy Act" (40 CFR § 1508.11).

The Trustees have integrated OPA and NEPA processes in this Final PDARP/PEIS. This integrated process allows the Trustees to meet the public involvement requirements of these statutes concurrently. This Final PDARP/PEIS complies with NEPA by 1) describing the purpose and need for restoration action in Chapter 5, Restoring Natural Resources; 2) summarizing the current environmental setting and affected environment in Chapter 3, Ecosystem Setting, and Chapter 4, Injury to Natural Resources; 3) developing programmatic restoration alternatives in Chapter 5, Restoring Natural Resources; 4) analyzing potential environmental effects in Chapter 6, Environmental Consequences and Compliance with Other Laws; and 5) incorporating public participation in the decision process as described in Chapter 1, Section 1.7, Public Involvement in Restoration Planning. Table 6.1-1 above summarizes the location of these elements and other required NEPA information. The Trustees considered all relevant public comments received during the public comment period in developing the Final PDARP/PEIS.

[1] "Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial." (40 CFR § 1508.8)

[2] For the purpose of NEPA, the proposed action represents the preferred restoration alternative as described in Section 5.5, Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative). Comprising Restoration Types that, as a portfolio, address the Trustee's goals, the proposed action includes the restoration approaches presented in Appendix 5.D, Restoration Approaches and OPA Evaluation.

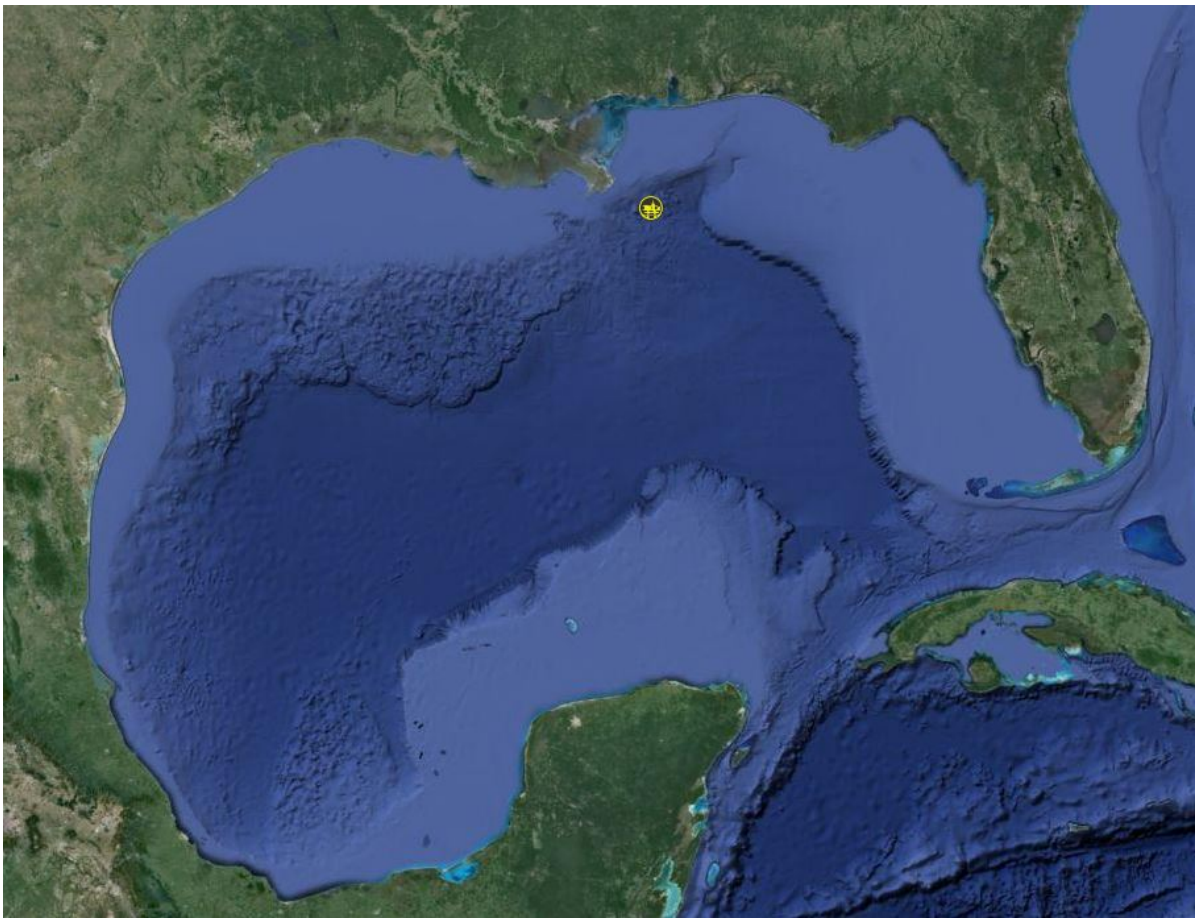
The rationale for preparing a programmatic DARP is provided in Chapter 5.2.2, Scope and Programmatic Context of Restoration Planning. In addition, a federal agency may prepare a programmatic EIS (PEIS) to evaluate broad actions, including similar actions that share common timing and geography (40 CFR § 1502.4(b); CEQ 1981). When a federal agency prepares a PEIS, the agency may "tier" subsequent, narrower environmental analyses on site-specific plans or projects from the PEIS (40 CFR § 1502.4(b); 40 CFR § 1508.28). Federal agencies are encouraged to tier subsequent, narrower analyses from a PEIS to eliminate repetitive discussions of the same issues and focus on the actual issues ripe for decision at each level of environmental review (40 CFR § 1502.20). In this light, the Final PDARP/PEIS evaluates a range of restoration approaches to enable narrower NEPA analyses for subsequent restoration plans to tier from this programmatic analysis. The appropriate level of NEPA analysis for each restoration plan will be determined by the lead federal agency for each plan and will be developed by each Trustee Implementation Group (TIG) (see Chapter 7). The subsequent restoration plans and NEPA analyses will be made available for public review and comment. Further discussion of future implementation, tiered NEPA analyses for subsequent restoration plans, and future public involvement is presented in Section 6.17, NEPA Considerations and Tiering Future Restoration Planning, and Chapter 7, Governance.

6.2 Approach to Affected Environment

NEPA requires a description of the existing environment that has the potential to be affected by the alternatives under consideration, with emphasis commensurate with the importance of the impact on those resources (40 CFR § 1502.15). The nature of this programmatic plan necessitates that this information be presented broadly in this Final PDARP/PEIS and at a refined scale through the course of subsequent restoration plans that are developed consistent with this Final PDARP/PEIS. The affected environment is a complex ecosystem comprising habitats, associated biological communities, and the physical environment upon which they depend. The complexity of the Gulf of Mexico ecosystem, the magnitude of restoration remaining to restore injuries to this system, and the need for consideration of environmental consequences associated with the proposed restoration actions require consideration of effects at the ecosystem level and consideration of the linked systems and processes within that ecosystem.

The main geographic focus of the Trustees' natural resource damage assessment (NRDA) and restoration efforts is the northern Gulf of Mexico (Figure 6.2-1, below[3]). The scope, nature, and magnitude of the spill caused impacts to coastal and oceanic ecosystems ranging from the deep ocean floor, through the oceanic water column, to the highly productive coastal habitats of the northern Gulf, including estuaries, shorelines, and coastal marshes. Affected resources include multiple species—some of which are threatened and endangered and/or recreationally and commercially important—as well as their habitats in the Gulf and along the coastal areas of Texas, Louisiana, Mississippi, Alabama, and Florida. These species and their habitats are an integral part of the Gulf of Mexico ecosystem. As many of these resources consist of highly migratory species, restoration efforts for some species may be conducted in habitats that occur outside the Gulf of Mexico. Examples include important breeding grounds for migratory birds in the northern United States, important fisheries in the Atlantic, or sea turtle nesting habitat on beaches in Mexico.

[3] For geographic context, Figure 6.2-1 depicts all of the Gulf of Mexico.



Source: *NOAA Environmental Response Management Application.*

Figure 6.2-1. The Gulf of Mexico covers approximately 600,000 square miles and is bordered by the five Gulf states, Mexico, and Cuba. A yellow marker shows the location of BP's Macondo well.

An overview of the ecosystem setting is presented in Chapter 3, including information on migratory ranges for resources that may spend only a portion of their life cycle within the Gulf of Mexico and otherwise depend on environments elsewhere. Chapter 3 focuses on the importance of the northern Gulf of Mexico ecosystem and the connections between the northern Gulf and other larger systems that exist via resource connectivity (flyways and migratory pathways) and economic transfers through commerce. Chapter 4, Injury to Natural Resources describes how key species, resources, and resource services were injured as a result of the *Deepwater Horizon* (DWH) incident and provides important information on the existing environment in which proposed restoration must be considered. The chapter's subsections providing an introduction and importance of resources and the key aspects of the injury for restoration planning inform the affected environment for NEPA purposes.

More specific information on the affected environment will be a part of subsequent, project-specific restoration plans in order to provide the level of detail needed to fully evaluate potential environmental consequences of future proposed actions. For example, there are areas designated as critical habitat for a number of Endangered Species Act (ESA)–listed species in the northern Gulf of Mexico, including

loggerhead sea turtles, smalltooth sawfish, Gulf sturgeon, beach mice, and piping plover.[4] A brief discussion of the potential for modification of critical habitat is considered at this programmatic level, where appropriate. Future restoration plans will provide evaluation based on the specific project detail and location.

[4] Detailed descriptions of critical habitat for each of these species can be found at *http://sero.nmfs.noaa.gov/protected_resources/section_7/threatened_endangered/Documents/sero.pdf* (National Marine Fisheries Service-managed species) and at *http://ecos.fws.gov/crithab/* (U.S. Fish and Wildlife Service-managed species).

6.3 Approach to Evaluation of Environmental Consequences

This section describes and compares the potential environmental consequences of the proposed action by evaluating the restoration approaches that make up the alternatives described in the Final PDARP/PEIS. In developing this integrated PEIS, the Trustees adhered to the procedural requirements of NEPA, the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR §§ 1500-1508), and NOAA's procedural requirements for implementing NEPA.[5]

6.3.1 Alternatives Considered in the PEIS

As described in Chapter 1, the Trustees are, in part, evaluating a programmatic decision regarding how natural resource damage settlement funds in the amount of $8.1 billion (plus up to $700 million for adaptive management for unknown conditions) would be used for restoration to address the natural resource injuries described in this document. Each action alternative developed in Chapter 5, Restoring Natural Resources, emphasizes a different comprehensive restoration planning philosophy. These programmatic alternatives are described and evaluated under OPA in Chapter 5, and the alternatives are briefly described again in this chapter to support the focus here on the evaluation of direct, indirect, and cumulative impacts in accordance with NEPA. As presented in Chapter 5, the Trustees considered a reasonable range of alternatives to restore for the injuries caused by the DWH incident. The restoration philosophy for each alternative is briefly described below.

Both Alternatives A, Comprehensive Integrated Ecosystem Restoration (preferred alternative), and B, Resource-Specific Restoration, are further defined by Restoration Types, and both include all of the Restoration Types described in Section 5.5 and in summary form in Section 6.4, Evaluation of Environmental Consequences of Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative). Alternatives A and B consist of a portfolio of Restoration Types that restore, protect, or enhance habitats, resources, and services. Each Restoration Type consists of one or more proposed restoration approaches, as summarized for Alternative A in Table 6.3-1. Although Alternatives A and B include the same set of Restoration Types, they differ in their emphasis on coastal habitat restoration and ecological interconnectivity compared with their emphasis on living coastal and marine resources.

Alternative C (Continue Injury Assessment and Defer Comprehensive Restoration Planning) describes continuing assessment, evaluation, and modeling of injuries to increase the certainty of the injury assessment before conducting restoration planning. Under this scenario, Alternative C may include the Restoration Types presented for Alternatives A and B, or could include additional or different Restoration Types and distribution of effort among the Restoration Types. All additional restoration would be deferred under Alternative C until such time as a comprehensive restoration plan is proposed and selected by the Trustees.

[5] NOAA Administrative Order Series 216-6, *Environmental Review Procedures for Implementing the National Environmental Policy Act* (NAO 216-6); the Department of the Interior NEPA regulations, 40 CFR Part 46.

Alternative D, Natural Recovery/No Action, evaluates a no-action alternative under NEPA that parallels a natural recovery alternative under OPA. No additional restoration, except for NRDA Early Restoration, would be implemented under NRDA in Alternative D. To allow for a meaningful analysis, the environmental consequences of each restoration approach are evaluated and presented. A summary of cumulative environmental impacts from implementing the alternatives in light of other past, present, and reasonably foreseeable future actions is also included at this programmatic level. This chapter concludes with a comparison of the environmental consequences among the four programmatic alternatives.

Table 6.3-1. Summary of DWH PDARP/PEIS Restoration Types and restoration approaches proposed under Alternative A.

Restoration Type	Restoration Approach
Wetlands, coastal, and nearshore habitats	Create, restore, and enhance coastal wetlands
	Restore and preserve Mississippi-Atchafalaya River processes
	Restore oyster reef habitat (see Section 6.4.12.1 under the Restoration Type Oysters)
	Create, restore, and enhance barrier and coastal islands and headlands
	Restore and enhance dunes and beaches
	Restore and enhance submerged aquatic vegetation (see Section 6.4.8.1 under the Restoration Type Submerged Aquatic Vegetation)
	Protect and conserve marine, coastal, estuarine, and riparian habitats
Habitat projects on federally managed lands	Create, restore, and enhance coastal wetlands (see Section 6.4.1.1 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
	Restore oyster reef habitat (see Section 6.4.12.1 under the Restoration Type Oysters)
	Create, restore, and enhance barrier and coastal islands and headlands (see Section 6.4.1.3 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
	Restore and enhance dunes and beaches (see Section 6.4.1.4 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
	Restore and enhance submerged aquatic vegetation (see Section 6.4.8.1 under the Restoration Type Submerged Aquatic Vegetation)
	Protect and conserve marine, coastal, estuarine, and riparian habitats (see Section 6.4.1.5 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
	Promote environmental stewardship, education, and outreach (see Section 6.4.13.3 under the Restoration Type Provide and Enhance Recreational Opportunities)
Nutrient reduction (nonpoint source)	Reduce nutrient loads to coastal watersheds
	Reduce pollution and hydrologic degradation to coastal watersheds (see Section 6.4.4.1 under the Restoration Type Water Quality)
	Create, restore, and enhance coastal wetlands (see Section 6.4.1.1 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
	Protect and conserve marine, coastal, estuarine, and riparian habitats (see Section 6.4.1.5 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
Water quality (e.g., stormwater treatments, hydrologic restoration, reduction of sedimentation, etc.)	Reduce pollution and hydrologic degradation to coastal watersheds
	Reduce nutrient loads to coastal watersheds (see Section 6.4.3.1 under the Restoration Type Nutrient Reduction [Nonpoint Source])
	Create, restore, and enhance coastal wetlands (see Section 6.4.1.1 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
	Protect and conserve marine, coastal, estuarine, and riparian habitats (see Section 6.4.1.5 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
Fish and water column invertebrates	Reduce impacts of ghost fishing through gear conversion and/or removal of derelict fishing gear
	Reduce mortality among Highly Migratory Species and other oceanic fishes
	Voluntary reduction in Gulf menhaden harvest
	Incentivize Gulf of Mexico commercial shrimp fishers to increase gear selectivity and environmental stewardship
	Voluntary fisheries-related actions to increase fish biomass

Restoration Type	Restoration Approach
	Reduce post-release mortality of red snapper and other reef fishes in Gulf of Mexico recreational fishery using fish descender devices
	Restore sturgeon spawning habitat (see Section 6.4.6.1 under the Restoration Type Sturgeon)
	Reduce Gulf of Mexico commercial red snapper or other reef fish discards through IFQ[a] allocation subsidy program
Sturgeon	Restore sturgeon spawning habitat Reduce nutrient loads to coastal watersheds (see Section 6.4.3.1 under the Restoration Type Nutrient Reduction [Nonpoint Source]) Protect and conserve marine, coastal, estuarine, and riparian habitats (see Section 6.4.1.5 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
Sea turtles	Reduce sea turtle bycatch in commercial fisheries through identification and implementation of conservation measures
	Reduce sea turtle bycatch in commercial fisheries through enhanced training and outreach to the fishing community
	Enhance sea turtle hatchling productivity and restore and conserve nesting beach habitat
	Reduce sea turtle bycatch in recreational fisheries through development and implementation of conservation measures
	Reduce sea turtle bycatch in commercial fisheries through enhanced state enforcement effort to improve compliance with existing requirements
	Increase sea turtle survival through enhanced mortality investigation and early detection of and response to anthropogenic threats and emergency events
	Reduce injury and mortality of sea turtles from vessel strikes
Submerged aquatic vegetation	Restore and enhance submerged aquatic vegetation
Marine mammals	Reduce commercial fishery bycatch through collaborative partnerships
	Reduce injury and mortality of bottlenose dolphins from hook and line fishing gear
	Increase marine mammal survival through better understanding of causes of illness and death as well as early detection and intervention for anthropogenic and natural threats
	Measure noise to improve knowledge and reduce impacts of anthropogenic noise on marine mammals
	Reduce injury, harm, and mortality to bottlenose dolphins by reducing illegal feeding and harassment activities
	Reduce marine mammal takes through enhanced state enforcement related to the Marine Mammal Protection Act
	Reduce injury and mortality of marine mammals from vessel collisions
	Protect and conserve marine, coastal, estuarine, and riparian habitats (see Section 6.4.1.5 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
Birds	Restore and conserve bird nesting and foraging habitat
	Create, restore, and enhance coastal wetlands (see Section 6.4.1.1 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
	Restore and enhance dunes and beaches (see Section 6.4.1.4 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
	Create, restore, and enhance barrier and coastal islands and headlands (see Section

Restoration Type	Restoration Approach
	6.4.1.3 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
	Restore and enhance submerged aquatic vegetation (see Section 6.4.8.1 under the Restoration Type Submerged Aquatic Vegetation)
	Protect and conserve marine, coastal, estuarine, and riparian habitats (see Section 6.4.1.5 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
	Establish or re-establish breeding colonies
	Prevent incidental bird mortality
Mesophotic and deep benthic communities	Place hard ground substrate and transplant coral
	Protect and manage mesophotic and deep benthic coral communities
Oysters	Restore oyster reef habitat
Provide and enhance recreational opportunities	Enhance public access to natural resources for recreational use
	Enhance recreational experiences
	Promote environmental stewardship, education, and outreach
	Create, restore, and enhance coastal wetlands (see Section 6.4.1 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats e)
	Restore oyster reef habitat (see Section 6.4.12 under the Restoration Type Oysters)
	Create, restore, and enhance barrier and coastal islands and headlands (see Section 6.4.1.3 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
	Restore and enhance dunes and beaches (see Section 6.4.1.4 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)
	Restore and enhance submerged aquatic vegetation (see Section 6.4.8.1 under the Restoration Type Submerged Aquatic Vegetation)
	Protect and conserve marine, coastal, estuarine, and riparian habitats (see Section 6.4.1.5 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats)

IFQ = individual fishing quota.

6.3.2 Determining the Level of Impact

Under NEPA, federal agencies must consider the potential environmental impacts of proposed actions. These effects may include, among others, impacts to social, cultural, and economic resources, as well as natural resources. To identify those resources that could be significantly affected by the proposed alternatives and actions, appropriate definitions of *impacts* must first be identified. Table 6.3-2 provides resource-specific guidelines for determining impacts of the programmatic alternatives.

As defined in NEPA, evaluations should include direct, indirect, and cumulative effects. The CEQ regulations (40 CFR §§ 1508.8 and 1508.7) define these effects as follows:

- **Direct effects** are caused by the action and occur at the same time and place as the action.
- **Indirect effects** are caused by the action and occur later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate and related effects on air and water and other natural systems, including ecosystems.

- **Cumulative effects** are the impact on the environment that 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 undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

This Final PDARP/PEIS describes and evaluates both adverse and beneficial impacts on the natural and human environments. In order to determine whether an action has the potential to result in significant impacts under NEPA, the **magnitude** of the impact, with respect to *context* and *intensity* of the action, must be considered. The qualitative assessment of impacts is based on a review of available and relevant reference material and professional judgment, using standards that include consideration of the permanence of an impact, the uniqueness of or ability to replace the resource, and the abundance or scarcity of the resource.

Context refers to area of impacts (local, statewide, etc.) and their duration (e.g., whether they are short- or long-term impacts). An impact lasting for a finite period and of short duration relative to the proposed restoration project and the environmental resource is considered short-term for purposes of this Final PDARP/PEIS. In general, the impacts of construction and associated activities (e.g., vehicle use, use of staging areas for equipment or area closure) undertaken to implement a restoration project are expected to be short-term, and the impacts that persist beyond construction are expected to be long-term. These characteristics are determined on a case-by-case basis and do not refer to any specific time period.

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 such as high visitation or wildlife breeding/rearing). Intensity is also described in terms of whether the impact would be beneficial or adverse. A single act might result in adverse impacts on one resource and beneficial impacts on another resource. An adverse impact is one having unfavorable or undesirable outcomes for the manmade or natural environment. Each adverse impact is described by one of the following terms:

- **Minor.** Minor impacts are generally those that might be detectable but, in their context, may nonetheless not be measurable because any changes they cause are so slight as to be impossible to define.
- **Moderate.** Moderate impacts are those that are more detectable and, typically, more quantifiable or measureable than minor impacts.
- **Major.** Major impacts are those that, in their context and due to their severity, have the potential to meet the thresholds for significance set forth in CEQ regulations (40 CFR § 1508.27) and, thus, warrant heightened attention and examination for potential benefit of mitigation.

Significance

"When used in NEPA, this word requires consideration of both context and intensity. For context, an action must be analyzed in several contexts such as society as a whole, the affected region, the affected interests, and the locality. For intensity, an action must be analyzed with respect to the severity of impact." (40 CFR § 1508.27)

A beneficial impact is one that creates a positive outcome in the manmade or natural environment. Because restoration conducted as part of this Final PDARP/PEIS is intended to result in significant, major benefits to injured resources, evaluation of the intensity of the benefits to resource categories is not described. For resource areas where there is no expected effect from project activities, a "no-impact" conclusion is made.

In this chapter, potential programmatic environmental consequences are presented largely without factoring in the types of best practices that could be used to avoid or minimize the potential adverse effects at a project-specific level. Such practices can be established during project planning and implementation. An exception is the analysis of impacts to protected biological resources and their habitats. For these resources, Restoration Types were specifically analyzed assuming the incorporation of best practices (see in Section A.1 of Appendix 6.A, Best Practices) that would typically be required by regulating agencies because these projects generally would not be able to move forward through agency review without incorporation of best practices (see Section 6.9). Such best practices include—but are not limited to—steps taken through site selection, engineering and design, use of proven restoration techniques, and other conditions or activities required for project-specific regulatory compliance. All projects implemented under subsequent restoration plans and tiered NEPA analyses consistent with this Final PDARP/PEIS would secure all necessary state and federal permits, authorizations, consultations, or other regulatory processes, including those related to sensitive habitats (e.g., wetlands or Essential Fish Habitat [EFH]) and protected species (e.g., marine mammals, such as dolphins, or federally listed species, such as sea turtles). Projects will also be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources. Note that consideration of best practices will be specifically included in the tiered analysis described in Section 6.17.

Chapter 5, Section 5.4.3, Early Restoration, describes the Early Restoration process undertaken by the Trustees and references restoration plans and the associated environmental reviews. These Early Restoration projects were evaluated by the Trustees with consideration of environmental impacts to physical, biological, and socioeconomic resources. Appendix 5.B, Early Restoration, Table 5.B-1, identifies the project, Early Restoration phase, geographic area (state- or Gulf-wide), and Restoration Type that the project is associated with. Analysis of the effects of these actions was considered in the evaluation of restoration approaches considered in this Final PDARP/PEIS.

This chapter evaluates the potential environmental impacts of restoration approaches, acknowledging that the selection of a programmatic alternative and associated restoration approaches does not in itself result in environmental impacts; impacts would occur as a result of projects ultimately identified and selected in future project-specific actions that tier from this PDARP/PEIS. The intensity definitions, as presented in Table 6.3-2, are used in this Final PDARP/PEIS for identifying adverse impacts of the proposed restoration approaches. These intensity definitions are also designed for use in subsequent tiered documents. The analysis uses the intensity definitions in evaluating whether the proposed restoration approaches may result in minor, moderate, or major adverse impacts. Section 6.4, Evaluation of Environmental Consequences of Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative), presents a summary of the findings of these analyses for each proposed restoration approach.

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.

6.4 Evaluation of Environmental Consequences of Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative)

As presented in Chapter 5, Restoring Natural Resources, three restoration alternatives are considered that meet the Trustees' identified need for a comprehensive restoration approach closely linked to injury that will guide and direct subsequent development and selection of specific restoration projects. Per NEPA, a fourth, no-action alternative is also considered.

Alternative A would establish an integrated restoration portfolio that emphasizes the broad ecosystem benefits that can be realized through coastal habitat restoration in combination with resource-specific restoration in the ecologically interconnected northern Gulf of Mexico ecosystem. As presented in Chapter 5, it comprises Restoration Types that restore for injuries to nearshore habitats, living coastal and marine resources, and recreational use. Organized within these Restoration Types, restoration approaches (Table 6.3-1) are evaluated for the environmental consequences of taking such actions. Appendix 5.D, Restoration Approaches and OPA Evaluation, describes 39 individual restoration approaches that could be used to implement the restoration plan, with descriptions of each, implementation considerations, and an OPA appropriateness evaluation. Below, the restoration approaches are evaluated individually[6] with respect to potential impacts to physical, biological, and socioeconomic resources. Following individual analysis by restoration approach, the environmental consequences of implementing Alternative A are summarized.

6.4.1 Restoration Type: Wetlands, Coastal and Nearshore Habitats

The following restoration approaches are proposed for wetlands, coastal and nearshore habitats:

- Create, restore, and enhance coastal wetlands.
- Restore and preserve Mississippi-Atchafalaya River processes.
- Restore oyster reef habitat (see Section 6.4.12.1 under the Restoration Type Oysters).
- Create, restore, and enhance barrier and coastal islands and headlands.
- Restore and enhance dunes and beaches.
- Restore and enhance submerged aquatic vegetation, or SAV (see Section 6.4.8.1 under the Restoration Type Submerged Aquatic Vegetation).

[6] As described in Section 5.4, Approach to Developing and Evaluating Alternatives, the Restoration Types and restoration approaches are building blocks for comprehensive restoration plan alternatives, which also must meet the Trustees' programmatic goals. As such, some restoration approaches fall under more than one Restoration Type. Because the environmental consequences would not differ based on the type of restoration implemented, restoration approaches are evaluated once, even if they are supportive of more than one Restoration Type. For example, "Restore oyster reef habitat" is an approach that supports both Wetlands, Coastal, and Nearshore Habitats and Oysters. It is noted in Section 6.4.1 under the first Restoration Type; however, its evaluation is presented in Section 6.4.12, Restoration Type: Oysters.

- Protect and conserve marine, coastal, estuarine, and riparian habitats.

The following sections describe the environmental consequences of these approaches. The approach for restore and enhance submerged aquatic vegetation (SAV) is described in Section 6.4.8. The approaches related to oyster restoration are presented in Section 6.4.12.

6.4.1.1 Create, Restore, and Enhance Coastal Wetlands

This restoration approach focuses on the creation, restoration, and enhancement of coastal wetlands, including marshes, mangroves, and pine savannahs, that provide benefits to injured resources through the replacement of injured wetland resources, provision of habitat for injured faunal resources and/or their prey, and improvement of water quality to benefit injured resources in coastal watersheds. Coastal wetlands are the backbone of the northern Gulf of Mexico coastal and nearshore ecosystem, providing a wide range of important ecological functions and services. They also serve as important habitat for fish and wildlife species, improve water quality, stabilize shorelines, reduce storm surge, and capture and store carbon in organic soils (Armentano & Menges 1986; Costanza et al. 2014; Costanza et al. 2008; Moody & Aronson 2007; Woodward & Wui 2001; Zimmerman et al. 2000). There are multiple restoration techniques that can be used, individually or in combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Create or enhance coastal wetlands through placement of dredged material.
- Backfill canals.
- Restore hydrologic connections to enhance coastal habitats.
- Construct breakwaters.

The following programmatic analysis is intended to capture potential broad impacts from a variety of techniques that may be proposed under this approach in future restoration plans.

6.4.1.1.1 Physical Resources

Short-term and long-term, minor to moderate adverse impacts on the physical environment could result from construction activities related to creating, restoring, and enhancing coastal wetlands. Short-term impacts could result from the use of staging areas (causing water turbidity from sediment disturbance) and construction equipment (releasing emissions causing adverse air quality and noise impacts from the operation of machinery). Short-term, minor to moderate noise impacts associated with construction activities could temporarily displace human use of those areas; however, this approach is expected to be implemented outside densely populated areas. Construction of hard structures such as breakwaters can involve use of heavy equipment on the shoreline and barges that can cause direct localized and short-term, moderate adverse impacts from sediment disturbance and compaction, increased turbidity, and noise as the materials are placed in the designed configuration. Long-term, minor adverse indirect impacts on the physical environment could occur from the placement of dredged material and breakwaters in shallow water areas, which may affect sediment dynamics. Placement of materials (such as dredged material or riprap) would result in long-term, but localized, adverse impacts to the existing substrate. Hydrology also may be affected where tidal connectivity is modified per project design. However, projects would typically require implementation of best practices to minimize or avoid adverse impacts. Best practices, such as silt curtains, buffer zones, and water quality monitoring, would be used to minimize such effects.

This approach will benefit wetlands and other shoreline habitats by raising substrate elevations affected by subsidence and sea level rise and re-establishing natural hydrology needed to restore the function of coastal wetland communities. Reconnecting coastal wetlands to freshwater sources and/or tidal flooding will restore the natural hydrology of these habitats. This would re-establish natural estuarine salinity gradients and could maintain and improve coastal water quality, benefiting other coastal habitats and resources. This approach also helps stabilize substrates, which increases the resilience of coastal wetlands to sea level rise and reduces coastal erosion. This approach supports linkages within the broader coastal and nearshore ecosystem by restoring the natural movement of water, sediments, energy, and nutrients among habitats.

6.4.1.1.2 Biological Resources

Short-term, minor to moderate adverse impacts to the biological environment could occur during construction activities related to 1) disturbance to wetland vegetation during construction and 2) displacement of land-based or aquatic faunal species resulting from staging equipment and materials, as well as entrapment of marine mammals. Long-term, minor to moderate impacts could include conversion of one wetland vegetation type to another (e.g., saline vegetation to more freshwater vegetation) with changes in the distribution of fauna communities. Some applications of this approach could also result in localized, permanent, adverse impacts to shallow intertidal or subtidal habitat—such as that for SAV or oysters, for instance, if fill is placed in these areas to create marsh. These impacts are expected to be confined to the immediate vicinity of the project, and best practices would likely be implemented to minimize adverse impacts.

This approach would provide long-term benefits for many ecologically and economically important animals, including fish, shrimp, shellfish, birds, sea turtles, marine mammals, and terrestrial mammals in the form of food, shelter, breeding, and nursery habitat. Many of the species that directly utilize coastal marshes and mangroves as juveniles later migrate offshore, where they serve as prey for ecologically and economically important open ocean species. Thus, these highly productive habitats support ecological connectivity both within the coastal ecosystem and between the coastal, nearshore, and open ocean ecosystems through the movement of animals that use wetlands during their life cycle to grow and reproduce. A variety of techniques could be implemented under this approach, and subsequent projects implementing these techniques would be designed to maximize ecological benefits to animals that depend on coastal wetland habitats.

6.4.1.1.3 Socioeconomic Resources

This approach could result in minor to moderate, localized adverse impacts to socioeconomic resources if a project includes protection of lands that otherwise would have been developed for residential housing or commercial uses. Indirect adverse impacts in the immediate area could occur during construction through 1) limits on recreational activities near the construction area to protect public safety; 2) temporary increases in road traffic due to movement of construction vehicles; and 3) adverse effects on aesthetics due to the presence of construction equipment, new breakwaters, or other changes to the surrounding environment.

Implementation of this approach at national, state, and local parks; wildlife refuges; and wildlife management areas could result in short-term, minor adverse impacts to land and marine management due to temporary partial or full closure of areas, public access restrictions, and/or interruption of

interpretive programs. Long-term benefits for the public are anticipated as a result of the restoration approach. Benefits to the local economy could accrue through an increase in employment and associated spending in the project area during construction. Over the long term, this approach may provide long-term benefits to recreationists through increased opportunities for wildlife viewing, kayaking, canoeing, hunting, fishing, and other recreational activities. Additional indirect benefits could include increased fishing opportunities (both commercial and recreational), from restoring coastal habitats that benefit fish. To the extent that these increased recreational opportunities result in increased visitation, local businesses may benefit from increased expenditures by visitors. This approach may increase property values adjacent to a project site if aesthetics are improved.

Improvements in water quality resulting from increased water filtration from these activities could also contribute long-term benefits to public health. Construction of breakwaters and wetland restoration and enhancement activities could provide benefits to coastal populations and infrastructure through improved flood and shoreline protection. This benefit is particularly effective for low-energy storm events.

Creating, enhancing, or restoring coastal wetlands could result in minor (temporary disturbance) to moderate (disturbance without loss of cultural information) impacts on cultural and historic resources due to construction activities such as dredging, addition of sediments or borrow materials, and/or removal of sediments, depending on the scale of the action and site-specific characteristics. Adverse impacts could include physical destruction or alteration of resources and may alter, damage, or destroy resources such as historic shipwrecks, engineering structures or landscapes, or connectivity with related sites. The Office of Coast Survey's Automated Wreck and Obstruction Information System (AWOIS) database and other relevant studies are available for identification of submersed resources for individual projects. Discovery or recovery of cultural or historic resources would allow their future protection.

6.4.1.2 Restore and Preserve Mississippi-Atchafalaya River Processes

This restoration approach seeks to provide large-scale benefits for the long-term sustainability of deltaic wetlands in coastal Louisiana by managing river diversions from the Mississippi-Atchafalaya River systems. Flood levees and river channelization have cut deltaic wetlands off from the Mississippi and Atchafalaya Rivers and the sediments, freshwater, and nutrients that originally created them (Boyer et al. 1997; Cahoon et al. 2011; Roberts 1997). Large-scale river management operations aim to reintroduce renewable, sustainable sources of sediment that are necessary for the long-term replenishment and sustainability of the deltaic wetlands in this region (Day et al. 2007; Kemp et al. 2014; Kim et al. 2009; Paola et al. 2011; Wang et al. 2014). River diversions represent a long-term strategy to restore injured wetlands and resources by reducing widespread loss of existing wetlands. This large-scale restoration approach aims to increase the long-term resilience and sustainability of other wetland restoration implemented in the region (Day et al. 2007; Kemp et al. 2014). Sediment diversions primarily redirect coarse-grained river bedload into deltaic wetlands and the shallow nearshore environment, although inherently freshwater and finer-grained silt will be diverted as well. The anticipated performance of diversions is a function of many factors, including but not limited to location, available sediment, velocity, river stage, outfall management, physical and ecological characteristics of the discharge area, and operational management of the diversion. Diversion-related impacts are also a

function of these factors, the magnitude of which will be predicted during project-specific planning, engineering, and design and will not be known until completion of construction and the initiation of operations and adaptive management.

As such, the Trustees anticipate that most diversions that may be proposed in subsequent restoration plans would require preparation of an EIS (or EISs) tiered from this PEIS to evaluate their impacts and benefits of those respective diversion, both as individual projects or as a suite of projects where appropriate. Thorough engineering and design, and associated project and watershed hydrodynamic and ecologic modeling, will be critical in completing project-level EISs. The Louisiana Coastal Protection and Restoration Authority (LCPRA) has spent years conducting river and diversion studies, the largest being the Mississippi River Hydrodynamic and Delta Management restoration study, an ongoing joint study conducted by the LCPRA and the U.S. Army Corps of Engineers (USACE). This study identifies and evaluates a combination of large-scale management and restoration features to address the long-term sustainability of the Mississippi-Atchafalaya delta region. It is intended to help guide the multiple uses of the river system; determine the magnitude of impacts; help identify project scale, scope, and location; and evaluate diversion alternatives. Hydrodynamic models and other forecasting tools will be used to refine projections of how water and sediment resources could be best used to restore and sustain deltaic growth. The results of this study are still pending, and other additional data collection and analysis may be required to determine project benefits and impacts.

The following sections describe the scope and possible magnitude of potential impacts associated with diversions, which typically are correlated with diversion size. These impacts are discussed in general terms, as no specific diversions are proposed in this Final PDARP/PEIS and project-specific impacts could not be known prior to completion of pending studies and project-level engineering and design, which would be evaluated in a subsequent restoration plan and project-specific tiered EIS(s).

6.4.1.2.1 Physical Resources

Localized, long-term, minor to moderate adverse impacts to sediments and geology are possible at the diversion construction site as the structure(s) is installed. Short-term, moderate adverse impacts to surface water quality are possible during diversion operation, which may reduce salinity, alter oxygen concentrations, and increase turbidity. Although considered adverse here, these water quality changes related to sediment and freshwater influx would be similar to those that occur during natural high flow events and are intended to mimic historical delta-building processes.

Some studies have suggested that increased nutrient loading to coastal wetlands could affect marsh soil shear strength and belowground biomass, which could reduce the resilience of the marsh to disturbances such as hurricanes (Deegan et al. 2012; Kearney et al. 2011; Turner 2011). However, studies that have looked specifically at the effects of the existing salinity control structures on soil stability, belowground biomass, and the accumulation of soil organic matter have shown mixed results (Day et al. 2013; DeLaune et al. 2003; DeLaune et al. 2013; Howes et al. 2010; Swarzenski et al. 2008). This impact would likely vary based on the type of vegetation in the receiving marsh (Morris et al. 2013; Teal et al. 2012). Research also indicates that wetlands in the deltaic plain are very efficient at removing nutrients, which should help limit any negative impacts associated with the river's nutrient loads (Day et al. 2003; DeLaune et al. 2005; VanZomeren et al. 2012). Further, the marshes surrounding the mouth of the Atchafalaya River and the uncontrolled Wax Lake outlet diversion in Atchafalaya Bay show

considerable resilience to storm impacts (Carle & Sasser 2015; Rosen & Xu 2013), indicating that high nutrient loads are not negatively affecting the stability of these marshes that receive large amounts of both sediment and freshwater from the Mississippi River. This suggests that negative impacts to soil stability would not be expected for diversions that are specifically designed to deliver high sediment loads.

6.4.1.2.2 Biological Resources

Diversions will periodically increase freshwater and sediment input to the receiving estuary, which can lead to changes in water temperature, clarity, oxygen and nutrient concentrations, and salinity, at least for the duration of the operation of the diversion and for some period of time after the diversion is closed. During these periods of water quality changes, short-term and some potentially long-term, moderate to major adverse impacts to biological resources are possible depending on the level and duration of stress on their biological functions. This could affect the distribution and reproductive patterns of some estuarine-dependent fish species and affect the sustainability of local oyster populations (Soniat et al. 2013). Additionally, oyster reef, estuarine sand/shell substrates, and marshes are identified as EFH for red drum and brown shrimp, both federally managed fisheries (GMFMC & NOAA 2007). Impacts to these habitats could result in in-kind impacts to the species that utilize these habitats. Depending upon the location and operation of the diversion(s), some displacement of certain fisheries may occur during the period of operation or during the residual effects of freshening. Changes in salinity patterns would likely alter marine mammal habitat and/or negatively affect marine mammal health, especially for resident stocks of bay, sound, and estuary bottlenose dolphins in the receiving basins that would not be expected to leave their home areas (LaBrecque et al. 2015; Miller 2003; Miller & Baltz 2009; Waring et al. 2015). Short-term, minor impacts to sea turtles and marine mammals may also occur as a result of changes in prey distribution and availability following operation of a large-scale diversion; additionally, sea turtles may be displaced from newly freshwater areas.

Conversely, long-term, moderate to major benefits to biological resources are also anticipated as a result of the restoration of deltaic processes that would increase the resilience of habitat for numerous species. Long-term increases in marsh acreage and health and long-term benefits in the form of restored deltaic processes are expected. Depending on the size and operation, river diversions can regulate salinity fluctuations and improve marsh productivity (Visser et al. 2013). A healthy marsh provides food and cover to juvenile fish, shrimp, crabs, oysters, and other biota.

Impacts to shellfish related to sediment flow are possible due to burial, predation, and salinity stress; injury or mortality due to increased turbidity (e.g., gill abrasion or clogging of feeding apparatus); and modified behavior and displacement due to changing environmental conditions and associated physiological stress (Wilber & Clarke 2001). Adverse impacts to current oyster reefs may be moderate to major and long-term depending on proximity to the diversion outfall and on operations, especially if spat-producing reefs are buried or otherwise do not provide a spat source for other reefs. These impacts could increase mortality, affect reproduction, and affect oyster spat settlement (Soniat et al. 2013). Freshwater inputs could push optimal salinities for oysters farther seaward. Benefits to oyster resources located in higher salinities, however, may result from freshwater inputs, which could reduce salinities and thus the potential for dermo infections (infection by the protozoan parasite *Perkinsus marinus*) and predation by oyster drills (*Stramonita haemastoma*), both of which are major threats to oyster survival

and productivity in high-salinity areas (areas with more than 20 practical salinity units [psu] over oyster reefs) (Petes et al. 2012; Soniat et al. 2012; Wilber & Clarke 2001).

Impacts to finfish related to sediment and freshwater diversions may also result due to increased turbidity (e.g., gill abrasion) or modified behavior and displacement due to changing environmental conditions and associated physiological stress (Wilber & Clarke 2001). Adverse impacts at a population level are not anticipated, and most populations will relocate to appropriate habitat. River diversions also affect water quality in ways that could change the distribution and reproductive patterns of estuarine-dependent fish species (Nyman et al. 2013) and disrupt the nursery functions of an estuary by affecting food and habitat availability (Rozas & Minello 2011; Rozas et al. 2005). Short-term moderate adverse impacts are anticipated for less freshwater-tolerant species, such as brown shrimp, spotted seatrout, and other estuarine-dependent species due to dependence of larvae and juveniles on estuarine conditions (Nyman et al. 2013). These species could be displaced during certain portions of the year, which could affect prey availability and abundance, growth rates, and predation rates (Rose et al. 2009). Species such as Gulf menhaden, blue crab, white shrimp, and red drum, which commonly use intermediate salinity areas, SAV habitats, and oyster reefs, could incur short-term adverse impacts during operation as a result of salinity changes but are anticipated to relocate to appropriate salinities, and potentially to newly restored saltwater marshes.

Freshwater inflow is an important component of circulation and flushing processes in estuaries, which supports the aquatic food web of marine fishery species by transporting planktonic organisms, nutrients, and detritus to the Gulf of Mexico. Freshwater fishery species, such as crawfish, catfish, largemouth bass, and other sunfish could benefit from implementation of this approach due to the increased freshwater input. Also, prior to vegetation establishment in receiving sites, short-term beneficial effects for wading and other shorebirds could occur in the form of expanded loafing, feeding, or nesting areas. There will also be a long-term beneficial effect on these species based on increased prey production derived from improved marsh productivity.

6.4.1.2.3 Socioeconomic Resources

Over the long term, restoration of the Mississippi-Atchafalaya River processes would be expected to result in overall socioeconomic benefits resulting from the preservation and restoration of coastal wetlands, as well as employment opportunities during the construction of such projects. Both short- and long-term adverse impacts to fisheries could occur, however, as resources and wetlands convert to more freshwater habitats.

Long-term, adverse socioeconomic impacts to the oyster industry are possible, as the diversions may affect oyster mortality and recruitment within the receiving basin, or shift oyster resources further south, thus increasing travel time and harvesting costs. Likewise, shifts in marine fisheries distribution could increase industry costs. In addition to fisheries, diversions could increase flooding frequency and duration that may affect commercially important terrestrial species (e.g., alligators). If such animals are affected, activities such as trapping, egg collection, and hunting opportunities may also be affected.

Impacts to cultural resources resulting from the implementation of this restoration technique are dependent on site-specific conditions associated with a proposed project. Creating, enhancing, or restoring wetlands could result in minor (temporary disturbance) to moderate (disturbance without loss

of cultural information) impacts on cultural and historic resources due to construction activities such as dredging, addition of sediments or borrow materials, and/or removal of sediments. Adverse impacts could include physical destruction or alteration of resources such as historic shipwrecks, engineering structures or landscapes, or connectivity between related sites.

Commercial navigation may be adversely affected by diversion-induced river shoaling. Diversions have the potential to change currents in the river and affect navigational safety. Navigation channel safety is a significant driver of dredging operations in the Mississippi River; the extent to which dredging operations may be affected will depend on project specifics. The previously mentioned Mississippi River Hydrodynamic and Delta Management restoration study, in part, considers diversion impacts to river dynamics and shoaling.

Diversions that contribute to the preservation or restoration of wetlands are expected to benefit public and private landowners; however, in the immediate areas of diversions there could be flooding of wetland areas during periods of operation. Over the long term, however, land gain resulting from diversions may provide a buffer from storm surge and sea level rise to help protect coastal communities and landowners.

6.4.1.1.3 Create, Restore, and Enhance Barrier and Coastal Islands and Headlands

This restoration approach focuses on restoring barrier and coastal islands, which would provide coastal habitat important to coastal stability and ecology in the Gulf of Mexico. Barrier island restoration has a long history, particularly in Louisiana where more than 20 projects have been conducted in the last two decades (CPRA 2012). Barrier and coastal islands and headlands provide important habitat for many animal and plant species including, but not limited to, sea turtles, birds, and endangered beach mice. Multiple restoration techniques are available for use individually, or in combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Restore or construct barrier and coastal islands and headlands via placement of dredged sediments.
- Plant vegetation on dunes and back-barrier marsh.

6.4.1.1.3.1 Physical Resources

Construction associated with restoration of barrier and coastal islands and headlands can result in direct, short-term adverse impacts to geology, substrates, water quality, and air quality from sediment handling at both the borrow site (sediment source) and the placement site. Local noise levels and vehicle emissions would increase temporarily, and minor to major adverse impacts from noise may occur, particularly at large barrier island restoration projects where sediment addition activities may occur over many months. The severity of these physical impacts is expected to be minor to major and would depend to a large degree on the location of the project, the amount of disturbance that these activities would generate, and the distance to sensitive receptors such as recreational users or wildlife.

6.4.1.1.3.2 Biological Resources

There may be direct short-term adverse impacts to benthic habitats during construction of barrier and coastal islands and headlands due to temporary placement of pipelines (for transport of sediments) and

temporary storage of dredged sediments in nearshore habitats. Long-term adverse impacts may also occur due to final placement of sediment in the footprint where existing habitats would be covered by additional sediment. Increased turbidity around the borrow site and placement sites may affect sensitive benthic habitats such as oyster reefs, coral reefs, and seagrasses (Michel et al. 2013). However, best practices, such as silt curtains, buffer zones, and water quality monitoring, would be used to minimize such effects. Adjacent benthic populations would be expected to move into the borrow site and recolonize quickly, within 1 to 3 years (Greene 2002).

Sea turtles and marine mammals present in project areas where dredging or underwater use of equipment is occurring could be adversely affected by temporary increases in noise and turbidity, water quality changes, alteration or loss of habitats, entrapment, and potential interactions with dredging equipment.

Potential short-term, minor adverse effects of this approach could include disturbance to marine mammals, sea turtles, and birds in nearshore waters from increased vessel traffic. Vessel collisions contribute to the anthropogenic mortality of several threatened marine species including turtles, manatees, and whales (Hazel et al. 2007; Kraus et al. 2005), and there is a possibility of vessel strikes to sea turtles and marine mammals from increased vessel activity. To prevent vessel collisions and noise impacts to marine mammals and sea turtles during dredging and vessel operations, other best practices (including shutting down dredge pumps, restricting vessel speeds, placing vessels in neutral in the presence of the animals, and moving away when animals are observed within specific distances of the vessel) are usually required (NMFS & FWS 2008). Barrier and coastal island and headland restoration and creation activities can result in short-term impacts to shorebirds from disturbance and reduced foraging efficiency if the birds are roosting and feeding in the area during a migration stopover. These activities could also result in harm or mortality if birds are nesting in the area. For example, the deposition of sand will temporarily deplete the intertidal food base during construction and for 6 months to 2 years following construction, depending on invertebrate faunal recovery rates (summarized in Bejarano et al. 2011). If disturbance or reduced foraging efficiency persists, birds may be temporarily displaced (Peterson et al. 2006), resulting in valuable energy reserve expenditures to seek available habitat elsewhere. Nourished beaches can negatively affect sea turtle nesting if the sand is too hard for the turtles to dig nests or if the composition and properties of the sand is different and reduces egg survival. However, all projects may include implementation of best practices to minimize or avoid any potential negative consequences. For example, sediment placement on shorelines to enhance or create nesting bird or sea turtle habitat would be scheduled to avoid disturbances during nesting season, and monitors would be used to avoid harm and mortality and minimize other effects.

Restoration efforts that increase stability and resilience of barrier and coastal islands may result in long-term habitat benefits, including increased areal extent and improvement of beach habitat for beach mice, foraging birds, nesting bird colonies, and sea turtle nesting. For example, barrier islands and headlands along the central Gulf Coast provide habitat for the federally protected piping plover, and expanding the potential nesting habitat for these beach-nesting birds could directly benefit the population. Restored barrier and coastal islands and headlands could benefit interior freshwater wetland habitats, back-bay seagrass and oyster reefs, and coastal and riparian areas by reducing erosion, scouring, and subsequent water quality impacts of storm surge events.

6.4.1.3.3 Socioeconomic Resources

Area closures are anticipated during construction to protect public safety and may result in short-term limits to tourism and recreational uses. If these closures occur in areas with high levels of hunting, fishing, and tourist activity, resource users may choose to pursue these recreational activities in different locations or forgo the activities. Adverse impacts to tourism and recreation resulting from potential closures would be expected to be short-term and minor to moderate. Over the long term, these projects could provide wildlife enthusiasts with increased wildlife viewing opportunities. Long-term benefits for the public are anticipated as a result of the restoration approach.

Impacts to cultural resources resulting from the implementation of this restoration technique are dependent on site-specific conditions associated with a proposed project. Creating, enhancing, or restoring barrier and coastal wetlands and headlands could result in minor (temporary disturbance) to moderate (disturbance without loss of cultural information) impacts on cultural and historic resources due to construction activities such as dredging, addition of sediments or borrow materials, and/or removal of sediments. Adverse impacts could include physical destruction or alteration of resources and may alter, damage, or destroy resources such as historic shipwrecks, engineering structures or landscapes, or connectivity with related sites. The AWOIS database and other relevant studies are available for identification of submersed resources for individual projects. Discovery or recovery of cultural or historic resources would allow their future protection.

Projects will be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

Barrier island restoration projects generally result in beneficial impacts on human use of those areas. In particular, wide beaches with healthy dunes may draw additional visitors to the area, with associated increases in visitor spending and sales and tax receipts. Short-term benefits to the local economy could accrue through an increase in employment and associated spending in the project area during construction activities. Project construction spending would support the workforce needed to design, engineer, manage, and carry out the project. Additionally, there would be socioeconomic benefits from improved shoreline integrity and additional buffer and flood storage during storms.

6.4.1.4 Restore and Enhance Dunes and Beaches

This restoration approach focuses on restoring dunes and beaches through various techniques that provide important habitat for many animal and plant species including, but not limited to, sea turtles, birds, and endangered beach mice. The approach will also serve to restore popular recreational areas for local visitors and tourists. Dunes are also sand storage areas that supply sand to eroded beaches. Because dunes have been heavily affected by development and storm activity, this habitat is often unavailable as a natural source of sand for beaches. A variety of restoration techniques are available for use, individually, or in combination, as potential restoration projects. Multiple restoration techniques are available for use individually, or in combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Renourish beaches through sediment addition.
- Restore dune and beach systems through the use of passive techniques to trap sand.
- Plant vegetation on dunes.

- Construct groins and breakwaters or use sediment bypass methods.
- Protect dune systems through use of access control.

6.4.1.4.1 Physical Resources

Construction associated with beach renourishment can result in direct, short-term adverse impacts to geology, substrates, and water quality from sediment handling at both the borrow site (sediment source) and the placement site and soil and substrate disturbance during dune vegetation plantings. Construction of hard structures such as groins, breakwaters, and living shorelines can involve the use of heavy equipment on the shoreline and/or barges that can cause direct, localized, and short-term adverse impacts to sediments (e.g., disturbance and compaction), water quality (e.g., increased turbidity), air quality (due to vehicle emissions), and ambient noise conditions as the materials are placed in the designed configuration. These structures will permanently cover existing substrates and geology. One concern with hard structures on beaches, if not properly designed, is that they can cause erosion of the downdrift shoreline and scour on the seaward end. Once in place, structures such as groins and breakwaters can change the natural process of sediment accretion and erosion, including preventing washover events on beaches and causing erosion in offsite locations. These adverse effects would be minor to moderate and long-term, because they could affect substrate and geologic characteristics of the adjacent shoreline and will extend beyond the construction period. Sediment bypassing methods could have minor and short-term adverse impacts at the placement site (e.g., erosion), however, these potential impacts can be addressed by appropriate design and engineering techniques However, best practices, such as silt curtains, buffer zones, and water quality monitoring, would be used to minimize such effects. Local noise levels would increase temporarily, and minor to major adverse impacts from noise may occur during construction. The severity of these physical impacts is expected to be minor to major and would depend to a large degree on the location of the project, the amount of disturbance that these activities would generate, and the distance to sensitive receptors such as recreational users or wildlife.

However, long-term beneficial impacts would be expected because beach and dune restoration can protect the coastline from sea level rise and reduce shoreline erosion, as described previously.

6.4.1.4.2 Biological Resources

Direct, short-term adverse impacts to benthic habitats during beach nourishment may occur due to temporary placement of pipelines (for transport of sediments), temporary storage of dredged sediments in nearshore habitats, and final placement of sediment in the footprint where existing habitats would be covered by additional sediment. Increased turbidity around the borrow site and placement sites may affect sensitive benthic habitats such as oyster reefs, coral reefs, and seagrasses (Michel et al. 2013). By affecting benthic habitat, beach renourishment may also affect benthic invertebrates and demersal fishes that may be part of marine mammal food chains (Peterson and Bishop 2005).

However, best practices such as silt curtains, buffer zones, and water quality monitoring, would be used to minimize such effects. Adjacent benthic populations would be expected to move into the borrow site and recolonize quickly, within 1 to 3 years (Greene 2002).

Beach habitats contribute to the quantity and quality of adjacent shallow water habitats that serve as nurseries or forage areas for some finfish species. The beach–shallow water interface also provides

nutrient exchange to aquatic habitats. Protecting these habitats could result in a long-term benefit to these species and indirectly benefit the food chain that relies on the health of adjacent shallow water areas.

Sea turtles and marine mammals present in project areas where dredging or underwater use of equipment is occurring could be adversely affected by temporary increases in noise and turbidity, water quality changes, alteration or loss of habitats, entrapment, and potential interactions with dredging equipment. Groin and breakwater construction could result in minor to moderate, long-term adverse impacts to access to nesting beaches for sea turtles and navigation/survival of hatchlings leaving nesting beaches.

Potential minor adverse effects of this approach could include disturbance to marine mammals, sea turtles, and birds in nearshore waters from increased vessel traffic, as described earlier in Section 6.4.1.3, Create, Restore, and Enhance Barrier and Coastal Islands and Headlands.

Restoration efforts that increase stability and resilience of dunes and beaches may result in long-term habitat benefits, including increased areal extent and improvement of beach habitat for beach mice, foraging birds, nesting bird colonies, and sea turtle nesting. For example, beaches along the central Gulf Coast provide habitat for the federally protected piping plover, and expanding the potential nesting habitat for these beach-nesting birds could directly benefit the population. Restored beaches and dunes could benefit back-bay seagrass and oyster reefs by reducing erosion, scouring, and subsequent water quality impacts of storm surge events.

The footprint of hard structures such as groins, breakwaters, and living shorelines changes the habitat from a soft to a hard substrate, which changes the benthic community, often adding habitat complexity and attracting new species of attached organisms such as oysters and algae and the animals that feed on them, such as birds, fish, and sea turtles (Bulleri & Chapman 2010).

6.4.1.4.3 Socioeconomic Resources

Area closures are anticipated during construction to protect public safety. This may result in short-term adverse impacts associated with limited access to, and opportunities for, tourism and recreation in specific areas. If these closures occur in areas with high levels of hunting, fishing, and tourist activity, resource users may choose to pursue these recreational activities in different locations, or forgo the activity. Adverse impacts to tourism and recreation resulting from potential closures would be expected to be short-term.

Socioeconomic impacts of beach restoration projects are generally positive. Wide beaches with healthy dunes may draw additional visitors to the area, with associated increases in visitor spending and sales and tax receipts. Short-term benefits to the local economy could accrue through an increase in employment and associated spending in the project area during construction activities. Socioeconomic benefits would also result from improved shoreline integrity and additional buffer and flood storage during storms.

If cultural or historic resources are present, minor to moderate adverse impacts to them would be anticipated during construction activities such as dredging and placement/removal of sediments or other materials used during the restoration of dunes and beach. Adverse impacts could include physical

destruction or alteration of all or part of a cultural or historic resource and may directly alter, damage, or destroy resources such as historic shipwrecks, engineering structures or landscapes, or connectivity with related sites. The AWOIS database and other relevant studies would be consulted in the identification of resources to evaluate potential impacts for individual projects. Discovery or recovery of cultural or historic resources would allow their future protection.

6.4.1.5 Protect and Conserve Marine, Coastal, Estuarine, and Riparian Habitats

This restoration approach supports, protects, and restores a wide variety of coastal, estuarine, and riparian habitats and the ecosystem services they provide, through the identification, protection, management, and restoration of important habitat areas or land parcels. This approach can provide habitat connectivity across habitat types or geographic areas, and minimize habitat loss by reducing or avoiding impacts from activities such as development. In addition, protecting habitats can provide public access for the use and enjoyment of the Gulf of Mexico's natural resources. There are multiple restoration techniques that can be used individually, or in combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Acquire lands for conservation.
- Develop and implement management actions in conservation areas and/or restoration projects.
- Establish or expand protections for marine areas.

6.4.1.5.1 Physical Resources

Specific restoration activities identified as part of land management plans could result in short-term, minor to moderate adverse effects on geology, substrates, and water resources. The intensity of impacts would strongly depend on the management goals for the acquired land and the location of the project. For example, fire management, predator control, water quality improvements, and vegetation planting may have short-term adverse impacts on soils, substrates, and air quality. Land acquisition could permit public access for recreational use. For example, marine protected areas (MPAs) are put in place to help maintain essential ecological processes, preserve genetic diversity, and ensure the sustainable use of species and ecosystems (Kelleher 1999) but do not generally preclude public access. This public use, which would depend on management stipulations developed as part of the land acquisition, could result in short-term, minor to moderate adverse effects through increased soil compaction, rutting, or erosion caused by human presence and activity within the conservation area. Increased public use could result in short-term, minor effects on surface water through increased sedimentation and turbidity caused by human presence and activity within wetland/shallow water habitat.

During implementation of land management plans and/or establishment/expansion of MPAs there could be short-term, minor to moderate adverse impacts to air quality from emissions generated by construction equipment and vehicles. Impacts during establishment of MPAs would be short-term and minor and likely a result of adding signs, buoys, and other infrastructure to identify the protection areas. The severity of impacts would highly depend on the length and type of construction required and the location of the project. Construction activities are anticipated to result in temporary minor to moderate adverse impacts to air quality due to pollutants from fuel emissions, including particulate matter, lead, and carbon monoxide greenhouse gases (GHGs) are specifically addressed in Section 6.14.1, Impacts of Restoration Approaches on GHG Emissions).

Depending on the land use following acquisition, some changes in noise levels could occur; however, these would be evaluated on a project-specific basis (e.g., public access might result in minor increases to noise levels from recreational users, or preservation of lands may help to maintain natural quiet over a longer term). During implementation of the land management plan, minor, short- and long-term adverse impacts to ambient noise levels could occur. The severity of impacts would depend to a large degree on the location of the project, the amount of noise that these activities would generate, and the proximity of sensitive noise receptors, including wildlife, to these activities.

Fee title land acquisition or use of a conservation easement could reduce disturbance of geology and substrates by protecting lands from development pressure. This would be a long-term beneficial effect that will extend the life of the project. Where easements and protected lands overlap ground water recharge zones, surface water, or brackish-water resources, water sources and quality could be further protected from future degradation by helping to reduce runoff. Similarly, where protected land overlaps wetlands or shorelines, the protection of natural hydrologic processes could indirectly help limit development and associated effects on water quality, including via saltwater intrusion. These would be long-term beneficial effects.

6.4.1.5.2 Biological Resources

Specific restoration activities identified as part of land management plans could result in short-term, minor to moderate adverse effects on conservation areas. The severity of impacts would be highly dependent on the management goals for the acquired land and the location of the project. Construction activities that may occur on conserved lands may result in introduction of invasive species. Use of best practices would help prevent the introduction of invasive species. However, if invasive species became established in, or adjacent to, restored or enhanced habitats areas, this adverse effect would be short- to long-term, would be limited to the local area, and might range from minor to moderate.

Removal of non-native/invasive plants benefits certain species as part of land management plans; however, there can be negative impacts on other ecosystem components if removal methods are too intensive (Zarnetske et al. 2010). Timing of removal actions would be scheduled to minimize disturbance to sensitive nontarget species. In addition, lethal predator control methods intentionally have direct effects on the targeted species, but such actions are taken only after careful technical evaluation and environmental assessment. Unintentional mortality of nontarget organisms and native species targeted for protection from predators could occur through the use of broadcast baits such as those used for rat removal. Aerial dispersal of baits containing rodenticides can cause direct mortality to foraging and scavenging animals (such as gulls and small mammals) that ingest bait pellets (EPA 2004). Exposure of nontarget organisms is generally reduced by the short life cycle of the chemicals used; however, additional application to remove predators may be necessary over time and could result in repeated impacts to those nontarget species at most risk.

Implementation of land management plans, located within or near restoration activities, could result in disturbed, removed, or altered habitats, which could cause minor to moderate, short- and long-term adverse effects on species that use those habitats for forage or nesting purposes. The severity of impacts would highly depend on the management goals for the acquired land and the location of the project. For example, land acquisition could permit public access for recreational use. This public use,

depending on management stipulations, could result in long-term, minor to moderate adverse effects on area species through increased human presence and activity on acquired habitats.

Conservation of habitat through fee title acquisition, use restrictions, and improved management could have a long-term benefit to any habitat on the property acquired or protected. Conservation would also allow for upland migration of beach, wetland, or other habitats as the sea level rises and could limit development encroachment. Conservation of habitat through fee title acquisition or conservation easements could have a long-term benefit to fish, sea turtles, marine mammals, birds, and terrestrial wildlife through the protection of coastal, riparian, or terrestrial habitat. These habitats can be important for food supply and various life stages of some species. These benefits would depend on project-specific goals and the location of acquired land. Establishment or expansion of MPAs would increase the ability to manage, conserve, and protect marine species.

6.4.1.5.3 Socioeconomic Resources

This approach could have long-term, minor to moderate adverse economic effects if conservation easement or acquisition prevents or limits development.

Preserving habitat by acquisition of property or through conservation easements could permanently limit the amount and type of development permitted, and the management and intensity of use on these properties would likely change. Land conservation or acquisition may result in restrictions on public access in areas where public access had previously been allowed, which could reduce recreational opportunities. Projects that result in changes in ownership and/or permitted uses could affect property taxes and have broader regional economic impacts resulting from changes in visitor spending in the region. Land acquisition could have a minor to moderate impact on socioeconomic resources due to changes in visitor spending and tax impacts. The transfer of fee title to lands and the creation of conservation easements, however, are transactions negotiated or arranged between willing parties and, as such, are not expected to give rise to adverse socioeconomic impacts to those who choose to engage in such transactions.

The acquisition of lands to protect habitat could result in impacts to recreation and tourism opportunities depending on site-specific land management practices applied. Closures, such as fencing or other mechanisms to protect nest sites, could result in short-term (seasonal) prohibitions on public access. Restrictions on public access in areas where public access had previously been allowed could reduce recreational opportunities.

Over the long term, these techniques could result in healthy populations and provide wildlife enthusiasts with increased wildlife viewing opportunities. Conservation or acquisition of natural land resources can have indirect benefits on fish and wildlife habitat, potentially resulting in increased fishing and hunting opportunities. Seasonal or permanent employment could increase in order to provide labor for the installation, maintenance, and implementation of management projects such as hunting or trapping.

Changes to land use resulting from land acquisition could change access to natural resources (e.g., restricted access for different types of uses when under private ownership) and change the future development of infrastructure or services. Depending on the type and location of the project, these implications could have an adverse or a beneficial impact on socioeconomic characteristics.

For example, if private lands are opened for recreational use, this could be beneficial. These benefits would result from improved aesthetics and opportunities to view, catch, or hunt wildlife either on the protected lands, if allowed, or in nearby areas that are likely to experience improved abundance and diversity of species as a result of the spillover effects of conservation efforts.

Further, the acquisition of coastal land for conservation easements could mitigate some of the economic impacts of expected sea level rise by preventing development that would be at risk from future storm surges or flooding. Social and economic impacts would be site-specific and would depend on what resources were protected or enhanced; the potential for use and enjoyment by residents, businesses, and visitors; and whether conservation efforts supported or conflicted with community goals.

Impacts to cultural resources and infrastructure resulting from the implementation of a conservation action or habitat management plan would depend on site-specific conditions associated with a project proposed for implementation. For example, benefits to cultural resources and infrastructure could result if conservation includes protecting cultural or infrastructure resources that are within or close to protected areas.

6.4.2 Restoration Type: Habitat Projects on Federally Managed Lands

This Restoration Type comprises many of the same restoration approaches proposed for many of the other Restoration Types. Rather than repeat the NEPA analyses here, we refer the reader to the sections in this chapter where the pertinent Restoration Types/approaches are analyzed.

- **Create, restore, and enhance coastal wetlands.** Potential techniques include but are not limited to creating or enhancing coastal wetlands through placement of dredged material, backfilling canals, restoring hydrologic connections to enhance coastal habitats, and constructing breakwaters. The programmatic NEPA analysis is found in Section 6.4.1.1 under the Restoration Type Wetlands, Coastal and Nearshore Habitats.
- **Restore oyster reef habitat.** Potential techniques include but are not limited to restoring or creating oyster reefs by placing cultch in nearshore intertidal and subtidal areas, constructing living shorelines, and enhancing oyster reef productivity through spawning stock enhancement projects. The programmatic NEPA analysis is found in Section 6.4.12.1 under the Restoration Type Oysters.
- **Create, restore, and enhance barrier and coastal islands and headlands.** Potential techniques include but are not limited to removing or constructing barrier and coastal islands and headlands via placement of dredged sediments and planting vegetation on dunes and back-barrier marsh. The programmatic NEPA analysis is found in Section 6.4.1.3 under the Restoration Type Wetlands, Coastal and Nearshore Habitats.
- **Restore and enhance dunes and beaches.** Potential techniques include but are not limited to renourishing beaches through sediment addition, restoring dune and beach systems using passive techniques to trap sand, planting vegetation on dunes, constructing groins and breakwaters or using sediment bypass methods, and protecting dune systems through use of

access control. The programmatic NEPA analysis is found in Section 6.4.1.4 under the Restoration Type Wetlands, Coastal and Nearshore Habitats.

- **Restore and enhance SAV.** Potential techniques include but are not limited to backfilling scars with sediment; revegetating beds via transplant and/or propagation; enhancing beds through nutrient addition; and protecting beds with buoys, signage, and other protective measures. The programmatic NEPA analysis is found in Section 6.4.8.1 under the Restoration Type Submerged Aquatic Vegetation.

- **Protect and conserve marine, coastal, estuarine, and riparian habitats.** Potential techniques include, but are not limited to, fee title acquisition; property use restrictions and/or management; and conserving, managing, and restoring habitat that is being acquired or is currently under protection. The programmatic NEPA analysis is found in Section 6.4.1.5 under the Restoration Type Wetlands, Coastal and Nearshore Habitats.

- **Promote environmental stewardship, education, and outreach.** Potential techniques include, but are not limited to, creating or enhancing natural-resource-related educational materials and/or programs to reduce visitor impacts to habitat. The programmatic NEPA analysis is found in Section 6.4.13.3 under the Restoration Type Recreational Use.

6.4.3 Restoration Type: Nutrient Reduction (Nonpoint Source)

The nutrient reduction and water quality Restoration Types address impacts to water quality. This section is specific to nutrient reduction (nonpoint source). The restoration approaches associated with this Restoration Type are as follows:

- Reduce nutrient loads to coastal watersheds.

- Reduce pollution and hydrologic degradation to coastal watersheds (see Section 6.4.4.1 under the Restoration Type Water Quality).

- Create, restore, and enhance coastal wetlands (see Section 6.4.1.1 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats).

- Protect and conserve marine, coastal, estuarine, and riparian habitats (see Section 6.4.1.5 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats).

The restoration approach is to reduce nutrient loads to coastal watersheds by reducing runoff from agricultural areas. The following sections describe the environmental consequences of this approach.

6.4.3.1 Reduce Nutrient Loads to Coastal Watersheds

This restoration approach would implement conservation practices in vulnerable areas to reduce nutrient pollution and provide ecosystem-scale benefits to Gulf Coast habitats and resources chronically threatened by nutrients and co-pollutants causing water quality degradation. Projects will be targeted in areas on public or private lands to reduce nutrient losses from the landscape and reduce loads to streams and downstream receiving waters and, thus, provide benefits to coastal waters that have degraded water quality (e.g., hypoxia and harmful algal blooms). As such, this approach would require

the voluntary cooperation and support of partners that may include, but are not limited to, private landowners and farmers; timber management/logging operations; municipal and county governments; and appropriate local, state, and federal agencies. Where feasible, these projects should be coordinated within watershed boundaries to enhance nutrient reductions to coastal water bodies. Examples of past successful water quality restoration projects include regional watershed management plans, state Clean Water Act 319 programs, and USDA-Natural Resources Conservation Service (NRCS) conservation programs (i.e., Environmental Quality Incentives Program, Conservation Reserve Program, Wetlands Reserve Program, Wildlife Habitat Incentives Program). This funding will not be used to fund previous activities required under local, state, or federal law (e.g., pollution reduction actions required by a Clean Water Act permit), but instead could be used in coordination with existing mandates to enhance water quality benefits. Through a coordinated and integrated watershed approach to project implementation, expected benefits include reductions in nutrient losses from the landscape; reductions in nutrient loads to streams and downstream receiving waters; reduction in water quality degradation (e.g., hypoxia and harmful algal blooms); and associated benefits to coastal waters, habitats, and resources.

6.4.3.1.1 Physical Resources

Some agricultural best practices include small-scale construction projects (e.g., to manage manure and runoff from feedlots). Therefore, during construction, short-term, minor adverse impacts on geology, substrate, hydrology, surface and ground water quality (e.g., nutrients, fertilizers, pesticides, total suspended solids in runoff, and high-conductivity ground water), air quality, and noise (due to emissions) would be anticipated. However, long-term benefits are expected to result because these conservation practices to reduce nutrients would slow erosion, stabilize soils, improve water quality, and increase ground water recharge.

6.4.3.1.2 Biological Resources

Depending on the projects implemented, short-term, minor adverse impacts may be anticipated during construction. For example, if construction includes earth-moving work, terrestrial vegetation may be disturbed. Benefits to biological resources such as benthic invertebrates, shellfish, finfish, and marine mammals could result from 1) improved water quality in the watershed and associated estuary and 2) reduced contaminant loadings (e.g., pesticides and fuel contaminants such as polyaromatic hydrocarbons and metals).

6.4.3.1.3 Socioeconomic Resources

Impacts to socioeconomics resulting from the implementation of this restoration approach are dependent on site-specific conditions associated with a project proposed for implementation. Depending on the techniques employed, short-term benefits to the local economy could accrue through an increase in employment and associated spending in the project area during construction activities. Improvements to water quality could result in indirect benefits to recreational activities and commercial fishing. If cultural or historic resources are present, minor adverse impacts to the resource would be anticipated during construction activities such as dredging and placement/removal of sediments or other materials.

6.4.4 Restoration Type: Water Quality (e.g., Stormwater Treatments, Hydrologic Restoration, Reduction of Sedimentation, etc.)

The nutrient reduction and water quality Restoration Types address impacts to water quality. This section is specific to water quality (stormwater treatments, hydrologic restoration, reduction of sedimentation, etc.). The restoration approaches associated with this Restoration Type are as follows:

- Reduce pollution and hydrologic degradation to coastal watersheds.
- Reduce nutrient loads to coastal watersheds (see Section 6.4.3.1 under the Restoration Type Nutrient Reduction [Nonpoint Source]).
- Create, restore, and enhance coastal wetlands (see Section 6.4.1.1 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats).
- Protect and conserve marine, coastal, estuarine, and riparian habitats (see Section 6.4.1.5 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats).

The restoration approach to reduce pollution and hydrologic degradation to coastal watersheds is described below.

6.4.4.1 Reduce Pollution and Hydrologic Degradation to Coastal Watersheds

This restoration approach focuses on restoring hydrology and reducing pollution in coastal watersheds to improve local water quality and provide benefits to nearshore Gulf Coast ecosystems. Development in coastal watersheds leads to hydrologic alterations that change the volume, timing, duration, and quality of freshwater inflow in the form of increased stormwater runoff and hydrologic restrictions. These alterations in freshwater inflows are also correlated with increased flooding and discharge of pollutants, including fecal bacteria and pathogens, to nearby coastal water bodies.

Stormwater runoff is the most common and ubiquitous source of nonpoint source pollution in the coastal landscape. It is created when rainfall flows over natural landscape or impervious surfaces and does not percolate into the ground. Coastal development is associated with impervious surface cover (e.g., roads, rooftops, parking lots, and driveways), which increases the volume and rate of stormwater runoff (EPA 2003). Stormwater runoff accumulates debris, sediment, and pollutants (e.g., chemicals, fertilizers, herbicides, insecticides, salts, oil, and bacteria and solids from livestock, pets, and faulty septic systems) throughout the landscape and discharges them into nearby coastal waters. This discharge can impair water quality in both local waterways and downstream coastal Gulf waters (EPA 2003). The U.S. Environmental Protection Agency (EPA) and the states regulate and permit certain pollutant sources; however, strategic enhancements in pollution reduction techniques could provide a reduction in pollution of nearby coastal waters.

This restoration approach would implement a combination of stormwater control measures, erosion control practices, agriculture conservation practices, forestry management practices, hydrologic restoration, and coastal and riparian conservation techniques that are not previously mandated by the Clean Water Act. This restoration approach could implement, but is not limited to, the following techniques:

- Low-impact development practices.
- Traditional stormwater control measures.
- Erosion and sediment control practices.

6.4.4.1.1 Physical Resources

Depending on the project type, there could be short-term, minor adverse impacts on geology, substrate, hydrology, water quality, air quality, and noise during the construction phase. However, short-term adverse impacts would be minimized by implementing best practices. Short-term, minor impacts to air quality and ambient noise levels are anticipated as a result of construction emissions. Long-term benefits to surface water and ground water are anticipated as a result of reduced total suspended solids, nutrients, and other contaminant loads in stormwater runoff and increases in pervious areas that concomitantly increase ground water recharge.

6.4.4.1.2 Biological Resources

Depending on the techniques employed, short-term, minor adverse impacts may be anticipated during construction. For example, if construction includes earthmoving work, terrestrial vegetation may be disturbed. Benefits to biological resources, such as benthic invertebrates, shellfish, finfish, and marine mammals, and SAV could result from improved water quality in the watershed and associated estuary from reduced contaminant loadings (e.g., pesticides and fuel contaminants).

6.4.4.1.3 Socioeconomic Resources

Impacts on socioeconomic resources resulting from the implementation of this restoration approach would depend on site-specific conditions associated with a project proposed for implementation. Upgrades or maintenance of infrastructure could result in minor, short- and long-term economic impacts related to funding of these efforts. Depending on the projects implemented, short-term benefits to the local economy could accrue through an increase in employment and associated spending in the project area during construction activities. Improvements to water quality could result in indirect benefits to recreational activities and commercial fishing. Projects that are anticipated to enhance stormwater infrastructure would be expected to result in improved public health and safety as a result of improved runoff controls and reduced stormwater flooding that may otherwise flood streets and interfere with utilities, including storm sewers and wastewater facilities.

6.4.5 Restoration Type: Fish and Water Column Invertebrates

The following restoration approaches are proposed for fish and water column invertebrates:

- Reduce impacts of ghost fishing through gear conversion and/or removal of derelict fishing gear.
- Reduce mortality among Highly Migratory Species and other oceanic fishes.
- Voluntary reduction in Gulf menhaden harvest.
- Incentivize Gulf of Mexico commercial shrimp fishers to increase gear selectivity and environmental stewardship.
- Voluntary fisheries-related actions to increase fish biomass.

- Reduce post-release mortality of red snapper and other reef fishes in the Gulf of Mexico recreational fishery using fish descender devices.
- Restore sturgeon spawning habitat (see Section 6.4.6.1 under the Restoration Type Sturgeon).
- Reduce Gulf of Mexico commercial red snapper and other reef fish discards through the individual fishing quota (IFQ) allocation subsidy program.

The following sections describe the environmental consequences of these approaches.

6.4.5.1 Reduce Impacts of Ghost Fishing Through Gear Conversion and/or Removal of Derelict Fishing Gear

This restoration approach focuses on reducing the amount of ghost fishing by derelict fishing gear, either by removing gear from coastal environments when it has been lost and/or by modifying (converting) gear so that when it is lost it is less likely to cause bycatch mortality. Marine debris is one of the most widespread pollution problems facing ocean and coastal environments worldwide (IMDCC 2014; NAS 2009). In the United States, the U.S. Congress defines marine debris as any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned in the marine environment or Great Lakes (33 USC § 1951 *et seq*., as amended). One of the most persistent and damaging types of marine debris is lost or derelict fishing gear (Macfadyen et al. 2009), which continues to catch organisms after the gear is lost, a phenomenon known as "ghost fishing." Ghost fishing from derelict fishing gear is a potentially significant source of mortality for fish and other organisms (Arthur et al. 2014; Macfadyen et al. 2009). Derelict blue crab traps are a potential target for restoration because they are present in high numbers in the Gulf, are documented to catch estuarine-dependent finfish and invertebrate species, and are relatively easy to find in both intertidal and subtidal waters. Research indicates that traps 1) are lost due to many factors, some of which are preventable, 2) persist in the environment for several years, and 3) nondiscriminately catch target and nontarget species (Arthur et al. 2014; Bilkovic et al. 2014; Clark et al. 2012; Guillory 1993; Havens et al. 2008). Multiple restoration techniques are available for use, individually or in combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Implement contract and volunteer removal programs to collect existing derelict fishing gear.
- Conduct voluntary gear conversion programs.

6.4.5.1.1 Physical Resources

Gear removal may result in minor, short-term adverse impacts on the physical environment from disturbance to existing substrates from gear removal devices. There may be short-term, minor adverse impacts to air quality, water quality, and benthos during assessment surveys, transport during removal events, and actual gear removals, which will require the use of vessels. The impacts associated with this activity are expected to be short-term and minor. Adverse impacts to physical resources are anticipated to be minor.

Beneficial impacts may occur to the physical environment due to removal and reduction of derelict fishing gear. For example, long-term benefits are expected due to decreased movement of derelict crab

traps on the seafloor, which may disturb benthic substrates. The proposed restoration would result in a reduction in persistent synthetics (plastics) in the environment that provide a mechanism for accumulation of organic toxins such as polychlorinated biphenyls (PCBs) (Van et al. 2012). Marine debris in general also provides a means of transporting invasive species to additional locations. Reductions in marine debris will lead to long-term, minor improvements in water quality.

6.4.5.1.2 Biological Resources

Short-term, minor adverse impacts to biological resources may occur as a result of gear removal activities, such as disturbance of sediments and vegetation.

Beneficial impacts are expected to biological resources due to removal and reduction of derelict fishing gear. Long-term benefits will accrue due to habitat improvement through reduced trap movement on benthic sediments (Uhrin et al. 2014); reductions in marine mammal, sea turtle, and diving seabird entanglement in the buoy line (Gilardi et al. 2010); and enhanced crab and finfish resources due to decreases in ghost fishing.

6.4.5.1.3 Socioeconomic Resources

Because participation in this approach would be voluntary, adverse economic impacts associated with participating are not anticipated. The gear conversion program would provide incentives for the voluntary use of technological innovations, while the gear removal program would provide incentives for assistance with derelict trap survey and removal operations.

Debris removal could result in long-term, beneficial socioeconomic impacts. Marine debris can result in beach closures, which can have particularly serious economic ramifications in coastal areas dependent upon tourism (Oigman-Pszczol & Creed 2007). Marine debris has the potential to disable vessels via direct interactions with the debris or propeller/intake interactions, which can result in economic costs (USCOP 2004). Marine debris can also damage fisheries habitat (NOAA 2011b) and can interfere with navigational safety because it can be difficult to see and avoid (NAS 2009). These types of encounters with marine debris at sea can result in costly damage to a vessel such as a tangled propeller or clogged intake (NOAA 2011b). Removal of derelict traps is expected to result in an indirect beneficial impact to both commercial and recreational boater safety due to reduced entanglement hazards to boat propellers.

No construction activities are anticipated as a consequence of this restoration approach that would adversely affect cultural or historic resources.

6.4.5.2 Reduce Mortality Among Highly Migratory Species and Other Oceanic Fishes

Highly migratory species and other oceanic fishes, including tunas, billfishes, sharks, and swordfish, transit large expanses of the world's oceans in search of desirable habitat, such as foraging or spawning grounds. In doing so, they move between jurisdictional boundaries. These species are threatened by the substantial mortality associated with bycatch (catch of nontarget species) within the commercial pelagic longline (PLL) fishery and post-release mortality in recreational rod and reel fisheries. The PLL fishery in the Atlantic (which includes the Gulf of Mexico and Caribbean) primarily targets yellowfin tuna, bigeye tuna, and swordfish. Incidentally caught species include bluefin tuna, billfish, and sharks. Regulations,

fishing practices, and bycatch mortality vary substantially by country and geography. This restoration approach aims to reduce bycatch-related mortality to HMS and other oceanic fish by encouraging fishers to convert to fishing gear that can exclude, or reduce harm to, nontarget species, including those considered undersized (i.e., not retained because of regulatory limits). Multiple restoration techniques are available for use, individually or in combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Promote gear conversion to circle hooks and weak hooks.
- Promote gear conversion to greenstick and buoy gear.
- Implement incentive-based annual time closure (repose period).

6.4.5.2.1 Physical Resources

This approach could result in short-term beneficial impacts to air quality if the pelagic longline fishing repose (period of inactivity) results in slightly reduced fishing hours and vessel use. Other techniques for this approach, such as the use of weak hooks or circle hooks, could increase vessel operation time if additional time is required to catch fishing quotas. Expected possible small shifts in the number and behavior of vessels may result in subtle changes in noise levels and air quality from those associated with the current operations in the PLL fishery. Vessel operations are anticipated to result in short-term, minor adverse impacts to air quality due to pollutants from fuel emissions, including particulate matter, lead, and carbon monoxide (GHGs are specifically addressed in Section 6.14.1). The impacts associated with this restoration approach are expected to be short-term.

6.4.5.2.2 Biological Resources

This approach could result in an increase in the catch of certain nontarget species as a result of the conversion to a different gear in the PLL fishery. This could result in minor to moderate, adverse, long-term impacts to those species. For example, many highly migratory species of sharks have higher catch rate with circle hooks (Afonso et al. 2012).

The use of circle hooks and weak hooks has been found to reduce discard mortality and bycatch among numerous species; thus, replacing traditional J-hooks with these alternative hook types would have long-term benefits to HMS and other pelagic ocean fishes (Serafy et al. 2012a; Serafy et al. 2012b). This approach is expected to reduce catch of large bluefin tuna (via weak circle hooks) by recreational fishers and reduce bycatch mortality of bluefin tuna and other nontarget species (via circle hooks) in the pelagic longline fishery. Although the proposed approach will not necessarily reduce the total number of bluefin caught recreationally, since they are managed under an individual bluefin tuna fishing quota system, the number of bluefin tuna caught during spawning and high migration intensity in the Atlantic Ocean will be reduced. The use of low-bycatch gear is expected to have a positive impact numerous species in the Atlantic and Gulf of Mexico ecosystem that are caught as bycatch in pelagic longline gear. The reduction in discards and discard and post-release mortality anticipated as a result of this approach would also allow more HMS and other oceanic fish to survive and, thus, continue to grow and/or reproduce.

Protected species that may also benefit from the proposed techniques include sea turtles, marine mammals, and seabirds. Dolphins and whales interact with longline fishing gear. Sea turtles can ingest the hooks of longline fishing gear, become entangled in the lines, or be hooked externally. Seabird interactions occur in the longline fishery, but at relatively low levels and mainly when gear is being set

and birds attempt to pull bait off the hooks. To the extent that this approach results in reduced fishing activities, reductions in protected species interactions with longline gear should also decrease.

6.4.5.2.3 Socioeconomic Resources

This approach could have minor to moderate, short-term adverse impacts on the commercial fishing industry in the Gulf of Mexico as a result of reduced fishing effort and income or price of harvested fish. However, the long-term benefits include reduced fishing pressure on species such as bluefin tuna and other nontargeted species, providing a mechanism for population and fishery recovery and eventual quota increases. Reducing bycatch can result in an increase in fish biomass that could in turn result an increased catch or fishing opportunities. This can result in an economic benefit to commercial and recreational fishers. If incentives such as replacing existing vessels with vessels that could fish with alternatives gears more effectively are implemented, vessel owners may incur benefits in reduced fuel costs and operating expenses. The scale of these impacts will depend on the specific techniques implemented and the resulting changes to fish quality and harvest levels. However, vessel captains and crews could continue to receive salaries; fish dealers may experience fewer disruptions in fish supplies than might occur if no fishing occurred; fuel suppliers may continue to sell fuel to vessels participating in the PLL repose; and ice, bait, and equipment suppliers may not see as much of a change in sales as if no fishing occurred.

The National Marine Fisheries Service (NMFS) received anecdotal feedback from dealers that indicates the use of alternative gear types may affect fish quality, which could affect ex-vessel prices (prices fishers receive for catch at the point of landing). Decreased prices would result in less profit for fishers, which could result in lower spending by participants in this approach.

No construction activities are anticipated as a consequence of this restoration approach that would adversely affect cultural or historic resources.

6.4.5.3 Voluntary Reduction in the Gulf Menhaden Harvest

This restoration approach focuses on a voluntary reduction in menhaden harvest. The approach would establish voluntary quotas that would ensure that catches remain at the targeted level and allow the industry maximum flexibility. Specific agreements/contracts would be developed with each company specifying the agreed-on quota, timing, and other considerations.

6.4.5.3.1 Physical Resources

No adverse impacts on physical resources are expected from this approach. Placing a cap on the fishery and decreasing the fishing effort would decrease deployment of purse seines and provide a short-term benefit to geology and substrates. There would be minor, short-term benefits to air quality by implementing the caps because fishing hours would be reduced. There would be minor, short-term beneficial impacts to noise, since fewer boats on the water in nearshore areas would result in less noise generated by the fishing vessels due to reduced fishing time.

6.4.5.3.2 Biological Resources

As a result of reduced menhaden catch, there would be benefits to other species, including commercially and recreationally important finfish species, marine mammals, and bird species that depend on menhaden as a food source (Akin & Winemiller 2006; Barry et al. 2008; Browder et al. 1983;

Fertl & Wursig 1995; Goodyear 1967; King 1989; Leatherwood 1975; Matlock & Garcia 1983). In response to decreases in the Gulf menhaden fishery catch, demand for reduction products (i.e., fish meal, fish oil, and fish solubles) must be met by other fisheries or by other substitute-product markets. The increased demand for these alternative sources of reduction products may result in minor to moderate adverse impacts on biological resources through increased harvest of these replacement sources. Increased bycatch (e.g., marine mammals) may also occur in areas outside the United States.

6.4.5.3.3 Socioeconomic Resources

Localized short- and long-term, moderate adverse impacts to affected local economies (i.e., reduction of spending in fishing communities) may occur as a result of capping the menhaden harvest. Kirkley (2011) found that a theoretical closure of the Reedville menhaden processing facility on the Chesapeake Bay (where OMEGA Protein is the sole harvester and processor of menhaden into meal and oil) would have a negligible effect on the Virginia economy as a whole, but would substantially affect the surrounding county. If the incentives are not passed on to the labor pool, this project may disproportionately affect temporary labor, which may constitute up to 50 percent of the menhaden processing facility employment base at the height of the season (NMFS 2015). Consequently, menhaden processing companies would be compensated for their participation in the reduced catch program based on a valuation of the projected decrease in menhaden landings resulting from project participation. Socioeconomic impacts on the labor force and fishing communities would also need to be analyzed prior to implementation.

Because menhaden are important prey for many commercially and recreationally important finfish species, this restoration approach may result in long-term, beneficial indirect impacts to recreational and commercial fishing activities. For example, sportfish in the Gulf of Mexico are known to heavily rely on Gulf menhaden for prey (Geers 2012). Reliance of commercial fisheries on menhaden is described above, under Biological Resources (Section 6.4.5.3.2). As a result, reducing the amount of menhaden harvested from coastal waters may indirectly benefit commercial and recreational fishers in Gulf waters via enhance catch rates of targeted species.

No construction activities are anticipated for this restoration approach that would adversely affect cultural or historic resources.

6.4.5.4 Incentivize Gulf of Mexico Commercial Shrimp Fishers to Increase Gear Selectivity and Environmental Stewardship

This restoration approach focuses on the inshore and offshore shrimp fisheries operating in the northern Gulf of Mexico to reduce the capture and mortality of bycatch associated with this fishery. There is a variety of restoration techniques that can be used individually, or in combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Promote gear conversion to more efficient bycatch reduction devices (BRD).
- Promote gear conversion to a hopper post-catch sorting systems.

6.4.5.4.1 Physical Resources

Normal fishing practices for shrimp trawl involve deploying and hauling of gear. The BRD gear modifications are not intended to change fishing behavior in terms of fishing effort or trawl gear type utilized and are therefore not anticipated to result in changes in number of vessels in the Gulf of Mexico. Therefore, impacts to air and/or water quality are not generally anticipated. However, short-term, minor adverse effects on air quality or water quality would occur if implementing the projects requires a trial or gear demonstration for participating vessels that involves the additional use of vessels.

6.4.5.4.2 Biological Resources

Because this approach primarily involves replacing gear and using a catch sorting system, no adverse impacts to biological resources are anticipated. Long-term benefits to biological resources, including commercially important finfish such as red snapper, sea turtles, marine mammals, and birds are expected due to the reduction of bycatch. Discarded bycatch in the commercial shrimp fishery is a waste of natural resources, including finfish species that are integral to Gulf food webs (Crowder & Murawski 1998). Therefore, efforts to reduce bycatch can be expected to have long-term benefits to finfish because finfish make up more than 57 percent of the total penaeid shrimp fishery catch in the Gulf of Mexico and South Atlantic (Scott-Denton et al. 2012). For example, bycatch in the shrimp fishery is a significant source of fishery-induced mortality for the commercially important red snapper, as well as several state and federally managed finfish species in the southeastern United States (Scott-Denton et al. 2012).

6.4.5.4.3 Socioeconomic Resources

This approach is likely to result in some adverse economic impacts to fishers who voluntarily participate in this type of restoration project. In particular, alternative gear may be less efficient than traditional gear, resulting in lower catch rates and additional labor and fuel requirements to catch a similar volume to that caught prior to gear replacement. These adverse impacts are expected to be short-term and long-term and may vary from minor to moderate depending on the affected fishers. However, the financial incentives offered to them could offset these impacts.

Reducing bycatch mortality may result in increases in fish biomass that may, in turn, result in increased catch or fishing opportunities. This can result in long-term economic benefits to commercial and recreational fishers. The scale of these impacts will depend on the specific techniques implemented.

No construction activities are anticipated as a consequence of this restoration approach that would adversely affect cultural or historic resources.

6.4.5.5 Voluntary Fisheries-Related Actions to Increase Fish Biomass

This approach would restore both target and bycatch species to Gulf of Mexico fisheries through influencing the type, amount, and specificity of fishing mortality. Fisheries, fishing pressure, and fishing technologies will evolve over time and new opportunities for increasing fish biomass through voluntary efforts could emerge. Actions to reduce fishing mortality will be implemented in partnership with the fishing community as mutually beneficial agreements between fishing operations and the Trustees. Knowing that bycatch remains a large concern in Atlantic (including Gulf) fisheries, this approach includes examples of the types of emerging issues which could be addressed through restoration, such as:

- Emerging fishing technologies.
- Illegal, unregulated, unreported (IUU) fishing.

6.4.5.5.1 Physical Resources

Because this approach is expected to primarily involve evaluation, coordination, and modeling, o adverse or beneficial impacts on physical resources are anticipated as a result of this approach.

6.4.5.5.2 Biological Resources

As under physical resources, because this approach is expected to primarily involve evaluation, coordination, and modeling, no adverse biological impacts are anticipated for this approach. Long-term benefits to fisheries resources can be expected as information from monitoring to support planning, implementation, and evaluation of fish and water column restoration can better inform fisheries management.

6.4.5.5.3 Socioeconomic Resources

Minor, short-term adverse effects on socioeconomic resources may occur. Any potential use of new gear or technology that are effective at reducing bycatch may also reduce efficiency in fishery operations and catch. These potential short-term adverse impacts may be resolved in the longer term by other potential implementation solutions identified as part of this approach (e.g., incentives). Funding for efforts to increase biomass volume through use of emerging fishing techniques is anticipated to provide economic benefits to recipients of project funds. Reducing IUU and bycatch mortality may result in minor increases in fish biomass that may, in turn, result in increased catch or fishing opportunities. This may result in long-term economic benefits to commercial and recreational fishers. The scale of these impacts will depend on the specific techniques implemented.

6.4.5.6 Reduce Post-Release Mortality of Red Snapper and Other Reef Fishes in the Gulf of Mexico Recreational Fishery Using Fish Descender Devices

This restoration approach would reduce the post-release mortality of recreationally caught red snapper *(Lutjanus campechanus)* and other reef fish, such as gag *(Mycteroperca microlepis)*, red grouper *(Epinephelus morio),* and vermilion snapper *(Rhomboplites aurorubens)* in the Gulf of Mexico by promoting the use of fish descender devices (e.g., weighted release devices) among recreational private boat, charter boat, and headboat anglers and providing education so that fishers can effectively use these devices and reduce angler handling time. The recreational reef fish fishery in the Gulf supports an economically important recreational fishery, which, in 2011, consisted of over 3 million recreational anglers taking 23 million trips (NOAA 2012). Among the most important targets in the recreational fishery are reef fish (e.g., snappers, groupers, tilefish, jacks, triggerfishes, and wrasses). Recreational vessels of all sizes target reef fish; these vessels range in size from small, 12-foot private boats to 85-foot headboats that may carry up to 100 people (Moran 1988; Sauls et al. 2014).

6.4.5.6.1 Physical Resources

No impacts to the physical environment from use of fish descender devices and improved post-release handling techniques are expected because no equipment that would disturb sediments or geological resources is permanently deployed.

6.4.5.6.2 Biological Resources

Minor and short-term adverse impacts to biological resources are expected as a result of the use of weighted-release devices that create the potential for greater interaction of gear with benthic habitats such as coral and sponge species, although proper training can reduce this potential. The use of weighted-release devices and other techniques to reduce post-release mortality would provide short- and long-term benefits by reducing post release mortality of reef fish. Long-term benefits to reef fish are anticipated because of the increased survival and reproductive success of individual fishes.

6.4.5.6.3 Socioeconomic Resources

This approach would provide funding for the recreational fishing sector to implement practices that result in reduced post-release mortality of reef fish captured by anglers. Depending on recreational anglers' perceptions, this practice could have a minor adverse or positive impact on their fishing experience. For example, if anglers consider using the fish descender devices as an inconvenience or detriment to their fishing experience and/or success, there may be adverse impacts on recreational fishing activities. However, recreational anglers may derive some satisfaction (benefits) associated with releasing fish with fewer impacts from barotrauma.

Reducing bycatch mortality can lead to a minor increase in fish biomass that could in turn result in an increased catch or fishing opportunities. This can result in long-term economic benefit to commercial and recreational fishers. The scale of these impacts will depend on the specific techniques implemented.

No construction activities are anticipated as a consequence of this restoration approach that would adversely affect cultural or historic resources.

6.4.5.7 Reduce Gulf of Mexico Commercial Red Snapper and Other Reef Fish Discards Through IFQ Allocation Subsidy Program

This restoration approach focuses on subsidizing fishers in the Gulf of Mexico to use individual fishing quota (IFQ) allocations rather than discard catch in the Gulf reef fish fishery. For instance, some fishers in the eastern Gulf discard a high percentage of red snapper catch. Discarded red snapper have a high rate of post-release mortality. The high discard rate is likely due to insufficient quotas which reduce the profitability of landing red snapper that are caught. The Trustees would establish a mechanism to subsidize the transfer of quota allocations to qualified fishers to reduce the number of discarded reef fish and promote healthy fishing practices. The total amount of quota transferred to participants would be based on Trustee-determined objectives for restoration and implemented in coordination with fishery managers. Successful implementation of this project would reduce the amount of reef fish, including red snapper, discards and associated mortality in the Gulf reef fish fishery.

6.4.5.7.1 Physical Resources

Although it is not likely to increase vessel traffic, this approach could result in a shift in the distribution of the fishery effort to from the western to the eastern Gulf of Mexico, which would result in increased vessel traffic in localized areas. Increased vessel traffic would be associated with short- and long-term, minor adverse impacts on water quality, air, and noise levels. No other adverse impacts on the physical environment associated with this approach are anticipated. Areas with less vessel traffic would experience long-term benefits associated with improved water quality, air quality, and noise levels.

6.4.5.7.2 Biological Resources

Shifts in fishing activities could result in localized, short- and long-term, minor adverse impacts to biological resources in localized areas, including some additional bycatch of other species during fishing operations in areas where quotas are increased. The restoration approach aims to further bolster the recovering red snapper and other reef fish populations by reducing the mortality of discarded fish resulting from commercial practices. This is expected to achieve long-term beneficial impacts to the red snapper population.

6.4.5.7.3 Socioeconomic Resources

Shifting the distribution of catch would result in distributional economic impacts, adversely affecting some regions while benefiting others. Specifically, there may be region-specific adverse impacts to fishers in the Gulf of Mexico where quotas may be redistributed. The duration and magnitude of these impacts will depend on the specific changes to fishing operations and how fishers adapt to the changes (e.g., shifts to other species of fish or reemployment in other industries). If successful, this approach will benefit commercial fishers and seafood markets in some areas of the Gulf of Mexico. Regional economic benefits may occur as a result of increased commercial fishing activity in some areas of the Gulf of Mexico, which could increase spending and employment in these areas. With additional purchasers of allocation or quota, prices could be driven up, so an economic analysis would be undertaken prior to implementation to evaluate the potential for unintended economic consequences.

No construction activities are anticipated as a consequence of this restoration approach that would adversely affect cultural or historic resources.

6.4.6 Restoration Type: Sturgeon

The following restoration approaches are proposed for Gulf sturgeon:

- Restore sturgeon spawning habitat.
- Reduce nutrient loads to coastal watersheds (see Section 6.4.3.1 under the Restoration Type Nutrient Reduction [Nonpoint Source]).
- Protect and conserve marine, coastal, estuarine, and riparian habitats (see Section 6.4.1.5 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats).

The restoration approach is to restore the spawning habitat and access to the spawning habitat for the federally protected Gulf sturgeon is described below.

6.4.6.1 Restore Sturgeon Spawning Habitat

Gulf sturgeon migrate from marine waters to spawn (lay and fertilize their eggs) in fresh water in the large river systems of the Gulf. Gulf sturgeon typically spawn near limestone outcroppings, cobble, gravel, or other hard bottom habitats (Scollan & Parauka 2008), which are relatively uncommon features in southern U.S. rivers. Gulf sturgeon make long migrations year after year to the same location to take advantage of this spawning habitat. Improving the conditions in these rivers will increase the Gulf sturgeon's ability to spawn and reproduce. A variety of restoration techniques are available for use,

individually or in combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Erosion and sediment control or abatement.
- In-stream barrier removal or construction of fish passage.

6.4.6.1.1 Physical Resources

Barrier removal could have short-term and long-term, minor to major impacts to soils, hydrology, air quality, and noise level. Removing a barrier would restore historical stream flows from the upstream water body or reservoir caused by the barrier or dam, flushing sediments and nutrients downstream and potentially temporarily exceeding downstream water quality thresholds for various pollutants. This situation may result in long-term, minor to moderate adverse effects depending on post-removal hydrology, sediment quantity and characteristics, and contaminant characteristics. Depending on the barrier and the method of removal, temporary downstream flooding may be a short-term adverse effect.

Long-term effects of dam and sill removal are numerous and complex and would require site-specific evaluation and appropriate permitting. Short- and long-term, minor to major adverse effects on physical resources are anticipated as a result of barrier removal and stream restoration. For example, conversion of former ponds or reservoirs to riverine habitat could result in declines in local ground water levels, alter wetland soils, expose former springs, and result in river channel changes.

Barrier removal can also benefit water quality, increasing dissolved oxygen levels, altering water temperature, acidity, nutrient levels, and other metrics (Heinz Center 2002). However, the reconnection of river reaches restores their physical integrity so that the river can operate as an integrated system. This reconnection of river stretches is among the most important long-term benefits of dam removal (Heinz Center 2002).

Additional benefits of barrier removal include the restoration of available sediment and freshwater flows to estuaries and habitat connectivity. Barrier removal would also eliminate the scouring and sediment loss that occurs on the downstream side of a barrier and eliminate the pond or reservoir conditions on the upstream side of the dam.

Erosion and sediment control or abatement activities in Gulf sturgeon spawning habitats would have long-term benefits through reductions in pesticides, metals, and other contaminants that have been identified as possible contributors to Gulf sturgeon decline and/or slow recovery (FWS & GSMFC 1995). Reducing erosion, sedimentation, and, potentially, contaminant loading from adjacent land use practices would improve water quality. The restoration activities could also increase the capacity of a stream and its banks to accommodate high-flow events, which would decrease erosion further and stabilize geology and substrates over the life of the project.

6.4.6.1.2 Biological Resources

Effects of barrier removal include short- and long-term effects on biological resources. Barrier removal may result in short-term minor to moderate adverse impacts to downstream aquatic resources from increased turbidity during and shortly after removal of the barrier due to the release of impounded sediment. Long-term adverse effects of this sediment release on fish, wildlife, and benthic invertebrates

would depend on the extent (if any) of contaminants in the released sediment and this sediment's subsequent fate and transportation in the river.

Barrier removal may also result in short- and long-term, moderate adverse effects on water levels in local wetlands as a result of declines in surface water levels and associated local ground water levels. Large barrier removal (e.g., dams) may result in a direct loss of species dependent on the open or slow water upstream of the barrier. Reservoirs themselves can also contribute to the creation of wetland areas; draining the reservoir by removing a dam may result in loss of upstream wetlands and/or gain of downstream wetlands (Heinz Center 2002).

Long-term adverse impacts of barriers such as dams that have open water pools or reservoirs upstream that are removed may also include increased opportunities for invasive and non-native species to expand into newly connected areas, requiring invasive species management. Soils in formerly impounded areas would be exposed and eroded and would require management to reduce stormwater runoff, including sediment and contaminants. The exposed area would likely require planting. Downstream of the barrier, erosion could result in the loss of riverine vegetation and subsequent need for additional invasive species management and native species plantings. In addition, removal or bypass of in-stream barriers would enable other aquatic resources to move throughout the river system as well. Long-term benefits to sturgeon are anticipated as a result of restored passage to upstream (spawning) areas. Longer-term effects, including changes in channel morphology and erosion, followed by eventual equilibrium establishment, new floodplains, and native vegetation, can take years or decades to develop (Hart et al. 2002). Gulf sturgeon spawning habitat restoration, protection, and access are anticipated to result in numerous long-term benefits to Gulf sturgeon, including restored access between coastal waters and spawning grounds and subsequent increases in spawning and population size. Barrier removal and restored river flows could scour the river channel upstream of the former barrier and expose hard, limestone and/or gravel bottoms or ledges, restoring spawning habitat for the sturgeon. Overall, the former river floodplain would be restored, resulting in a greater diversity of plants and animals when compared with the barrier and associated upstream water body. Gulf sturgeon spawning habitat restoration, protection, and access would also benefit other wetland and aquatic resources.

Some erosion and sediment control measures may involve shorter-term adverse impacts to local biota, particularly during project construction. However, overall erosion and sediment control or abatement in identified spawning areas is expected to provide long-term benefits to multiple biological resources through improved water quality. In-water construction activities in saltwater areas may cause short-term, minor adverse impacts to marine mammals, such as manatees, if entrapment occurs.

Targeted acquisition of land, gravel rights, or management easements would benefit Gulf sturgeon by protecting areas, including spawning areas, from future disturbances or degradation. In addition, benefits would result from improving water quality by reducing direct runoff and sedimentation, as well as implementing strategies such as barrier bypasses on the acquired land. Depending on the location, land acquisition and management can also increase the amount of habitat for many other species, such as fish and birds.

6.4.6.1.3 Socioeconomic Resources

Depending on the size and type of fish barrier removed or fish passage created, this approach may result in a variety of short-term and long-term socioeconomic effects, both positive and negative, ranging from minor to major.

Barrier removal may result in minor to major adverse impacts to the water supply for agriculture or municipal uses or transportation, flood protection, and hydropower supply, depending on the size and designated use of the barrier that is removed. If reservoir areas behind barriers are eliminated due to barrier removal, flatwater-focused recreational activities could be adversely affected. In addition, barrier removal could affect the aesthetics of upstream and downstream locations, and property values in the vicinity could be affected. Specific impacts of barrier removal on affected industries will be evaluated on a site-specific basis.

Preserving habitat by acquiring property or through conservation easements would permanently limit the amount and type of development permitted, and the management and the intensity of use on these properties would likely change. Land conservation or acquisition may result in restrictions on public access in areas where public access had previously been allowed, which could reduce recreational opportunities. Projects that result in changes in ownership and/or permitted uses could affect property taxes. Land acquisition could have a minor to moderate impact on socioeconomic resources due to changes in visitor spending and tax impacts. The transfer of fee title to lands and the creation of conservation easements, however, are transactions negotiated or arranged between willing parties and, as such, are not expected to give rise to adverse socioeconomic impacts to those who choose to engage in such transactions.

Barrier removal as well as erosion and sediment control or abatement measures may result in short-term benefits to the local economy through an increase in employment and associated spending in the project area during construction activities, and removal of dams can have both economic and safety benefits. For example, many dams in the United States are aging (Heinz Center 2002), which results in deterioration of construction materials, and dams are more prone to failure, resulting in both economic and safety concerns (Poff & Hart 2002). Maintaining these structures can be as much as three times greater than the cost of removing them (Poff & Hart 2002).

Recreational activities, particularly wildlife-related recreation, may benefit from removal of fish barriers or improved fish passages. Barrier removal could also improve recreational navigation along a waterway, increasing the ability of boats to move from one area to an adjacent area.

Cultural resource impacts would be site-specific and would depend on what resources were protected or enhanced. Indirect beneficial impacts to cultural resources could result if conservation includes protecting historic and cultural resources that are within or close to protected areas. If cultural or historic resources are present, minor to moderate adverse impacts to the resource would be anticipated during construction activities such as dredging and placement/removal of sediments or other materials used during restoration activities. Adverse impacts could include physical destruction or alteration of all or part of a cultural or historic resource and may directly alter, damage, or destroy resources such as

historic shipwrecks, engineering structures or landscapes, or connectivity with related sites. Discovery or recovery of cultural or historic resources would allow their future protection.

6.4.7 Restoration Type: Sea Turtles

The following restoration approaches are proposed for sea turtles:

- Reduce sea turtle bycatch in commercial fisheries through identification and implementation of conservation measures.
- Reduce sea turtle bycatch in commercial fisheries through enhanced training and outreach to the fishing community.
- Enhance sea turtle hatchling productivity and restore and conserve nesting beach habitat.
- Reduce sea turtle bycatch in recreational fisheries through development and implementation of conservation measures.
- Reduce sea turtle bycatch in commercial fisheries through enhanced state enforcement effort to improve compliance with existing requirements.
- Increase sea turtle survival through enhanced mortality investigation and early detection of and response to anthropogenic threats and emergency events.
- Reduce injury and mortality of sea turtle from vessel strikes.

6.4.7.1 Reduce Sea Turtle Bycatch in Commercial Fisheries Through Identification and Implementation of Conservation Measures

This restoration approach focuses on reducing the bycatch and mortality of sea turtles in Gulf of Mexico commercial fisheries by identifying, developing, and implementing sea turtle bycatch reduction measures. Sea turtles are known to interact with several gear types, including bottom longline, pelagic longline, trawls, gillnets, and pots/traps (NMFS & FWS 2008; NMFS et al. 2011). This restoration approach would identify potential bycatch reduction measures such as gear modifications (e.g., hook size and type), changes in fishing practices (e.g., reduced soak times), and/or temporal and spatial fishery management in Gulf commercial fisheries. Restoration techniques for this approach include, but are not limited to, the following:

- Pre-implementation studies to develop and test bycatch reduction measures.
- Implementation of bycatch reduction measures (e.g., use of large circle hooks and reduced soak time when fishing for reef fish).

6.4.7.1.1 Physical Resources

Normal fishing practices for shrimp trawl, menhaden purse seine, and trap/pot fisheries involve deploying and hauling of gear. These routine practices may cause temporary, minor disruption of the benthic habitat and water column. These minor disruptions of benthic habitat and water column are not expected to increase as a result of this restoration approach.

6.4.7.1.2 Biological Resources

The proposed changes in gear and fishing practices to reduce bycatch are not expected to adversely affect other species or habitats, therefore no adverse impacts to biological resources are expected. Bycatch reduction solutions that are developed and implemented are expected to directly reduce sea turtle bycatch in fishing gear and may also reduce bycatch of marine mammal and fish species. Improved bycatch reduction techniques could have long-term beneficial effects on sea turtle populations by reducing the number of sea turtles incidentally caught as bycatch as a result of current fishing practices.

6.4.7.1.3 Socioeconomic Resources

Minor, short-term adverse effects on the socioeconomic environment may occur. Any potential bycatch solutions that are effective at reducing bycatch may also reduce efficiency in fishery operations and catch. These potential short-term adverse impacts may be resolved in the longer term by other potential implementation solutions identified as part of this approach (e.g., incentives or buy-outs). Any ground-disturbing restoration activities would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

Funding for bycatch reduction technologies is anticipated to provide economic benefits to recipients of project funds. Reducing bycatch mortality may result in minor increases in fish biomass that may, in turn, result in increased catch or fishing opportunities. This can result in long-term economic benefits to commercial and recreational fishers. The scale of these impacts will depend on the specific techniques implemented.

6.4.7.2 Reduce Sea Turtle Bycatch in Commercial Fisheries Through Enhanced Training and Outreach to the Fishing Community

This restoration approach involves an increase in training and outreach to the fishing community to improve compliance with bycatch reduction requirements to reduce the bycatch of sea turtles in fisheries. The approach could expand the NOAA Gear Monitoring Team (GMT) model program to provide a greater capacity for education, outreach, and training to the principal fishing sectors that interact with sea turtles (i.e., shrimp trawl [otter and skimmer], pelagic and bottom longline, gillnet, and hook-and-line).

This restoration approach could expand the successful NOAA GMT program, which operates in the Gulf states out of the NMFS Southeast Fisheries Science Center's Pascagoula Lab, to the Gulf states. This expansion would allow similar programs to be implemented at the state level. The approach could also add a new NOAA GMT in the southeastern U.S. Atlantic. Broadening of the existing, successful program and integrating federal and state efforts into an effective partnership would maximize the likelihood of success. The primary goal of an expanded GMT program is to provide a greater capacity for outreach, education, and training to the principal fishing sectors that interact with sea turtles (i.e., shrimp trawl [otter and skimmer], PLL, bottom longline, gillnet, and hook-and-line fisheries).

6.4.7.2.1 Physical Resources

Enhanced training and outreach to reduce sea turtle bycatch is not expected to have adverse or beneficial effects on physical resources because actions include on-water and/or at dock courtesy inspections, as part of the GMT program, and would not increase the fishing effort.

6.4.7.2.2 Biological Resources

Increased training and education is intended to increase compliance with existing sea turtle bycatch reduction requirements for fisheries. Increased compliance with these requirements would provide benefits to sea turtles by reducing sea turtle bycatch and mortality.

6.4.7.2.3 Socioeconomic Resources

Adverse socioeconomic impacts are not expected from this restoration approach. However, any ground-disturbing restoration activities would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources. Increased education and outreach can directly benefit individuals, groups, and businesses involved in commercial fishing in the region. Education and outreach should allow fishers to be in better compliance with regulations and potentially avoid citations associated with noncompliance.

6.4.7.3 Enhance Sea Turtle Hatchling Productivity and Restore and Conserve Nesting Beach Habitat

This restoration approach focuses on restoring and conserving nesting beach habitat for sea turtles. In Florida and Alabama, the restoration would benefit nesting loggerheads and green turtles, while in Texas, Kemp's ridleys would benefit. While on land, these turtles face a variety of threats. This restoration approach involves ameliorating some of these threats and as such represents an opportunity to improve turtle reproductive success. There are a variety of restoration techniques that can be used individually, or in combination, as potential restoration projects. Not all restoration techniques are suitable for all locations. This restoration approach could employ, but is not limited to, the following techniques:

- Reduce beachfront lighting on nesting beaches.
- Enhance protection of nests.
- Acquire lands for conservation of nesting beach habitat.
- Beach user outreach and education.

6.4.7.3.1 Physical Resources

Predator control may involve the use of vehicles on nesting beaches to locate predators or set/check traps; however, these effects are expected to be short-term and will be designed to minimize disturbance to nesting sea turtles and their nests. Screening or caging of nests and nest relocation (if necessary) could have a short-term, minor adverse impact to affected substrates, but disturbed sites would be restored after placement of screens/cages or removal of turtle eggs. Minor, short-term adverse impacts to ambient noise levels could occur during implementation of lighting projects (e.g., removing pole-mounted lights and installing new, turtle-friendly lighting), which could result in temporary changes to ambient noise conditions, air quality impacts from increased monitoring via vehicles, and/or long-term compaction due to increased vehicle use. These changes would be only slightly apparent to visitors while this technique is being implemented and would not attract attention, dominate the soundscape, or detract from current user activities or experiences.

Restoration efforts to protect and conserve sea turtle nesting beaches, whether through site-specific projects, fee acquisition, or conservation easements, could provide numerous long-term benefits to beach habitats. Preservation could allow beach and dune migration and sediment migration, which

would have long-term beneficial effects on geology and substrates over the life of the project. Conservation could also allow for upland migration as sea level rises and could limit development encroachment. Shoreline habitats landward of the beach (e.g., wetlands) could benefit from adjacent beach and dune area protection because these areas provide protection from storm surge and reduce erosion.

6.4.7.3.2 Biological Resources

Adverse effects on sea turtles or other species (i.e., birds) could result from restoration activities requiring human activity and vehicle traffic on nesting beaches. Nest relocation, if necessary, could result in short- to long-term adverse effects, embryo death due to handling, decreased hatching and emergence success, and increased predation of concentrated nests. Adverse effects from implementation of exclusion caging or predator control could occur to species that use the affected area. If used for management of egg predators, poison baits could enter the waterway through air application and leach into adjacent surface or ground waters, but these effects would be minimized through proper use. Predator control efforts also have the potential to result in indirect adverse ecological effects (e.g., encouraging nontargeted, potentially undesirable predators to become established).

Protection and conservation of sea turtle nesting beaches would minimize development encroachment on nesting and foraging habitat, which would be a long-term benefit to birds, sea turtles, terrestrial wildlife, and other species that use the beach habitat. For rare wildlife species (such as beach mice) that depend on beach or dune habitat, protection and conservation of habitat could have a long-term benefit.

Beach habitats contribute to the quantity and quality of adjacent shallow water habitats that serve as nurseries or forage areas for some finfish species. The beach–shallow water interface also provides nutrient exchange to aquatic habitats. Protecting these habitats could result in a long-term benefit to these species and indirectly benefit the food chain that relies on the health of adjacent shallow water areas.

Nesting beach improvement via predator control and use of turtle-friendly lighting, as well as nest detection, monitoring, and protection (such as nest screening or caging), could provide a long-term benefit to sea turtles by increasing nesting success and hatchling survivorship, resulting in a higher number of sea turtles surviving to adulthood and reproductive life stages. For example, turtle-friendly lighting would reduce artificial light sources to minimize the potential for both nesting females and hatchlings to become disoriented or misoriented. Predator control on the beaches could also benefit nesting birds and other wildlife by reducing nest predation, while increased hatchling survivorship would improve food sources for herons and ghost crabs that prey on hatchlings before they enter the water and species that prey on post-hatchlings in the water.

6.4.7.3.3 Socioeconomic Resources

Preserving habitat by acquiring property through fee acquisition or protecting property through conservation easements would permanently limit the amount and type of development that would be permitted on these lands, and the management and the intensity of use on these properties would likely change. Land conservation or acquisition may result in restrictions on public access in areas where

public access had previously been allowed, which could reduce recreational opportunities. Projects that result in changes in ownership and/or permitted uses could affect property taxes and have broader regional economic impacts resulting from changes in visitor spending in the region. Land acquisition could have a minor to moderate adverse impact on socioeconomic resources due to changes in visitor spending and tax impacts. The transfer of fee title to lands and the creation of conservation easements, however, are transactions negotiated or arranged between willing parties; as such, they are not expected to give rise to adverse socioeconomic impacts to those who choose to engage in such transactions.

Implementation of this approach at national, state, and local parks; wildlife refuges; and wildlife management areas could result in short-term, minor adverse impacts to land and marine management. These impacts would be temporary and would occur primarily if activities result in partial or full closure of these areas. If closures were to occur, impacts could include public access restrictions to parts of the park, interruption of certain interpretive programs, and similar impacts. In the long term, these techniques would have beneficial impacts on land and marine management at parks, wildlife refuges, and wildlife management areas because these restoration activities would help park management and staff members fulfill their obligations to manage these properties for the benefit of the environment and the public. Any ground-disturbing restoration activities would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

Beneficial impacts to recreational experiences and wildlife viewing from this restoration approach could also occur as a result of the improvement of wildlife and aquatic species habitat. This approach could produce short-term benefits to regional economies. The distribution of economic benefits within the region would also depend on the locations or sourcing of labor, supplies, materials, and equipment. These regional economic benefits would include jobs, income, sales, and tax receipts.

6.4.7.4 Reduce Sea Turtle Bycatch in Recreational Fisheries Through Development and Implementation of Conservation Measures

This restoration approach focuses on reducing and minimizing the bycatch of sea turtles in recreational fisheries in the nearshore, shallow water habitats of the Gulf of Mexico. This approach would first focus on improving understanding of bycatch in recreational fisheries in the Gulf of Mexico. For example, it could develop a comprehensive characterization of sea turtle bycatch on hook-and-line gear at piers and similar fixed structures in the Gulf. This effort would likely include deploying observers or implementing a survey program to document and characterize bycatch at piers and similar fixed structures. The data collected would be used to develop and test a range of potential bycatch reduction measures or techniques. Once identified, potential bycatch reduction measures could be experimentally implemented to determine their effectiveness for eventual implementation on a voluntary basis.

6.4.7.4.1 Physical Resources

This approach is anticipated to involve studying, characterizing, and testing new techniques to reduce turtle bycatch, both on piers and similar fixes structures as well in open water areas or test facilities, so no adverse or beneficial effects on physical resource are expected from this restoration approach.

6.4.7.4.2 Biological Resources

Short-term, minor adverse effects on sea turtle and/or fish populations could be caused by testing new bycatch reduction techniques. Long-term beneficial effects on sea turtle populations could be observed with a reduction in sea turtle bycatch in recreational fisheries.

Reductions in bycatch of sea turtles and injury/mortality of sea turtles caught in recreational fisheries would have benefits for adult and juvenile sea turtles. Adult and juvenile sea turtles have survived the high mortality rates at younger, smaller life stages and are extremely valuable to the population, as they are either already reproductively active or have a high likelihood of surviving to reproduce. Additional benefits could include increased knowledge regarding the capture of other nontarget species.

6.4.7.4.3 Socioeconomic Resources

Socioeconomic impacts of this approach will depend on the specific restoration project implemented to reduce sea turtle bycatch in recreational fisheries. Short-term and long-term, minor adverse impacts to socioeconomic resources could occur if conservation measures implemented disrupt recreational fishing opportunities. Studies to inventory recreational fisheries, or investigate factors contributing to turtle bycatch, could result in long-term beneficial effects due to a slight increase in regional employment if local labor is employed.

6.4.7.5 Reduce Sea Turtle Bycatch in Commercial Fisheries Through Enhanced State Enforcement Effort to Improve Compliance with Existing Requirements

This restoration approach would enhance state enforcement of sea turtle bycatch reduction requirements for fisheries conducted in state waters through increased training and outreach of relevant state enforcement personnel and increased state fisheries enforcement effort.

6.4.7.5.1 Physical Resources

Potential long-term, minor adverse effects of this approach could include temporary, localized disturbance and suspension of sediments from increased enforcement vessel traffic on the water; temporary, localized impacts on air quality and noise could also occur. Long-term beneficial effects may occur from implementation of innovative solutions (e.g., gear modifications, best fishing practices, and safe deterrence methods) and outreach to fishers, which may prevent fishing gear from becoming derelict and disturbing bottom sediments.

6.4.7.5.2 Biological Resources

Potential long-term, minor adverse effects of this approach could include temporary, localized disturbance to marine mammals, sea turtles, and birds in nearshore waters from increased enforcement vessel traffic. Possible direct biological consequences would be short-term and minor. The increased vessel traffic from additional enforcement activities could result in increased disturbance of sea turtles, marine mammals, and other marine organisms. The possibility of vessel strikes of sea turtles and marine mammals from increased enforcement vessel activity also exists, but is likely extremely low.

Increased training and education is intended to increase compliance with existing sea turtle bycatch reduction requirements for fisheries conducted in state waters. Increased compliance with these requirements would provide benefits to sea turtles by reducing sea turtle bycatch and mortality.

6.4.7.5.3 Socioeconomic Resources

Adverse socioeconomic consequences are not expected. Instances of noncompliance are also expected to decrease over time if steady, consistent enforcement efforts are applied. Beneficial effects include the potential for law enforcement job opportunities and reduced conflict among legal and illegal fishers.

6.4.7.6 Increase Sea Turtle Survival Through Enhanced Mortality Investigation and Early Detection of and Response to Anthropogenic Threats and Emergency Events

This restoration approach involves enhancing the infrastructure and capacity of the Gulf of Mexico Sea Turtle Stranding and Salvage Network (STSSN). This restoration approach could provide additional support to the STSSN through 1) enhanced network response and coordination, 2) enhanced preparedness and response capacity for emergency events, 3) enhanced investigation of mortality sources, 4) enhanced data access and analysis, 5) enhanced rehabilitation capacity where necessary, and 6) improved coordination and communication among and between rehabilitation facilities, state coordinators, USFWS, and NOAA.

6.4.7.6.1 Physical Resources

Enhancing the STSSN could result in localized long-term, minor adverse impacts to physical resources associated with human activities and use of equipment during mobilization of stranding and response efforts on beaches. A slight increase in the use of vessels and/or vehicles may occur due to implementation of this approach as responses to marine-based stranding events (e.g., cold stun events) or land-based strandings increase.

6.4.7.6.2 Biological Resources

Increased response activities could result in long-term, minor adverse impacts to fish and wildlife due to increased vessels and/or vehicle interactions.

Benefits of an improved STSSN include a likely increase in the success of rescue, rehabilitation, and release of live sea turtles. Mortality investigations, as well as other data collected by enhanced stranding networks, would better guide NOAA and other natural resource managers. This would provide long-term benefits to sea turtles and other species, such as marine mammals, that could be identified during stranding response activities.

6.4.7.6.3 Socioeconomic Resources

An expanded STSSN and development of an emergency response program would increase the ability for personnel to respond to sea turtle stranding events and/or emergencies on water or land. Long-term, minor adverse effects could be created by increasing human and vehicular traffic in responding to strandings, which could negatively affect boater or beachgoer experiences. Beneficial effects could include some job opportunities associated with the STSSN. The expansion of the existing stranding network would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

6.4.7.7 Reduce Injury and Mortality of Sea Turtles from Vessel Strikes

This restoration approach focuses on reducing the injury and mortality of sea turtles from vessel strikes in the Gulf of Mexico. Restoration techniques for this approach include, but are not limited to, public

outreach and education, a comprehensive review of the temporal and spatial distribution of vessel strikes, and additional cofactors that may influence the frequency of vessel strikes (e.g., water depth, vessel speed, and vessel size), and the development and implementation of potential mechanisms to reduce the frequency of vessel strikes (e.g., voluntary speed restrictions or vessel exclusion areas in highest risk locations).

6.4.7.7.1 Physical Resources

Because this approach involves activities in offices, laboratories, open water areas, or test facilities, no adverse or beneficial effects on physical resources are expected from this restoration approach.

6.4.7.7.2 Biological Resources

Because this approach involves educational outreach activities that would be conducted in offices, laboratories, open water areas, or test facilities, no adverse impacts are anticipated from this restoration approach. Long-term beneficial effects on sea turtle populations would be observed with a reduction of sea turtle injury and mortality from vessel strikes. Reductions in vessel strikes would have benefits for adult and juvenile Kemp's ridley, loggerhead, and green sea turtles. Adult and juvenile sea turtles are extremely valuable to the population, as they are either already reproductively active or have a high likelihood of surviving to reproduce. Additional benefits could include increased knowledge regarding the frequency of vessel strikes and factors contributing to those events.

6.4.7.7.3 Socioeconomic Resources

Socioeconomic impacts will depend on the restoration project implemented to reduce sea turtle injury and mortality from vessel strikes. Long-term, minor adverse impacts could occur if conservation measures implemented disrupt recreational boating or commercial shipping practices through voluntary speed restrictions or vessel exclusion areas.

6.4.8 Restoration Type: Submerged Aquatic Vegetation

One approach is proposed for SAV, which focuses on restoring and supporting healthy SAV communities. This approach is described further below.

6.4.8.1 Restore and Enhance Submerged Aquatic Vegetation

This restoration approach focuses on restoring and protecting SAV habitat. Healthy SAV serves critical ecological functions in the Gulf of Mexico, including serving as habitat and forage for fish and wildlife, decreasing wave energy, protecting soil, and increasing sediment accretion (Beck et al. 2007; Fonseca 1996; Fonseca & Bell 1998; Heck Jr. et al. 2008; NPS 2014; Orth et al. 2006). Therefore, minimizing further deterioration and erosion of sediment and enhancing vegetation communities can improve stability and colonization in SAV beds. SAV can also provide habitat and foraging areas for invertebrates, sea turtles, fish, water fowl, and wading birds (Fonseca 1996; Fonseca & Bell 1998). Multiple restoration techniques are available for use, individually or in combination, as potential restoration projects (Farrer 2010; Fonseca 1996; Fonseca & Bell 1998; Paling et al. 2009; Thomson et al. 2010; Treat & Lewis III 2006). This restoration approach could employ, but is not limited to, the following techniques:

- Backfill scars with sediment.
- Revegetate SAV beds via propagation and/or transplanting.
- Enhance SAV beds through nutrient addition.

- Protect SAV beds with buoys, signage, and/or other protective measures.
- Protect and enhance SAV through wave attenuation structures.

6.4.8.1.1 Physical Resources

SAV restoration and enhancement projects that involve construction (i.e., backfill scars with sediment, install buoys/signs, and construct attenuation structures) could have short-term, minor adverse impacts on geology, substrate, and water quality due to sediment disturbance during construction at both the borrow site (for backfill sediments) and the placement site. Depending on the type of wave attenuation structure, there could be a minor, permanent change in substrate type. Possible minor adverse effects could include temporary, localized disturbance and suspension of sediments in nearshore waters and impacts on air and noise quality from increased vessel traffic during construction. Long-term, minor adverse impacts on air quality and noise could be expected through emissions and noise associated with increased recreational use of the restored SAV habitat.

Long-term beneficial impacts to geology and substrate would result because SAV protection would maintain the stabilization of sediments in the area, reducing possible future erosion and minimizing wave action on nearby shorelines. A long-term beneficial effect on water quality could be realized through the uptake of nutrients and particulates and sediment stabilization by an enhanced or restored SAV community.

6.4.8.1.2 Biological Resources

Disturbance and removal of sediments from dredging of sediment for backfilling scars and placement of wave attenuation structures could result in short-term, minor adverse impacts due to disturbance, displacement, and/or mortality of benthic organisms at both the borrow site and the placement site. A possible adverse long-term impact can result if stakes are left at the site for a prolonged period of time, causing a shift in the species of SAV growing at the site (Powell et al. 1989). Adjacent benthic populations would be expected to move into the borrow site and recolonize quickly, within 1 to 3 years (Greene 2002).

Long-term beneficial impacts to biological resources would be expected due to the restoration or enhancement of the SAV community. Restored SAV would promote the growth of healthy algal communities in the area. SAV beds provide important aquatic habitat for fish and invertebrates to use for foraging and spawning. In addition to directly benefitting SAV, all techniques under this restoration approach benefit shallow water habitat. This would improve the ecological integrity and continuity among resources that use SAV for foraging, shelter, and spawning habitat.

6.4.8.1.3 Socioeconomic Resources

Some protective measures may have negative socioeconomic impacts. For instance, “no-motor zones” could negatively affect local fishing and tourism, while the installation of signs and markers could be informative but may necessarily result in a change to recreational activity. The impact will depend on the specific type of protective measure and the project site.

Beneficial socioeconomic impacts would be expected from implementation of this restoration technique by increasing fishery resources that would in turn benefit commercial and recreational fisheries and other recreational activities (i.e., boating, diving, hunting, and bird watching).

SAV restoration may provide localized short-term socioeconomic benefits during project implementation related to an increase in employment and associated spending in the project area during construction.

Restoration of SAV beds could provide long-term, minor beneficial impact to coastal infrastructure by reducing intensity of storm waves on nearby shorelines and infrastructure.

Impacts on cultural resources resulting from the implementation of this restoration approach are dependent on site-specific conditions associated with a project proposed for implementation. If cultural or historic resources are present, minor to moderate adverse impacts to the resource would be anticipated during construction activities, such as dredging and placement/removal of sediments or other materials used during the restoration, but would depend on site-specific conditions associated with a project proposed for implementation.

6.4.9 Restoration Type: Marine Mammals

The following restoration approaches are proposed for marine mammals:

- Reduce commercial fishery bycatch through collaborative partnerships.
- Reduce injury and mortality of bottlenose dolphins from hook and line fishing gear.
- Increase marine mammal survival through better understanding of causes of illness and death as well as early detection and intervention for anthropogenic and natural threats.
- Measure noise to improve knowledge and reduce impacts of anthropogenic noise on marine mammals.
- Reduce injury, harm, and mortality to bottlenose dolphins by reducing illegal feeding and harassment activities.
- Reduce marine mammal takes through enhanced state enforcement related to the Marine Mammal Protection Act.
- Reduce injury and mortality of marine mammals from vessel collisions.
- Protect and conserve marine, coastal, estuarine, and riparian habitats (see Section 6.4.1.5 under the restoration approach Wetlands, Coastal and Nearshore Habitats).

The following sections describe the environmental consequences of these approaches.

6.4.9.1 Reduce Commercial Fishery Bycatch Through Collaborative Partnerships

This restoration approach focuses on reducing direct interactions between bottlenose dolphins with shrimp trawl, menhaden, and trap/pot fishing gear through collaborative partnerships to identify, test, and implement solutions. Techniques to reduce direct interactions between bottlenose dolphins with shrimp trawl, menhaden, and trap/pot fishing gear developed as a tiered approach may include, but are not limited to, the following:

- Develop collaborative partnerships and convene workshops to characterize interactions and determine the best strategies for reducing marine mammal bycatch in commercial fishing gear.
- Implement the solutions identified by these partnerships.
- Monitor and evaluate effectiveness of bycatch reduction actions.

6.4.9.1.1 Physical Resources

Normal fishing practices for shrimp trawl, menhaden purse seine, and trap/pot fisheries involve deploying and hauling of gear. These routine practices may cause temporary, minor disruption of the benthic habitat and water column, but are not expected to increase as a result of this restoration approach. Thus, this approach is not anticipated to result in impacts to physical resources. Long-term benefits may occur from implementation of innovative solutions (e.g., gear modifications, best fishing practices, and safe deterrence methods) and outreach to fishers, which may prevent fishing gear from becoming derelict and disturbing bottom sediments.

6.4.9.1.2 Biological Resources

The proposed changes in gear and fishing practices to reduce marine mammal bycatch are not expected to adversely affect other species or habitats, and as a result, no adverse impacts to biological resources are expected. Bycatch reduction solutions that are developed and implemented are expected to directly reduce marine mammal bycatch in fishing gear and may also reduce bycatch of sea turtle and fish species. Increased and enhanced monitoring and data collection are expected to help natural resource managers make more informed decisions in protecting marine mammals, sea turtles, fisheries, and their habitat.

6.4.9.1.3 Socioeconomic Resources

Minor, short-term adverse effects on the socioeconomic environment may occur. Development of successful bycatch reduction techniques may require research to ensure that a fisher's catch is not negatively affected. The collaborative partnership and stakeholder-based process of this approach is designed to identify solutions that reduce dolphin bycatch while still allowing for fishery operations. However, any potential bycatch solutions that are effective at reducing dolphin bycatch may reduce efficiency in fishery operations and catch. These potential short-term adverse impacts may be resolved in the longer term by other potential implementation solutions identified as part of this approach (e.g., incentives or buy-outs). No construction activities are anticipated as a consequence of this restoration approach that would adversely affect cultural or historic resources.

6.4.9.2 Reduce Injury and Mortality of Bottlenose Dolphins from Hook and Line Fishing Gear

This restoration approach focuses on reducing the harmful impacts of hook-and-line fishing on marine mammals. Restoration techniques to reduce injury to bottlenose dolphins from hook and line fishing may include, but are not limited to, the following:

- Enhance understanding of the baseline frequency, scope, scale, and nature of these interactions through systematic surveys of fishers and continued evaluation of stranding data.

- Develop collaborative partnerships and convene workshops with stakeholders to identify and implement effective actions for reducing interactions in hook-and-line gear.

- Systematically repeating surveys and stranding data evaluations to measure success.

6.4.9.2.1 Physical Resources

No adverse effects on the physical environment are expected from these efforts to reduce fishing interactions between anglers and dolphins, since modifications would likely reduce the amount of derelict hook-and-line fishing gear in the water. Long-term beneficial effects are expected from implementation of innovative solutions (e.g., gear modifications, best fishing practices, and safe deterrence methods) and outreach to fishers, which may prevent fishing gear from becoming derelict and disturbing bottom sediments.

6.4.9.2.2 Biological Resources

Long-term benefits to biological resources are expected because the development and implementation of innovative solutions to directly reduce dolphin interactions with hook-and-line gear would result in a reduction in injury and death to bottlenose dolphins. Outreach and education on these solutions is also expected to further raise awareness among fishers on how to prevent interactions with dolphins. This may further prevent dolphins from teaching these unnatural behaviors to other dolphins. Innovative solutions may also benefit sea turtles and other protected species by reducing any potential interactions with the gear.

6.4.9.2.3 Socioeconomic Resources

Minor, short-term adverse effects on socioeconomic resources may occur from this restoration approach. Any short-term adverse impacts from participation are expected to be offset by long-term beneficial impacts from reduced dolphin interactions with fishing gear and resulting damage to gear and catch.

No construction activities are anticipated as a consequence of this restoration approach that would adversely affect cultural or historic resources.

6.4.9.3 Increase Marine Mammal Survival Through Better Understanding of Causes of Illness and Death as Well as Early Detection and Intervention for Anthropogenic and Natural Threats

This restoration approach focuses on increasing marine mammal survival through improving understanding of key causes of morbidity and mortality and also on the early detection and mitigation of anthropogenic or natural threats. The outcomes of this approach are anticipated to have positive impacts on the survival of many marine mammal species in the Gulf of Mexico, but in particular on bay, sound, and estuary and coastal stocks of bottlenose dolphins. Other offshore species that are subject to mass strandings or die-offs may also benefit, including short-finned pilot whales (*Globicephala macrorhynchus*) and rough-toothed dolphins (*Steno bredanensis*). This restoration approach could employ, but is not limited to, the following techniques:

- Expand the Marine Mammal Stranding Network's (MMSN's) capabilities along the coast of the Gulf of Mexico.

- Enhance capabilities to rapidly diagnose causes of marine mammal morbidity and mortality to identify threats and mitigate impacts (conservation medicine).
- Improve the ability to detect and rescue free-swimming dolphins that are entangled, entrapped (e.g., due to levee construction), or out of habitat (e.g., due to hurricane displacement).
- Develop and increase the technical and infrastructure capabilities to respond to major stranding events or disasters (natural and anthropogenic).

6.4.9.3.1 Physical Resources

There may be short-term, minor adverse effects on geology, substrates, and water quality during stranding responses due to use of temporary pools for rehabilitation of stranded mammals, contamination (e.g., from wastes or pathogens), and carcass burial on site. Rehabilitation facilities would have necessary permits for wastewater discharges.

6.4.9.3.2 Biological Resources

There may be short-term, minor adverse impacts to marine mammals and/or other species incidental to response activities. For example, rescue attempts and associated increases in travel and activity may result in habitat disturbance or accidental injury to another animal during the response. However, improved response would likely increase the success of rescue, rehabilitation, and release of live marine mammals. Marine mammal stranding data, as well as other data collected by enhanced stranding networks, would better guide NMFS and other natural resource managers in managing and protecting marine mammals and their habitat. Therefore, this restoration approach would provide long-term benefits to marine mammal populations.

6.4.9.3.3 Socioeconomic Resources

An expanded MMSN would increase the ability for personnel to respond to marine mammal stranding events and/or emergencies on water or land. A slight increase in the use of vessels and/or vehicles to respond to marine-based stranding events (e.g., entanglements or entrapments) or land-based strandings may result from implementation of this approach. Long-term, minor adverse effects could be created by increasing human and vehicular traffic during strandings responses, which could negatively affect boater or beachgoer experiences. Beneficial effects could include some job opportunities associated with the MMSN.

No construction activities are anticipated as a consequence of this restoration approach that would adversely affect cultural or historic resources.

6.4.9.4 Measure Noise to Improve Knowledge and Reduce Impacts of Anthropogenic Noise on Marine Mammals

This restoration approach focuses on utilizing passive acoustics and other technologies to characterize the spatial overlap between noise and marine mammal stocks to inform noise reduction actions in appropriate areas. This will be accomplished through techniques that include, but are not limited to, the following:

- Characterize spatial and temporal distributions and density of marine mammals in the Gulf.
- Characterize ocean noise throughout the Gulf.

- Develop collaborative partnerships to identify and implement noise reduction measures.

6.4.9.4.1 Physical Resources

Short-term and long-term reductions in anthropogenic noise (e.g., noise from commercial ships and recreational watercraft, oil and gas exploration, sonar, marine pile driving, and underwater explosions) may be anticipated as a result of improved technologies that can be used to reduce ambient or acute noise.

6.4.9.4.2 Biological Resources

Short-term, minor adverse impacts could result from the deployment of passive acoustics and other technologies to evaluate and address noise impacts on marine mammals. For example, increased vessel activity for deploying and monitoring effects of noise may result in increases in direct interactions with marine mammals. Long-term benefits to marine mammals would include reduction of anthropogenic ocean noise, which could help marine mammals maintain a viable population.

6.4.9.4.3 Socioeconomic Resources

This approach would potentially result in long-term, minor to moderate indirect adverse impacts on industries where noise is an issue (e.g., shipping, dredging, marine construction, military sonar testing, and energy). Depending on outcomes of the workshop and the strategies and technologies developed to reduce noise impacts on marine mammals, industries may change behaviors, which could result in either costs or benefits to individual operations. Noise reducing strategies can benefit shipping industries, since typical noise reduction technologies focus on creating efficient operation for large ships. Updated, efficient ships could decrease utilization costs for shipping companies. Noise reduction technologies include propeller design, engine design, engine placement within ships, and vibration control.

No construction activities are anticipated as a consequence of this restoration approach that would adversely affect cultural or historic resources.

6.4.9.5 Reduce Injury, Harm, and Mortality to Bottlenose Dolphins by Reducing Illegal Feeding and Harassment Activities

This restoration approach focuses on reducing harmful impacts to marine mammals from illegal feeding and harassment activities by people. This restoration approach includes, but is not limited to, the following techniques:

- Conduct human dimension studies (e.g., surveys, focus groups, and interviews).
- Implement outreach and education strategies based on human dimension study outcomes.
- Partner with stakeholders to widely distribute and communicate tools/strategies to effectively reach targeted user groups throughout the Gulf of Mexico.

6.4.9.5.1 Physical Resources

No adverse impacts to physical resources are anticipated as a result of implementation this restoration approach, since it is limited to studies, outreach, and education and includes no disturbance of soils, substrates, or other physical resources.

6.4.9.5.2 Biological Resources

Reducing interactions between humans and wild bottlenose dolphins is expected to reduce associated harm, related mortality, and long-term chronic stress to animals and populations.

6.4.9.5.3 Socioeconomic Resources

Adverse socioeconomic consequences associated with this approach are not expected. Instances of noncompliance are also expected to decrease over time if steady, consistent enforcement efforts are applied. Implementation of this restoration approach is expected to reduce illegal human activities causing harm to bottlenose dolphins. No construction activities are anticipated as a consequence of this restoration approach that would adversely affect cultural or historic resources.

6.4.9.6 Reduce Marine Mammal Takes Through Enhanced State Enforcement Related to the Marine Mammal Protection Act

This restoration approach builds capacity and training for state enforcement agencies to implement the Marine Mammal Protection Act (MMPA) in their state waters. This approach could include working with Gulf states individually to identify training needs and the most appropriate venue and format for the delivery of MMPA-related training. This approach could also include developing and distributing outreach products or techniques targeted specifically to officers. In addition, this approach could provide increased funding to state enforcement agencies to increase the percentage of time that officers and equipment (e.g., vessels) are dedicated to MMPA enforcement activities.

6.4.9.6.1 Physical Resources

Potential long-term, minor adverse effects of this approach could include temporary, localized disturbance and suspension of sediments from increased enforcement vessel traffic on the water; temporary localized impacts on air quality and noise could also occur.

Enhanced enforcement of the MMPA could increase routine boat and all-terrain vehicle operations by state enforcement agencies, which could have long-term, minor adverse impacts to substrate, as well as to air quality, and noise.

6.4.9.6.2 Biological Resources

There could be long-term, minor adverse impacts to biological resources from disturbances during increased routine boat and all-terrain vehicle operations. Long-term beneficial impacts to marine mammals would be supported by additional training and the enhancement of state enforcement capacities. Increased compliance with MMPA regulations can reduce illegal and harmful activities associated with marine mammals.

6.4.9.6.3 Socioeconomic Resources

This restoration approach could have a long-term, minor adverse impact on recreational and commercial fisheries by increasing fisher interactions with law enforcement, which could be perceived negatively by fishers. Benefits include potential health and safety benefits resulting from reductions in incidents of human injuries that can occur as a result of illegal behaviors (e.g., feeding, swimming with, or physically interacting with dolphins).

This technique may have a beneficial effect on socioeconomic resources if additional jobs are created as a result of increased enforcement. No construction activities are anticipated as a consequence of this restoration approach that would adversely affect cultural or historic resources.

6.4.9.7 Reduce Injury and Mortality of Marine Mammals from Vessel Collisions

This restoration approach focuses on reducing vessel collisions with marine mammal species in the Gulf of Mexico by developing and implementing a comprehensive mitigation strategy. This strategy may include techniques such as time/area-sensitive changes to vessel routes and speeds, mariner training, and mariner and recreational boater outreach and education. Passive acoustics, tagging, and predictive modeling are additional useful tools that help inform effective mitigation to reduce vessel collisions with marine mammals (cetaceans) in the Gulf of Mexico. Providing incentives, establishing agreements, and providing edcuation and outreach can help reduce these uncertainties.

Techniques that would implement modifications to vessel routes and speeds would have project-specific impacts and require place-based evaluation. This level of specificity is not proposed in this Final PDARP/PEIS. For this reason, these impacts are discussed in general terms. Project-specific impacts would be evaluated in a subsequent restoration plan and project-specific tiered NEPA evaluation.

6.4.9.7.1 Physical Resources

Few adverse or beneficial effects on physical resources are expected from this restoration approach. Reduced vessel speeds should reduce engine noise levels generally, although sounds may be emitted for longer periods of time. As such, minor adverse impacts to ambient noise conditions may be anticipated. Changes to vessel routes would redistribute the impacts of vessel traffic on air quality and water quality and could result in minor adverse impacts to air quality and water quality if vessel operating time is increased.

6.4.9.7.2 Biological Resources

This restoration approach could result in minor, indirect adverse impacts to biological resources. If vessels are in the water for longer periods of time (due to needed speed reductions and reroutes of vessels) then there is an increased chance of introducing pollution to the marine environment, which will diminish water quality. Water quality could also be diminished as a result of boats being in the water longer. For example, poorly maintained sanitary waste systems aboard boats can increase bacteria and nutrient levels in the water. Long-term beneficial effects on marine mammal populations, particularly Bryde's whales, would be observed with a reduction of marine mammal injury and mortality from vessel collisions. The population of Bryde's whales in the northern Gulf of Mexico is very small, with markedly low genetic diversity. As such, any reduction in injury or mortality from vessel collisions is important for this population. Reductions in vessel collisions would also have benefits for sperm whales, as well as small cetaceans such as bottlenose dolphins. This approach may also reduce vessel strikes of other organisms, such as sea turtles. Adopting measures to reduce the incidences of ship strikes is expected to be an effective means to reduce the number and severity of ship strikes on marine mammals and promote their population growth and recovery.

6.4.9.7.3 Socioeconomic Resources

Socioeconomic impacts of this approach are likely to vary and will depend on the characteristics and locations of implemented strategies to reduce marine mammal injury and mortality from vessel

collisions. Long-term, minor to moderate adverse impacts could occur if measures disrupt recreational boat or commercial shipping practices through voluntary speed restrictions, vessel rerouting, or vessel exclusion areas. Impacts may include increased costs to recreational and commercial operators due to delays or increases in travel times that result from vessels slowing down or rerouting, vessels making multiport calls, or vessel that divert to other ports. As noted above, providing incentives, establishing agreements, and providing edcuation and outreach can help reduce impacts.

Based on the nature of the approach considered at this time, restoration techniques are not anticipated to result in impacts to cultural or historic resources.

6.4.10 Restoration Type: Birds

The following restoration approaches are proposed for birds:

- Restore and conserve bird nesting and foraging habitat.
- Create, restore, and enhance coastal wetlands (see Section 6.4.1.1 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats).
- Restore and enhance dunes and beaches (see Section 6.4.1.4 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats).
- Create, restore, and enhance barrier and coastal islands and headlands (see Section 6.4.1.3 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats).
- Restore and enhance submerged aquatic vegetation (see Section 6.4.8.1, under the Restoration Type Submerged Aquatic Vegetation).
- Protect and conserve marine, coastal, estuarine, and riparian habitats (see Section 6.4.1.5 under the Restoration Type Wetlands, Coastal, and Nearshore Habitats).
- Establish or re-establish breeding colonies.
- Prevent incidental bird mortality.

6.4.10.1 Restore and Conserve Bird Nesting and Foraging Habitat

This approach involves conserving and restoring target habitat areas or land parcels for bird resources. There are a variety of restoration techniques that can be used individually, or in combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Enhance habitat through vegetation management.
- Restore or create riverine islands.
- Create or enhance oyster shell rakes and beds.
- Promote nesting and foraging area stewardship.

- Provide or enhance artificial nest sites.
- Increase availability of foraging habitat at inland, managed moist-soil impoundments, agricultural fields, and aquaculture ponds.

6.4.10.1.1 Physical Resources

Temporary, short-term adverse impacts to existing soils, geology, water quality, and air quality are anticipated for any construction activities associated with the techniques; however, the project itself would result in long-term impacts if sediments or shells are borrowed and/or placed for construction of shell rakes or islands. Minor impacts are anticipated for activities associated with stewardship and enhancing nest sites. Impacts would be temporary and minor and limited to installation of signs, access, fences, or other means of reducing human trespass. Protecting bird habitat could have long-term benefits to geology, substrates, and water quality by preventing disturbance and loss of soil and reducing erosion. Protecting nesting and foraging habitat for birds could have indirect, long-term benefits by preventing development and disturbances, which can reduce surface water runoff and result in water quality benefits.

Creation of riverine islands and oyster shell rakes would require the use of heavier construction activities and result in minor to moderate adverse impacts to water and air quality. Placement of shells and/or borrow materials would cover existing sediments and result in moderate to major adverse impacts on those riverine and estuarine bottoms.

6.4.10.1.2 Biological Resources

Construction associated with installation of signs, access, fences, or other means of reducing human trespass may result in temporary minor adverse effects on biological resources, in the form of temporary disturbances to birds and other biota. Creation of riverine islands and oyster and shell rakes would require the use of heavier construction activities and result in minor to moderate adverse impacts to water and air quality. Placement of shells and/or borrow materials on estuarine sediments would bury existing habitats and have moderate to major adverse impacts on those habitats by burying and replacing existing habitats.

Benefits of the proposed restoration approach include conservation of bird nesting and foraging habitat that would increase bird health and reproduction by preventing habitat loss through land conversion. Restrictions on seasonal or overall human use that could result from changes in land management would reduce habitat degradation.

Improvements in habitat associated with this approach may draw additional visitors to the area, resulting in potential indirect adverse impacts from human presence. Human disturbance can lead to failure of nests, increased egg and chick predation, or even total colony abandonment. Reducing anthropogenic disturbance in and around nesting birds by establishing buffer distances would benefit nesting success. Bird nesting and foraging habitat could be protected through the use of exclusion devices, vegetated buffers, maintenance of beach wrack, distance buffers and/or patrols by wildlife stewards, and targeted outreach and education. Managing vegetation is a common restoration technique to enhance habitat for specific bird species. Reducing vegetation on beaches, for example, can provide nesting and foraging habitat for birds such as such as snowy plover, least tern, black

skimmer, and American oystercatcher. Conversely, adding vegetation can provide habitat for other bird species such as wading birds and brown pelicans. Common vegetation management methods include mechanical treatments, application of pesticides or herbicides, biological control to manage plant species, and active planting.

Some bird species nest primarily or exclusively on islands located in lakes or rivers. Creating or enhancing riverine islands will expand nesting habitat and/or increase the longevity of those islands, resulting in increases in production of the bird species using the islands. Direct placement of shell hash (oyster rakes) on beaches and using bagged blocks of living oysters to enhance or create living oyster reefs would benefit shorebirds by providing foraging, nesting, and roosting habitat for the American oystercatcher, in particular. Intertidal oyster beds provide foraging sites at low tide, when the shellfish are accessible to oystercatchers. Oyster beds above mean high tide serve a critical function for oystercatchers by providing foraging and high-quality high tide roost sites.

Predation can be a significant source of bird mortality when nest sites or colonies are located in habitat that does not have adequate protection. Several options exist for removing or excluding predator threats to nesting birds. Predator control by nonlethal (e.g., exclusionary fencing or live-trapping) and lethal methods consistent with current management practices could be implemented at the discretion of the land-management agencies based on their evaluation of necessity and feasibility. Shoreline stewardship to emphasize the maintenance of wrack on beaches would provide benefits. Wrack refers to the accumulation of seaweed, terrestrial plants, animal remains and/or other organic debris along the high tide line of a beach that provides habitat for invertebrates, an important food source for beach-dependent birds (Dugan et al. 2000; FWS 2012). Shoreline stewardship should emphasize the maintenance of wrack and wrack production processes.

The lack of suitable nesting sites, such as those provided by tree cavities or shrub or tree platforms, can limit local tree-nesting bird densities. Providing artificial nest sites, such as nest platforms and nest boxes, can help mitigate this limitation, facilitating breeding for certain bird species. Managing flood depth and timing of shallowly flooded impoundments, fields, ponds, and agricultural fields would benefit migrating birds.

6.4.10.1.3 Socioeconomic Resources

Minor, short-term adverse impacts could result due to construction activities. Impacts may be long-term for large projects such as island creation. However, improvements in habitat associated with this approach may draw additional visitors to the area with associated visitor spending, increasing sales and tax receipts on retail purchases.

Creating, enhancing, or restoring bird nesting habitat may result in minor (temporary disturbance) to moderate (disturbance without loss of cultural information) impacts on cultural and historic resources due to construction activities such as dredging, addition of sediments or borrow materials, and/or removal of sediments, depending on the scale of the action and site-specific characteristics. Discovery or recovery of cultural or historic resources would allow their future protection.

6.4.10.2 Establish or Re-establish Breeding Colonies

This restoration approach focuses on establishing or re-establishing bird breeding colonies through chick translocation and/or attracting breeding adults to restoration sites. This restoration approach could employ, but is not limited to, the following techniques:

- Fledgling and chick translocation to new colonies.
- Acoustic vocalization playbacks and decoys to attract breeding adults to restoration sites, which are often employed in conjunction with other restoration activities enhancing a target site for breeding birds (Jones & Kress 2012).
- Actively reintroducing seabirds to breeding areas. This is a proven technique to help mitigate losses from factors such as oil spills (e.g., Apex Houston Trustee Council 2011; Kress 1983; Parker et al. 2007).

6.4.10.2.1 Physical Resources

Establishing nesting bird colonies could include minor ground disturbing activities such as construction of nesting platforms and vegetation management. Thus, impacts to the physical environment (geology, substrates, air quality, ambient noise levels, etc.) are anticipated to be minor.

6.4.10.2.2 Biological Resources

Establishing nesting bird colonies could result in minor, short-term disturbances to biological resources during nesting platform construction and vegetation management efforts. In particular, adverse impacts, including injury or mortality, could occur to individual birds during relocations. Areas with restored bird populations or breeding colonies may draw additional visitors to the area, resulting in potential, indirect adverse impacts from human presence. Mitigation measures such as restrictions on seasonal or overall human use would also reduce this impact.

Long-term benefits to birds are expected from this approach. Re-establishing historic breeding colonies and establishing new colonies provides additional habitat for birds.

6.4.10.2.3 Socioeconomic Resources

No adverse socioeconomic impacts are expected from implementation of projects from establishment or re-establishment of breeding colonies. Depending on the scope and scale of this restoration approach, this approach could provide benefits through increased opportunities for wildlife viewing. Areas with restored bird populations or breeding colonies may draw additional visitors to the area, with associated visitor spending and increased sales and tax receipts on retail purchases.

6.4.10.3 Prevent Incidental Bird Mortality

A number of anthropogenic activities can lead to incidental bird mortality. There are a variety of restoration techniques that can be used individually, or in combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Remove derelict fishing gear.
- Support bird rehabilitation centers.
- Reduce collisions by modifying lighting and/or lighting patterns on oil and gas platforms.
- Reduce seabird bycatch through voluntary fishing gear and/or technique modifications.

6.4.10.3.1 Physical Resources

No construction activities are proposed under this approach. Ground-disturbing activities would be limited to actions associated with derelict fishing gear removal, and impacts to the physical environment (e.g., geology, substrates, air quality, and ambient noise levels) are anticipated to be minimal. Supporting bird rehabilitation centers may include additional traffic associated with travel to and from both injured birds and the rehabilitation center, including travel to potentially sensitive areas to retrieve injured birds. Increased traffic could adversely affect sediments by compaction for the life of the project. Long-term benefits may be anticipated as a result of reduced gear and their associated movements along the sea floor, which can disturb benthic habitat. In addition, removing gear often removes persistent plastics.

6.4.10.3.2 Biological Resources

Localized, short-term, minor adverse impacts to biological resources could occur from disturbance during the cleanup of the derelict fishing gear. Timing cleanup activities to avoid active nesting birds (e.g., during winter) would reduce this impact. Efforts to reduce seabird bycatch are not expected to increase risks to other species. Short-term, temporary impacts of bird rehabilitation support efforts may include bird disturbance and potential incidental mortality of birds (and other animals) and loss/damage of vegetation during retrieval activities.

Long-term beneficial impacts to birds are expected from this approach. Reducing mortality by removing abandoned fishing gear left in bird habitats (e.g., nets, hooks, and fishing lines) would benefit many bird species. Depending on the timing, location, and technique, species other than birds could also benefit, such as marine mammals and fish. Providing education and supporting the rehabilitation and release of birds injured from derelict fishing gear would improve survivability of affected birds. Reduction in offshore bird mortality through modifications of lighting on oil and gas platforms with bird-friendly alternatives could provide long-term benefits to many species of birds.

6.4.10.3.3 Socioeconomic Resources

Potential adverse socioeconomic impacts are expected to be minor and short-term. Providing support and education, modifying lighting, removing derelict fishing gear, and working with fishers to reduce seabird bycatch will have minor socioeconomic benefits through the local employment required for implementation. Removing derelict fishing gear could provide a minor benefit to fishers through reduced gear damage and increased safety that would result from fewer interactions with derelict gear. No adverse socioeconomic impacts to fishers are expected, as seabird bycatch reduction activities would be voluntary and would not impose additional regulations or requirements on fishers.

Biomass of birds would increase as a result of proposed restoration, which could in turn result in increased opportunities for bird watchers and, further, long-term local economic benefit. The scale of these impacts will depend on the specific techniques implemented.

6.4.11 Restoration Type: Mesophotic and Deep Benthic Habitats

The following restoration approaches are proposed for mesophotic and deep benthic communities:

- Place hard ground substrate and transplant coral.
- Protect and manage mesophotic and deep benthic coral communities.

6.4.11.1 Place Hard Ground Substrate and Transplant Coral

This restoration approach includes placement of new hard ground substrate and coral transplantation to restore the mesophotic and deep benthic corals and their associated communities. There are multiple techniques that can be used individually, or in combination, as potential restoration projects. Those techniques include, but are not limited to, the following:

- Place substrate.
- Implement coral transplanting or fragmenting.

6.4.11.1.1 Physical Resources

Placement of hard substrate would cover soft-bottom substrate, causing a long-term, minor to moderate adverse effect to the localized area, depending on the scale of the activity. Due to the large proportion of the sea floor bottom that is soft sediment substrate compared to the more limiting hard substrate, it appears likely that the beneficial effect would outweigh any adverse impacts. The placement of each structure would result in some short-term, minor adverse impacts to the physical environment due to the disturbance of the seafloor bottom, which would temporarily suspend sediments. However, these effects would be localized and temporary. Project construction would typically require some use of heavy equipment, which would result in increased vehicle use and associated emissions causing minor adverse effects on air quality in the project vicinity due to pollutants from fuel emissions, including particulate matter, lead, and carbon monoxide (GHGs are specifically addressed in Section 6.14.1). Construction activities could also result in short-term, minor adverse impacts to ambient noise. Any air quality impacts would be localized and short in duration. Increased boat traffic caused by anglers traveling to the reef could increase air pollution in the vicinity; however, increases in air pollution would be anticipated to be minimal.

6.4.11.1.2 Biological Resources

There could be long-term, minor adverse impacts to sessile and other limited movement species because the placement of substrate would injure or kill some organisms either through the placement of the substrate or through the loss in the soft bottom habitat in the area. However, these effects are expected to be localized. Work activities during placement could affect the biological environment as a result of the use of equipment, displacement of substrate, and increased turbidity in the work area. Some species may leave the area during deployment activities, but they would likely return after activities cease. Short-term, minor to moderate adverse impacts to fish, turtles, and (albeit unlikely) marine mammals in the form of direct injury and/or mortality may be anticipated due to construction-related activities, including entrainment.

Long-term beneficial effects on the biological environment are expected from this technique. Enhanced availability of substrate for corals to colonize, along with increased cover through transplantation, will not only benefit these coral species but will also benefit associated reef fish as well as sessile and benthic organisms that occur at these depths. This approach could also provide benefits to fish species that associate with mesophotic and deep benthic communities.

Lionfish and orange cup coral, which are invasive species, are already present in large numbers in the Gulf and therefore will be monitored for at the sites.

6.4.11.1.3 Socioeconomic Resources

Short-term activities associated with project implementation would require transportation, construction, and/or placement of signs and/or buoys. Short-term beneficial socioeconomic impacts would be expected due to local job creation and construction needed to implement the project techniques. Long-term benefits would be anticipated as a result of increasing recreational opportunities in the project area.

Creating, enhancing, or restoring mesophotic and deep benthic habitat could result in minor (temporary disturbance) to moderate (disturbance without loss of cultural information) impacts on cultural and historic resources due to construction activities such as addition of sediments or other materials, depending on the scale of the action and site-specific characteristics. The AWOIS database and other relevant studies are available for identification of submersed resources for individual projects. Discovery or recovery of cultural or historic resources would allow their future protection.

6.4.11.2 Protect and Manage Mesophotic and Deep Benthic Coral Communities

This restoration approach focuses on establishing areas for spatially discrete management and protections for mesophotic and deep benthic communities and associated resources. Establishment of protection areas typically has a lower economic cost than creation of the resources (Chapman & Julius 2005). Establishing protections for mesophotic and deep benthic communities could include expanding existing protections or designating new areas.

6.4.11.2.1 Physical Resources

Depending on the management actions that are implemented, installation of infrastructure (e.g., mooring buoys) or the removal of debris would temporarily disturb the ocean bottom. The potential adverse effects would be minor, short-term, and localized. Construction activities are anticipated to result in short-term, minor to moderate adverse impacts to air quality due to pollutants from fuel emissions, including particulate matter, lead, and carbon monoxide (GHGs are specifically addressed in Section 6.14.1). Following construction, indirect impacts may include the increased use of the area by visitors with boats, resulting in additional increases in noise and emissions during use.

Establishing protections and associated management actions could result in long-term benefits to the physical environment by limiting future ground disturbing activities and/or infrastructure development within the protected area.

6.4.11.2.2 Biological Resources

Minor and short-term adverse effects may occur during implementation of this approach. These activities could affect the biological environment as a result of the use of equipment, displacement of substrate, and increase in turbidity in the work area. Temporary displacement of individuals from the work area or mortality of individual species may occur.

The mesophotic and deep benthic coral communities would benefit from a protective restoration project because they are sessile and therefore much more susceptible to threats like oil and gas activities, fishing activities, and marine debris. Benefits to mesophotic and deep benthic coral communities include increases in coral cover over time (Selig & Bruno 2010). Benefits to resources such as fish biomass (Edgar et al. 2011; Harborne et al. 2008) and abundance (Jeffrey et al. 2012), particularly in no-take reserves (Edgar et al. 2011; Kramer & Heck 2007), are anticipated. Although benefits to corals

may require as many as 10 years after protected area establishment, long-term establishment is anticipated, similar to that which occurred in the Flower Garden Banks National Marine Sanctuary.

The designation or expansion of a protected area would benefit biological resources by protecting mesophotic and deep water communities and other resources found in the area. Other benefits could include reducing impacts due to limitations on fishing that can otherwise alter predator-prey relationships, disturb bottom habitats, and increase loss of fish biomass. Management actions within the protected area could provide benefits. For example, management actions could reduce marine debris and impacts of debris on corals and other organisms, such as entanglement of marine mammals in derelict fishing gear, and fish that can be incidentally caught in "ghost" fishing gears. Management actions may also include increasing setbacks of oil and gas infrastructure, limits on bottom-tending fishing gear, limits on anchoring and the discharge of pollutants, removal of marine debris such as derelict fishing gear, and invasive species removal, all of which would improve habitat for mesophotic and deep benthic coral communities.

6.4.11.2.3 Socioeconomic Resources

Designation or expansion of a protected area may restrict some activities within certain areas. However, overall, it would likely improve populations of marine organisms and subsequently increase recreational enjoyment of those resources. Long-term, moderate adverse impacts could occur. These impacts would be associated with restrictions within a protected area that limit access to resources—e.g., restrictions on bottom-tending fishing gear (Suman et al. 1999).

The designation or expansion of a protected area and associated management actions would benefit the socioeconomic environment by improving opportunities for tourism and recreation in these areas. Any increase in visitation for recreation or tourism could in turn result in positive long-term regional economic impacts due to increased visitor spending in affected areas.

6.4.12 Restoration Type: Oysters

One approach is proposed for oysters, which focuses on restoring and supporting healthy oyster communities. This approach is described further below.

6.4.12.1 Restore Oyster Reef Habitat

This restoration approach focuses on the restoration, creation, and enhancement of oyster reef habitat, resilient oyster populations, and diverse benthic and fish communities. Oysters are considered "ecosystem engineers" for their role in creating reefs that modify, through their physical presence, the surrounding environment while also providing habitat, refuge, and foraging areas for many other species including benthic organisms and fish (Coen & Luckenbach 2000; Powers et al. 2009; VanderKooy 2012; Wong et al. 2011). Oysters are most abundant in shallow, semi-enclosed water bodies (less than 12 meters in depth) in areas where salinity levels are between 15 and 30 parts per thousand (VanderKooy 2012). Successful restoration of oysters depends on three major factors: 1) appropriate site conditions (e.g., firm substrate, salinity, wave energy, and water quality); 2) adequate supply of oyster larvae to recruit to available cultch material; and 3) adequate amounts of substrate for recruitment (i.e., clean, unburied cultch in suitable habitat) (Brumbaugh & Coen 2009; Cake Jr. 1983; Powell & Klinck 2007). Multiple restoration techniques are available for use, either individually or in

combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Restore or create oyster reefs through placement of cultch in nearshore intertidal and subtidal areas.
- Construct living shorelines.
- Enhance oyster reef productivity through spawning stock enhancement projects such as planting hatchery-raised oysters, relocating wild oysters to restoration sites, oyster gardening programs, and other similar projects.
- Develop a network of oyster reef spawning reserves.

6.4.12.1.1 Physical Resources

Short-term, minor adverse impacts on physical resources would be anticipated as a result of cultch placement. Short-term, minor adverse impacts on air quality and noise would be anticipated during cultch placement associated with construction activities. Long-term, minor adverse impacts on air quality and noise would be expected through emissions and noise associated with increased recreational and commercial use of the restored oyster habitat. Short-term, minor adverse impacts on geology, substrates, water quality, air quality, and noise could result from activities such as anchoring marker buoys and signs for reserve areas. The installation of infrastructure could have short-term, minor adverse impacts on water quality, including increased turbidity and reduced water clarity.

Land-based construction of hatchery facilities could result in short-term, minor to moderate impacts to soils and water quality. Operation of these facilities could result in long-term, minor to moderate impacts to water quality associated with wastewater discharges from the facilities. Impacts would be dependent on site-specific conditions and the specific design and approach used for facilities.

Long-term benefits to substrates would be anticipated as a result of the placement of oyster shell or other suitable substrate for oyster recruitment. Placement of reefs may reduce wave energy reaching shorelines, which may reduce wave energy and erosion of shorelines and stabilize substrates. Long-term benefits to water quality could also occur due to increased filter feeding by oysters.

6.4.12.1.2 Biological Resources

Short-term, minor impacts to biological resources could occur during placement of cultch or substrate required for living shorelines: doing so could cause short-term increases in turbidity, reducing water clarity (and photosynthetically available light), increasing crab predator abundance and subsequent predation on oyster spat, and burial of existing benthic communities. Anchors installed in a reserve for buoys or signs would result in long-term, minor loss of habitat in the footprint of the anchor. Short-term, minor to moderate adverse impacts to fish, turtles, and (albeit unlikely) marine mammals in the form of direct injury and/or mortality may be anticipated due to cultch placement activities, including entrainment.

Creation of oyster habitat would support increased populations of oysters, which would be a long-term beneficial impact. Long-term benefits of the created/restored reef include foraging and nursery habitat and refuge for numerous finfish and shellfish.

Land-based construction of hatchery facilities could result in short-term and long-term, minor to moderate impacts to biological resources during project construction. These impacts would be associated with land clearing, construction activities, and vehicle use; however, these impacts will depend on site-specific conditions. Operation of these facilities could have long-term, minor to moderate impacts to biological resources, which would be related to wastewater discharge.

Long-term benefits to other organisms, including marine mammals, sea turtles, fish, and birds are also anticipated due to the oyster reef role as "ecosystem engineer." Reefs provide protection, habitat, foraging, and propagation grounds for these organisms. Oyster reefs also dissipate wave energy and improve water clarity, in turn, benefiting SAV and marshes.

6.4.12.1.3 Socioeconomic Resources

This approach could result in minor to moderate, short-term and long-term adverse impacts to human use within the areas designated as oyster reserves; this designation will remove these areas from potential harvest. This is expected to be a short-term, minor adverse effect, as oyster harvesters should begin to see increased oyster recruitment to fished reefs over the long term, due to the increased supply of oyster larvae to the system provided by the reserves.

Long-term beneficial socioeconomic impacts would be expected from implementation of this restoration approach by ultimately increasing recreational and commercial shellfish harvest opportunities. Restoration could increase the natural productivity of the shallow water area, thereby improving the quality of habitat and increasing oyster recruitment, potentially leading to increased revenue from commercial and recreational activities. Impacts to infrastructure and cultural resources resulting from the implementation of this restoration approach are dependent on site-specific conditions associated with a project proposed for implementation.

This approach could include short-term benefits to the local economy through an increase in employment and associated spending in the project area during construction activities. Hatchery operations would result in long-term, minor economic benefits from employment and maintenance spending. Construction of a living shoreline would provide socioeconomic benefits by reducing the risk of potential hazards, such as storm surges, and improve shoreline integrity. The scope and scale of these impacts would be evaluated on a site-specific and project-by-project basis, similar to other restoration approaches.

Impacts to cultural resources resulting from the implementation of this restoration technique are dependent on site-specific conditions associated with a proposed project. Restoring oyster reef habitat could result in minor (temporary disturbance) to moderate (disturbance without loss of cultural information) impacts on cultural and historic resources that may be located in the area of the restoration. Discovery or recovery of cultural or historic resources would allow their future protection.

6.4.13 Restoration Type: Provide and Enhance Recreational Opportunities

The following restoration approaches are proposed for lost recreational use and are discussed below:

- Enhance public access to natural resources for recreational use.
- Enhance recreational experiences.
- Promote environmental stewardship, education, and outreach.

The following approaches are also proposed under this Restoration Type (these impacts are discussed above in Section 6.4.1, Restoration Type: Wetlands, Coastal and Nearshore Habitats):

- Create, restore, and enhance coastal wetlands.
- Restore oyster reef habitat.
- Create, restore, and enhance barrier and coastal islands and headlands.
- Restore and enhance dunes and beaches.
- Restore and enhance submerged aquatic vegetation.
- Protect and conserve marine, coastal, estuarine, and riparian habitats.

6.4.13.1 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. Access to recreational areas can be improved by enhancing or constructing infrastructure (e.g., boat ramps, piers, boardwalks, dune crossovers, camp sites, educational/interpretive spaces, navigational channel improvements and dredging, safe harbors, navigational aids, ferry services, rebuilding of previously damaged or destroyed facilities, promenades, trails, roads and bridges to access natural resources, and marina pump-out stations). Improved public access could also be accomplished by providing or improving water access in publicly owned areas (e.g., parks and marinas), which might also increase boating safety. The construction and operation of boat ramps, piers, or other infrastructure could occur on publicly owned lands. 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.

6.4.13.1.1 Physical Resources

Depending on the location and intensity of construction necessary to implement various improvements to infrastructure, short-term and long-term, minor to moderate adverse impacts on the physical environment could result from projects that enhance public access. For example, construction of a dock or pier to provide increased public access could result in short-term impacts on turbidity and sediments during construction. Possible minor adverse effects could also include temporary, localized impacts on air and noise quality from increased vessel traffic during construction.

The potential for long-term, minor to moderate adverse impacts exists depending on the use and placement of bulk-heading in association with certain infrastructure improvements (e.g., boat ramps, roads and bridges). Bulkheading has the potential for localized disruption of sediment dynamics. The purchase of access rights, easements, and/or property could result in long-term, minor impacts on soils if the lands were previously vacant and require installation of trails or other access infrastructure.

Depending on the types of recreation encouraged and the increase in usage of a land conservation site, long-term, minor adverse impacts to the physical environment are possible due to increased vehicle or boat usage in the vicinity of the site. For example, an increase in noise could occur with increased recreational use on a land parcel resulting in long-term, minor adverse impacts.

Efforts to enhance public access, through land acquisition or conservation easements, could also allow beach and dune migration and sediment migration in response to future climate and weather, which would have long-term beneficial effects on geology and substrates. Conservation could also allow for upland migration as sea level rises and could limit development encroachment. Wetland habitats landward of the beach could benefit from adjacent beach and dune area protection because these areas provide protection from storm surge and reduce erosion. Acquisition of land, or conservation easements, would increase the amount of land that could be managed for reducing stormwater runoff, sediments, and contaminants, thereby directly benefiting water quality.

6.4.13.1.2 Biological Resources

Short-term, minor to moderate adverse impacts on biological resources could result from improving recreational opportunities through enhancements to infrastructure. Short-term impacts associated with the construction or enhancements of certain types of infrastructure (e.g., boat ramps or bridges) are possible due to potential changes in sediment dynamics and would be site-specific. Other adverse impacts could include the short-term displacement of animals, including protected species such as beach mice, and the change of habitats from natural areas to built environments. Much of this infrastructure is or can be located in sensitive resources areas such as occupied beach mouse habitat, gulf sturgeon critical habitat, and EFH. Therefore, specific project design must consider the potential impacts on these resources and include BMPs and other mitigation measures to avoid adversely affecting sensitive natural resources. In-water construction activities may cause entrapment of marine mammals, sea turtles, and other protected species; however, use of best practices should mitigate this risk.

Depending on the intensity of recreational use, an increase in human and/or vehicular traffic on a land conservation tract could cause overall long-term, moderate adverse impacts to the biological resources. Added disturbance associated with human and vehicular presence could disrupt biological resources. Conservation measures could be taken in order to reduce the stress on these resources. Additional piers could cause harm or mortality to marine mammals and other organisms from fishing gear entanglements or ingestion, as well as from people illegally feeding dolphins from piers.

Adverse impacts could also occur as a result of increased fishing mortality from recreational fishing.

Improved access to resource-based recreational opportunities (e.g., bird watching) furthers the public's appreciation and understanding of the species and the habitats they need for survival. This awareness could bring long-term, minor beneficial impacts to biological resources as the public further supports conservation and wildlife management efforts. Conservation or acquisition of natural land resources can have long-term beneficial impacts on adjacent terrestrial systems and nearby marine ecosystems. This approach would reduce the amount of natural land being converted to uses that could introduce invasive species, pollutants, sediments, or contaminants to nearby systems; it would also serve as a

buffer between stressors and vulnerable ecosystems, resulting in long-term benefits to existing plant and animal resources.

6.4.13.1.3 Socioeconomic Resources

Preserving habitat by acquisition of property or through conservation easements could permanently limit the amount and type of development permitted, and the management and intensity of use on these properties would likely change. Land conservation or acquisition may result in restrictions on public access in areas where public access had previously been allowed, which could reduce recreational opportunities, although given the specific intent of this approach to improve recreational opportunities, this effect is anticipated to be minor for these projects. Projects that result in changes in ownership and/or permitted uses could affect property taxes and have broader regional economic impacts resulting from changes in visitor spending in the region. Land acquisition could have a minor to moderate impact on socioeconomic resources due to changes in visitor spending and tax impacts. However, the transfer of fee title to lands and the creation of conservation easements are transactions negotiated or arranged between willing parties and, as such, are not expected to give rise to adverse socioeconomic impacts to those who choose to engage in such transactions.

If private lands are opened for recreational use, this could be beneficial. The conservation of land would result in long-term beneficial effects on socioeconomic resources due to improved aesthetics and opportunities to view, catch, or hunt wildlife. Similarly, the tourism sector could benefit from any additional trips or spending induced by restoration or protection of terrestrial and marine ecosystems.

Further, the acquisition of coastal land for conservation easements could mitigate some of the economic impacts of expected sea level rise by preventing development that would be at risk from future storm surges or flooding.

The enhancement or construction of infrastructure would have long-term beneficial impacts on the socioeconomic resources of the surrounding area. This restoration approach would also improve socioeconomic resources by providing public access. Improvements in recreational opportunities that result from infrastructure enhancement have the potential to create localized increases in business opportunities and have long-term beneficial impacts.

Long-term benefits to cultural resources resulting from implementation of this restoration approach would be dependent on site-specific conditions. If cultural resources are present in a specific area, conservation of land would protect the resource from future impacts (e.g., due to development or construction).

6.4.13.2 Enhance Recreational Experiences

This restoration approach focuses on enhancing the public's recreational experiences. The experience of recreational activities such as swimming, boating, diving, bird watching, beach going, and fishing can vary depending on the appearance and functional condition of the surrounding environment in which they occur. There are a variety of restoration techniques that can be used individually, or in combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Place stone, concrete, or permissible materials to create artificial reef structures.

- Enhance recreational fishing opportunities through aquaculture.
- Reduce and remove land-based debris.

6.4.13.2.1 Physical Resources

This restoration approach may have short-term, minor adverse impacts on geology and substrate resulting from sediment disturbance from dredging and filling associated with activities such as placement of artificial reef structures and construction of aquaculture facilities. The soil and sediment disturbance from these activities could also result in short-term, minor impacts to water quality. The use of land- and marine-based construction equipment could result in short-term, minor adverse impacts to air quality and noise.

6.4.13.2.2 Biological Resources

Artificial reef placement could result in short-term, minor adverse impacts via benthic fauna disturbance. There could be additional adverse impacts to fauna if increased fishing occurs at the restoration site. Depending on the structure used, limited durability can have adverse impacts if pieces of the structure become detached. This poses the risk of environmental damage to surrounding habitats, especially during storm events.

Construction of aquaculture facilities could result in short-term, minor impacts to biological resources located at or adjacent to the construction site. Aquaculture could produce long-term, minor to moderate adverse impacts if hatchery-reared fish negatively affect the genetic diversity of the wild stock and/or affect the balance of the fish community. Additionally, adverse impacts could occur through introduction of diseases or competition with wild species, along with potential effects on habitat or protected and sensitive marine areas (NOAA 2015). See the discussion in Chapter 5, Appendix 5.D, Section D.8.2.1, explaining how the "Responsible Approach" would be a component of stock enhancement projects. Beneficial impacts could occur if the survival of finfish or shellfish leads to an increase in fish or bivalve densities without displacing wild organisms.

This restoration approach provides direct benefits to recreational users including nearshore and offshore fishing, beach use, and bird watching. Long-term beneficial impacts on biological resources are expected from the reduction of land-based debris. These benefits could accrue by reducing marine wildlife entanglement, injury, or death (CCC 2011).

Long-term beneficial impacts could occur if artificial reefs provide habitat for fish. Whether the availability of new habitat will serve to increase fish and/or invertebrate biomass or will only serve to concentrate organisms at the site is likely dependent on where the reef is sited and how it is designed (NOAA 2015).

Long-term beneficial impacts could result for habitats such as wetlands, shorelines, and water column if land-based debris was removed. Sensitive benthic habitats, including corals, oyster reefs, and SAV beds, would also benefit from less debris reaching coastal and offshore waters.

6.4.13.2.3 Socioeconomic Resources

Short-term, minor adverse impacts could occur due to construction activities or infrastructure changes associated with enhancing recreational experiences. Short-term, minor adverse impacts in the immediate area could occur during construction through 1) limiting recreational activities near the

construction area in order to protect public safety, 2) temporarily increasing road or vessel traffic due to movement of construction vehicles, and 3) adversely affecting aesthetics due to the presence of construction equipment or changes to the surrounding environment. Changes to infrastructure could occur as the local, existing infrastructure expands to meet the needs of a growing or new hatchery.

Impacts to cultural resources and infrastructure would be project-specific and dependent upon site-specific conditions. Potential long-term, moderate adverse impacts to cultural resources could occur if artifacts are located at project sites.

This restoration approach is intended to provide benefits to recreational users, including nearshore and offshore fishing, beach use, and bird watching. Socioeconomic benefits would include increased access to recreational opportunities and enhanced experiences due to infrastructure improvements. Improving access and condition of visitor areas could result in long-term beneficial impacts, including an increase in beach use, an increase in recreational fishing, and increases in other resource uses that could result in an economic uplift in the surrounding area. Short-term beneficial impacts could occur to socioeconomic resources due to construction activities (e.g., dredging, artificial reef placement, and aquaculture facility construction), which would increase employment and spending in the surrounding area.

Debris removal could result in long-term beneficial socioeconomic impacts, as described earlier in Section 6.4.5.1 (Reduce Impacts of Ghost Fishing Through Gear Conversion and/or Removal of Derelict Fishing Gear), including reductions in beach closures, vessel disablement, and habitat damage and improvements in navigation safety.

6.4.13.3 Promote Environmental Stewardship, Education, and Outreach

This Restoration Type involves providing and enhancing recreational opportunities through environmental stewardship, education, and outreach activities. There are multiple restoration techniques that can be used individually, or in combination, as potential restoration projects. This restoration approach could employ, but is not limited to, the following techniques:

- Create or enhance natural-resource-related education facilities.
- Create or enhance natural-resource-related education programs.

6.4.13.3.1 Physical Resources

Construction of educational facilities could cause short-term to long-term, minor to moderate adverse impacts to soils for the duration of construction. New facility construction projects could cause long-term, moderate adverse impacts on the geology and substrate. These impacts would be on a site-specific basis, due to the large variation of projects that could occur in this approach. For example, expanding an existing facility would have minor, short-term adverse impacts, but the permanent conversion of geology and substrate to a new facility and needed amenities, such as parking lots, could have long-term, minor to moderate impacts. Runoff during facility construction could have short-term, minor impacts on water quality. Short-term, minor impacts to air quality and noise may also occur during construction. Depending on the specific project, some research activities and interactive activities can have short-term, minor adverse impacts on soils and water resources. Increased human and vehicular traffic could cause long-term, minor adverse impacts to the physical resources including soils, water resources, and noise.

Programs developed at education centers and museums that provide education on environmental issues could beneficially affect these resources by encouraging conservation, understanding, and environmental stewardship of water resources and wildlife (NOAA 2006).

6.4.13.3.2 Biological Resources

Construction of educational facilities would result in short-term, minor adverse impacts to biological resources via ground disturbance during construction activities and long-term, minor to major adverse impacts due to replacement of habitat with hard structures and associated maintenance and increased human activity. The development of education programs or youth groups would have no direct impact, but trail building and some restoration work done by educational programs could have minor, short-term adverse impacts on the biological resources during the working phase of the project. Increased human and vehicular traffic could cause long-term, minor adverse impacts to biological resources.

Long-term beneficial impacts on biological resources could be expected from the outreach provided by educational facilities. Programs developed at education centers and museums that provide education on environmental issues could benefit these resources by encouraging conservation, understanding, and environmental stewardship of natural resources and wildlife (NOAA 2006). Overall, if these educational programs increase appreciation for, and awareness of, the status of vulnerable ecological resources in the Gulf region, implementing this technique has the potential to have a long-term, minor beneficial impact on biological resources. The benefits would result from educating youth and the local community about environmental issues in the community and beyond, habitat restoration, and conservation.

6.4.13.3.3 Socioeconomic Resources

Short-term, minor adverse impacts could occur due to construction of education facilities. Impacts in the immediate area could occur when construction activities 1) limit recreational activities near the construction area in order to protect public safety, 2) temporarily increase road or vessel traffic due to movement of construction vehicles, and 3) adversely affect aesthetics due to the presence of construction equipment. Impacts on cultural resources resulting from the implementation of this restoration approach are dependent on site-specific conditions. Potential long-term, moderate adverse impacts to cultural resources could occur if artifacts are located at project sites.

Short-term benefits to the local economy could accrue through an increase in employment and associated spending in the project area during construction activities. There could be short- to long-term beneficial impacts, since new or expanded environmental stewardship, education, and outreach facilities and related educational programs would employ new workers.

Long-term beneficial impacts on socioeconomic characteristics would be expected. Museums and education centers would contribute to the quality of life of the areas where they are situated and they can attract tourism to a region and promote civic pride.

6.4.14 Preliminary Phases of Restoration Planning

This section addresses the environmental consequence considerations associated with planning, feasibility studies, design engineering, and permitting on future restoration projects. As presented in Section 6.4.15, Summary of Impacts of Alternative A, the Final PDARP/PEIS evaluates a range of restoration approaches, enabling narrower NEPA analyses for subsequent restoration plans. These

subsequent plans will include project-specific actions and may propose a preliminary phase of a restoration project. For example, additional activities such as project planning, feasibility studies, and engineering and design studies may be needed on a complex project before it is proposed for implementation.

This preliminary phase of project planning may include activities such as characterizing the environment, determining the best restoration approach from an engineering standpoint, and predicting and comparing results and conditions with and without the project. Such activities can include a mixture of research into historical conditions, modeling of hydrologic response to the project, and creating maps and scale drawings of the project site. This may also include minimally intrusive field activities such as drilling into the soil or sediment with a soil auger, vibra-core, or hand probe to remove core samples for grain size or chemical analysis; determining existing and predicted ground water levels and elevations; and performing geotechnical evaluation. These activities may also include archaeological studies at and around the project site, which often involve digging test pits, and collecting and documenting historic features. All of the information described above may also be required to further develop projects from a conceptual phase. Some data collection may also require permits, for example when collecting data related to threatened and endangered species.

Environmental consequences that may occur as a result of these actions are considered here and are consistent with similar considerations evaluated in other programmatic restoration plans (e.g., NOAA 2015). Project planning, feasibility studies, design engineering studies, and permitting activities are intended to support the development of projects to propose in more detail in subsequent restoration plans. Preliminary planning phases can increase the effectiveness and efficiency of habitat restoration. Some preliminary phases of project planning would cause direct, short-term, minor impacts through associated fieldwork (e.g., including drilling into soil or sediment with an augur, drill rig, or other tools to remove surface, subsurface, or core samples). These impacts would be very minor and localized to the project site given how small such areas are in relation to an overall project area. Temporary impacts to the biological and physical environment also could include short-term, temporary disturbance of habitats and species; minor emissions from vehicles; and minor disturbance to terrestrial, estuarine, and marine environments. In cases where the appropriate permit or other environmental review has been secured (e.g., for photographing, handling, or disturbing listed species) or determined to be unnecessary (e.g., certain minor, temporary disturbance of marine mammals that does not constitute harassment), minor impacts to certain protected and managed resources also could occur and be considered minor.

For subsequent restoration plans that propose a preliminary project phase where environmental consequences fall within the range of impacts evaluated in this subsection, a tiered NEPA analysis would not be needed for the particular proposed project. In those cases, the subsequent restoration plan can reference back to this PEIS and state that no additional tiered NEPA analysis is required (see Section 6.17, NEPA Considerations and Tiering Future Restoration Planning). Project-planning actions for preliminary project phases fall within the scope of the analysis of this PEIS where such proposals have adverse impacts equal to or less than those analyzed here. Although information gathered may inform future projects, the outcome of the preliminary phases does not commit the Trustees to future actions. Specifically, once a preliminary phase of project planning has been completed, the proposal to

implement the project would be included in a subsequent restoration plan and associated NEPA analysis.

6.4.15 Summary of Impacts of Alternative A

As part of this PEIS, potential long- and short-term, physical, biological, and socioeconomic impacts of restoration under the program alternatives are evaluated. The generally qualitative level of detail of the evaluation is commensurate with the programmatic planning-level decisions to be made.

Restoration approaches are focused on a habitat type (e.g., wetlands, coastal, and nearshore habitats); improving water quality; groups of similar species (e.g., marine mammals, shore and nesting birds, sea turtles, pelagic highly migratory fishes, reef fishes, and SAV); and enhancing recreational opportunities. Beneficial and adverse, and minor, moderate, or major impacts are anticipated as a result of Alternative A, depending on the specific characteristics of the projects ultimately proposed in subsequent restoration plans, including the size, location, design, operation, and other aspects of future project development. However, there are some similarities in impacts across resources. For example, benefits to physical, biological, and socioeconomic resources are typically long-term and result from restoration of habitats, species, or recreational uses intended as a result of the action. Adverse impacts are generally short-term in duration, such as disturbances associated with construction activities. Long-term adverse impacts include impacts to in geology and habitat as a result of conversion of habitat from one type to another that occurs as part of restoration activities. Impacts to each of these resource categories are briefly summarized below.

6.4.15.1 Physical Resources

Impacts of restoration approaches targeting creation, restoration, and/or enhancement of coastal habitats (e.g., dunes, barrier islands, coastal wetlands) to physical resources are generally anticipated to be primarily adverse in the short term due to construction, and beneficial in the long term due to restoration of sustainable and resilient coastal systems. Adverse impacts to the existing environment are acknowledged with habitat conversions, but it is important to note that these are generally intended changes that replaces a ubiquitous, less productive substrate with a higher productivity habitat. For example, large-scale restoration activities may include construction over multiple years and would be considered long-term for purposes of this Final PDARP/PEIS. These adverse impacts would be minimized by best practices. The long-term benefits to the physical resources outweigh the short-term, minor impacts and include restored freshwater flows, sediment, and nutrient loads; restored sediment dynamics and deltaic processes; and overall coastal resiliency.

Several restoration approaches focus on species or groups of species: for example, reef and highly migratory pelagic fish, the Gulf sturgeon, sea turtles, birds, and marine mammals. Impacts to physical resources for these approaches are fewer, of smaller intensity, and localized in comparison to habitat restoration. These restoration approaches include reducing bycatch and bycatch mortality using particular hooks; increasing the use of bycatch reduction devices; preserving areas for foraging, nesting, and/or spawning activities; and restricting access to areas (sanctuaries) or time periods (bluefin tuna spawning period). Short-term, minor adverse impacts for species-directed approaches may include 1) localized sediment/substrate disturbances due to actions such as marine debris removal or installation of signs or buoys to reduce trespass and 2) air quality and/or ambient noise impacts due to increased

vehicle emissions. The benefits to the physical environment as a result of these restoration actions are typically minor and include ocean and shoreline disturbance due to removal of marine debris and minor improvements to water and air quality due to reduced or restricted development.

6.4.15.2 Biological Resources

Adverse impacts to biological resources as a result of restoration approaches are short- and long-term and minor to moderate to major. Adverse impacts are typically a result of replacement of existing habitat by the newly created or restored habitat (e.g., burial with sediment for dune creation), displacement or loss of species due to habitat replacement, or injury or mortality due to direct interaction or entrainment during restoration activities (e.g., construction or processing equipment). An example of a short-term, temporary disturbance would be displacement of fish and benthic invertebrates during construction and the return and recolonization of organisms following construction activities. Benefits to biological resources are long-term and will increase habitat for foraging, nesting, and spawning; reduce bycatch and mortality of bycatch among fish, sea turtles, birds, and marine mammals; or reduce disturbance to resources such as mesophotic corals, oyster reefs, and SAV beds.

Habitat restoration approaches that create, restore, or enhance habitat have a minor to moderate to major adverse impact on existing habitats being replaced. For example, restoration of marsh habitats may require dredging to restore hydrologic and hydraulic connectivity, as well as sediment borrow and placement for establishment of vegetation at appropriate elevations. Short-term, minor adverse impacts anticipated include reduced water quality, air quality, and ambient noise conditions primarily due to construction in water, in wetlands, and on land. Long-term major adverse impacts include loss of existing habitats (e.g., open water or land) and commensurate losses of vegetation and animals associated with the replaced habitats. Benefits of the marsh restoration would be long-term and significant with respect to sediment supply source, water quality improvements, fish and wildlife habitat (nursery, foraging, spawning), as well as opportunities for recovery of particular listed species.

Restoration approaches include limiting access within discrete areas, reducing bycatch and bycatch mortality, improving response and rescue abilities, revegetation, and predator control. Adverse impacts of these approaches are typically associated with incidental injury or mortality that would occur with or without the restoration (e.g., entrainment despite bycatch reduction devices, bycatch despite use of circle hooks instead of J-hooks, illegal oyster harvesting, and incidental injury or mortality to animals during already established rescue/response activities). Long-term benefits to these resources are often a result of reducing mortality and increasing chances of reproduction among individual organisms that, combined with other management actions (such as access restrictions, quotas, and closed fishing seasons), would have population-level benefits.

6.4.15.3 Socioeconomic Resources

The magnitude and duration of socioeconomic impacts will depend on the scale of the actions chosen and site-specific characteristics such as location, presence of cultural resources in the project area, and regional availability of substitutes (e.g., recreational opportunities or alternative employment).

Few, if any, major adverse impacts to socioeconomic resources are expected to result from the restoration approaches. For example, potential major adverse socioeconomic impacts include impacts to landowners in the immediate areas of diversions implemented to restore and preserve Mississippi-

Atchafalaya River processes. Barrier removal to restore sturgeon spawning habitat may result in minor to major adverse socioeconomic-related impacts to the water supply for agriculture or municipal uses, transportation, flood protection, and hydropower supply, depending on the size and designated use of the barrier that is removed.

In addition, many of the restoration approaches have potential for minor to moderate, long-term adverse impacts on fishing and other recreational activities due to changes such as use of alternative gear, repose, quota shifting, or restrictions on areas available for activities. Voluntary incentivized participation in restoration approaches such as reduced trapping or fishing would at least partially mitigate the adverse impacts of reduced income for individuals. Industries such as shipping and energy could be affected if noise restrictions are enacted. Construction activities associated with the restoration approaches may result in short-term limitations on public access, resulting in economic impacts due to reduced visitation and spending.

Numerous socioeconomic benefits are expected to result from the restoration approaches included in Alternative A. Over the long term, restoration approaches will improve the health of wildlife and fish populations, which in turn leads to increased opportunities for wildlife viewing and fishing. Regional economic benefits are expected as a result of increased tourism and recreation due to restoration of barrier islands and beaches and other important habitats. In addition, construction associated with the restoration approaches will result in short-term regional economic benefits due to increased employment and spending. Finally, the restoration approaches will provide a very important socioeconomic benefit by reducing the risk of potential hazards, such as storm surges, and improving shoreline integrity.

6.5 Evaluation of Direct and Indirect Environmental Consequences for Other Alternatives

This section considers the environmental consequences of Alternatives B, Resource-Specific Restoration; C, Continue Injury Assessment and Defer Comprehensive Restoration, and D, Natural Recovery/No Action. This section draws on the evaluation of Alternative A, above, to provide a higher-level summary of potential environmental consequences for these alternatives.

6.5.1 Alternative B: Resource-Specific Restoration

Alternative B would establish a resource-specific restoration portfolio based on the Trustees' programmatic goals, purpose, and need. Alternative B seeks to maximize benefits to individual resources and human uses based on close, well-defined relationships between injured resources and the Restoration Types. This alternative is focused on restoring injured natural resources as directly as is practical. Because Alternative B comprises the same Restoration Types as Alternative A, the description of Alternative B does not repeat the information for each Restoration Type just presented in Section 6.4, Evaluation of Environmental Consequences of Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative). Although the Restoration Types that make up Alternative B are the same as those described under Alternative A, there are important distinctions in how the Trustees could implement restoration between Alternatives A and B.

Alternative B would emphasize the Restoration Types associated with living coastal and marine resource restoration, with correspondingly less emphasis on wetland, coastal, and nearshore habitat restoration. Alternative A has a primary focus on implementing restoration actions that provide the benefit of ecosystem linkages and the ability to compensate for inferred or unquantified injuries as well as the connectivity among resources, habitats, and human uses. This means that there is an emphasis on coastal habitat restoration in Alternative A. Alternative B has a focus on restoring living coastal and marine resources. Although ancillary benefits may be provided for ecosystem linkages under Alternative B, these are not a primary consideration for this alternative. Therefore, coastal habitat restoration is a component but not the focus of Alternative B.

Under both Alternatives A and B, the Trustees would implement monitoring, assessment, and scientific support activities to evaluate the response to restoration and to better inform ongoing restoration and management decisions within an adaptive management framework. Likewise, both Alternatives A and B would factor in contingencies to address future unknown conditions, given the unprecedented scale of restoration required and the number of years that it will take to implement this plan.

Overall, Alternative B would focus on resource-specific restoration, shifting the restoration and funding allocation emphasis from the goal of Restore and Conserve Habitats to the goal of Replenish and Protect Living Coastal and Marine Resources. Although restoration of living coastal and marine resources may include some habitat restoration, the amount of habitat restoration that would be implemented is less certain than in Alternative A. Since the restoration portfolio under this alternative relies on the same approaches as Alternative A with a different emphasis across Restoration Types, the potential environmental consequences, including the direct, indirect, and cumulative impacts of the approaches could be the same as those summarized in Section 6.4.15, Summary of Impacts of Alternative A.

However, the environmental consequences of Alternative B would be expected to reflect relatively less of those impacts associated with the approaches under the Wetlands, Coastal, and Nearshore Habitat Restoration Type and more of those impacts associated with approaches under the goal of Replenish and Protect Living Coastal and Marine Resources.

6.5.2 Alternative C: Continue Injury Assessment and Defer Comprehensive Restoration Planning

Alternative C defers development of a comprehensive restoration plan until greater scientific understanding of the injury determination is achieved. This alternative could include the Restoration Types identified for Alternatives A and B, which are described in Section 5.5, Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative), but also could include refinements to those Restoration Types or a change in focus across the Restoration Types. Although approved Early Restoration projects would continue, no further NRDA restoration would be conducted until the additional injury assessment is completed and a corresponding restoration plan developed. Under Alternative C, the allocation of funding to restoration could be substantially less because injury assessment costs would reduce the total amount available for restoration. As a result, it would be expected that less restoration would occur, and correspondingly fewer environmental consequences (particularly fewer beneficial impacts) associated with that restoration implementation would also result.

This alternative might increase the potential for more directly targeted restoration projects. However, further study may not substantially change the understanding of the nature or extent of certain injuries regardless of the length of time or amount of funding devoted to further study. This is due to the inherent difficulties in studying many oceanic systems and the time that has already passed since the spill. Although further study might be able to provide more certainty to the injury quantification, the Trustees do not expect that the increased degree of certainty would substantially change the Trustees' restoration approach.

Deferring restoration planning in favor of continued assessment would cause substantial delays in restoration implementation beyond Early Restoration, which would lead to further losses in natural resources and their services. This further study may not substantially change the understanding of the nature or extent of certain injuries regardless of the length of time or amount of funding devoted to further study. Additionally, the reduction in funds available for restoration (due to expenditure on continued assessment) would result in Alternative C not providing as much benefit to injured resources as Alternative A or B.

6.5.3 Alternative D: Natural Recovery/No Action

NEPA requires consideration of a no-action alternative as a basis for comparison of potential environmental consequences of the action alternatives. OPA regulations also require that "trustees 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]).

As discussed in Chapter 5, Section 5.8, under the Natural Recovery/No Action alternative, the Trustees would not prepare a restoration plan to undertake any additional restoration for injured natural resources or to compensate for lost services. Early Restoration would be the only restoration implemented under NRDA under this alternative—no additional restoration would be done by Trustees. This alternative does not meet the purpose and need for restoration of injured resources and services.

Under this alternative, Trustees would allow natural recovery processes to occur, which could result in one of four outcomes for injured resources: 1) gradual recovery, 2) partial recovery, 3) no recovery, or 4) further deterioration. Under this alternative, resources affected by the spill would remain injured for a longer period of time. For example, SAV in the Chandeleur Islands that would see beneficial impacts from approaches to restore and enhance the resource may otherwise recover naturally—but over the course of 2 to 10 years, rather than over a more expedited period. Similarly, marine mammals would see accelerated benefits from restoration through enforcement capabilities; reductions in commercial bycatch; reduced illegal feeding and harassment; or enhanced capacity to respond to stranded, injured, and entangled individuals. Without such restoration, natural recovery of these resources could require decades.

A "no-impact" conclusion could be made for the Natural Recovery/No-Action alternative because this alternative would largely result in a continuation of the conditions described in Chapters 3, Ecosystem Setting, and 4, Injury to Natural Resources, and there would be neither associated funding costs nor any economic benefits. However, as the benefits to resources intended as a result of implementing the PDARP/PEIS would not be realized, and given that technically feasible restoration approaches are available, the alternative is not further compared against the other action alternatives.

This alternative would have no beneficial impacts to elements of the environment, as natural resources would recover more slowly or not recover without restoration. Under the no-action alternative, some habitat recovery could result from other federal actions (such as ESA-related actions), but not from the federal action being evaluated in this PEIS. When analyzed in combination with other past, present, and reasonably foreseeable future actions, Alternative D is not expected to contribute to short-term or long-term, cumulative adverse impacts to physical resources, biological resources, or socioeconomics.

6.6 Cumulative Impacts

6.6.1 Potential Cumulative Impacts

The 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 undertakes such other actions" (40 CFR § 1508.7). As stated in the CEQ handbook, *Considering Cumulative Effects* (CEQ 1997a), 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 Alternative D, No Action. Although the Restoration Types are expected to be the same under both Alternative A and B, the distribution and level of use of the approaches implemented under Alternative B would be different. Without an understanding of this distribution, it would be speculative to estimate a distinction between potential cumulative impacts of Alternatives A and B. As stated above, Alternative C represents a deferment of restoration activities, and it would be expected that less restoration would occur and correspondingly fewer environmental consequences associated with that restoration implementation would also result. Therefore, for the evaluation at this programmatic level, cumulative impacts presented here reflect an estimate for Alternatives A, B, and C.

Cumulative Impacts

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 undertakes such other actions" (40 CFR § 1508.7).

Consistent with CEQ regulations, the cumulative impacts analysis considers the environmental impacts of proposed alternatives when added to impacts of past, present, and reasonably foreseeable future actions throughout the northern Gulf of Mexico region.

The following analysis considers cumulative impacts from a programmatic perspective. The following section describes the multistep approach used for evaluating cumulative impacts in this document.

6.6.2 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 in tables corresponding to specific affected resources.
- **Step 2—establish boundaries.** In order 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 to 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 programmatic analysis groups specific actions by cumulative action categories. These action categories are listed and described below. The more specific actions within each action category are listed in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis.

- **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.

6.6.3 Identification of Resources Affected and Boundaries of Analysis (Steps 1 and 2)

6.6.3.1 Resources Affected

In this Final PDARP/PEIS, cumulative impacts include all of the resources identified in the environment/affected resources sections.

6.6.3.2 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 particular resource being assessed. For the purpose of this analysis, the spatial boundary includes those areas where restoration approaches described in each alternative likely could occur, which is assumed to be the northern Gulf of Mexico region. Although many of these resources consist of highly migratory species, and restoration efforts may be conducted in habitats that occur outside the Gulf of Mexico, at this stage of programmatic review an estimation of potential cumulative impacts beyond the Gulf of Mexico would be so speculative that it would not be informative. Cumulative impact analysis in tiered environmental reviews will address this potential at that more appropriate scale.

6.6.3.3 Temporal Boundary of Analysis

Guidance on determining what actions to consider in the cumulative impact analysis comes from a variety of sources. 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

present effects on the affected resources.[7] 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 are allowed to aggregate the effects of past actions without delving into the historical details of individual past actions. Courts have agreed with this approach, giving deference to CEQ's interpretation of NEPA and stating that, as it relates to past actions, NEPA requires "adequate cataloging of relevant past projects in the area" (Ecology Center v. Castaneda, 574 F.3d 652, 667 [9th Cir. 2009]).

Present actions are those that are currently occurring and result in impacts to 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 alternatives. 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 a number of 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 Final PDARP/PEIS, future actions identified as those actions likely to be initiated prior to finalization of the PDARP and actions that are likely to occur beyond finalization of the PDARP are determined to be reasonably foreseeable and likely to contribute to the overall cumulative impacts.

6.6.4 Categories of Cumulative Actions in the Northern Gulf of Mexico Region (Step 3)

In order to effectively consider the potential cumulative impacts at a programmatic level, the Trustees identified categories of similar actions. Within these categories, examples of actual past, present, and reasonably foreseeable future actions are described (see also Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis). There may be additional small-scale activities not currently identified; however, the categories and their associated described actions provide the necessary information to fully understand the cumulative impacts that may be experienced by specific affected resources.

6.6.4.1 Restoration Related to the DWH Spill

There are a number of past, present, or future restoration efforts and actions related to the spill. Although the full extent of these restoration actions are not known at this time, multiple large-scale restoration efforts occurring in the Gulf are anticipated in coming years. A brief description of some of these programs is presented below. The Trustees recognize that subsequent restoration plans and their integrated, tiered NEPA analyses will need to build on the programmatic cumulative impact analysis to

[7] The cumulative impact assessments (both programmatic and project-level) appropriately do not separately analyze the effects of the spill itself.

analyze potentially significant cumulative impacts, including other funded restoration projects, within the geographic and resource focus of the subsequent restoration plans.

6.6.4.1.1 RESTORE Act

The Resources and Ecosystems Sustainability, Tourist Opportunities and Revived Economies of the Gulf Coast States (RESTORE) Act of 2012 established a Gulf Coast Ecosystem Restoration Council. In 2013, the RESTORE Council adopted an Initial Comprehensive Plan (GCERC 2013), which provides a framework to implement a coordinated, Gulf Coast regionwide restoration effort in a way that restores, protects, and revitalizes the Gulf Coast. In August 2015, the RESTORE Council released a draft Initial Funded Priorities List (FPL) for ecological restoration and protection projects selected according to its Initial Comprehensive Plan. Approximately $5.3 billion for RESTORE will be available, of which $800 million has already been paid. BP will pay 80 percent of $5.5 billion ($4.4 billion) more over the course of the next 16 years. The remaining $127.6 million (80 percent of the $159.5 million penalty against Anadarko) is potentially subject to appeal, so it is not certain whether or when that amount will be paid. The RESTORE Act dedicates 80 percent of any civil and administrative penalties paid under the Clean Water Act to the Gulf Coast Restoration Trust Fund for ecosystem restoration, economic recovery, and tourism promotion in the Gulf Coast region.

6.6.4.1.2 Restoration Under Other Criminal Plea Agreements

In 2012 to 2013, BP and Transocean each entered into criminal plea agreements with the United States Justice Department. Substantial funding under those plea agreements is being directed to:

- **The Gulf Environmental Benefit Fund (GEBF).** This fund is administered by the National Fish and Wildlife Foundation, to restore and protect Gulf Coast natural resources. GEBF will receive $2.544 billion dollars in total; some of this money has already been paid to the GEBF, and all of it should be paid by 2018. During the first 3 years (2013–2015) of the agreement, 73 projects worth nearly $480 million were supported through the Gulf Environmental Benefit Fund. Projects were selected after consultation with state and federal resource agencies and are distributed across the five Gulf states (NFWF 2016).

- **The North American Wetlands Conservation Fund.** This fund is administered by the U.S. Fish and Wildlife Service and is designated for "wetlands restoration and conservation projects" located in the Gulf or projects that would "benefit migratory bird species and other wildlife and habitat" affected by the oil spill. Specific projects are not yet identified.

- **The National Academy of Sciences.** This funding is intended to enhance the safety of offshore drilling to protect human health and the environment. The money will be used for a 30-year "program focused on human health and environmental protection, including issues relating to offshore oil drilling" and the production and transportation of hydrocarbons in the Gulf and the Outer Continental Shelf. The National Academy of Sciences announced the funding of 12 exploratory grants under its Gulf Research Program, totaling more than $1.5 million, on September 9, 2015.[8]

[8] Description of these exploratory grants by the National Academy of Sciences is available at *http://nas.edu/gulf/index.html*.

6.6.4.1.3 Resource Stewardship Activities

Stewardship activities within the Gulf of Mexico region include a diverse range of federal, state, local governmental, nongovernmental, and private coastal and marine habitat protection and restoration projects. These stewardship activities are intended to provide benefits to Gulf of Mexico resources, many of which are the same resources and services affected by the DWH oil spill. Similarly, implementation of some stewardship activities would have impacts to many of the same resource components being evaluated under the DWH restoration. This section includes programs that focus on land protections and conservation easements and those that focus on habitat restoration. For information on examples of specific past, present, and future actions, see Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis.

6.6.4.1.4 Water Quality Improvement Programs

The condition of the Gulf of Mexico ecosystem reflects water quality impacts from urban development, industry, transportation, agricultural runoff, atmospheric deposition, and other sources throughout the Gulf of Mexico watershed. A number of authorities are in place to reduce the discharge of contaminants that enter the Gulf of Mexico (e.g., OPA; the Clean Air Act; the Clean Water Act; the Farm Bill; the National Park Service Organic Act; and the Marine Protection, Research and Sanctuaries Act). Water quality improvement programs and authorities seek to address human uses that result in water quality degradation in the Gulf of Mexico and are expected to continue into the foreseeable future in an effort to restore water quality conditions.

Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis, describes many of the federal, state, and local projects and programs related to water quality improvement that have occurred in the past and present and are expected to continue into the future.

6.6.4.2 Military Operations

Military operations in the Gulf of Mexico are undertaken primarily by the U.S. Air Force and the U.S. Navy within federally designated areas for the purposes of personnel training, research, design, testing, and evaluation. There are 18 U.S. military bases along the northern Gulf of Mexico; as well, there are more than 40 military warning areas designated by the U.S. Air Force (for various testing and training missions) and the U.S. Navy (for various naval training and testing operations) (BOEM 2012).

The Gulf of Mexico Range Complex is a combined air, land, and sea space that provides realistic training areas for U.S. Navy personnel. In coastal and marine areas, the Gulf of Mexico Range Complex includes military operations areas and overlying special use airspaces, the Naval Support Activity Panama City Demolition Pond, security group training areas, and supporting infrastructure. Four offshore operating areas in the northern Gulf of Mexico—Corpus Christi, New Orleans, Pensacola, and Panama City—define where the U.S. Navy conducts surface and subsurface training and operations. The two security group training areas are also located in marine waters of the Gulf of Mexico Range Complex: one off the coast of Panama City, Florida, and one off the coast of Corpus Christi, Texas. These areas are used for machine gun and explosives training. Naval Support Activity, Panama City, Florida, conducts diver training and underwater research, as well as ship salvage and submarine rescue exercises (BOEM 2012).

U.S. fleet aircraft operated by all Department of Defense units train within a number of special-use airspace locations that overlie the military operations areas, as designated by the Federal Aviation

Administration. Special-use airspaces are largely located offshore, extending from 3.5 miles out from the coast over international waters and in international airspace (BOEM 2011). Examples of actions considered in this cumulative action category are found in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis.

6.6.4.3 Marine Transportation

When the potential cumulative impacts associated with marine transportation are considered, port development; shipping and maritime services; and associated navigation, channel construction, and maintenance are important. The Gulf of Mexico coast encompasses a comprehensive system of ports and waterways that provide the facilities and logistics for import and export of foreign and domestic goods, as well as intermodal transport between vessels, trucks, and railroads. Major shipping lanes run throughout the Gulf ecosystem, and the volume and value of shipping and port activities is continually increasing. Marine transportation planning to improve traffic congestion and other shipping issues has been occurring. A few examples of actions considered in this cumulative action category are described below (further examples can be found in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis):

- **Present action.** The M-10 Marine Highway Corridor includes the Gulf of Mexico; the Gulf Intracoastal Waterway; and connecting commercial navigation channels, ports, and harbors from Brownsville, Texas, to Jacksonville and Port Manatee, Florida. The M-10 connects to other Marine Highway Corridors: the M-49 Corridor at Morgan City, Louisiana; the M-65 Corridor in Mobile, Alabama; and the M-55 in New Orleans, Louisiana.

- **Future action.** For example, U.S. Department of Transportation's Maritime Administration has identified marine corridors, projects, and initiatives to establish all water routes to serve as extensions of the surface transportation system. These corridors are planned to ease traffic congestion and reduce air emissions resulting from truck traffic along the interstates and other roadways, particularly within the major cities along established transportation routes (MARAD n.d.).

- **Future action.** Corridor traffic via land is expected to grow significantly by 2025, and the M-10 route would provide a maritime route that could ease congestion (including freight rail congestion) around Houston and along 400 miles of the corridor already operating at an unacceptable level of service (MARAD n.d.). The M-10 route is expected to provide public benefits by reducing congestion on roadways, reducing GHG emissions, and reducing road maintenance costs (MARAD n.d.).

- **Future action.** Two projects are associated with the M-10 Marine Highway Corridor. The Cross Gulf Container Expansion Project will expand the frequency and capacity of container-on-barge traffic. The Gulf Atlantic Marine Highway Project is a public-private venture that would distribute containers between the Gulf, mid-Atlantic, and south Atlantic coasts of the United States via the M-10 and M-95 Corridors from Brownsville, Texas, to South Carolina. These marine routes provide benefits over the corresponding land routes; for example, the Cross Gulf water route between Brownsville, Texas, and Port Manatee, Florida, is about 600 miles shorter

than the land route (Fritelli 2011). The construction of additional vessels could help to expand the use of these marine highways.

- **Ongoing and future actions.** In anticipation of the potential for increased maritime commerce as a result of the 2014 expansion of the Panama Canal, ports along the Gulf of Mexico have signed Memoranda of Use with the Panama Canal Authority and are expanding and upgrading their infrastructure. Memoranda of Use have been signed with the ports of Freeport, Galveston, Houston, and the Port of Corpus Christi Authority, Texas; Port of New Orleans, Louisiana; Alabama State Port Authority; Mississippi State Port Authority at Gulfport; and Broward County (Port Everglades Department), Manatee County Port Authority, and Tampa Port Authority, Florida (Panama City Port Authority 2015). Many of the ports are deepening and widening channels, improving existing facilities, and developing new terminals, berths, and container storage areas in order to attract additional markets and maintain competitiveness.

6.6.4.4 Energy Activities

The Gulf of Mexico is one of the most important regions in the United States for energy and chemical resources. This sector is supported by numerous facilities, including platform fabrication yards, shipyards, support and transport facilities, pipelines, pipe coating yards, liquefied natural gas (LNG) processing and storage facilities, refineries, petrochemical plants, and waste management facilities, among others. Examples of actions considered in this cumulative action category are found in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis.

6.6.4.4.1 Offshore Oil Production

Management of the oil and gas resources of the Outer Continental Shelf (OCS) is governed by the Outer Continental Shelf Lands Act (OCS Lands Act), which sets forth procedures for leasing, exploration, development, and production of those resources. The Bureau of Ocean Energy Management (BOEM) within the Department of the Interior is responsible for implementing the requirements of the act related to preparing the leasing program (BOEM 2012). Pursuant to the OCS Lands Act, BOEM has prepared *A Proposed Outer Continental Shelf Oil and Gas Leasing Program for 2012–2017* (BOEM 2012). The 5-year proposed program includes a schedule of offshore oil and gas lease sales on the U.S. OCS. Of the 15 proposed lease sales included in the proposed program, 12 are in the Gulf of Mexico:

- **Western Gulf of Mexico—**a total of five annual areawide lease sales, beginning in the fall of 2012, that made available all unleased acreage.
- **Central Gulf of Mexico—a** total of five annual areawide lease sales, beginning in the spring of 2013, that make available all unleased acreage.
- **Eastern Gulf of Mexico—**a total of two sales, in 2014 and 2016, in areas of the eastern Gulf of Mexico.

Transportation for most oil and gas from the Gulf of Mexico Proposed Planned Leasing Program is anticipated to be accomplished through extension and expansion of existing offshore pipeline systems, with some transport from barge and shuttle tankers.

6.6.4.4.2 Offshore Natural Gas Facilities

LNG facilities on the OCS are currently in various stages of the permitting process. One offshore LNG terminal operated off the coast of Louisiana until approximately 2012. Although the future of offshore LNG terminals is uncertain, the U.S. Coast Guard provides the current status of applications (USCG 2015).

6.6.4.4.3 State Oil and Gas Activities

All Gulf states, except Florida, have active oil and natural gas programs in offshore state waters and onshore areas. Texas and Louisiana have the highest levels of oil and gas activity in the Gulf of Mexico, and this activity is predicted to continue into the foreseeable future. Oil production in Texas in recent years has increased from 443 thousand barrels (Mbbl) in 2000, to 727 Mbbl in 2012. Texas' natural gas withdrawals increased from 5.6 billion cubic feet in 2000 to 7.1 billion cubic feet in 2012. Over 167,000 oil wells and over 102,000 gas wells are active in the state. Louisiana oil production increased from 2010 to 2011 by 6 percent (to 68.1 Mbbl), and gas production by 33.4 percent (to 2.9 trillion cubic feet [Tcf]). Oil production is forecasted to decrease slightly through 2030; however, natural gas production is expected to increase through 2020 to over 3 Tcf and then decrease to approximately 2.5 Tcf by 2030 (LDNR 2015). The Mississippi Development Authority has issued proposed rules for seismic exploration and state leasing for offshore oil and gas drilling in the state's coastal waters. Drilling of new wells for oil and gas in Alabama has increased substantially from 1999 to 2012, and the number of producing wells increased to 6,929 in 2010, up from 564 wells in 1970 (Alabama Oil and Gas Board 2011). Expansion of offshore oil and gas production is increasing shipbuilding along the Alabama coast due to demand for offshore supply and rig-tending vessels and infrastructure associated with repairing drilling rigs (GCERTF 2011). Examples of actions considered in this cumulative action category are found in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis.

6.6.4.5 Marine Mineral Mining, Including Sand and Gravel Mining

BOEM has authority to lease mineral resource deposits within coastal Gulf waters for phosphate, oyster shell, limestone, sand and gravel, and magnesium (MMS 2004). However, sand and gravel are the minerals that are primarily mined in the Gulf of Mexico. Limitations of sand, both in terms of the correct composition and quantity, can be an issue in many areas of the Gulf. The BOEM Marine Minerals Program is observing an increase in the requests for OCS sand because suitable state resources are becoming depleted. Examples of actions considered in this cumulative action category are found in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis.

6.6.4.6 Dredged Material Disposal

Materials from maintenance dredging are primarily disposed of offshore on existing dredged-material disposal banks and in ocean dredged-material disposal sites (ODMDS), which are regulated by EPA. Additional dredged-material disposal areas for maintenance or new-project dredging are developed as needed and must be evaluated and permitted by USACE and relevant state agencies prior to construction.

The USACE's beneficial use of dredge materials program makes dredged materials disposed of offshore available for potential beneficial uses to restore and create habitat and beach nourishment projects. Virtually all ocean dumping that occurs today is maintenance dredging of sediments from the bottom of channels and water bodies in order to maintain adequate channel depth for navigation and berthing.

USACE's New Orleans District oversees seven active ODMDSs in the Gulf of Mexico. The Mobile District oversees seven ODMDSs in the Gulf of Mexico. The Galveston District oversees 17 active ODMDSs in the Gulf of Mexico. Dredged materials from the Gulf Intracoastal Waterway are sidecast at these ODMDS locations. USACE's Ocean Disposal Database reports the amount of dredged material disposed of in ODMDSs by district (USACE 2015). Two primary federal environmental statutes govern dredge material disposal. The Marine Protection, Research, and Sanctuaries Act (also called the Ocean Dumping Act) governs transportation for the purpose of disposal into ocean waters. Section 404 of the Clean Water Act governs the discharge of dredged or fill material into U.S. coastal and inland waters. EPA and USACE are jointly responsible for the management and monitoring of ocean disposal sites. The responsibilities are divided as follows: 1) USACE issues permits under the Clean Water Act and the Marine Protection, Research, and Sanctuaries Act; 2) EPA has the lead for establishing environmental guidelines/criteria that must be met to receive a permit under either statute; 3) permits for ODMDS disposal are subject to EPA review and concurrence; and 4) EPA is responsible for identifying recommended ODMDSs.

The 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (the London Convention), to which the United States is a signatory, requires annual reporting of the amount of materials disposed of at sea. USACE prepares the dredged material disposed portion of the report to the International Maritime Organization, the yearly reports for which are included in USACE's Ocean Disposal Database (USACE 2015). Examples of actions considered in this cumulative action category are found in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis.

6.6.4.7 Outer Continental Shelf Sand Borrowing

BOEM has issued 31 noncompetitive negotiated agreements to access OCS sand resources. The OCS Program continues to focus on identifying sand resources for coastal restoration, investigating the environmental implications of using those resources, and processing noncompetitive use requests.

Approximately 76 million cubic yards of sand are expected to be needed for coastal restoration projects as reported by the Gulf of Mexico OCS Region's Marine Minerals Program.

The boundary between the OCS and Texas state waters (9 nautical miles [10 miles; 16 kilometers]) allows that some offshore sand is within the jurisdiction of the state; however, the easternmost portion of the shelf in Texas state waters is relatively devoid of beach-quality sand deposits. The Texas General Lands Office, in cooperation with BOEM and Texas Bureau of Economic Geology, has investigated the potential for use of Heald and Sabine Banks as borrow for beach restoration projects; however, no specific projects have been identified. Some uncertainty exists about how much OCS sand offshore of the state of Louisiana will eventually be sought. The Louisiana Coastal Area Ecosystem Restoration plan may use up to 60 million cubic yards; however, state/federal cost-sharing agreements and federal funding levels for project design and construction is uncertain (CPRA 2012). There has been a recent increase in state-funded projects in Louisiana requesting OCS sand resources. It is anticipated that this trend of state-led projects will continue into the future as restoration funding is made available directly to the state through the Coastal Impact Assistance Program, restitution (i.e., fines and penalties associated with the DWH event), and the Gulf of Mexico Energy Security Act. Examples of actions considered in this cumulative action category are found in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis.

6.6.4.8 Coastal Development and Land Use

The landscape of the northern Gulf of Mexico has been altered and will continue to be altered as a result of land use activities that include coastal development and redevelopment for residential, commercial, industrial, recreational, agricultural, and forestry purposes. Changes in land use patterns that result from a need for economic development, such as tourism-related coastal development, intensify demand on coastal resources and can lead to environmental degradation and natural hazard risks. Increasing populations within coastal communities, such as resort and retirement communities, can change the historical water-dependent land uses, which include public access for recreation, commercial and recreational fishing, and ship-building. Examples of actions considered in this cumulative action category are found in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis.

Based on building permit numbers, construction of single-family homes in Louisiana and Texas decreased after 2006. Mississippi and Alabama continue to have a low, but consistent level of building permits issued (NOAA 2011a). Development within the South Padre Island and Port Aransas areas of Texas and the Tampa Bay region of Florida is principally residential and mixed use development; however, many construction projects have been canceled or reduced in scope or have had build-out timeframes extended as a result of the post-2008 economy.

Seasonal and retirement communities have also grown within the Gulf of Mexico region, especially in the Gulf communities of Florida and Texas. The region contains over 500,000 seasonal homes, distributed as follows: Texas (14 percent); Louisiana (7 percent); Mississippi (1 percent); Alabama (4 percent) and Florida (74 percent) (NOAA 2011a).

6.6.4.9 Fisheries and Aquaculture

The Gulf of Mexico Fishery Management Council (GMFMC) is one of eight regional fishery management councils established by the Fishery Conservation and Management Act of 1976. The GMFMC prepares fishery management plans that are designed to manage fishery resources within the 200-mile limit of the Exclusive Economic Zone (EEZ) in the Gulf of Mexico. The GMFMC has authority to regulate fisheries in federal waters, including aquaculture. Federal waters begin 3 to 9 nautical miles offshore and extend to the outer edge of the 200-mile EEZ. From Texas and Florida, federal waters begin 9 nautical miles out, and from Mississippi, Louisiana, and Alabama, federal waters begin 3 nautical miles out (GMFMC 2013).

The GMFMC manages and regulates commercial and recreational fishing in federal waters. It sets closures for sensitive areas and marine sanctuaries; quotas; trip limits; and minimum size limits for coastal migratory fish, reef fish, shellfish, and other fish. For recreational fishing, the GMFMC regulates fishing activities, including setting of seasons and closures; permitting activities; and setting of daily limits, bag limits, and minimum size requirements. Currently no aquaculture activity occurs within federal waters, although an Aquaculture Fishery Management Plan (FMP) has been developed that would permit and regulate these operations. Examples of actions considered in this cumulative action category are found in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis.

The GMFMC and NMFS developed the Aquaculture FMP to maximize benefits to the nation by establishing a regional permitting process to manage the development of an environmentally sound and economically sustainable aquaculture industry in federal waters of the Gulf of Mexico. The primary goal of the proposed aquaculture permitting program is to increase the maximum sustainable yield and

optimum yield of federal fisheries in the Gulf of Mexico by supplementing the harvest of wild-caught species with cultured products. Although the Aquaculture FMP has been approved, it has not been implemented. Implementation regulations are currently being finalized for the Aquaculture FMP.

If the Aquaculture FMP is implemented, up to 20 offshore aquaculture operations would be permitted in the Gulf over the next 10 years, with an estimated annual production of up to 64 million pounds (NOAA 2015). The plan prohibits shrimp farming and only allows the raising of native Gulf species.

Various state agencies are responsible for regulating recreational, commercial, and aquaculture activities within state waters, including the Florida Fish and Wildlife Conservation Commission, Florida Department of Environmental Protection, Florida Department of Agriculture and Consumer Service Division of Aquaculture; Alabama Department of Conservation and Natural Resources Marine Resources Division; Mississippi Department of Environmental Quality; Mississippi Department of Marine Resources; Mississippi Department of Agriculture and Commerce; Mississippi Department of Wildlife, Fisheries, and Parks; Louisiana Department of Wildlife and Fisheries; and Texas Parks and Wildlife Department. These agencies manage, monitor, and regulate commercial fisheries and aquaculture within their state waters. The agencies' activities include licensing and permitting activities and operations; leasing of coastal submerged land for aquaculture; setting of catch limits, quotas, and seasons; regulation of harvesting and processing; and provision of technical assistance.

As described on its website, the Gulf States Marine Fisheries Commission was established by an act of Congress (P.L. 81-66) in 1949 as a compact of the five Gulf states. Its charge is "to promote better utilization of the fisheries, marine, shell and anadromous, of the seaboard of the Gulf of Mexico, by the development of a joint program for the promotion and protection of such fisheries and the prevention of the physical waste of the fisheries from any cause." The Commission is composed of three members from each of the five Gulf states. Those members include the head of the marine resource agency of each state, a member of the legislature, and a citizen with knowledge of marine fisheries appointed by the governor.

6.6.4.10 Tourism and Recreation

The tourism industry in the Gulf region offers a wide variety of activities such as golfing, gambling, beach recreation, boating, ecotourism (wildlife watching, birding, visiting parks, beaches and wildlife refuges, and scenic viewing), hunting, and fishing. Many of these activities are directly dependent upon the coastal ecosystems of the Gulf of Mexico. Access to the waters, beaches, wildlife, and scenic views in each of the five Gulf states supports a multibillion dollar regional tourism industry (Gulf Coast Ecosystem Restoration Task Force 2011). Examples of actions considered in this cumulative action category are found in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis.

Efforts to promote and increase tourism in the Gulf states include marketing and advertising incentives, casino resort development, wildlife and cultural festivals, and golf tournaments. There are activities for increasing and diversifying passive recreation and tourism in the Gulf. These activities include birding, wildlife viewing, cultural heritage enjoyment, and water trails that can be traversed by canoe or kayak.

6.6.5 Cumulative Impact Analysis (Step 4)

The following section and associated tables describe the cumulative impacts of the alternatives being considered when combined with other past, present, and reasonably foreseeable future actions. The analysis below considers the impacts of the cumulative action categories and their corresponding actions identified above and in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis. The analysis recognizes that in most cases the contribution to the cumulative impacts for a given resource from implementing the action alternatives would be difficult to discern at a broad programmatic level across the Gulf of Mexico, given the context and intensity of impacts from the other past, present, and future actions. In many situations, implementing one of the action alternatives would likely help reduce overall long-term adverse impacts by providing a certain level of offsetting benefits, especially when considered in concert with other actions of similar nature (e.g., stewardship programs or non-NRDA restoration). The cumulative impact analysis is evaluated by affected resource.

There are several ways in which effects may come together to result in cumulative effects. For purposes of the following analysis, cumulative effects have been identified and may fall under one or more of four categories:

- **Additive adverse or beneficial effect.** Occurs when the negative or beneficial impact on a resource adds to effects from other actions.
- **Synergistic (interactive) adverse effect.** Occurs when the net adverse impact on a resource is greater than the sum of the adverse impacts from individual actions (this could also result in a different type of impact than the impact of the individual impacts; e.g., increased temperature discharges in water when added to increased nutrient loading can result in reduced dissolved oxygen).
- **Synergistic (interactive) beneficial effect.** Occurs when the net beneficial impact on a resource is greater than the sum of the benefits from individual actions (this could also result in a different type of impact than the impact of the individual impacts).
- **Countervailing effect.** Occurs when the overall net effect of two or more actions, when combined, is less than the sum of their individual effects.

In the following sections, the analysis is organized by resource and alternative. The analysis follows the pattern below:

- Direct and indirect effects of the proposed action (X).
- Impacts to the resources from applicable past, present, and reasonably foreseeable future actions (Y).
- Potential cumulative impacts of the alternative and applicable actions on an affected resource (Z), where the effects may interact and be additive; more simply, X + Y = Z.

6.6.5.1 Physical Environment

The nearshore marine environment in the northern Gulf of Mexico comprises the coastline and the inner continental shelf, extending to depths of 600 feet. The offshore marine environment consists of portions of the Gulf of Mexico that are more than 600 feet deep, including the outer shelf, continental slope, and abyssal plain. Coastal transition areas typically include tidally influenced areas (e.g., marshes, estuaries, and coastal wetlands). Finally, upland environments are those habitats that are adjacent to coastal transition areas but are not subject to a tidal regime or regularly inundated by water.

Construction and operation of energy and mining facilities (offshore and onshore); marine transportation facilities; commercial, industrial, and residential development in coastal habitats; and corridor improvements (hereinafter "ongoing activities") are detailed in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis. These actions may alter, damage, or destroy elements in physical resources through impacts including water quality degradation, substrate disturbances, and conversion of habitats to residential, commercial, or industrial uses or other human disturbances. There are also many environmental stewardship and restoration projects that have occurred or are underway in the region that may affect physical resources (see Appendix 6.B).

The northern Gulf of Mexico region includes upland surface soils, subsurface rock features, and submerged coastal and oceanic sediments. Sediment resources are particularly important along the areas dominated by deltaic processes (e.g., Mississippi River Delta), and where land building and erosion are dynamic and dependent on the availability of sediment resources.

Gulf Coast hydrology and water quality are mainly affected by freshwater inputs (from inland waters of the Gulf of Mexico watershed) and the movement of saltwater. The quantity and rate of freshwater inputs through contributing rivers can be altered by a number of natural and anthropogenic factors such as changes in rainfall and land cover; flood control practices; spillway operation; navigation structures such as locks, dams, weirs, and other water control structures; consumption of freshwater by agriculture, municipal, and industrial interests; and the development of stormwater infrastructure. Freshwater inflows to the northern Gulf of Mexico contribute nutrients, sediments, and pollutants from upstream agriculture, stormwater runoff, industrial activities, and wastewater discharges. The influx of these constituents is further affected by currents and surface winds. In addition, the nearshore environment, including tidal marsh areas, has been physically modified (e.g., through channelization and canal construction), allowing saltwater intrusion, which affects both surface and subsurficial ground water resources. These alterations can affect the influx of freshwater into the northern Gulf of Mexico; this in turn alters salinity regimes in nearshore areas, potentially increasing the frequency and magnitude of hypoxic events. On balance, the inflow of freshwater provides the freshwater and sediment inputs necessary for maintaining healthy nearshore salinity regimes and coastal landscapes, and offshore currents generally improve water quality through mixing and dilution. However, offshore currents can also serve as a conduit for pollution that can contribute to water quality degradation.

All of the Gulf Coast counties meet the National Ambient Air Quality Standards (NAAQS) for nitrogen dioxide, sulfur dioxide, carbon monoxide, particulate matter, and lead. However, the Houston-Galveston-Brazoria area has been listed by EPA as in nonattainment for existing ozone standards (EPA 2015; IPCC 2013). Large increases in natural gas production in the Gulf Coast region helped contribute to an increase in calculated 2012 CH_4 emissions in recent years (EPA 2015). National emissions in 2013

totaled 6,673 million metric tons (Mt) CO_2 Eq. This was a 2.0 percent increase from 2012 (EPA 2015). Globally, GHG emissions reached 31,734 Mt CO_2 Eq. per year in 2012 (IEA 2014).

Noise levels in areas of the Gulf Coast region are affected by a number of ongoing activities (Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis). The primary sources of terrestrial noise in the coastal environment are transportation- and construction-related activities. In the marine environment, sounds are also introduced from marine transportation, military activities, energy development, and mineral-related activities (e.g., oil and gas exploration, drilling, and production), among others.

Alternatives A and B include all of the previously discussed restoration approaches that are included in the wide-ranging Restoration Types: restoration of wetlands, coastal, and nearshore habitats, federal lands, water quality, fish, sturgeon, sea turtles, SAV, marine mammals, birds, mesophotic and deep benthic habitats, oysters, and recreational opportunities. Alternative C could include the Restoration Types identified for Alternatives A and B, but also could include refinements to those Restoration Types or a change in focus across the Restoration Types.

For restoration approaches targeting creation, restoration, and/or enhancement of coastal habitats, impacts to physical resources are generally anticipated to be adverse in the short term and long term due to construction activities and beneficial in the long term due to restoration of sustainable and resilient coastal systems. Adverse impacts would be minimized by best practices. The long-term benefits to the physical resources outweigh the short-term, minor impacts and include restored freshwater flows, sediment, and nutrient loads; restored sediment dynamics and deltaic processes; and overall coastal resiliency.

Several restoration approaches focus on species or groups of species, such as reef and highly migratory pelagic fish, the Gulf sturgeon, sea turtles, birds, and marine mammals. Impacts to physical resources for these approaches are fewer, of smaller intensity, and localized in comparison to habitat restoration. Short-term, minor adverse impacts for species-directed approaches may include 1) localized sediment/substrate disturbances due to actions such as marine debris removal or installation of signs or buoys to reduce trespass and 2) air quality and/or ambient noise impacts due to increased vehicle emissions. The benefits to the physical environment as a result of these restoration actions are typically minor and include ocean and shoreline improvements due to removal of marine debris and minor improvements to water and air quality due to reduced or restricted development.

Under Alternative D, No Action, no restoration under NRDA beyond Early Restoration projects would occur. Past, present, and reasonably foreseeable future actions described above would be expected to continue. As described above, impacts of these other actions would include soil compaction and removal, reduced soil stability, soil contamination, rutting, removal of substrates, and erosion. Countervailing impacts associated with reduced erosion or increasing sediment availability from restoration, conservation, and recovery efforts associated with other environmental stewardship and restoration activities in the Gulf of Mexico would also occur.

Based on information available for this analysis, Alternatives A, B, and C are not expected to contribute substantially to short-term or long-term cumulative adverse impacts to physical resources when analyzed in combination with other past, present, and reasonably foreseeable future actions.

Alternative C would delay and may reduce benefits to physical resources. Alternative D would not contribute to long-term restoration benefits to physical resources and would contribute to degradation of physical resources in the northern Gulf of Mexico ecosystem. Where appropriate, regional or site-specific cumulative impact analyses would be conducted in documents tiering from the PDARP/PEIS to address potential impacts in more detail.

6.6.5.2 Biological Resources

Biological resources include habitats, as well as the plant and animal species (living coastal and marine resources) that utilize those habitats. Habitats of the northern Gulf of Mexico injured by the spill are described in Chapter 3, Ecosystem Setting, and include habitats important for protected species that are subject to other stressors (e.g., SAV is considered a sensitive, protected habitat that has declined and provides foraging for listed sea turtles).

The biota of the northern Gulf of Mexico ecosystem are an interconnected fabric of linked habitats, including nearshore intertidal marshes, mangroves, submerged aquatic vegetation, sand beaches, and oyster reefs; the estuarine, shelf, and offshore water column (including the highly productive *Sargassum* habitat); and soft-bottom habitats, mesophotic reefs, and deep sea corals. The resources and habitats of the northern Gulf of Mexico are linked through physical processes and biological relationships. These habitats provide key functions and resources required by the high diversity of plants and animals that depend on these habitats and their interconnections. Impacts to one habitat may result in cascading effects on an array of other habitat types. For example, development in coastal transition zones may increase the volume and rates of stormwater runoff and result in excessive sedimentation in receiving water bodies, which could adversely affect biota.

The northern Gulf of Mexico is home to a host of living coastal and marine resources that include a diversity of plant and animal species. The movement of species between habitats is an important ecological characteristic of the northern Gulf ecosystem. Certain species utilize a variety of habitats for portions of their life cycle (e.g., many juvenile fish Gulf species utilize estuaries until they reach maturity, when they migrate to the open waters of the Gulf of Mexico). Other species, such as migratory birds, spend only part of the year in the Gulf Coast. Some species spend the vast majority of their life cycle in a single habitat type (e.g., oysters on a reef) and may be more vulnerable to habitat destruction than other species that utilize this habitat type intermittently.

Impacts to northern Gulf of Mexico habitats from past, present, and reasonably foreseeable future actions, as described above, would also affect those living coastal and marine resources that rely on them. Actions that reduce/degrade habitat or increase/restore habitat would have corresponding impacts to the species that use those habitats.

As discussed above, Alternatives A and B include all of the previously described restoration approaches that are included in the wide-ranging Restoration Types: restoration of wetlands, coastal, and nearshore habitats, federal lands, water quality, fish, sturgeon, sea turtles, SAV, marine mammals, birds, mesophotic and deep benthic habitats, and oysters, as well as recreational opportunities. Alternative C could include the Restoration Types identified for Alternatives A and B, but also could include refinements to those Restoration Types or a change in focus across the Restoration Types.

Most Alternative A and Alternative B restoration approaches are anticipated to result in short-term, minor to moderate adverse impacts to habitat as a result of construction activities. Adverse impacts could include increased soil erosion, vegetation damage or removal, changes in water quality from turbidity and substrate disturbance from in-water work, and the potential introduction or opportunity for establishment of invasive species.

Alternatives A and B have the potential to result in long-term, minor to moderate adverse impacts to habitats adjacent to new breakwaters or other shoreline protection structures because they could change natural current patterns and sediment accretion and erosion rates, alter availability of invertebrate prey, and cause changes to erosion in offsite locations. Long-term, minor to moderate adverse impacts may also occur from habitat restoration where one habitat type is permanently converted to another target habitat type (e.g., displacement of unvegetated open water habitat to restore wetlands or oyster reefs). Since the restoration approaches under Alternatives A and B focus on restoring or protecting natural resources, the northern Gulf of Mexico is expected to largely experience long-term beneficial impacts through improved health, stability, and resiliency of habitats, including sensitive habitats such as wetlands, barrier islands, areas of SAV, and reefs. These restoration approaches could help re-establish native plant communities, stabilize substrates, support sediment deposition, strengthen shorelines, and reduce erosion, among other habitat improvements.

Under Alternative C, the allocation of funding to restoration could be substantially less because injury assessment costs would reduce the total amount available for restoration. As a result, it would be expected that less restoration would occur, and correspondingly fewer environmental consequences, particularly fewer beneficial impacts, associated with that restoration implementation would also result.

Past, present, and reasonably foreseeable future actions described above for the No-Action Alternative would be expected to continue. As described above, activities including energy and mining, coastal development and land use, military activities, and marine transportation would result in short- and long-term adverse impacts to habitats, including habitat degradation through reduced quality (e.g., reduced water quality or introduction of invasive species), habitat fragmentation, and habitat loss. Construction activities from habitat restoration and conservation and recovery efforts associated with other environmental stewardship and restoration activities would also contribute to short-term adverse impacts. However, countervailing beneficial impacts from habitat restoration and conservation and recovery efforts associated with other environmental stewardship and restoration activities in the Gulf of Mexico would also occur. These actions would likely create new or restore degraded habitats, protect habitats from fragmentation, and preserve unaffected quality habitats, especially sensitive habitats.

Based on information available for this analysis, Alternatives A, B, and C are not expected to contribute substantially to short-term or long-term cumulative adverse impacts to biological resources when analyzed in combination with other past, present, and reasonably foreseeable future actions. Alternative C would delay and may reduce benefits to biological resources. Alternative D would not contribute to long-term benefits of restoring biological resources. Where appropriate, regional or site-specific cumulative impact analyses would be conducted in documents tiering from the PDARP/PEIS to address potential impacts in more detail.

6.6.5.3 Socioeconomics

As described in the affected environment sections of this document, millions of people live, work, and recreate in the northern Gulf of Mexico region and, therefore, rely on the natural and physical resources the Gulf's environment provides. Land use in the region comprises a heterogeneous mix of industrial activities (manufacturing, marine, shipping, agricultural, and petrochemical industry activities), recreation, and tourism. Land management for conservation purposes also occurs at the federal, state, and local government levels, as well as on private lands.

People have lived in the coastal region of the Gulf of Mexico for more than 10,000 years. Today many unique and diverse cultures call the Gulf Coast home. These cultures, past and present, are often closely linked to the environmental and natural resources that make up the Gulf Coast ecosystem, which these restoration approaches seek to help restore. Cultural resources encompass a range of traditional, archeological, and built assets. Historic properties in the affected coastal communities date from both the prehistoric and historic periods.

Commercial fisheries represent a multibillion dollar industry in the northern Gulf of Mexico and have traditionally included finfish, shrimp, oysters, and crabs. State, federal, and international agencies regulate fishery resources within their jurisdictions. NOAA (2015) defines aquaculture as "…breeding, rearing, and harvesting of animals and plants in all types of water environments including ponds, rivers, lakes, and the ocean." The Census of Aquaculture targets "all commercial or noncommercial places from which $1,000 or more of aquaculture products were produced and either sold or distributed during the census year" (USDA & NASS 2005). Noncommercial operations include federal, state, and tribal hatcheries (USDA & NASS 2005).

Construction and operation of energy and mining facilities (offshore and onshore); marine transportation facilities; commercial, industrial, and residential development in coastal habitats; and corridor improvements (hereinafter "ongoing activities") are detailed in Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis. There are also many environmental stewardship and restoration projects that have occurred or are underway in the Gulf Coast region that may affect socioeconomics (see Appendix 6.B).

Provision of public health and safety can be complicated by large storm events such as tropical storms and hurricanes (and associated storm surges, winds, and battering waves) that have historically caused extensive damage to the shoreline as well as infrastructure such as roadways, bridges, and buildings. The Gulf's coastal communities are at increased risk for severe shoreline damage and storm surges. In addition, construction activities and increased human uses of resources can also pose risks to public health and safety.

Taken together, ongoing and likely future actions in the northern Gulf of Mexico provide benefits to a number of socioeconomic resources while also adversely affecting other resources, including commercial fisheries and recreation.

Under Alternatives A and B, proposed restoration approaches specifically directed at restoring, enhancing, and conserving resources and habitats in the northern Gulf of Mexico ecosystem would be undertaken. Alternatives A and B are anticipated to include wide-ranging restoration approaches,

including restoration of wetlands, coastal, and nearshore habitats; federal lands; water quality; fish; sturgeon; sea turtles; marine mammals; birds; mesophotic and deep benthic habitats; and oysters; as well as recreational opportunities. Few, if any, major adverse impacts to socioeconomic resources are expected to result from the restoration approaches. For example, potential major adverse socioeconomic impacts include impacts to landowners in the immediate areas of diversions implemented to restore and preserve Mississippi-Atchafalaya River processes. Barrier removal to restore sturgeon spawning habitat may result in minor to major adverse socioeconomic- impacts to the water supply for agriculture or municipal uses, transportation, flood protection, and hydropower supply, depending on the size and designated use of the barrier that is removed. In addition, many of the restoration approaches have potential for minor to moderate long-term adverse impacts on fishing and other recreational activities due to changes such as use of alternative gear, repose, quota shifting, or restrictions on areas available for activities. Voluntary incentivized participation in restoration approaches such as reduced trapping or fishing would at least partially mitigate the adverse impacts of reduced income for individuals. Industries such as shipping and energy could be affected if noise restrictions are enacted. Construction activities associated with the restoration approaches may result in short-term limitations on public access, resulting in economic impacts due to reduced visitation and spending.

Numerous socioeconomic benefits are expected to result from the restoration approaches included in Alternatives A and B. Over the long term, restoration approaches will improve the health of wildlife and fish populations, which in turn leads to increased opportunities for wildlife viewing and fishing. Regional economic benefits are expected as a result of increased tourism and recreation due to restoration of barrier islands and beaches and other important habitats. In addition, construction associated with the restoration approaches will result in short-term regional economic benefits due to increased employment and spending. Finally, the restoration approaches will provide a very important socioeconomic benefit by reducing the risk of potential hazards, such as storm surges, and improving shoreline integrity.

Under Alternative C, the allocation of funding to restoration could be substantially less because injury assessment costs would reduce the total amount available for restoration. As a result, it would be expected that less restoration would occur, and correspondingly fewer environmental consequences associated with that restoration—particularly fewer beneficial impacts—would result.

Other past, present, and reasonably foreseeable future activities described above under the No-Action Alternative would be expected to continue. As described above, current and future activities such as those related to ongoing coastal development and land use, commercial and recreational fishing and aquaculture, tourism, marine mineral mining, and energy development, as well as construction activities associated with stewardship, NRDA, and non-NRDA restoration activities, would result in adverse and beneficial effects on local economies. These impacts would depend on regional economic conditions, the types of activities occurring, their economic impacts, and their location with respect to regional economies.

Based on information available for this analysis, Alternatives A, B, and C are not expected to contribute substantially to short-term or long-term cumulative adverse impacts to socioeconomics when analyzed in combination with other past, present, and reasonably foreseeable future actions. Alternative C would

delay and may reduce benefits to socioeconomics. Alternative D would not contribute to long-term benefits to recreational use and employment anticipated under Alternatives A, B, and C. Where appropriate, regional or site-specific cumulative impact analyses would be conducted in documents tiering from the PDARP/PEIS to address potential impacts in more detail.

Executive Order 12898 (February 11, 1994) states that, to the greatest extent practicable, federal agencies must "identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." As described in Section 6.16, environmental justice considerations will be conducted in documents that are tiered from this Final PDARP/PEIS.

Chapter 7, Governance, describes a process by which periodic reviews will be conducted to evaluate the status of the PEIS and determine if supplements are necessary as a result of changing conditions. Should significant changes in the affected environment occur that render the current analysis inaccurate, a supplemental analysis may be conducted. This may include changes to the cumulative impacts analysis.

6.7 Comparison of Environmental Consequences of Alternatives

This section focuses on a comparison of the environmental consequences of the alternatives, with consideration of the direct, indirect, and cumulative impact analyses presented above. It begins with a summary of impacts for Alternative C and focuses on comparing Alternatives A and B. At this programmatic level, the Trustees find that the most meaningful distinction between the alternatives derives from the differences in environmental benefits, specifically the benefits to injured resources. Since analysis under OPA must consider the benefits of restoration alternatives to injured resources, it is helpful to refer to the OPA comparison of alternatives in Chapter 5, Section 5.9. That analysis is included here where it informs the NEPA analysis.

Under Alternative C, the Trustees would continue assessing injuries and defer development of a comprehensive restoration plan. Since the specific emphasis among Restoration Types and description of approaches would not be fully developed until the restoration plan is developed, an analysis of potential adverse environmental consequences of this alternative is not provided here. Alternative C would result in a delay of restoration implementation and in less available funding for restoration planning and implementation. Thus, Alternative C would not be as successful as Alternative A or B in meeting the Trustees' goals for returning the injured natural resources and services to baseline and/or compensating for interim losses.

The No-Action Alternative (Alternative D) does not meet the Trustees' goals and clearly does not provide the significant environmental benefit to injured natural resources and services that would occur through active restoration.

The Trustees next considered the comparative environmental impacts of Alternatives A and B. As described in Chapter 5, Section 5.9, Comparative OPA Evaluation of Action Alternatives, both action alternatives are composed of a restoration portfolio that 1) meets the four programmatic goals of benefiting habitat, water quality, living coastal and marine resources, and recreational use; 2) includes the Restoration Types identified based on injury; and 3) distributes that restoration across the five states, federal lands, and nearshore and offshore waters (see Chapter 5, Section 5.3.1, Programmatic Trustee Goals). Additionally, the alternatives meet the fifth goal by including monitoring, adaptive management, and adaptive management for unknown conditions. The Trustees would also factor in contingencies to address future unknown conditions, given the unprecedented scale of restoration required and the number of years that it will take to implement this plan.

Since Alternatives A and B are based on the same Restoration Types, the detailed analysis of restoration approaches in Section 6.4, Evaluation of Environmental Consequences of Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative), also serves as the detailed environmental impact analysis of the restoration approaches that make up Alternative B. However, Alternatives A and B differ in their emphasis. Alternative A emphasizes coastal habitat restoration and ecological interconnectivity. Alternative B emphasizes restoration of living coastal and marine resources.

Alternative A (Comprehensive Integrated Ecosystem Restoration) will employ an ecosystem approach toward implementing restoration with the intent of enhancing and strengthening the connectivity and productivity of habitats and resources, which will help sustain restoration gains over the long term. This

alternative emphasizes restoration of highly productive coastal habitats, which provide food and shelter for a wide array of resources affected by the spill. It explicitly recognizes the importance of coastal habitats to the physical and biological interconnectivity of the northern Gulf of Mexico ecosystem and is more likely than Alternative B to address both documented and reasonably inferred but unquantified injuries. The recognition of the key role of coastal habitats helps ensure that multiple resources will benefit from restoration and that reasonably inferred but unquantified injuries are likely to be addressed. To achieve the desired portfolio of restoration approaches, the emphasis on coastal habitat restoration will be complemented by additional restoration for living coastal and marine resources and recreational uses to ensure full compensation for all injured resources. This combination of implementing restoration across resource types and emphasizing coastal habitat restoration plus robust monitoring and adaptive management creates a restoration portfolio that maximizes the likelihood of providing long-term benefits to resources and services injured by the spill. This alternative also emphasizes restoring habitats in combination with one another to achieve multiple, and potentially synergistic, benefits and considers restoration approaches that can produce large-scale benefits across multiple resources to support resiliency and sustainability.

Alternative B would implement more direct, resource-specific restoration, shifting the restoration emphasis from the goal Restore and Conserve Habitats to the goal Replenish and Protect Living Coastal and Marine Resources. However, since Alternative B emphasizes living coastal and marine resources and correspondingly reduces the emphasis on coastal habitat restoration, the Trustees are less certain that it would provide as much benefit for the reasonably inferred but unquantified injuries summarized in Chapter 4, Section 4.11, Injury Assessment, Summary and Assessment of Findings. The strong, but indirect ecological linkages between habitats and species injured by the spill would be ancillary, rather than primary, benefits under Alternative B.

Alternative A provides more certainty of achieving environmental benefits in the northern Gulf of Mexico, as it provides more certainty that benefits to ecosystem linkages will occur and will restore for reasonably inferred but unquantified injuries. This analysis under NEPA closely corresponds to the alternatives analysis under OPA, and informed the Trustees' identification of Alternative A as preferred.

6.8 Cooperating Agencies

NOAA is the lead federal Trustee for preparing the DWH Final PDARP/PEIS and has invited all Trustees (see Section 1.2 for a list of designated Trustees) to act as cooperating agencies pursuant to NEPA (40 CFR § 1508.5). The federal Trustees intend to adopt this PEIS. This document is prepared in accordance with 40 CFR §§ 1500–1508, *CEQ's Regulations for Implementing NEPA, NOAA Administrative Order Series 216-6 Environmental Review Procedures for Implementing the National Environmental Policy Act*. Correspondence relating to cooperating agencies is included in Appendix 6.C, Trustees' Correspondence.

Cooperating Agency

"Means any Federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major Federal action significantly affecting the quality of the human environment. The selection and responsibilities of a cooperating agency are described in Section 1501.6. A State or local agency of similar qualifications or, when the effects are on a reservation, an Indian Tribe, may by agreement with the lead agency become a cooperating agency" (40 CFR § 1508.5).

6.9 Compliance with Other Applicable Authorities

In addition to the requirements of OPA and NEPA, requirements of other laws may apply to the Final PDARP/PEIS. The Trustees will ensure compliance with these relevant authorities. The authorities described below are most relevant to future proposed actions in subsequent restoration plans. Whether and to what extent an authority applies to a future project depends on the specific characteristics of a particular project, among other things.

The authorities listed below are the most commonly relevant to Trustees' restoration actions. An expanded list of federal laws and regulations is included in Appendix 6.D, Other Laws and Executive Orders.

6.9.1 Endangered Species Act

The purpose of the ESA is to conserve endangered and threatened species and the ecosystems upon which they depend. The ESA directs all federal agencies to utilize their authorities to further these purposes. Section 7(a)(1) requires federal agencies, in consultation with NMFS and USFWS, to carry out programs for conservation of listed species. Restoration under this program is likely to further the conservation of listed species.

Section 7(a)(2) of the ESA requires every federal agency, in consultation with and with the assistance of the Secretaries of the Interior and Commerce, to ensure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. Section 9 of the ESA and regulations issued pursuant to Section 4(d) of the ESA prohibit the take of listed species unless exempted by the NMFS or USFWS. To "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect listed species. This prohibition applies to federal and nonfederal parties. It is anticipated that at least some of the restoration projects may result in take. An incidental take statement (ITS) is included in formal consultations and exempts an action agency from Section 9 prohibitions as long as the action agency complies with the reasonable and prudent measures and terms and conditions of the ITS.

Information on threatened and endangered species and critical habitat designations under NMFS jurisdiction in the Gulf of Mexico is available at *http://sero.nmfs.noaa.gov/protected_resources/section_7/threatened_endangered/Documents/gulf_of_mexico.pdf* and *http://sero.nmfs.noaa.gov/maps_gis_data/protected_resources/critical_habitat/index.html*.

Information on threatened and endangered species and critical habitat designations under USFWS jurisdiction in the Gulf of Mexico is available from the following links: *http://ecos.fws.gov/ecp/*, *http://www.fws.gov/ecological-services/*, and *http://ecos.fws.gov/crithab/*.

To comply with the ESA on future project-specific actions, a federal Trustee, on behalf of the implementing trustee(s) when necessary, will serve as the action agency to initiate ESA consultations and conferences with USFWS and/or NMFS on proposed projects or groups of projects that may affect

listed and proposed species and their designated or proposed critical habitats. The Trustees will develop a list of species and critical habitats that may be affected by each proposed project or group of projects, document the types of potential impacts from the proposed project to listed and proposed species and designated critical habitats, incorporate applicable practices from Appendix 6.A (Best Practices) of this Final PDARP/PEIS, and—where necessary—propose additional project-specific avoidance and minimization measures. Based on this information, projects or groups of projects will be analyzed to determine if they 1) would have no effect on listed species, species proposed for listing, or designated or proposed critical habitat (together, "listed resources"); 2) may affect, but are not likely to adversely affect, listed resources; or 3) are likely to adversely affect listed resources.

Conference is a process of early interagency cooperation involving informal or formal discussions between a federal agency and USFWS and/or NMFS pursuant to Section 7(a)(4) of the ESA regarding the likely impact of an action on proposed species or proposed critical habitat. Although conferences are only required by the ESA statute for proposed federal actions that are likely to jeopardize proposed species or result in destruction or adverse modification of proposed critical habitat, the Trustees will conference on proposed actions that may affect proposed species and proposed critical habitats in order to minimize or avoid adverse effects on listed species and to streamline ESA authorizations once the proposed species is listed and/or critical habitat is designated.

The status of these ESA consultations and conferences, including required conservation measures and/or best practices and design criteria, where applicable, will be included in final subsequent restoration plans prepared consistent with this Final PDARP/PEIS (see Section 6.17, NEPA Considerations and Tiering Future Restoration Planning). A project form was established in DWH Early Restoration Phase IV to streamline information needed for consultation with USFWS and NMFS. A current version of this form can be similarly used to streamline information collection for both USFWS and NMFS for future projects.

The Trustees must comply with the procedural obligations of Section 7 of the ESA (see Chapter 7, Section 7.3, Restoration Planning). If the Trustees determine a project has No Effect on ESA-listed species and their critical habitat, this determination should be documented and retained in project records. If a Federal action agency determines that the action is not likely to adversely affect listed species or designated critical habitat, initiates consultation, and NMFS or USFWS concurs, Section 7 consultation is complete.

If NMFS or USFWS does not concur, then the federal action agency (representing the implementing Trustee(s) when necessary) will initiate formal consultation for actions likely to adversely affect a listed species or designated critical habitat. NMFS or USFWS will provide a biological opinion that includes an ITS. This ITS provides an exemption to take, and requires the action agency to implement nondiscretionary terms and conditions. The federal action agency ensures these terms and conditions are met, coordinating with the implementing Trustee as appropriate. If NMFS or USFWS determines that the project is likely to jeopardize listed species or destroy or adversely modify critical habitat, NMFS or USFWS will provide reasonable and prudent alternatives (RPAs) that will allow the project to proceed without likely jeopardy or adverse modification. It is possible that an individual project may result in jeopardy or adverse modification of critical habitat and would thus need to be modified through an RPA that avoids jeopardy and adverse modification or would need to be abandoned altogether. The Trustees

have initiated programmatic ESA consultation with NMFS and USFWS (Appendix 6.C.5). Program-level consultation, resulting in a programmatic biological opinion, examines the effects of a program on ESA-listed species and their critical habitat. It also provides an analysis that can be tiered from during future ESA consultations. Programmatic biological opinions offer pathways for streamlining large numbers of projects that require ESA consultation (as described above) by providing a consistent framework for submitting individual projects or groups of projects.

This Final PDARP/PEIS is not proposing to identify or select specific projects for implementation, and consultations with USFWS and NMFS would occur as part of subsequent restoration planning. In 2015, NMFS and USFWS established new rules for programmatic consultations,[9] and the Trustees are seeking a framework programmatic consultation with both USFWS and NMFS. In particular, the Trustees have been coordinating with NMFS to determine if project design criteria for restoration activities might be available for consideration in future consultations (see Appendix 6.A.2).

6.9.1.1 Projects with Existing Consultations

A project that could be proposed as part of future restoration planning might have a completed ESA consultation that was initiated by another action agency before being tiered from this Final PDARP/PEIS.

For species under NMFS jurisdiction, the Trustees will initiate a new consultation but may rely on the analysis in the previously completed consultation after determining that 1) no new species or critical habitats have been proposed, listed, or designated; 2) the proposed action has not changed in a manner or to an extent that might affect a proposed or listed species or proposed or designated critical habitat in a manner or to an extent not previously considered; and 3) no newly available information reveals that effects from the proposed action might affect species or critical habitats in a manner or to an extent not previously considered.

For species under USFWS jurisdiction, if USFWS determines that the project has not changed in scope, the pre-existing consultations will be reviewed to determine if the consultations are still valid. Specifically, projects will be reviewed to determine if 1) any new species or critical habitats have been proposed, listed, or designated; 2) the proposed action has changed in a manner or extent that might affect a proposed or listed species or proposed or designated critical habitat in a manner or to an extent not previously considered; or 3) if new information is available to reveal that effects from the proposed action might affect species or critical habitats in a manner or to an extent not previously considered. If any single criterion above is met, the consultation will be reinitiated, and, if necessary, a new consultation will be started.

If NMFS or USFWS determines that an existing consultation is not valid for a project, the Trustees will initiate a new consultation.

6.9.1.2 Section 10(a)(1)(A) Research Permits

The ESA and implementing regulations prohibit the take of species listed as endangered or threatened; however, Section 10(a)(1)(A) of the ESA allows NMFS and USFWS to issue permits to take species listed

[9] Framework and mixed programmatic consultations are described in the NMFS/USFWS May 11, 2015, ITS rule found here: *http://www.fws.gov/endangered/improving_ESA/pdf/Final%20ITS%20Rule%20Federal%20Register%205-11-2015.pdf.*

under the ESA for scientific purposes or to enhance the survival of the species. Permit issuance criteria require that research activities are consistent with the purposes and polices of the ESA and that such activities would not have a significant adverse impact on the species or stocks. In some circumstances, separate Section 10(a)(1)(A) authorization is not required if an ITS in a biological opinion exempts the project from the ESA's take prohibitions.

6.9.2 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) as amended in 1996 created a requirement for federal agencies to consult with the NOAA NMFS when their actions or activities may adversely affect habitat identified by federal regional fishery management councils or NMFS as EFH. It is important to note that projects with a positive net environmental outcome may require EFH consultation due to temporary or permanent impacts during construction or implementation. For example, EFH consultation would be required if one type of EFH is lost through conversion to another type of EFH during construction of a wetland restoration or habitat improvement project.

At its most basic, an EFH consultation consists of a federal agency providing NMFS with an EFH assessment and NMFS responding with EFH conservation recommendations, followed by the federal agency's written response to the recommendations. EFH consultation is required if the action may adversely affect EFH. Generally, a consultation begins when NMFS receives the federal action agency's EFH Assessment. An EFH Assessment is a critical review of the proposed project and its potential impacts to EFH. As outlined in the regulation, an EFH assessment must include 1) a description of the action, 2) an analysis of the potential adverse effects of the action on EFH and the managed species, 3) the federal agency's conclusions regarding the effects of the action on EFH, and 4) proposed mitigation, if applicable. If appropriate, the assessment should also include the results of an onsite inspection, the views of recognized experts on the habitat or species effects, a literature review, an analysis of alternatives to the proposed action, and any other relevant information. To help inform the EFH assessment process, project proponents can use the NOAA EFH Mapper to view spatial representations of EFH. The EFH Mapper can be accessed at *http://www.habitat.noaa.gov/protection/efh/efhmapper/.*

To comply with the MSFCMA, it is anticipated, most EFH consultations will occur with NMFS once projects are selected and when a sufficient level of detail and information are available to identify site-specific avoidance, minimization, or mitigation measures; determine effects; and develop EFH conservation recommendations. For each proposed project, EFH assessments will be submitted to NMFS with a request for consultation. Before consultation begins, EFH technical assistance can be requested from NMFS during the design, planning, and permitting stages. Refer to Appendix 6.A for best practices and to the NMFS Southeast Region EFH webpage for additional information (*http://sero.nmfs.noaa.gov/habitat_conservation/efh/index.html*).

Some projects that could be proposed as part of future restoration planning may have completed EFH consultation before being tiered from this Final PDARP/PEIS. In these instances, the pre-existing consultation may suffice and will be reviewed by the proponent action agency and NMFS to determine if the consultation is still valid. Reinitiating EFH consultation will generally not be required for projects unless the proposed activities adversely affect EFH in a manner or extent not previously considered.

6.9.3 Marine Mammal Protection Act

The Marine Mammal Protection Act of 1972 (MMPA) was enacted in response to increasing concerns among scientists and the public that significant declines in some species of marine mammals were caused by human activities. The MMPA established a national policy to prevent marine mammal species and population stocks from declining beyond the point where they ceased to be significant functioning elements of the ecosystems of which they are a part.

The Department of Commerce, through the NMFS, is charged with protecting whales, dolphins, porpoises, seals, and sea lions. Walrus, manatees, otters, and polar bears are protected by the Department of the Interior through USFWS. The MMPA established a moratorium on the taking of marine mammals in U.S. waters. It defines "take" to mean "to hunt harass, capture, or kill" any marine mammal or attempt to do so. The MMPA further defines "harassment" as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment) or has the potential to disturb a marine mammal or marine mammals stock in the wild by causing disruption of natural behavioral patterns (Level B harassment).

The MMPA generally prohibits take of marine mammals in U.S. waters by any person and by U.S. citizens in international waters. NMFS can authorize take for the following activities:

- Scientific research.
- Enhancing the survival or recovery of a marine mammal species or stock.
- Incidental take during commercial fishing operations.
- Incidental take during nonfishery activities.

Some of the restoration actions described in this PDARP/PEIS may result in directed (e.g., scientific research and monitoring) or incidental (e.g., entrapment or noise harassment from pile driving) take of marine mammals. Incidental takes are those that are unintentional, but not unexpected. NMFS issues two types of incidental take authorizations: the incidental harassment authorization (IHA) and the Letter of Authorization (LOA). See Table 6.9-1 below for more information.

Table 6.9-1. Decision tree for MMPA authorizations.

If your action has potential to	Then you should
Result in **"harassment"** only (i.e., injury or disturbance)	Apply for an Incidental Harassment Authorization[a] (effective up to 1 year)
Result in harassment only (i.e., injury or disturbance) **and** is planned for multiple years	Apply for a Letter of Authorization[a, b] (effective up to 5 years)
Result in **"serious injury"** or mortality	Apply for a Letter of Authorization[a, b] (effective up to 5 years)

[a] For activities that occur in Arctic waters where the activity has the potential to affect the availability of a species or stock of marine mammals for subsistence uses, your monitoring plan must be peer-reviewed.

[b] For a Letter of Authorization (LOA), NMFS must issue regulations. An LOA issued under associated regulations is appropriate for multiyear activities. These proposed actions must be well-planned with enough detailed information to allow for a robust analysis of the entire duration of the planned activity. Because an IHA can only be valid for 1 year and LOAs can be valid for up to 5 consecutive years, the rulemaking/LOA process may be used to reduce the administrative burden even when serious injury or mortality is not anticipated.

To facilitate compliance with the MMPA take provision, the Trustees will develop a systematic and efficient MMPA review process with the NMFS and/or USFWS. The process will include initial screening of restoration projects by the appropriate agency to evaluate whether an activity is likely to result in an incidental take. This review process will evaluate whether 1) the activity does not have the potential to result in an incidental take (e.g., land acquisition) and therefore MMPA authorization is not warranted; 2) incidental take is unlikely to occur due to the nature of the activity, and/or the activity implements best practices to avoid, prevent, or mitigate take and therefore MMPA authorization is not warranted; 3) incidental take is likely to occur, but if best practices are fully implemented to avoid, prevent, or significantly reduce the risk of take, an MMPA authorization may not be warranted; and 4) incidental take is likely to occur, and it is not possible to prevent or mitigate risk, therefore an IHA or LOA may be warranted. Trustees will not authorize restoration projects that have not completed the MMPA review and/or received MMPA authorization, if required. For planning purposes, the timing generally required for authorizations under MMPA is provided on NMFS website.[10] For IHAs, applications should be made six to nine months in advance of the intended project start date. Some IHAs may take longer to process. For rulemakings/LOAs, applications should be made at least 1 year before project start date, preferably. There are two outcomes of the ITA process; see Table 6.9-2 for more information.

[10] *http://www.nmfs.noaa.gov/pr/permits/incidental/#when*; accessed August 9, 2015.

Table 6.9-2. Two outcomes of the ITA process.

	Letter of Authorization (LOA)	Incidental Harassment Authorization (IHA)
MMPA Section	101(a)(5)(A)	101(a)(5)(D)
May Authorize	Harassment or mortality	Harassment only (Level A or B)
Structure	• Requires promulgation of regulations • Cleared through NOAA/DOC/Office of Management and Budget • Regulations valid for 5 years; once regulations are in place, LOA(s) may be issued • Process includes two comment periods for rulemaking (both 30 days), but none for annual LOAs	• No rulemaking • Cleared in NMFS Office of Protected Resources • IHAs valid for up to 1 year • Process includes one 30-day comment period
Processing Time	• Not prescribed by statute • Typically 12–18 months (variable based on complexity)	• 120 days by statute • Typically about 180 days

DOC = U.S. Department of Commerce.

Permits to conduct scientific research on marine mammals, or to enhance the survival or recovery of a species or stock, may be issued pursuant to Section 104 of the MMPA. These permits must specify the number and species of animals that can be taken and designate the manner (e.g., method, dates, and locations) in which the takes may occur. NMFS or USFWS must find that the manner of taking is "humane" as defined in the MMPA. The permit application must demonstrate that the taking will be consistent with the purposes of the MMPA and applicable regulations. NMFS has promulgated regulations to implement the permit provisions of the MMPA (50 CFR § 216) and provides application instructions, which prescribe the procedures (including the form and manner) necessary to apply for permits.

As future projects are considered for implementation, information will be shared from a project proponent to NOAA or USFWS through the use of a project form. This form provides an opportunity to include information about marine mammals that are covered under the ESA and MMPA and may be affected by a project. This early coordination will help ensure that the evaluations and actions proposed by the Trustees align with associated regulatory processes and considerations. For example, the issuance of an IHA, LOA, or scientific research permit (under MMPA) is a federal action subject to the requirements of NEPA, and it may be possible to include NMFS's or USFWS's NEPA considerations in the Trustees' planning process described in Chapter 7, Governance. With the information provided in the form, implementing Trustees will coordinate early with regulatory agencies to better understand project-level risks and impacts to marine mammals and potentially identify best practices to reduce those risks.

6.9.4 Coastal Zone Management Act

The goal of the Coastal Zone Management Act (CZMA) is to encourage states to preserve, protect, develop, and, where possible, restore and enhance the resources of the nation's coastal zone. The CZMA encourages coastal states to develop and implement comprehensive management programs for activities that balance the need for coastal resource protection with the need for economic growth and

development in the coastal zone. Coastal management plans developed by a coastal state must be approved by the Secretary of the U.S. Department of Commerce. Once a state's plan is approved, Section 307 of the CZMA, called the "federal consistency" provision, gives a state a strong role in federal agency decision-making for activities that may affect the coastal uses or resources of that state. The federal consistency provision is a major incentive for states to join the federal Coastal Zone Management Program and is a powerful tool that state programs use to manage coastal activities and resources and to facilitate cooperation and coordination with federal agencies.

Generally, "federal consistency" requires that federal actions, whether within or outside the coastal zone of a state, *that will have reasonably foreseeable effects* on any coastal use (land or water) or natural resource within a state's coastal zone be consistent with the enforceable policies of the state's federally approved coastal management program. This requirement is addressed through processes that provide for state review of a federal agency's determination of consistency with the relevant state's federally approved program. The "federal consistency" requirement is applicable to a wide range of federal actions but does *not* apply to every action or authorization of a federal agency. It is triggered when it is reasonably foreseeable that a proposed federal agency activity or federal license or permit activity will have an ''effect on any coastal use or resource'' (referred to as the "effects test"). "Effects" in this context is not limited to environmental effects; it includes effects on coastal uses. It also includes both direct and indirect (cumulative and secondary) effects that would result from the activity, even if occurring later or farther away, as long as those effects are still reasonably foreseeable (15 CFR § 930.11[g]).

Restoration actions proposed to be undertaken or authorized by federal agencies, including federal Trustees acting pursuant to OPA, are subject to review for "federal consistency" under the CZMA. Although the Final PDARP/PEIS does not propose any specific restoration actions or projects, it does outline and describe a programmatic structure that would serve as the Trustees' overarching "blueprint" under which project-specific restoration plans would be developed, proposed, and selected, with substantial and meaningful opportunities for public participation in that process. It includes elements that would establish and guide the development of such plans. It also identifies the responsibilities and principles that the Trustees would apply and follow, individually and collectively, at every level of planning, to govern and provide for fulfillment of their duty on behalf of the public to restore, replace, rehabilitate, and acquire natural resources or resource services that were lost, injured, or destroyed as a result of the DWH oil spill.

Although the PDARP/PEIS is programmatic in nature, the federal Trustees recognize that there are reasonably foreseeable effects on coastal uses and resources that would flow from adoption of the Final PDARP/PEIS. Further, federal and state agencies are encouraged to coordinate as early as possible in developing a proposed federal action under the CZMA regulations; guidance and procedures for federal and state agencies coordination, cooperation, and compliance with federally approved state coastal management plans under the CZMA are provided at 15 CFR § 930. Accordingly, the federal Trustees evaluated those reasonably foreseeable effects of the PDARP/PEIS for consistency with the federally approved coastal management programs in Texas, Louisiana, Alabama, Mississippi, and Florida and submitted a consistency determination for the PDARP/PEIS for state review coincident with public

review of this document on October 6, 2015 (Appendix 6.C.3). Each state reviewed the Trustees' consistency determination and each state concurred with that determination (Appendix 6.C.4).

6.9.5 National Historic Preservation Act

The National Historic Preservation Act of 1966 (NHPA), as amended in 2000 (16 USC § 470[w]), defines a historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register [of Historic Places]." Historic properties encompass built resources (e.g., bridges, buildings, and piers), landscapes, archeological sites, and traditional cultural properties (TCPs). TCPs are historic properties significant for their association with practices or beliefs of a living community that are both fundamental to that community's history and part of the community's cultural identity. These properties may be above ground, below grade, or submerged in waterways and include resources listed in, or eligible for listing in, the National Register of Historic Places (NRHP). Terrestrial cultural resources may include buildings, structures, sites, and objects. Cultural resources offshore may include shipwrecks, archeological sites, structures, or districts. Archaeological, architectural, and Native American resources are protected by a variety of laws and their implementing regulations.[11]

Although TCPs are typically associated with Native American culture, such historic properties also may be associated with other ethnic groups or communities. TCPs may vary between rural and urban areas and even within the same ethnic group. Research and contact with appropriate groups is part of the identification of TCPs.

The NRHP is the official federal list of historic properties and is maintained by the National Park Service (NPS). As of November 2011, more than 10 percent of the properties listed in the NRHP were located in the affected Gulf states (9,083 of the 86,255 properties). The NRHP is dynamic; the list is not comprehensive and does not include all properties that meet the criteria for significance and integrity. Listings are limited only to those historic properties that have been formally documented, nominated, and accepted for inclusion by the Keeper of the NRHP.[12]

All projects tiered from this PDARP/PEIS will be reviewed under Section 106 of the NHPA prior to any project activities that would restrict consideration of measures to avoid, minimize, or mitigate any adverse impacts on historic properties located within a project area. Projects will be implemented in accordance with all applicable federal and state laws and regulations, including those laws and regulations concerning the protection of cultural and historic resources.

[11] Federally, these include the NHPA as amended in 2000; the Archeological and Historic Preservation Act of 1974; the Archaeological Resources Protection Act of 1979; the American Indian Religious Freedom Act of 1978; the Native American Graves Protection and Repatriation Act of 1990; the Submerged Lands Act of 1953; the Abandoned Shipwreck Act of 1987; and the Sunken Military Craft Act. The Advisory Council on Historic Preservation) further guides treatment of archaeological and architectural resources through the Protection of Historic Properties (36 CFR § 800) regulations. Additional regulations and guidelines for shipwrecks include 10 USC 113, Title XIV. for the Sunken Military Craft Act and the Guidelines for Archaeological Research Permit Applications on Ship and Aircraft Wrecks under the Jurisdiction of the Department of the Navy.

[12] The NRHP includes historic properties that possess significance and integrity applying the National Register Criteria for Evaluation (36 CFR § 60[a–d]).

6.9.6 Coastal Barrier Resources Act

The Coastal Barrier Resources Act (CBRA) established the John H. Chafee Coastal Barrier Resources System, a defined set of geographic units along the Atlantic, Gulf of Mexico, Great Lakes, U.S. Virgin Islands, and Puerto Rico coasts. The CBRA restricts federal expenditures of funds for activities located within the Coastal Barrier Resources System unless those activities meet one of the listed exceptions under the CBRA. A federal agency proposing to spend funds within the Coastal Barrier Resources System must consult with USFWS to determine whether the proposed federal expenditure meets one of the CBRA exceptions or is otherwise subject to restrictions. USFWS will review future projects tiered from this PDARP/PEIS and subject to the CBRA and will engage in the intraservice consultation to confirm that exceptions to the CBRA's funding restrictions apply to those projects.

6.9.7 Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (MBTA) implements various treaties and conventions among the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under MBTA, unless permitted by regulations, it is unlawful to pursue; hunt; take; capture or kill; attempt to take, capture, or kill; possess; offer to sell or sell; barter; purchase; deliver; or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. USFWS regulations broadly define "take" under MBTA to mean "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR § 10.12).

Each future project tiered from this PDARP/PEIS will be reviewed by USFWS to ensure that take, pursuant to the MBTA, does not occur. The review process will include the project sponsor documenting species or groups of birds likely to be present in the project area and likely behaviors the birds would be exhibiting on or near the project site (i.e., breeding, nesting, feeding, foraging, resting, or roosting). If migratory birds may be present in a project area, avoidance measures (included in Appendix 6.A, Best Practices, and/or the project-specific sections of restoration plans tiered from this PDARP/PEIS) will be implemented to ensure that these birds (including parts, nests, eggs, or products) are not wounded or killed during construction or use of the project area. Avoidance measures, where applicable, will be described within each specific project description. Projects that will need to be implemented throughout several seasons will utilize best practices to discourage migratory birds from using an area during construction. Best practices will be coordinated between USFWS and the appropriate state Trustee agency. No future DWH PDARP/PEIS project will involve actions that the USFWS determines are expected to pursue, hunt, take, capture or kill migratory birds; attempt to take, capture or kill them; possess, offer for sale, sell, barter, purchase, deliver, ship, import or export them; or cause them to be shipped, exported, imported, transported, carried, or received.

6.9.8 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Bald and Golden Eagle Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb" (16 USC § 668[c]). For the purpose of this document, "disturb" means to agitate or

bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle; 2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior (50 CFR § 22.3). In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes, or is likely to cause, a loss of productivity or nest abandonment.

Eagles are not as sensitive to human disturbance during migration and wintering as they are while nesting. However, wintering eagles can congregate at specific sites year after year (i.e., established roost sites) for purposes of feeding and sheltering. Therefore, USFWS will review each future project tiered from this PDARP/PEIS to evaluate bald eagle status in the action area and determine if best practices (see Appendix 6.A) need to be put into place to avoid nonpurposeful "taking" or "disturbing" of bald eagles. Specifically, the review process will include the project sponsor documenting the presence or absence of known bald eagle nests or congregation/roosting sites. If nests or congregations are known, projects will be evaluated to determine if activities will be able to maintain a standard buffer distance (based on vegetation cover and nearby similar activities). If a standard buffer distance for project construction and the nest can be maintained, then the buffer distance will become a required best practice for project implementation. If a standard buffer distance cannot be maintained, then the sponsor will need to either alter the project or seek a nonpurposeful take permit. It is likely that any measures taken to protect bald eagles or other migratory birds will also protect golden eagles.

6.9.9 Clean Air Act

6.9.9.1 NEPA Review Under CAA Section 309

Under Section 309 of the Clean Air Act (CAA), EPA is authorized to review certain proposed actions of other federal agencies in accordance with NEPA and to make those reviews public. Based on a rating system established by the EPA Office of Federal Activities (OFA), EPA reviews each draft EIS to determine if there are unacceptable levels of environmental impacts from the proposed project or decision, as well as the adequacy of the information and public disclosure in the EIS. Upon review, EPA issues a rating of the environmental impacts and may make recommendations to the lead agency.

EPA's OFA reviewed the Draft PDARP/PEIS, and a rating of "LO," Lack of Objections, was issued on December 2, 2015. Based on its review, EPA:

- Noted the Trustees' commitment to consideration of project-specific impacts and mitigation in future plans that will tier from the PDARP/PEIS.
- Expressed support for the preferred alternative, noting consistencies with EPA's own restoration priorities in Louisiana.

- Noted EPA's commitment to working with implementation agencies and the U.S. Army Corps of Engineers to ensure effective and efficient review processes under Section 404 of the Clean Water Act.
- Expressed appreciation of the discussion of environmental justice (EJ) and suggested its EJMAPPER tool as a tool to use in tiered EJ analyses.
- Supported the Trustees' determination to conduct appropriate GHG and climate change analysis at the project-specific level using CEQ's 2014 revised draft guidance on climate change impacts analysis.

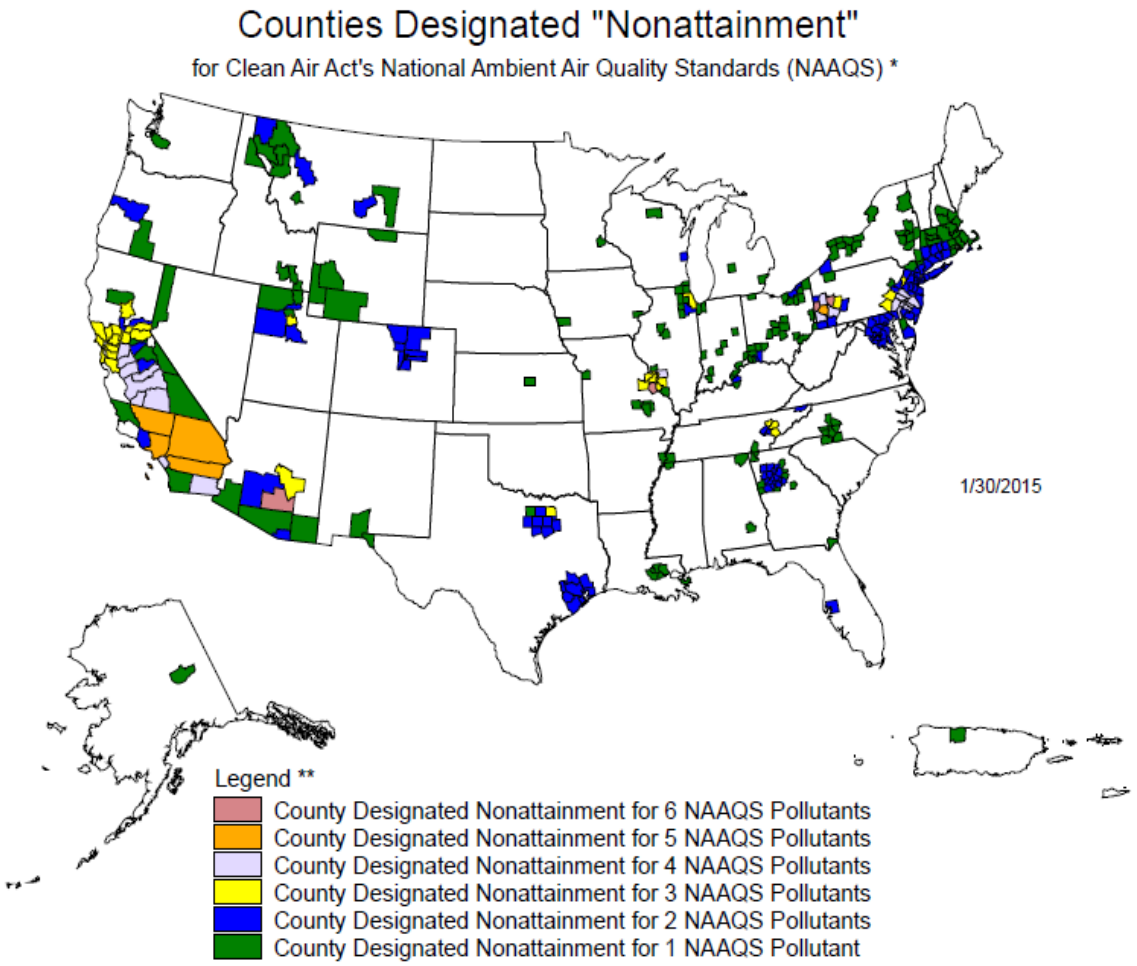
For a copy of this correspondence and related environmental rating, see Appendix 6.C.6, Trustees' Correspondence.

6.9.9.2 Consideration of National Ambient Air Quality Standards

The CAA also requires EPA to set NAAQS for pollutants considered harmful to public health and the environment. NAAQS have been set for six common air pollutants (also known as criteria pollutants): particle pollution or particulate matter, ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead. Particulate matter is defined as fine particulates with a diameter of 10 micrometers or less (PM_{10}), and fine particulates with a diameter of 2.5 micrometers or less ($PM_{2.5}$). When a designated air quality area or airshed in a state exceeds one or more of the NAAQS, that area may be designated as a "nonattainment" area. Areas with levels of pollutants below the health-based standards are designated as "attainment" areas. To determine whether an area meets the NAAQS, air monitoring networks have been established and are used to measure ambient air quality.

Only 28 counties/parishes in the Gulf Coast region are classified as nonattainment areas (Figure 6.9-1, below). These counties surround the Houston, Texas, area, the New Orleans and Baton Rouge, Louisiana, areas, and the Tampa, Florida, area, and are listed below (Table 6.9-3). Environmental consequences of project actions in counties that are designated attainment areas (all counties other than those listed in Table 6.9-3) would be expected to have similar air quality impacts, including GHG emissions, to those of Gulf of Mexico regionwide restoration projects (i.e., minor and short-term in duration and not resulting in exceedances of NAAQS or GHG emissions singularly or cumulatively) (DWH Trustees 2014, 2015; NOAA 2015). Projects located in or adjacent to counties designated as attainment areas would therefore be in compliance with CAA requirements and additional, project-specific analysis would not be required.

A project located in or adjacent to a county designated as a nonattainment area (currently or in the future if other Gulf state counties receive the nonattainment designation) would be required to analyze project-specific air quality and GHG emissions. This analysis would be used to determine whether the project—singularly or cumulatively, considering other foreseeable actions—would or would not likely result in exceedances of the identified NAAQS pollutant(s) and whether the project is consistent with a State Implementation Plan, if established.



Source: *EPA (2015).*

Figure 6.9-1. Counties designated "nonattainment."

Table 6.9-3. List of counties by state-designated nonattainment.

Texas[a] (Houston Area)	Chambers County Liberty County Montgomery County Harris County Waller County Fort Bend County Brazoria County Galveston County
Louisiana	St. Bernard Parish Livingston Parish East Baton Rouge Parish West Baton Rouge Parish Iberville Parish Ascension Parish
Florida	Hillsborough County

[a] Other counties classified as nonattainment areas in Texas are located in northern and western Texas EPA (2015).

6.9.10 Clean Water Act; Rivers and Harbors Act; and Marine Protection, Research and Sanctuaries Act

Waters of the United States (as defined by the Clean Water Act and implementing regulations) and navigable waterways (regulated by the Rivers and Harbors Act) are present throughout the Gulf Coast and could be affected by proposed projects. Section 404 of the Clean Water Act requires USACE authorization before discharging dredged or fill material into waters of the United States, including wetlands and special aquatic sites. Section 10 of the Rivers and Harbors Act requires USACE authorization prior to any work done in, under, or over navigable waters of the United States or affecting the course, location, condition, or capacity of such waters. Authorization from the USACE pursuant to Section 103 of the Marine Protection, Research and Sanctuaries Act may also be required for the transportation of dredged material for the purpose of dumping it in ocean waters.

There may be other provisions of the Clean Water Act or Rivers and Harbors Act that are also applicable to future DWH PDARP/PEIS projects depending on site-specific circumstances. Specifically:

- Section 14 of the Rivers and Harbors Act and codified in 33 USC 408 (commonly referred to as "Section 408") authorizes the alteration or occupation or use of a USACE completed civil works project if the Secretary determines that the activity will not be injurious to the public interest and will not impair the usefulness of the project. Under Section 401 of the Clean Water Act, projects that entail discharge to wetlands or other waters within federal jurisdiction must obtain state certification of compliance with applicable state water quality standards. Under Section 401, states can review and approve, condition, or deny all federal permits or licenses that might result in a discharge to state waters, including wetlands.

- Section 402 of the Clean Water Act establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate point source discharges of pollutants into waters of

the United States. A NPDES permit sets specific limits for point sources discharging pollutants into waters of the United States and establishes monitoring and reporting requirements, as well as special conditions. EPA is charged with administering the permit program, but can authorize states to assume many of the permitting, administrative, and enforcement responsibilities. All five Gulf Coast states are authorized to issue NPDES permits.

For future DWH PDARP/PEIS projects with activities that might be subject to the provisions above, project sponsors would coordinate with the appropriate USACE District and/or state office responsible for authorizing such activities to help identify whether a permit is needed and, if so, what type. This early coordination helps facilitate information-sharing and communication, thus maximizing available efficiencies in the permitting process. Early coordination also allows for advance discussion of measures to avoid and minimize potential project impacts and helps inform sponsors on additional factors that are considered in the permit decision-making process.

6.9.11 Estuary Protection Act

The Estuary Protection Act encourages consideration in planning and development activities of the value of estuaries and the need to protect, conserve, and restore them. Where projects are proposed to take place within an estuary, the consideration of the potential impacts will include evaluation of the value of the estuarine resources.

6.9.12 Archaeological Resource Protection Act

The purpose of the Archaeological Resource Protection Act (ARPA) is to secure, for the present and future benefit of the American people, the protection of archeological resources and sites that are on public and Indian lands. The Act fosters increased cooperation and exchange of information between governmental authorities, the professional archeological community, and private individuals having collections of archeological resources and data that were obtained before October 31, 1979. The ARPA requires any person seeking to excavate or remove archaeological resources from public lands and Indian lands to obtain a permit from the appropriate federal land manager before conducting those activities. The Trustees will comply with the ARPA's requirements for all DWH NRDA restoration projects that would occur on public lands and Indian lands.

6.9.13 National Marine Sanctuaries Act

The National Marine Sanctuaries Act is the principal statute governing the designation and management of protected marine areas of special significance. The statute requires NOAA to designate National Marine Sanctuaries in accordance with specific guidelines and to develop and review management plans for these sites. It provides for the continuation of existing leases, licenses, and other established rights in sanctuary areas and for the development of research and education programs. The statute also prohibits destruction, injury, or loss of sanctuary resources, and it establishes liability for response costs and natural resource damages for injury to these resources. If a site-specific restoration project has the potential to affect a marine sanctuary, the Trustees will develop appropriate avoidance or mitigation to comply with the National Marine Sanctuaries Act. Under Section 304(d) of the Act, federal agencies are required to consult for actions that may affect sanctuary resources. Through such consultations, the

Secretary of Commerce may recommend mitigation to avoid adverse effects on resources. If such recommendations are made, the Trustees shall adopt the recommended mitigation. The Trustees will also coordinate with NOAA and provide the information necessary to complete the sanctuary development process if a proposed restoration project might result in new or expanded protection of marine areas of special significance.

6.9.14 Farmland Protection Policy Act

The Farmland Protection Policy Act was established to minimize the impact federal programs have on the conversion of farmland to nonagricultural uses. Farmland under the Act includes lands considered prime, unique, or of statewide or local importance. These lands are not limited solely to croplands, but also include forest land and pastureland. The Act requires federal programs to be compatible with state, local, and private programs and policies to protect farmland. Every 2 years, federal agencies must develop and review their programs and policies to implement the Act. The Act does not authorize the federal government to regulate the use of private or nonfederal land or affect the property rights of owners. Projects that may irreversibly convert farmland to nonagricultural use and are completed by a federal agency or with assistance from a federal agency are subject to the provisions of the Act. When specific restoration projects are proposed, the Trustees will determine the potential effects of the projects on farmland and coordinate with the NRCS when appropriate.

6.9.15 Additional Executive Orders

The following executive orders (EOs) are also identified here. Compliance will follow in future tiered project-level actions under the DWH PDARP/PEIS.

6.9.15.1 EO 11988: Floodplain Management

EO 11988 requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of flood plains and avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

6.9.15.2 EO 11990: Protection of Wetlands

EO 11990is intended to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. To meet these objectives, the Order requires federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided.

6.9.15.3 EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

EO 12898 requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of programs, policies, and activities on minority or low-income populations. Environmental justice review should be incorporated into the NEPA process and, where disproportionate adverse effects on minority and low-income populations are identified, address those impacts.

6.9.15.4 EO 12962: Recreational Fisheries

EO 12962 is intended to conserve, restore, and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide.

6.9.15.5 EO 13112: Invasive Species

EO 13112 applies to all federal agencies whose actions may affect the status of invasive species, requires agencies to identify such actions, and to the extent practicable and permitted by law, requires agencies to 1) take actions specified in the Order to address the problem consistent with their authorities and budgetary resources and 2) not authorize, fund, or carry out actions that they believe are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless

> pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

6.9.15.6 EO 13175: Consultation and Coordination with Indian Tribal Governments

EO 13175 reaffirms the federal government's commitment to a government-to-government relationship with Indian tribes and directs federal agencies to establish procedures to consult and collaborate with tribal governments when new agency regulations would have tribal implications.

6.9.15.7 EO 13186: Responsibilities of Federal Agencies to Protect Migratory Birds

EO 13186 directs executive departments and agencies to take certain actions to further implement the MBTA.

6.9.15.8 EO 13693: Planning for Federal Sustainability in the Next Decade

EO 13693 directs federal leadership in energy, environmental, water, fleet, buildings, and acquisition management to continue to drive national GHG reductions and support preparations for the impacts of climate change.

6.9.16 Compliance with State and Local Laws and Other Federal Regulations

As future project-level analyses are tiered from this PDARP/PEIS, Trustees will ensure compliance with all applicable state and local laws and other applicable federal laws and regulations relevant to the individual state within which the project is to be located. Those laws and regulations relevant to individual proposed projects will be addressed in subsequent restoration planning.

6.10 Relationship Between Short-Term Use of the Human Environment and Long-Term Productivity

Section 102(2)(c)(iv) of NEPA requires that an EIS "discuss…the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity." This section describes how the action alternatives would affect the short-term uses of the human environment and how that would affect the maintenance or enhancement of long-term productivity.

As described in Chapter 5, the purpose of this action is to restore extensive and complex injuries to natural resources and services resulting from the DWH spill. To meet this purpose, the Trustees have proposed alternatives intended to improve certain aspects of the human environment and thus maintain and enhance the long-term productivity of a number of natural resources. Sections 6.4, Evaluation of Environmental Consequences of Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative), and 6.4.15, Summary of Impacts of Alternative A, describe the kinds of short- and long-term adverse impacts and/or benefits that would be expected for the different Restoration Types.

For a number of restoration approaches, such as restoring wetlands, coastal, and nearshore habitats; federal lands; water quality; fish; sturgeon; sea turtles; SAV; marine mammals; birds; mesophotic and deep benthic habitats; oysters; as well as providing recreational opportunities, restoring barrier islands and beaches, and conserving habitats, short-term adverse impacts generally include those impacts associated with construction or implementation of restoration activities. However, not only would these impacts be expected to be temporary, but these restoration approaches are intended to enhance long-term productivity of natural resources. For example, restored habitats would provide food, shelter, breeding, and nursery habitat for many ecologically and economically important animals.

Some restoration approaches, particularly those focused on recreational use, intend to provide and enhance recreational opportunities that would increase access to, and the recreational use of, resources. Depending on how those uses are managed, these restoration approaches could result in both short-term and long-term impacts to habitats and resources. However, those impacts are not expected to degrade long-term productivity; overall, the alternatives considered here are expected to enhance long-term productivity.

6.11 Irreversible and Irretrievable Commitment of Resources

Section 102(2)(c)(v) of NEPA requires that an EIS "discuss…any irreversible and irretrievable commitment of resources which would be involved in the proposed action should it be implemented" (40 CFR § 1502.16). However, NEPA and the CEQ regulations do not define "irreversible and irretrievable." For purposes of this analysis, a commitment of a resource includes such things as agency funding or staff necessary to undertake a project.

Implementation of any of the action alternatives would require an irreversible and irretrievable commitment of resources, including staff time for project planning and development, and the associated funding necessary to go through the consultation, coordination, and decision-making processes. Other resource use that would be irreversible and irretrievable would be the use of energy through the combustion of fossil fuels and material resources for construction. However, the level of commitment would vary based on restoration approach. For example the reconstruction of a wetland would require more resources than an action that replants vegetation on beaches.

6.12 Unavoidable Adverse Impacts

Section 102(2)(c)(ii) of NEPA requires that an EIS include information on "any adverse environmental effects which cannot be avoided should the proposed action be implemented." Unavoidable adverse impacts are the effects on the human environment that would remain after mitigation measures and best practices have been applied. They do not include temporary or permanent impacts that would be mitigated. While these impacts do not have to be avoided by the planning agency, they must be disclosed, considered, and mitigated where possible (40 CFR § 1500.2[e]). For some restoration approaches described above, mitigation measures and best practices are identified as options that can be used to avoid, reduce, minimize, or mitigate these impacts, where applicable, during implementation. These mitigation options are provided for consideration in future project development and selection. They vary based on site-specific conditions and are not required mitigations as part of the action alternatives. Therefore, subsequent restoration plans will consider appropriate mitigation measures and best practices. Unavoidable adverse impacts associated with conversion of habitat and built infrastructure are considered and evaluated for relevant restoration approaches where reasonably foreseeable. In addition, future DWH PDARP/PEIS planning phases and associated NEPA analyses would consider the extent to which adverse impacts can be avoided, including consideration of appropriate mitigation, and would describe those adverse impacts that are unavoidable. Many examples of best practices are identified in Appendix 6.A.

6.13 Consideration of Incomplete or Unavailable Information

Programmatic NEPA reviews may support policy- and planning-level decisions when there are limitations in available information regarding the timing, location, and environmental impacts of subsequent implementing action(s). For example, in the absence of certainty regarding the environmental consequences of future proposed actions, agencies may be able to make broad program decisions and establish parameters for subsequent analyses based on a programmatic review that adequately examines the reasonably foreseeable consequences of a proposed program, policy, plan, or suite of projects (CEQ 2014a).

The broad scope of the restoration planning decisions made at this time makes it impossible to fully analyze the environmental impacts of potential projects that may be developed over the implementation period of this PDARP/PEIS. For example, because timing and project locations have not yet been specified for future bird restoration projects, NEPA analysis at this time can only consider a broad range of potential impacts that could result from implementation of restoration approaches, rather than a site-specific analysis. In other cases, restoration approaches may be more novel, where the environmental consequences of implementing specific projects under those approaches are incompletely known, such as coral transplantation for deep benthic coral communities. Accordingly, the Trustees will use the available information in this programmatic review to make reasoned, broad program decisions and establish parameters for the future restoration plans that will tier from this document. Further, monitoring and adaptive management will be key components in future restoration projects.

6.14 Consideration of the Effects of Climate Change

In 2014, CEQ issued revised draft guidance on considering the effects GHG emissions and climate change in the analysis of proposed actions under NEPA (CEQ 2014a). The revised draft climate change guidance also suggests ways that federal agencies should consider effects of climate change in developing projects that are resilient in nature and able to adapt to changes in the existing environmental conditions over time.

6.14.1 Impacts of Restoration Approaches on GHG Emissions

Increases in GHG increase the amount of heat trapped and increase global temperatures. EPA (2015) reports that global warming over the past 50 years is due primarily to human-induced emissions of heat-trapping GHG, primarily from "burning fossil fuels (coal, oil, and gas), with important contributions from deforestation, agricultural practices, and other activities." GHGs (other than water vapor) comprise CO_2 (82 percent) and much smaller amounts of methane, nitrous oxide, and fluorinated gases (the remaining 18 percent) (EPA 2015). The construction industry alone produced approximately 1.7 percent of total U.S. GHG emissions in 2002, representing 6 percent of the total U.S. industry-related GHG emissions (Lee et al. 2009). EPA estimates of CO_2 emissions into the atmosphere in 2011 from diesel-powered construction and mining equipment total 75 million tons. However, GHG emissions from construction equipment on project sites are highly variable, and standardized methods with adequate accuracy and reliability are needed (Lee et al. 2009).

Pursuant to CEQ-issued revised draft guidance to federal agencies on evaluating GHG emissions and the impacts of climate change under NEPA, a NEPA analysis should consider both of the following:

- The potential effects of a proposed action on climate change (using projected GHG emissions as a proxy for those effects).
- The implications of climate change for the environmental effects of the proposed action (i.e., impacts with respect to how climate change may alter the effects of the proposed action).

Major federal actions may have incremental, or project-by-project, climate change impacts "which have not been afforded the appropriate level of attention and analysis in prior NEPA reviews" (CEQ 2014a). In considering GHG emissions under NEPA, CEQ guidance suggests, the extent of the analysis should be commensurate with the quantity of projected GHG emissions. This concentrates analyses on matters that are truly important to making a decision on the proposed action. When assessing the potential significance of the climate change impacts such as GHG emissions resulting from a proposed action, agencies should consider both context and intensity, as is done for all other impacts. Under the revised draft guidance, it is the emission of GHG that constitutes an environmental impact and not the effects of those emissions on climate dynamics. As subsequent restoration plans tier from this Final PDARP/PEIS (see Section 6.17, NEPA Considerations and Tiering Future Restoration Planning), an appropriate level of analysis of GHG emissions will be included in the related NEPA analyses, and any project or site-specific considerations related to climate change would be updated.

Mitsch et al. (2012), based on carbon flux analysis of 21 wetland studies, concluded that

> wetland ecosystems provide an optimum natural environment for the sequestration and long-term storage of CO2 from the atmosphere…and can be created and restored to provide carbon sequestration and other ecosystem services without great concern of creating net radiative sources on the climate due to methane emissions.

The authors found that while wetlands are also natural sources of GHG emissions, especially methane, methane emissions become unimportant within 300 years and most wetlands become both net carbon and radiative sinks within the same or smaller time frames.

Many of the restoration approaches in this Final PDARP/PEIS could include some construction activities. For example, the Restoration Types Wetlands, Coastal, and Nearshore Habitats, Submerged Aquatic Vegetation, and Habitat Projects on Federally Managed Lands, are expected to involve construction activities. Emissions of GHGs into the atmosphere from the use of construction machinery would vary by individual project and would be addressed on a project-by-project basis. Restoration of these types of habitats, however, could, over time, result in carbon sequestration in excess of construction-related emissions and internal methane emissions, as described by Mitsch et al. (Mitsch et al. 2012).

Other restoration approaches evaluated in this Final PDARP/PEIS may result in incidental increased GHG emissions due to vehicle emissions for travel, additional monitoring efforts, and similar small-scale activities. For example, species-specific Restoration Types, such as restoration of fish and water column invertebrates, marine mammals, and birds and reducing sea turtle bycatch in commercial fisheries through identification and implementation of conservation measures, may result in GHG emissions from additional monitoring efforts, potential pilot projects, and similar small-scale activities.

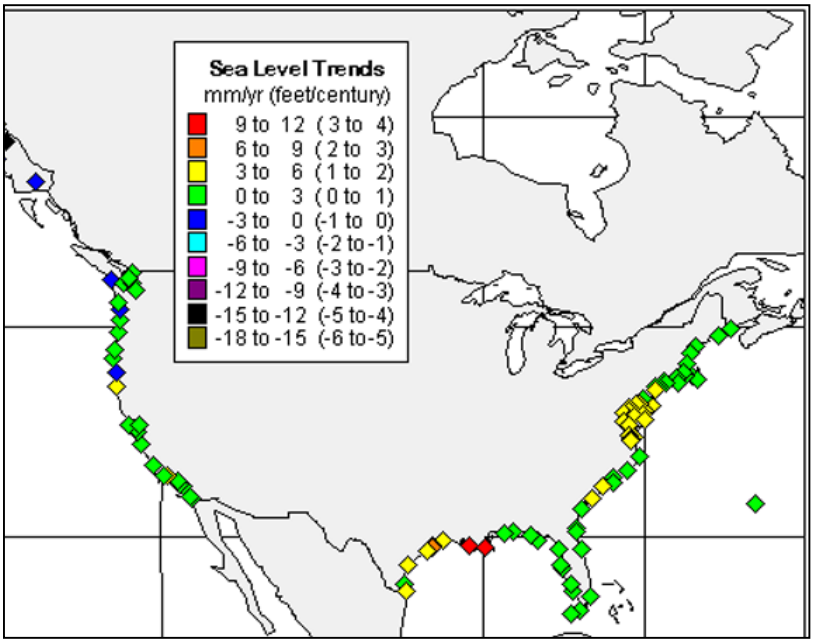
6.14.2 Current Climate Change Projections

The Intergovernmental Panel on Climate Change (IPCC) projects a rise of the world's oceans from 0.26 to 0.82 meters by the end of the century, depending on the level of GHG emissions (IPCC 2013). In addition, the IPCC has concluded that "each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850" (IPCC 2013).

Climate change is projected to lead to a number of impacts in the southeastern United States, including increases in air and water temperatures, decreased water availability, an increase in the frequency of severe weather events, and ecosystem change. Average annual temperatures are predicted to increase 3 to 10 degrees Fahrenheit by the end of the next century (USGCRP 2014). It is suggested that heavier rainfall is expected, separated by increased dry periods, which would result in increased risk of flooding and drought (USGCRP 2014).

Coastal environments are expected to be at increasing risk due to sea level rise and increases in hurricane intensity and storm surge. Figure 6.14-1 illustrates the projected changes in sea level. Areas experiencing little to no change in mean sea level are illustrated in green. Areas illustrated with positive sea level trends (yellow-to-red) are experiencing both global sea level rise and lowering or sinking of the local land, causing an apparently exaggerated rate of relative sea level rise. For example, some areas in Texas and Louisiana are experiencing subsiding land elevations, which are further exacerbating effects of sea level rise (NOAA 2013).

Climate change will likely have a number of impacts on the aquatic ecosystems of the northern Gulf of Mexico. Higher ocean temperatures are expected to increase coral bleaching (Scavia et al. 2002). Sea level rise and increasingly frequent coastal storms and hurricanes and associated storm surges will affect shorelines, altering coastal wetland hydrology, geomorphology, biotic structure, and nutrient cycling (Michener et al. 1997). Furthermore, an increase in atmospheric CO_2 concentrations is projected to increase freshwater discharge from the Mississippi River to the coastal ocean, decrease aquatic oxygen content, and expand the hypoxic zone in the northern Gulf of Mexico (Justic et al. 1997). Sea level rise could result in more frequent flooding of low-lying areas, which would permanently alter some ecological communities (USGCRP 2014).



Source: *NOAA (2013).*

Figure 6.14-1. Regional mean sea level trends.

In addition to effects on natural resources, climate change effects will likely cause damage to transportation infrastructure, affecting travel and damaging roads and bridges (USGCRP 2014). Hurricanes and storms will continue to damage property. Long-term development and projects will need to consider climate-related effects in design stages to improve structure resiliency.

6.14.3 Climate Change Considerations in Planning

CEQ (2014a), citing the National Research Council, provides the following general definition of climate change adaptation as:

> Action that can be implemented as a response to changes in the climate to harness and leverage its beneficial opportunities (e.g., expand polar shipping routes) or ameliorate its negative effects (e.g., protect installations from sea level rise).

The CEQ encourages pre-emptive planning to the extent practicable and consideration of climate change adaptations designed to reduce the vulnerability of a system to the effects of climate change. An example would be designing projects that are resilient across a range of future climate scenarios. In its recent draft guidance, CEQ relies on 40 CFR § 1502.24 when it states that with regard to the effects of climate change on the design of a proposed action and alternatives, "an agency must present the environmental impacts of the proposed action in clear terms and with sufficient information to ensure the professional and scientific integrity of the discussion and analysis" (CEQ 2014a).

A 2013 EO reinforces the direction to undergo planning efforts to develop projects that are more resilient to changes in the environment over time as a result of climate change effects. It states that

> The Federal Government must build on recent progress and pursue new strategies to improve the Nation's preparedness and resilience. In doing so, agencies should promote: (1) engaged and strong partnerships and information sharing at all levels of government; (2) risk-informed decision-making and the tools to facilitate it; (3) adaptive learning, in which experiences serve as opportunities to inform and adjust future actions; and (4) preparedness planning. (Executive Order, Preparing the United States for the Impacts of Climate Change, November 1, 2013)

Projects associated with the Restoration Types evaluated in this Final PDARP/PEIS are not inconsistent with the EO and CEQ guidance on climate change.

Consideration of coastal vulnerability from climate change factors is important in planning. IPCC defines vulnerability as "the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes" (IPCC 2007). Factors affecting coastal vulnerability include the physical characteristics of a particular setting and climate and nonclimate drivers (Burkett & Davidson 2012). Climate drivers include sea level change, waves and currents, winds, storminess, atmospheric CO_2, atmospheric temperature, water properties, sediment supply, and ground water availability (Burkett & Davidson 2012). Figure 6.14-2 illustrates coastal vulnerability as a result of projected sea level rise for the northern Gulf Coast. Consideration of factors such as sea level rise, changes to shorelines, and altered hydrology at the project design stage will allow for the anticipation of a range of environmental changes and the development of projects that would be more resilient over time based on current understanding of these factors. Changes in these factors, however, may affect the longevity of some projects post-construction. As described in Chapter 5, Section 5.5, Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative), the preferred alternative includes a specific focus on achieving large-scale benefits to coastal habitats that are expected to contribute to the overall health and resiliency of northern Gulf of Mexico coastal environment and resources.

Source: *USGS National Index of Coastal Vulnerability to Sea Level Rise, Data Basin 2014.*

Figure 6.14-2. Gulf Coast vulnerability to sea level rise index.

Yellow areas have moderate vulnerability to sea level rise, orange areas have high vulnerability, and red areas have very high vulnerability.

6.15 Best Practices

NOAA and USFWS have established best practices, which include guidance documents, lessons learned, and project design criteria for many restoration actions. Project proponents are expected to consider these, and any additional relevant best practices, in the development of subsequent restoration projects and associated regulatory compliance. Trustees use appropriate best practices to avoid or minimize impacts to natural resources, including listed species and their habitats.

As part of future project-specific environmental review (NEPA, ESA and other appropriate authorities), appropriate best practices would be considered by the Trustees and analyzed in subsequent restoration plans. During any environmental review process, additional project-specific measures may be recommended or required as applicable to a project type in different locations (e.g., dune walkovers in Florida and Texas) due to differences in relevant conditions, such as species presence or absence or other factors. The final set of project-specific best practices and mitigation measures would be determined prior to implementation by the implementing Trustees and regulating agencies.

Appendix 6.A, Best Practices, provides a list of measures that could be included on a project-specific basis, as appropriate, to avoid, minimize, or reduce potential adverse effects on the resources. Appendix 6.A is intended to evolve as an adaptive management component of implementing the PDARP/PEIS. As such, the appendix is intended be a living document. As new best practices are established, existing best practices are refined, or new techniques and information are informed by implementation, these measures will be added to or updated in the relevant websites identified in the appendix. In this capacity, new projects will have available the current range of best practices to support project design and implementation.

6.16 Environmental Justice Considerations in Future Restoration Planning

The intent of an environmental justice evaluation under EO 12898, Federal Actions to Address Environmental Justice in Minority and Low Income Populations (1994), is to identify communities and groups that meet environmental justice criteria and suggest strategies to reduce potential adverse impacts of projects on affected groups. The purpose of EO 12898 is to identify and address the disproportionate placement of adverse environmental, economic, social, or health impacts from federal actions and policies on minority and/or low-income communities. This order requires lead agencies to evaluate impacts on minority or low-income populations during preparation of environmental and socioeconomic analyses of projects or programs that are proposed, funded, or licensed by federal agencies.

According to CEQ and EPA guidelines established to assist federal and state agencies, a minority population is present in a project area if 1) the minority population of the affected area exceeds 50 percent or 2) the minority-population percentage of the affected area is meaningfully greater than the minority-population percentage in the general population or other appropriate unit of geographic analysis. By the same rule, a low-income population exists if the project area consists of more than 50 percent people living below the poverty threshold, as defined by the U.S. Census Bureau, or has a poverty percentage meaningfully greater than that of the general population or other appropriate unit of geographic analysis.

The CEQ guidance indicates that when agencies determine whether environmental effects are disproportionately high and adverse, they are to consider whether there is or would be an impact on the natural or physical environment (as defined by NEPA) that would adversely affect a minority or low-income population.

None of the published guidelines defines the term "disproportionately high and adverse," but CEQ includes a nonquantitative definition, stating that an effect is disproportionate if it appreciably exceeds the risk, or rate, to the general population (CEQ 1997b).

The restoration approaches that make up the programmatic alternative are not, in general, expected to create a disproportionately high and adverse effect on a minority or low-income populations. Population characteristics, including race and ethnicity and per-capita income as it relates to the poverty level, as well as effect determinations considered for environmental justice analyses will be considered in future projects tiered from this PDARP/PEIS. Project-specific data, such as that available from the EPA environmental justice mapping tool "EJMAPPER,"[13] will be utilized to consider implications for local minority or low-income populations.

[13] See *http://www.epa.gov/ejscreen*.

6.17 NEPA Considerations and Tiering Future Restoration Planning

6.17.1 Tiering Future Restoration Planning

As described in Section 5.10.4, Subsequent Restoration Planning, and Section 7.2, Management Structure, the Trustees, through each Trustee Implementation Group (TIG), intend to prepare subsequent restoration plans integrated with NEPA analyses tiered from this PEIS (40 CFR § 1508.28). These subsequent restoration plans will propose projects or phases of projects (e.g., preliminary planning) or—in some cases, particularly for ESA-listed species—may propose strategic or resource-level plans to guide decision-making.

Tiering

Tiering refers to the coverage of general matters in broader environmental impact statements (such as national program or policy statements) with subsequent narrower statements or environmental analyses (such as regional or basinwide program statements or ultimately site-specific statements) incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared.

The programmatic analysis included in the Final PDARP/PEIS provides a comprehensive plan for restoration and streamlines TIG restoration planning by evaluating broad programmatic issues and impacts, thereby allowing the Trustees to tier future project-specific analyses from the programmatic analyses. Tiering future project-specific analyses would reduce or eliminate duplicative documentation by focusing future project analyses on project-specific issues and incorporating by reference the issues evaluated in the broad programmatic analyses. For example, when the TIGs propose future restoration projects for consideration, they may prepare environmental assessments for the projects that tier from this PEIS if the conditions and environmental effects described in the PEIS are still valid or address any exceptions. If a subsequent restoration plan and integrated NEPA analysis differ from the analysis provided at this programmatic level (e.g., best practices that were assumed in this analysis are not incorporated as part of a proposed project), that difference would be described in the tiered NEPA analysis to indicate whether the significance of impacts differs from the significance presented in this PDARP/PEIS. If the impacts of a future restoration project are analyzed in an environmental assessment tiered from this PEIS, and found to be not a significant impact, the environmental assessment tiered would produce a finding of no significant impact, and no further NEPA analysis would be necessary. If the impacts of a project were found to be significant, those impacts would be evaluated in a tiered EIS. The public will have an opportunity to review and comment as future restoration plans are developed.

6.17.2 Draft Restoration Plans and Corresponding NEPA Analysis

The TIGs will integrate the appropriate level of NEPA analysis with the subsequent restoration plans at draft and final. The NEPA analyses will tier from this PEIS, as appropriate, and be prepared in accordance with NEPA and implementing regulations. The NEPA analysis will be consistent with this PEIS and the environmental consequences described broadly for the relevant restoration approaches. In addition to regulatory requirements, the analysis will do the following:

- **Identify the level of tiered NEPA review (e.g., tiered EA or tiered EIS).** Restoration plans that propose projects with potentially significant adverse impacts will require a tiered EIS, including formal public scoping. Some proposals for preliminary project planning (e.g., selection of a project phase for funding of engineering and design) are analyzed in the PEIS and may not require a project-specific analysis and would instead incorporate this PEIS by reference.

- **Identify cooperating agencies and determine other environmental compliance requirements.** The TIG agencies generally will be cooperating agencies for purposes of NEPA. Additional cooperating agencies should be invited when they have jurisdiction by law or an agency has special expertise with respect to any environmental issue. This early coordination with other agencies, either through cooperating agency roles or technical assistance on other environmental projects, can provide for more efficient planning and can be a means to reduce environmental impacts early in the planning process. In addition, when proposed projects may overlap jurisdictions, the implementing TIG agencies will coordinate with other TIG agencies. Draft and final restoration plans will describe other environmental compliance requirements and the status toward receiving necessary approvals.

- **Describe the affected environment.** The Trustees will focus on site-specific issues not addressed in this PEIS.

- **Analyze the direct, indirect, and cumulative impacts of the proposed projects.** The Trustees will determine if the effects are consistent with the environmental consequences analyzed in this PEIS and clearly describe any differences. This analysis will focus on the site-specific issues and need not repeat broader environmental analyses considered in this PEIS. Consideration of cumulative impacts of proposed projects in this manner is consistent with 2014 CEQ guidance regarding effective use of programmatic NEPA analysis: "An analysis of the cumulative impacts for each resource would be provided in each level of review, either by relying upon the analysis in the programmatic NEPA review or adding to that analysis in the tiered NEPA review, either approach facilitated by incorporating by reference the cumulative impact analysis provided in the programmatic NEPA review" (CEQ 2014b).

- **Consider mitigating measures.** The Trustees will indicate how practices identified in the PEIS to reduce potential environmental impacts were considered in developing proposed projects or how these practices will be used to reduce potential adverse impacts of the projects.

- **Evaluate projects under OPA requirements.** The Trustees will indicate how the planning and implementation considerations described in Chapter 5, Section 5.5, Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative), and Appendix 5.D, Restoration Approaches and OPA Evaluation, were considered when developing projects.

- **Designate a lead federal agency.** One federal Trustee agency will serve as the lead federal agency for each restoration plan's NEPA compliance. All four federal Trustees would be adopting this PEIS, so any of the federal agencies can serve as the lead for tiered NEPA analyses. Other federal Trustee agencies would participate as co-leads or as cooperating agencies in the NEPA analysis.

- **Provide opportunity for public comment.** As described in Chapter 7 (Governance) and required by OPA NRDA regulations, TIGs will provide an opportunity for public review and comment on each subsequent restoration plan and tiered NEPA analysis.

- **Prepare final restoration plans and corresponding NEPA analysis.** Following the consideration of public comments, the TIGs will revise restoration plans and NEPA analyses as appropriate and will release a final restoration plan with the integrated final NEPA analysis. Note that the appropriate NEPA finding or decision document must be completed before the TIG can make final decisions on approving the restoration projects in a plan for implementation. Compliance with other environmental laws (e.g., ESA) will be completed at the timing appropriate for each particular statute, regulatory, or other approval process.

6.18 DWH Final PDARP/PEIS Repositories

State	Library	Address	City	ZIP
AL	Dauphin Island Sea Laboratory, Admin Building	101 Bienville Boulevard	Dauphin Island	36528
AL	Thomas B. Norton Public Library	221 West 19th Avenue	Gulf Shores	36542
AL	Alabama Department of Conservation and Natural Resources, State Lands Division, Coastal Section Office	31115 5 Rivers Boulevard	Spanish Fort	36527
AL	Weeks Bay National Estuarine Research Reserve	11300 US Highway 98	Fairhope	36532
AL	Mobile Public Library, West Regional Library	5555 Grelot Road	Mobile	36606
FL	Franklin County Public Library	29 Island Drive	East Point	32328
FL	Okaloosa County Library	185 Miracle Strip Parkway, SE	Ft. Walton	32548
FL	Panama City Beach Public Library	125000 Hutchison Boulevard	Panama City Beach	32407
FL	Escambia Southwest Branch Library	12248 Gulf Beach Highway	Pensacola	32507
FL	Wakulla County Library	4330 Crawfordville Highway	Crawfordville	32327
FL	Walton County Library, Coastal Branch	437 Greenway Trail	Santa Rosa Beach	32459
FL	Santa Rosa County Clerk of Court, County Courthouse	5841 Gulf Breeze Parkway	Gulf Breeze	32561
FL	Bay County Public Library	898 W. 11th Street	Panama City	32401
FL	Gulf County Public Library	110 Library Drive	Port St. Joe	32456
FL	Jefferson R.J. Bailar Public Library	375 S. Water Street	Monticello	32344
FL	Taylor County Public Library	403 N. Washington Street	Perry	32347
FL	Dixie County Public Library	16328 SE 12 Avenue	Cross City	32628
FL	Levy County Public Library	7871 NE 90th Street	Bronson	32621
FL	Homosassa Public Library	4100 S. Grandmarch Avenue	Homosassa	34446
FL	Hernando County Public Library	238 Howell Avenue	Brooksville	34601
FL	Land O'Lakes Branch Library	2818 Collier Parkway	Land O' Lakes	34639
FL	Pinellas Public Library	1330 Cleveland Street	Clearwater	33755
FL	Temple Terrace Public Library	202 Bullard Parkway	Temple Terrace	33617
FL	South Manatee Branch Library	6081 26th St West	Bradenton	34207
FL	Jacaranda Public Library	4143 Woodmere Park Boulevard	Venice	34293
FL	Mid County Regional Library	2050 Forrest Nelson Boulevard	Port Charlotte	33952
FL	Riverdale Branch Library	2421 Buckingham Road	Fort Myers	33905
LA	St. Tammany Parish Library	310 W. 21st Avenue	Covington	70433
LA	Terrebonne Parish Library	151 Library Drive	Houma	70360
LA	New Orleans Public Library, Louisiana Division	219 Loyola Avenue	New Orleans	70112
LA	East Baton Rouge Parish Library	7711 Goodwood Boulevard	Baton Rouge	70806
LA	Jefferson Parish Library East Bank Regional Library	4747 W. Napoleon Avenue	Metairie	70001

State	Library	Address	City	ZIP
LA	Jefferson Parish Library West Bank Regional Library	2751 Manhattan Boulevard	Harvey	70058
LA	Plaquemines Parish Library	8442 Highway 23	Belle Chase	70037
LA	St. Bernard Parish Library	1125 E. St. Bernard Highway	Chalmette	70043
LA	St. Martin Parish Library	201 Porter Street	Martinville	70582
LA	Alex P. Allain Library	206 Iberia Street	Franklin	70538
LA	Vermillion Parish Library	405 E. St. Victor Street	Abbeville	70510
LA	Martha Sowell Utley Memorial Library	314 St. Mary Street	Thibodaux	70301
LA	South Lafourche Public Library	16241 E. Main Street	Cut Off	70345
LA	Calcasieu Parish Public Library Central Branch	301 W. Claude Street	Lake Charles	70605
LA	Iberia Parish Library	445 E. Main Street	New Iberia	70560
LA	Mark Shirley, Louisiana State University AgCenter	1105 West Port Street	Abbeville	70510
MS	Biloxi Public Library, Local History and Genealogy Department	580 Howard Avenue	Biloxi	39530
MS	West Biloxi Public Library	2047 Pass Road	Biloxi	39531
MS	Waveland Public Library	333 Coleman Avenue	Waveland	39576
MS	Vancleave Public Library	12604 Highway 57	Vancleave	39565
MS	Hancock County Library System	312 Highway 90	Bay St. Louis	39520
MS	Gulfport Harrison County Library	1708 25th Avenue	Gulfport	39501
MS	Pass Christian Public Library	111 Hiern Avenue	Pass Christian	39567
MS	Orange Grove Branch Library	12031 Mobile Avenue	Gulfport	39503
MS	Kathleen McIlwain Public Library	2100 Library Lane	Gautier	39553
MS	Pascagoula Public Library	3214 Pascagoula Street	Pascagoula	39567
MS	Moss Point City Library	4119 Bellview	Moss Point	39563
MS	Ocean Springs Municipal Library	525 Dewey Avenue	Ocean Springs	39564
MS	Kiln Public Library	17065 Highway 603	Kiln	39556
MS	Margaret Sherry Memorial Library	2141 Popps Ferry Road	Biloxi	39532
MS	East Central Public Library	21801 Slider Road	Moss Point	39532
MS	D'Iberville Library	10274 3rd Avenue	D'Iberville	39532
MS	Mercy Housing & Human Development[a]	1135 Ford Street	Gulfport	39507
MS	Center for Environmental and Economic Justice[a]	336 Rodenberg Avenue	Biloxi	39531
MS	MS Coalition for Vietnamese-American Fisher Folks and Families[a]	1636 Popps Ferry Road, Suite 228	Biloxi	39532
MS	STEPS Coalition[a]	610 Water Street	Biloxi	39530
MS	Gulf Islands National Seashore Visitors Center	3500 Park Road	Ocean Springs	39564
TX	Jack K. Williams Library, Texas A&M University at Galveston	Texas A&M University at Galveston; Building #3010, 200 Seawolf Parkway	Galveston	77554
TX	Port Arthur Public Library	4615 9th Avenue	Port Arthur	77672
TX	Library, Texas A&M, Corpus Christi	6300 Ocean Drive	Corpus Christi	78412
TX	Rosenberg Library[a]	2310 Sealy Street	Galveston	77550

[a] These repositories will receive Vietnamese translations of Chapters 1, 7, and 8 of the Final PDARP/PEIS.

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Agency, Firm	Name	Position	Education
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Appendix A. Best Practices

The federal regulatory agencies will provide guidance to implementing trustees and federal action agencies as part of the environmental compliance process. Best practices generally include design criteria, best management practices (BMPs), lessons learned, expert advice, tips from the field, and more. Trustees use appropriate best practices to avoid or minimize impacts to natural resources, including protected and listed species and their habitats.

Federal environmental compliance includes developing a project proposal, requesting technical assistance if needed, and then entering into consultation or coordination under the relevant regulatory act (e.g., Endangered Species Act [ESA], Magnuson-Stevens Fishery Conservation and Management Act [MSFCMA], Migratory Bird Treaty Act, Marine Mammal Protection Act, Bald and Golden Eagle Protection Act, Clean Water Act). During any consultation process, additional project-specific measures may be recommended or required as applicable to a project type in different locations (e.g., dune walkovers in Florida and Texas) due to differences in relevant conditions, such as species presence or absence or other factors.

Below is a list of best practices that the Trustees have determined could be applicable to the stated restoration approaches. The potential programmatic environmental consequences described in Chapter 6, Environmental Consequences and Compliance with Other Laws, are presented largely without factoring in best practices that could avoid or minimize the potential adverse effects at a project-specific level. Such practices can be established during project planning and implementation. An exception is the analysis of impacts to protected biological resources and their habitats. For these resources, Restoration Types were specifically analyzed assuming the incorporation of best practices that would typically be required by regulating agencies because these projects generally would not be able to move forward through agency review without incorporation of best practices (see Section 6.9). Such best practices include, but are not limited to, steps taken through site selection, engineering and design, use of proven restoration techniques, and other conditions or activities required for project-specific regulatory compliance. Future projects tiered from this programmatic document will include the best practices below or best practices identified during project consultation, as appropriate. If changes to the best practices below are warranted for specific future projects, those changes will be analyzed in the future NRDA analysis and associated tiered Environmental Assessments (EAs) and Environmental Impact Statements (EISs) as well as other required reviews. Once best practices have been accepted, the project will be implemented using those best practices.

Points of contact:

- U.S. Fish and Wildlife Service (USFWS) Ecological Services Field Offices
  http://www.fws.gov/ecological-services/map/index.html
- National Marine Fisheries Service (NMFS) Southeast Region
  http://sero.nmfs.noaa.gov/

A.1 Practices Included in Environmental Consequences Analysis in Chapter 6, Section 6.4

The PDARP/PEIS assumed incorporation of the practices described in this Section A.1, Practices Included in Environmental Consequences Analysis in Chapter 6, Section 6.4, in the analysis of environmental consequences. This section presents best practices organized by species and also includes a section on general construction measures. Several of the best practices are described in larger documents and only the titles are included here. Appropriate websites should be checked during project planning to see if updated guidance is available. The organization by species is as follows:

- Birds
    - Bald eagle
    - Migratory birds
    - Piping plover and red knot
    - Red-cockaded woodpecker
- Mammals
    - Beach mouse
    - Manatee
    - Bottlenose dolphin
    - Other marine mammals
- Reptiles and amphibians
    - Reticulated flatwoods salamander
    - Eastern indigo snake
- Tortoises/turtles
    - Gopher tortoise
    - Sea turtles—in water
    - Sea turtles—nesting beaches
- Fish
    - Gulf sturgeon
- Plants
    - Protected plants
- Invasive species
- General construction measures

A.1.1 Birds

A.1.1.1 Bald Eagles

If bald eagle breeding or nesting behaviors are observed or a nest is discovered or known, have all activities avoid the nest by a minimum of 660 feet. If the nest is protected by a vegetated buffer where there is *no* line of sight to the nest, then the minimum avoidance distance is 330 feet. Maintain this avoidance distance from the onset of breeding/courtship behaviors until any eggs have hatched and eaglets have fledged (approximately 6 months).

If a similar activity (such as driving on a roadway) is closer than 660 feet to a nest, maintain a distance buffer as close to the nest as the existing tolerated activity. If a vegetated buffer is present and there is no line of sight to the nest and a similar activity is closer than 330 feet to a nest, then maintain a distance buffer as close to the nest as the existing tolerated activity.

In some instances activities conducted within 660 feet of a nest may result in disturbance, particularly for the eagles occupying the Mississippi barrier islands. If an activity appears to cause initial disturbance, stop the activity and move all individuals and equipment away until the eagles are no longer displaying disturbance behaviors. Contact the USFWS's Migratory Bird Permit Office to determine how to avoid impacts or if a permit may be needed.

A.1.1.2 Migratory Birds

Use care to avoid birds when operating machinery or vehicles near birds.

During the project design phase, coordinate with the USFWS and the state trust resource agency to site and design projects to avoid or minimize impacts to migratory bird nesting habitats or important feeding/loafing areas.

Avoid working in migratory bird nesting habitats during breeding, nesting, and fledging (approximately mid-February through late August). If project activities must occur during this timeframe and breeding, nesting, or fledging birds are present, contact the state trust resource agency to obtain the most recent guidance to protect nesting birds or rookeries, and their recommendations will be implemented.

Conservation areas may already be marked to protect bird nesting areas. Stay out of existing marked areas.

If vegetation clearing is necessary, clear vegetation outside the migratory bird nesting season (approximately mid-February through late August) 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 nest successfully fledges.

Avoid driving over the natural organic material ("wrack") line or areas of dense seaweed, as these habitats may contain hatchlings and chicks that are difficult to see.

Install pointy, white piling caps on exposed pilings to prevent bird roosting on piers, docks, and marinas.

A.1.1.3 Piping Plover and Red Knot

Provide all individuals working on a project with information in support of general awareness of piping plover or red knot presence and means to avoid birds and their critical or otherwise important habitats.

Avoid working in designated critical habitat when piping plovers are present (approximately late July through mid-May) or important wintering sites for red knots when they are present (contact USFWS for red knot timeframes and habitats) to the maximum extent practicable. If work must be conducted when people are present, avoid working near concentrations of individuals or post avoidance areas to minimize disturbance.

For projects that result in large-scale habitat changes, coordinate early with USFWS to enhance or protect habitat features preferred by the species (inlet shoals, lagoons, washover fans, ephemeral pools, baysides, and mud flats). Do not remove sand from intertidal, sand, or mud flats.

Use dredged material to enhance adjacent emerged and submerged shoals and bayside habitats within and adjacent to project areas.

Minimize vegetation planting in preferred habitats and avoid removal of wrack year-around along the shoreline.

During recreational use, enforce leash or "no pet" policies in critical or important habitats.

A.1.1.4 Red-Cockaded Woodpecker

Avoid working within active red-cockaded woodpecker clusters (the minimum convex polygon containing the aggregation of cavity trees used by a group of red-cockaded woodpeckers and a 200-foot-wide buffer surrounding the polygon).

If avoidance is not possible or management activities in red-cockaded woodpecker suitable habitat are desired, conduct standard surveys to determine if the habitat is supporting any individuals or presence can be assumed. If red-cockaded woodpeckers are present (or assumed to be), avoid cavity trees and use mechanized equipment during the non-nesting season (approximately April 1 through July 31).

If tree removal is necessary, survey pine trees approximately 60 or more years old for active cavities within one year of the proposed removal. Extend surveys from the project site out to no less than one-half mile. Replace any cavities affected by the project via drilled cavity construction.

If impacts to suitable foraging habitat (pines approximately 30 or more years old and within one-half mile of an active cavity tree) are proposed, conduct a foraging habitat analysis. Foraging habitat may need to be replanted post-project.

Design projects within red-cockaded woodpecker suitable habitat such that prescribed fire needs are not impeded.

A.1.2 Mammals

A.1.2.1 Beach Mouse

Avoid using vehicles and mechanical equipment within the dune system, including primary, secondary, and tertiary dunes.

Avoid storing or staging equipment, vehicles, and project debris in a manner or location where it could be colonized by mice.

If work must occur within the dune system, have a qualified, permitted, biologist survey the project site before work commences and flag potential burrows and tracks so that they can be avoided.

Where possible, replace footpaths or low-lying dune walkovers with improved walkovers that do not fragment the dune system. For dune walkover construction in Florida and Alabama, follow the Conservation Measures for Dune Walkover Construction (FWS 2015).

Avoid vegetation removal, including scrub vegetation. If vegetation is damaged or removed during project implementation, plant appropriate native plants in the same location to minimize erosion and provide a food source for beach mice. If forage plants are reduced or limited in the project area, supplemental beach mouse food sources may be necessary.

A.1.2.2 Manatee

In Florida, follow the most current versions of USFWS's *Standard Manatee Conditions for In-Water Work* and *Additional Conditions for In-Water Activities in Manatee Habitat* for in-water work in Alabama, Mississippi, and Texas where manatees could be present, follow conditions a, b, c, and d of the *Standard Manatee Conditions.* Report any collisions to the USFWS or state trust resource agency. Temporary signs, if necessary, can be modified from the Florida Fish and Wildlife Conservation Commission's template to reflect local conditions. In Louisiana, follow the most recent version of the *Standard Manatee Conditions*.

A.1.2.3 Bottlenose Dolphin

For projects with any in-water construction activities, dredging, or wetland/barrier island creation and nourishment, follow the most current version of the NMFS Southeast Region's *Measures for Reducing Entrapment Risk to Protected Species* for projects that enhance recreational fishing opportunities (e.g., fishing pier enhancement/development), visibly post the NMFS Southeast Region's *Dolphin-Friendly Fishing Tips* sign and other applicable protected species educational signs.

For projects that enhance recreational and commercial vessel based activities, follow NMFS's *Southeast U.S. Marine Mammal and Sea Turtle Viewing Guidelines*.

A.1.2.4 Other Marine Mammals

To reduce the risk associated with vessel strikes of protected species or related disturbance, follow the most current version of NMFS Southeast Region's *Vessel Strike Avoidance Measures and Reporting for Mariners*, revised February 2008.

A.1.3 Reptiles and Amphibians

A.1.3.1 Reticulated Flatwoods Salamander

Avoid suitable habitat during all construction activities and do not permanently alter hydrology of the area. Avoid eliminating connectivity between suitable ponds.

Use silt fencing to prevent sedimentation or erosion of the project site into ponds.

If suitable habitat (including the approximately 1,500-foot buffer zone around breeding ponds) may be affected, perform pre-project surveys within 2 miles of known breeding sites or assume the presence of reticulated flatwoods salamanders. Schedule work during the nonbreeding season (summer) and maintain the natural contour of the ponds.

A.1.3.2 Eastern Indigo Snake

If suitable habitat or other evidence of Eastern indigo snakes is discovered within the project area during site surveys, implement the most recent version of USFWS's *Standard Protection Measures for the Eastern Indigo Snake*.

A.1.4 Tortoises/Turtles

A.1.4.1 Gopher Tortoise

If suitable habitat is present, have a qualified biologist conduct surveys to identify any gopher tortoise burrows. If burrows are within the project area and cannot be avoided through establishing a protective buffer (size determined by USFWS and the state trust resource agency), implement standard procedures to relocate the tortoise within the project site but away from the areas of construction or restoration or consider conservation banks. A Candidate Conservation Agreement with Assurances may be appropriate for project sites within the nonlisted range of the species.

A.1.4.2 Sea Turtles—In Water

Implement the following guidelines: NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions* (revised March 23, 2006), NMFS's *Measures for Reducing Entrapment Risk to Protected Species* (revised May 22, 2012) and NMFS's *Vessel Strike Avoidance Measures and Reporting for Mariners* (revised February 2008).

A.1.4.3 Sea Turtles—Nesting Beaches

If a sea turtle (either adult or hatchling) is observed, maintain at least 200 feet between the turtle and personnel, equipment, or machinery and notify the sea turtle monitoring program. Allow the turtle to leave the area of its own volition.

During nourishment activities, use beach quality sand that is suitable for successful sea turtle nesting and hatchling emergence. Emulate the natural shoreline slope and dune system (including configuration and shape) to the maximum extent practicable.

In Florida and Alabama, avoid the use of vehicles and heavy machinery on nesting beaches during sea turtle nesting and hatching season (approximately May through October).

If work must occur on nesting beaches during sea turtle nesting season (May through August), begin work with vehicles or machinery after 9:00 am local time to allow the sea turtle monitoring program to detect and mark new nests and assess the need to relocate sea turtle nests that could be affected by the project construction. Avoid marked nests by at least 10 feet.

If beach topography is altered, restore all areas to the natural beach profile by 8:00 pm local time each day during nesting and hatching season. Restore beach topography by raking tire ruts and filling pits or holes.

Avoid driving over the wrack line or areas of dense seaweed, as these habitats may contain sea turtle hatchlings that are difficult to see.

All observed sea turtle nests located in Texas should be excavated and the eggs relocated for incubation.

Construction in Texas should be scheduled to avoid Kemp's ridley nesting season, which extends from April 1 until October 1.

A.1.5 Fish

A.1.5.1 Gulf Sturgeon

Avoid work in riverine critical habitats when Gulf sturgeon are likely to be present (April to October). Do not dredge in spawning areas when Gulf sturgeon are likely to be present.

During project implementation, maintain riparian buffers of at least 100 feet around critical habitat. Install silt fencing to prevent sedimentation or erosion into streams and rivers.

Operate dredge equipment in a manner to avoid risks to Gulf sturgeon (e.g., disengage pumps when the cutter head is not in the substrate; avoid pumping water from the bottom of the water column). Implement NMFS's *Sea Turtle and Smalltooth Construction Conditions* (revised March 23, 2006) and NMFS's *Measures for Reducing Entrapment Risk to Protected Species* (revised May 22, 2012), as they are protective of Gulf sturgeon as well.

A.1.5.2 Sawfish

Implement NMFS's *Sea Turtle and Smalltooth Construction Conditions* (revised March 23, 2006) and NMFS's *Measures for Reducing Entrapment Risk to Protected Species* (revised May 22, 2012).

A.1.6 Plants

A.1.6.1 Protected Plants

Perform surveys to determine if protected plants (or suitable habitat) are on or adjacent to the project site. Have a qualified individual perform the surveys and follow suitable survey protocols. Conduct plant surveys during appropriate survey periods (usually flowering season).

Design projects to avoid known locations and associated habitat to the extent possible. Use "temporary" removal of plants and soil profile plugs (which include the A and B horizons) with the intent to replace to original location post-construction as a last resort. Consider transplanting and seed banking only after all other options are exhausted.

Enhance and protect plants on site and in adjacent habitats to the maximum extent possible.

Use only native plants for post project restoration efforts.

A.1.7 Invasive Species

Develop and implement a Hazard Analysis and Critical Control Points (HACCP) plan to prevent and control invasive species. Use (ASTM E2590−08) or other version of HACCP or other similar planning tool.

Implement an Integrated Pest Management (IPM) approach to facility design, sanitation, and maintenance to prevent and control invasive and pest species.

Inspect sites, staging, and buffer areas for common invasive species prior to the onset of work. Map any invasive species detected and note qualitative or quantitative measures regarding abundance. Implement a control plan, if necessary, to ensure these species do not increase in distribution or abundance at a site due to project implementation. Inspect sites periodically to identify and control new colonies/individuals of an invasive species not previously observed prior to construction.

Prior to bringing any equipment (including personal gear, machinery, vehicles, or vessels) to the work site, inspect each item for mud or soil, seeds, and vegetation. If present, clean the equipment, vehicles, or personal gear until they are free from mud, soil, seeds, and vegetation. Inspect the equipment, vehicles, and personal gear each time they are being prepared to go to a site or prior to transferring between sites to avoid spreading exotic, nuisance species.

Place and maintain predator-proof waste receptacles in strategic locations during project implementation to prevent an increase in predator abundance. For projects designed to enhance or increase visitor use, maintain predator-proof waste receptacles for the life of the project.

Have the appropriate state agency inspect any equipment or construction materials for invasive species prior to use.

Inspect and certify propagated or transplanted vegetation as pest and disease free prior to planting in restoration project areas.

A.1.8 General Construction Measures

A.1.8.1 Guidelines

Bubble Curtain Specifications for Pile Driving, as contained in the Florida Statewide Programmatic Opinion on page 270.

Construction Guidelines in Florida for Minor Piling-Supported Structures Constructed in or over Submerged Aquatic Vegetation (SAV), Marsh or Mangrove Habitat, U.S. Army Corps of Engineers/NMFS, August 2001.

Key for Construction Conditions for Docks or Other Minor Structures Constructed in or Over Johnson's Seagrass (Halophila johnsonii), NMFS/U.S. Army Corps of Engineers, October 2002.

National Artificial Reef Plan (as Amended): Guidelines for Siting, Construction, Development, and Assessment of Artificial Reefs, NOAA, February 2007.

Guidelines for Marine Artificial Reef Materials, GSMFC, January 2004.

Assessment and Mitigation of Marine Explosives: Guidance for Protected Species in the Southeast U.S., NMFS, February 2008.

A.1.8.2 Piling Installation

Push pilings into soft, bottom substrate to reduce noise from installation; do not drive and hammer pilings into bottom substrate unless necessary for proper construction.

A.1.8.3 Protected Species

Provide all individuals working on a project with information in support of general awareness of and means to avoid impacts to protected species and their habitats present at the specific project site.

Survey for other at-risk or imperilled species. If found on site, contact the USFWS and state trust resource agency to determine if avoidance or minimization measures or a Candidate Conservation Agreement with Assurances may be appropriate.

A.1.8.4 Site Maintenance and Conduct

Use the nearest, existing staging, access and egress areas, travel corridors, pathways, and roadways (including those provided by the state, local governments, land managers, trustee, or private property owner, with proper permissions) and do not create new staging areas, access (except dune walkovers) or egress, or travel corridors through dune habitats.

Limit driving on the beach for construction to the minimum necessary within the designated travel corridor–established just above or just below the primary "wrack" line. Avoid driving on the upper beach whenever possible, and never drive over any dunes or beach vegetation. Check with the USFWS and state trust resource agency for additional specific beach driving recommendations in Florida and Alabama.

Minimize construction noise to the maximum extent practicable when working near protected species and their habitats.

Maintain or improve all lighting regimes. Methods include working during daylight hours only, prohibiting lighting on dune walkovers, and using wildlife-friendly lighting where lighting is necessary for human safety.

Post signs at kiosks, ramps, and piers to provide visitors with information to avoid and minimize impacts to protected species and their habitats while recreating. Develop signs in coordination with NMFS, USFWS, and the local state trust resource agency.

Supply and maintain containers for waste fishing gear to avoid fish and wildlife entanglement.

A.1.8.5 Land and Vegetation Protection

Develop and implement an erosion control plan to minimize erosion during and after construction and where possible use vegetative buffers (100 feet or greater), revegetate with native species or annual grasses, and conduct work during dry seasons.

Develop and implement a spill prevention and response plan, including conducting daily inspections of all construction and related equipment to ensure there are no leaks of antifreeze, hydraulic fluid, or other substances and cleaning and sealing all equipment that would be used in the water to rid it of chemical residue. Develop a contract stipulation to disallow use of any leaking equipment or vehicles.

Prohibit use of hazardous materials, such as lead paint, creosote, pentachlorophenol, and other wood preservatives during construction in, over or adjacent to, sensitive sites during construction and routine maintenance.

Where landscaping is necessary or desired, use native plants from local sources. If non-native species must be used, ensure they are noninvasive and use them in container plantings.

A.1.8.6 Wetland and Aquatic Resource Protection

Complete an engineering design and post-construction inspection for projects where geomorphic elevations are restored in wetlands, marshes, and shallow water habitats to ensure the success of the restoration project. Manage elevation of fill material to ensure projected consolidation rates are accomplished and that habitat suitable for wetland and marsh vegetation is developed.

Avoid and minimize, to the maximum extent practicable, placement of dredged or fill material in wetlands and other aquatic resources.

Design construction equipment corridors to avoid and minimize impacts to wetlands and other aquatic resources to the maximum extent practicable.

To the maximum extent possible, implement the placement of sediment to minimize impacts to existing vegetation or burrowing organisms.

Place protective warning signs and buoys around at-risk habitats for infrastructure projects that could increase recreational uses in SAV or oyster areas.

Apply herbicide in accordance with the direction and guidance provided on the appropriate U.S. Environmental Protection Agency (EPA) labels and state statutes during land-based activities.

Only use suitable borrow sites (i.e., those that do not contain *Sargassum,* SAV, or oysters) as dredging sites for sediment. Obtain sediments by beneficially using dredged material from navigation channels or by accessing material from approved offshore borrow areas. Sediments must closely match the chemical and physical characteristics of sediment at the restoration site. Additionally, use target borrow areas within reasonable proximity to suitable sites for sediment placement.

When local conditions indicate the likely presence of contaminated soils and sediments, test soil samples for contaminant levels and take precautions to avoid disturbance of, or provide for proper

disposal of, contaminated soils and sediments. Evaluate methods prior to dredging to reduce the potential for impacts from turbidity or tarballs.

Perform maintenance of generators, cranes, and any other stationary equipment operated within 150 feet of any natural or wetland area, as necessary, to prevent leaks and spills from entering the water.

Designate a vehicle staging area removed from any natural surface water resource or wetland to perform fueling, maintenance, and storage of construction vehicles and equipment. Inspect vehicles and equipment daily prior to leaving the storage area to ensure that no petroleum or oil products are leaking.

Upon completion of construction activities, restore all disturbed areas as necessary to allow habitat functions to return. Create and manage public access developments to enhance recreational experience and educational awareness to minimize effects to habitat within wetland and shallow water areas and to the long-term health of related biological communities.

Incorporate containment levees for fill cells for projects using marsh creation or other barrier island restoration. Remove these containment levees after construction to allow for the restoration of natural tidal exchange.

Use silt fencing where appropriate to reduce increased turbidity and siltation in the project vicinity. This would apply to both on land and in water work.

Continue oyster and clam shell recycling programs to provide natural material for creating additional oyster reefs.

Ensure shells to be introduced for reef creation are subjected to depuration in a secure open air area for a period of not less than 6 months.

Make all efforts to reduce the peak sound level and exposure levels of fish to reduce the potential impact of sound on fish present in the project areas.

Use a vibratory hammer whenever possible to reduce peak sound pressure levels in the aquatic environment.

Use sound attenuation devices where practicable for pulse noise (impact hammers) to reduce peak sound pressure levels in the aquatic environment.

Stipulate the timing of activities to avoid impacts to spawning fish and eggs/larvae.

Use best practices to reduce turbidity, such as turbidity blankets, to reduce the potential impact of turbidity on finfish.

Screen water withdrawal pipes to minimize potential entrainment of fish from the withdrawal area. Have project proponents coordinate with NMFS to create an intake screen that would minimize potential impingement of fish.

A.1.8.7 Aquaculture Facilities

Treat effluent from aquaculture facilities to avoid dispersal of potential pathogens into receiving waters.

Make sure that all aquaculture facilities and fish raised in those facilities meet fish health standards and are screened for pathogens prior to release into receiving waters.

Implement a genetics management plan that ensures maintenance of genetic diversity of native stocks of finfish in the Gulf of Mexico.

Develop and implement a stocking management plan prior to the release of hatchery-reared finfish.

A.2 Future Best Practices

The PDARP/PEIS did not incorporate the practices described in this section (Section A.2) in the analysis of environmental consequences in Chapter 6. Although these were not available at the time of analysis in the PDARP/PEIS, practices developed in the future are intended to provide essential technical assistance to avoid and minimize effects to ESA-listed species and their designated critical and Essential Fish Habitat (EFH). Incorporating this guidance into future restoration plans can lead to effective and efficient consultation under the ESA and MSFCMA. As projects in the Gulf of Mexico are implemented, additional practices may be developed. Check the websites below for the most recent guidance available.

A.2.1 Project Design Criteria for ESA-Listed Species

Project Design Criteria (PDC) are being developed by NMFS[1] to provide technical assistance and avoid or reduce adverse impacts to ESA-listed and protected species. PDCs may be developed for the following and/or additional restoration actions:

- Marine debris removal.
- Living shorelines.
- Marsh creation and enhancement.
- Non-fishing piers.
- Oyster reef creation or enhancement.

Once complete, detailed descriptions of PDCs can be found under the "NMFS' Southeast Regional Office Guidance" on the following webpage: *http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/index.html*.

A.2.2 Best Practices for EFH Under MSFCMA

At time of publication, practices to avoid and minimize effects to EFH were under development. Please check the following webpage for EFH best practices that may be developed: *http://sero.nmfs.noaa.gov/habitat_conservation/efh/guidance_docs/index.html*.

[1] NMFS Protected Resources Division Southeast Region 2015. Personal communication with Rachel Sweeney and Mike Tucker, August.

A.3 References

FWS (U.S. Fish and Wildlife Service). (2015). *Conservation measures for dune walkover construction*. Panama City, FL: Panama City Ecological Services, Fish & Wildlife Conservation Office. Retrieved from *https://www.fws.gov/panamacity/resources/ConservationMeasuresforDuneWalkoverConstruction.pdf*

Appendix B. Additional Actions for Consideration in Cumulative Impacts Analysis

The following tables describe additional actions or programs considered as part of the PDARP/PEIS cumulative impact analysis. The tables are organized by the category of actions being evaluated.

Table 6.B-1 presents examples of habitat conservation and protection programs in the Gulf Coast region.

Table 6.B-1. Example habitat conservation and protection programs in the Gulf Coast region.

Federal or Federal/State/Local Partnership Activities	
The National Marine Sanctuaries	Two sanctuaries are located in the Gulf of Mexico: Flower Garden Banks, which includes 36,000 acres of waters offshore of Texas and Louisiana, and the 2,900 square mile area in the Florida Keys.
The National Wildlife Refuge System	36 National Wildlife Refuges are located within the coastal areas of the Gulf of Mexico. No new National Wildlife Refuges have been proposed in the Gulf of Mexico proposed planning area.
National Estuarine Research Reserves	Federal and state partnerships. Past actions have included the establishment of four estuarine research reserves in the Gulf of Mexico area from Texas to Tampa Bay. There are no known future nominated estuaries planned for the National Estuarine Research Reserves in the Gulf of Mexico.
Gulf of Mexico Marine Protected Areas (MPAs) (State and Federal)	There are approximately 295 MPAs located within the Gulf of Mexico region, covering nearly 40 percent of the Gulf of Mexico U.S. marine waters. MPAs by jurisdiction include 19 in Texas, 17 in Louisiana, 21 in Mississippi, 7 in Alabama, 217 in Florida, and 33 in federal waters.
USDA NRCS Wetlands Reserve Program (WRP)	The WRP is one of the largest private lands wetland restoration and easement programs in the United States.
USDA Conservation Reserve Program (CRP)	The CRP is the largest private lands buffer and conservation cover rental contract program in the United States. Annual enrolled acreage for 2013 (USDA 2013): • Texas: 3,261,730 million acres • Louisiana: 313,533 acres • Mississippi: 779,168 acres • Alabama: 326,247 acres • Florida: 46,605 acres
USDA Grassland Reserve Program (GRP)	The GRP is jointly administered by the Farm Service Agency and the Natural Resources Conservation Service to protect and enhance working grazing lands, grasslands, and rangelands through rental contracts and conservation easements.
USDA NRCS Farm and Ranch Land Protection Program (FRPP)	The FRPP provides funding to eligible states, Indian tribes, and nongovernmental organizations for purchase of conservation easements to protect agricultural use and related conservation values of eligible land by limiting nonagricultural uses of that land.
USDA NRCS Environmental Quality Incentives Program (EQIP)	EQIP provides financial and technical assistance to farmers and ranchers in order to improve water and air quality, conserve ground and surface water resources, reduce soil erosion and sedimentation, and improve or create wildlife habitat.

Federal or Federal/State/Local Partnership Activities	
USDA NRCS Wildlife Habitat Incentives Program (WHIP)	WHIP provides financial and technical assistance to wildlife-minded landowners and producers who want to develop and improve wildlife habitat on agricultural land, nonindustrial private forest land, and Indian land.
The National Park System	National Park Service lands along the coast or in coastal areas of the Gulf of Mexico include the Everglades National Park, Big Cypress National Preserve, Dry Tortugas National Park, Padre Island National Seashore, Gulf Islands National Seashore, Palo Alto Battlefield National Historical Park, Jean Lafitte National Historic Park, New Orleans Jazz National Historical Park, and DeSoto National Memorial.
NOAA Coastal and Estuarine Land Conservation Program	The Coastal and Estuarine Land Conservation Program provides grants to Gulf of Mexico state agencies and local governments to acquire property or conservation easements in the coastal zone or coastal watershed.
USFWS ESA Recovery/Habitat Plans	As part of the recovery plans for some ESA listed species, Critical Habitat has been designated as described in Chapter 3. USFWS Habitat Conservation programs include Endangered Species Grants, Partners for Fish and Wildlife, the Coastal Program, the National Coastal Wetlands Conservation Grant Program, North American Wetlands Conservation Grants, Fish Passage Program, and National Fish Habitat Partnerships.
MSFCMA EFH Fishery Management Plans	EFH has been identified and described in fishery management plans developed by the Gulf of Mexico Fishery Management Council and NMFS Highly Migratory Species Division Habitat Areas of Particular Concern (HAPCs) have been defined for some of these designations.
North American Bird Conservation Initiative (NABCI) -Bird Conservation Regions (BCRs)	The NABCI strategy is to foster coordination and collaboration on key issues of concern, including bird monitoring, conservation design, private lands, international collaboration, and state and federal agency support for integrated bird conservation. Five NABCI BCRs overlap the area of the northern Gulf of Mexico.
State Activities	
Texas	Texas Coastal Management Program, Texas Land and Water Resources Conservation and Recreation Plan, Texas Prairie Wetlands Project, Texas Wetland Conservation Plan, Texas Water Plan (Texas State Water Development Board 2012), Texas 2012 Regional Water Plans, Texas Parks and Wildlife Conservation Programs, Seagrass Conservation Plan for Texas and the Coastal Erosion Protection Planning and Response Act Program are active coastal and land protection programs.
Louisiana	Louisiana's 2012 Comprehensive Master Plan for a Sustainable Coast guides all coastal restoration and hurricane protection efforts (CPRA 2012).
Mississippi	Coastal Preserves Program works to protect sensitive coastal habitats using Tidelands Trust Funds to acquire coastal areas. The Mississippi Coastal Improvement Program provides resources to address storm damage, saltwater intrusion, erosion, fish and wildlife, and other purposes. Other efforts include Mississippi Comprehensive Resource Management Plan and Mississippi's Vision for Gulf Coast Recovery, Restoration, and Protection.
Alabama	Through the Forever Wild Program, and other programs, Alabama has invested in land protection around the Mobile-Tensaw River delta. Other projects that are likely to be implemented are identified in the Coastal Recovery Commission of Alabama's Roadmap to Resilience.

Federal or Federal/State/Local Partnership Activities	
Florida	Florida Forever program has protected 305,990 acres of functional wetlands as part of its 10 million acres of conservation lands protected (FDEP 2015).
Private and Nongovernmental Conservation Easements—Past to 2010 (Conservation Registry 2012)	
Texas	Total of 282,060 acres.
Louisiana	Total of 363,000 acres including holdings of The Nature Conservancy, which is one of the largest landowners.
Mississippi	Total of 294,000 acres including Ducks Unlimited holdings of 289,000 acres.
Alabama	Total of 71,000 acres including Alabama Land Trust holdings of 23,000 acres.
Florida	Total of 483,000 acres including Southwest Florida Water Management District holdings of 53,187 acres.

Table 6.B-2 below describes many of the federal, state, and local projects and programs related to habitat restoration that have occurred in the past and present and are expected to continue into the future. Because of the number of individual restoration projects that are implemented through these programs, major agency or nongovernmental programs have been described generically. These many and various types of restoration programs and the thousands of projects they comprise are implemented at many different scales and in accordance with the various programs, authorities, and bodies that enable restoration activities.

Table 6.B-2. Example restoration programs in the Gulf Coast region.

Federal Activities	
Coastal Impact Assistance Program (CIAP) and Gulf of Mexico Energy Security Act (GOMESA)	The CIAP provides funding to the six OCS oil- and gas-producing states—Alabama, Alaska, California, Louisiana, Mississippi, and Texas—for the conservation, protection and preservation of coastal areas, including wetlands. Each state has an approved plan for implementing appropriations. All surplus funds are currently projected to be expended by fiscal year 2017 (CPRA 2015). The Gulf of Mexico Energy Security Act (GOMESA) covers OCS oil and gas leasing activities and revenue sharing in the Gulf of Mexico. GOMESA funds are to be used for coastal conservation, restoration, and hurricane protection. A total of 8.3 million acres are offered for oil and gas leases and include approximately 2 million acres in the central Gulf, approximately 0.5 million acres in the eastern Gulf, and approximately 5.8 million acres in the central Gulf (BOEM 2015).
EPA's Estuary Program	The National Estuary Program provides focused management to benefit habitats, water quality, and other desired resource management objectives for Coastal Bend Bays and Estuaries, Corpus Christi Bay, Galveston Bay, Barataria-Terrebonne Estuarine Complex, Mobile Bay, Tampa Bay, Sarasota Bay, and Charlotte Harbor.
USDA NRCS Gulf of Mexico Initiative (GOMI)	NRCS delivers voluntary financial and easement assistance through existing conservation programs in 16 priority watersheds in the Gulf of Mexico watershed. GOMI objectives are to improve water quality, increase water conservation, and enhance wildlife habitat within watersheds draining into the Gulf of Mexico through long-term contracts with private landowners, which would result in implementation of a wide range of conservation practices and land protection easements.

USDA NRCS Migratory Bird Habitat Initiative	The Migratory Bird Habitat Initiative was established in response to the *Deepwater Horizon* (DWH) disaster to provide immediate food and critical habitat for bird populations potentially affected by the spill.
USDA Farm Bill Conservation Programs (non-easement)	A number of USDA programs and projects have been implemented in the Gulf of Mexico region to address resource concerns, including wildlife habitat, water quality and quantity, soil quality, and other resource concerns.
USFWS State Wildlife Grants	USFWS administers several grant programs to support wildlife restoration benefiting Gulf of Mexico ecosystems. USFWS has provided funding to all Gulf states.
Gulf of Mexico Community-Based Restoration Program	The Gulf of Mexico Community-Based Restoration Program is a multi-year, regional partnership between the Gulf of Mexico Foundation, the NOAA CRP, the EPA Gulf of Mexico Program, and the Gulf states and Caribbean Territories. The purpose of this partnership is to strengthen the conservation efforts of the NOAA CRP and EPA Gulf of Mexico Program by supporting on-the-ground restoration activities and fostering local stewardship of ecologically significant areas.
USACE Programs	The Water Resource Development Act authorizes USACE to plan and establish wetland areas as part of an authorized water resources development project. The Mississippi Coastal Improvement Program was established by USACE after Hurricane Katrina. The program is comprehensive, consisting of structural, nonstructural, and environmental improvement projects for coastal Mississippi. The Northern Gulf of Mexico Regional Sediment Management Plan and Projects addresses restoration and sediment management at a regional scale.
State And Regional Activities	
State and Regional Invasive Species Management Activities	Invasive species have been the focus of a number of efforts, including Southeast Aquatic Resource Partnership, Gulf and South Atlantic Regional Panel on Aquatic Invasive Species, Aquatic Nuisance Species Task Force, and National Invasive Species Council.
Texas	Oyster restoration efforts in Galveston Bay are underway to address siltation and destruction of oyster beds due to hurricane impacts. Seagrass Conservation Plan for Texas and the Coastal Erosion Protection Planning and Response Act Program are also active coastal restoration/conservation programs. Other restoration priorities and projects being implemented in Texas include protection and restoration of Chenier Plain wetlands, ICWW shoreline habitat protection and restoration, freshwater inflow and saltwater intrusion initiatives, water quality initiatives in priority watersheds associated with bay ecosystems (e.g., Galveston, San Antonio, Nueces, Laguna Madre, and Aransas Bays rookery island protection and restoration efforts).
Louisiana	Louisiana's 2012 Comprehensive Master Plan for a Sustainable Coast ("Master Plan") represents fundamental state policy with regards to coastal planning and restoration. It was drafted following extensive technical and public input and consultation and includes a suite of restoration and protection measures designed to achieve a sustainable and resilient coastal landscape and to protect Louisiana's coastal resources from inundation (CPRA 2012). The Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) and the Louisiana Coastal Wetlands Conservation and Restoration Task Force—a state and federal partnership—has authorized over 185 projects since its inception, representing over 133,000 acres of coastal wetland restoration. A total of 93 projects have been completed, representing 80,000 acres. CWPPRA will implement 91 projects, representing 53,000 acres in the foreseeable future.

	Louisiana Department of Wildlife and Fisheries (LDWF) cultch planting has been ongoing since 1917. Since the initiation of the program, LDWF has placed over 1.5 million cubic yards of cultch material on nearly 30,000 acres. Other federal statewide efforts include the Louisiana Coastal Area Near-Term Plan and CPRA's Annual Plans. CPRA's Mississippi River Hydrodynamic and Delta Management Studies authorized through USACE Water Resources Development will address water and sediment management on the Mississippi River. Other restoration actions may be funded through CIAP and/or state surplus dollars.
Mississippi	Mississippi Coastal Improvement Program provides resources to address storm damage, saltwater intrusion, erosion, fish and wildlife, and other purposes. Fifteen "interim" projects were funded following Hurricane Katrina. Mississippi Coastal Improvement Program has developed a comprehensive program for coastal restoration and protection, especially focused on barrier islands. In 2009, USACE funded barrier island and other restoration activities. A regional Sediment Management Master Plan is in development to address Gulf barrier island restoration.
Alabama	The state of Alabama is focused on barrier island restoration. Restore Coastal Alabama Project will restore 100 miles of oyster reefs and over 1,000 acres of coastal marsh and seagrass beds. Community-based oyster and marsh restoration projects with nongovernmental organizations are also underway. Future efforts include the implementation of an Alabama Coastal Resiliency Plan.
Florida	Florida's Comprehensive Everglades Restoration Plan contributes to Gulf of Mexico restoration efforts. Other programs include Coastal Wildlife Conservation Initiative to address native wildlife and coastal ecosystems and the Statewide Beaches Habitat Conservation Plan led by the Florida Department of Environmental Protection.
Example Regional Restoration Planning Efforts	
Gulf of Mexico Foundation: Community Based Restoration Partnership	Gulf of Mexico Foundation has administered the program, managing over 75 restoration projects throughout the Gulf and Caribbean. Example projects include: <u>2012 Community Based Restoration Partnership Projects</u> Bon Secour Shoreline and Habitat Restoration Galt Preserve Restoration Restoring Coral Reefs with in-situ Nursery Techniques <u>2011 Community Based Restoration Partnership Projects</u> Oyster Reef Restoration in the Texas Coastal Bend Elmer's Island Community-led Restoration Habitat Restoration in Mobile Bay Enhancement of mangrove shorelines in Clam Bayou Newman Branch Creek Phase II Restoration
NFWF	NFWF has supported over 450 projects in the Gulf of Mexico with a total value of more than $128 million. After the DWH oil spill, NFWF supported more than 75 projects and administered $22.9 million under the Recovered Oil Fund for Wildlife and other funding sources (NFWF 2013).

The Gulf Coast Joint Venture	The Gulf Coast Joint Venture is a partnership among federal and state agencies, nonprofit organizations, and private landowners dedicated to the conservation of priority bird habitat along the U.S. Gulf of Mexico coast. Habitat projects are developed and implemented by five regional Initiative Teams of biologists and managers of public and private lands. The Gulf Coast Joint Venture partners include numerous other organizations and hundreds of individuals that are involved in specific collaborative habitat, planning, or evaluation projects.

B.1 Water Quality Improvement Programs

Table 6.B-3 describes many of the federal, state, and local projects and programs that protect and restore Gulf of Mexico water quality. The programs listed are only representative of efforts being undertaken throughout the Mississippi River and other tributaries to the Gulf of Mexico. In particular, the states outside of the study area but contributing to these waters are implementing programs similar in scope and magnitude to those described below.

Table 6.B-3. Example regulatory and voluntary programs to improve water quality in the Gulf Coast region.

Federal or Federal/State/Local Partnership Activities	
EPA	Under the Clean Water Act, EPA works with states, tribes and communities to help prevent and control pollutants in our nation's waters via funding assistance (e.g., State Revolving Loan Fund capitalization grants, grants to states for administering water pollution control programs and controlling nonpoint sources of pollution) and overseeing or directly administering regulatory (e.g., NPDES discharge permits) and nonregulatory programs. Vessel emission control in the Gulf of Mexico—emission standards to reduce the environmental impact from marine spark-ignition engines and vessels by requiring manufacturers to control exhaust emissions from fuel tanks and fuel lines. Mercury Reduction to Gulf of Mexico—Mercury and Air Toxics Standards for power plants to limit mercury, acid gas, and other pollution from power plants. Proposed targeted reductions of atmospheric deposition for mercury, sulfur, nitrogen, and other pollutants to U.S. waters, including the Gulf of Mexico.
Hypoxia Task Force Action Plan	Implementation of comprehensive nutrient and phosphorus reduction strategies for states in the Mississippi and Atchafalaya River Basin.
National Ocean Policy Implementation Plan	National Ocean Council with NOAA, USDA, USGS, and Hypoxia Task Force members identified collaborative measures with regional partnerships to improve water quality in the Gulf of Mexico. The National Ocean Policy Implementation Plan was finalized in 2013 (NOC 2013). Mississippi River interagency monitoring, modeling, and assessment partnership established in 2013. With interested states, MSR collaborated on the development and implementation of state-wide nitrogen and phosphorus reduction strategies in the MSR and Gulf region in 2014.

Federal or Federal/State/Local Partnership Activities	
USDA NRCS	The Migratory Bird Habitat Initiative was established in response to the DWH disaster to provide immediate food and critical habitat for bird populations potentially affected by the spill. Nutrient Management Implementation—28 million acres of land have come under nutrient management systems within the MSR since 2000, including 4 million acres added in fiscal year 2009 and 2010. Soil Erosion Control—Conservation practices were applied to 34 million acres of land for erosion control from fiscal 2005 to fiscal 2010, including 10 million acres in Fiscal 2009 and 2010.
USACE	Steele Bayou Project-Mississippi—flood control/sediment reduction project in the MSR watershed in which sediment control and water management practices were installed, including eight low-head weirs to maintain minimum water depths in the channels and 67 sediment control structures to prevent sediment from filling the channels.
Louisiana Nutrient Management Strategy	Several Louisiana state agencies including the Coastal Protection and Restoration Authority of Louisiana, Louisiana Department of Environmental Quality, Louisiana Department of Agriculture and Forestry, and Louisiana Department of Natural Resources work cooperatively with other state, federal, and watershed based stakeholders to implement a comprehensive strategy for nutrient management. This nutrient management strategy takes into account nonpoint and point sources and includes agricultural management practices, wastewater treatment technologies, coastal programs and restoration activities in an effort to manage nutrient levels while meeting regulatory requirements under the Clean Water Act and while developing incentive-based approaches for participation of all stakeholders within the watershed community (Louisiana Nutrient Management Strategy Interagency Team 2014).
Mississippi State Nutrient Reduction Strategy and Delta Farmers	The Mississippi Department of Environmental Quality participates with the state Nutrient Reduction Strategy Work Group to develop a consistent approach among MSR states to reduce nutrient loadings to the Gulf. The Mississippi Department of Environmental Quality is co-leading an effort with Delta Farmers Advocating Resource Management to develop a nutrient reduction strategy for the Delta region of Mississippi. Mississippi/Gulf of Mexico Watershed Nutrient Task Force is working to address statewide nutrient reduction and upper-basin information and technology exchange.
Florida Numerical Nutrient Limits	Authorized by the Watershed Restoration Act 1999, Florida is implementing nutrient reduction strategies through its total maximum daily load program and setting numerical nutrient limits on the amount of allowable nutrients that can be discharged into state waters.

Federal or Federal/State/Local Partnership Activities	
Gulf of Mexico Alliance (GOMA), Alabama, Florida, Louisiana, Mississippi, and Texas Nutrient Reduction Strategies	States and the GOMA are working to develop and implement state nutrient reduction frameworks to restore local water quality conditions.
Non-Governmental Organizations	Mississippi River Water Quality Collaborative sponsored by the McKnight Foundation brings together representatives from more than 20 nongovernmental organizations from states along the Mississippi River corridor to explore strategies for comprehensive, riverwide water quality improvements. Lower Mississippi River Conservation Committee, Lower Mississippi River Aquatic Resource Management Plan, a 10-year operational plan to address the primary factors adversely affecting aquatic resources in the river's active floodplain and backwater areas: • Ducks Unlimited. • The Conservation Fund. • The Nature Conservancy. • Louisiana Environmental Action Network. • Tennessee Clean Water Network. • Iowa Environmental Council. • Minnesota Center for Environmental Advocacy. • Mississippi River Basin Alliance.
International Water Quality Projects	North American Emissions Control Area–2010 to control marine vessel pollution in international waters.

B.2 Other Cumulative Actions

This section presents Table 6.B-4, which provides examples of military activities and projects, Table 6.B-5, which provides examples of shipping and maritime port projects, Table 6.B-6, which provides examples of tourism and recreation programs, Table 6.B-7, which provides examples of dredged material disposal projects, and Table 6.B-8, which provides examples of outer continental shelf projects.

Table 6.B-4. Example military activities and projects in the Gulf Coast region.

Installation	Activity
Eglin Air Force Base, Pensacola, Florida	Installation of a fiber optic cable between Eglin and Santa Rosa Island. Three new missions resulting from BRAC 2005 realignment; 59 F-35 Primary Assigned Aircraft and associated cantonment construction and limited flight training operations added under the Record of Decision in 2008 (USAF 2009). More than 50 planned Military Construction projects beyond FY 2010 with approximately 2 million square feet (Eglin Air Force Base 2009).
Hurlburt Field, Eglin Complex, Florida	Selected as preferred location for future receipt of a 140-person Air Force Reserve MQ-1 Predator squadron that would provide intelligence, surveillance, reconnaissance, and precision-strike capability for joint force commanders. More than 50 transportation and capital improvement projects at Hurlburt Field over 2011 to 2016; $24 million in construction and maintenance projects in fiscal year 2012 (Hurlburt Field 2012).
Naval Air Station Pensacola, Florida	Potential decrease in Pensacola area jobs of about 3,784 through BRAC 2005 recommendations that realign and consolidate commands. New training aircraft arrivals through 2020 may require operational and facility changes, including longer runways, new overlays, taxiways, parking aprons, and updated operational training space. Addition of fleet aircraft and missions would intensify the number of flight operations (Escambia County 2003).
BRAC 2005 Recommendations Naval Air Station Corpus Christi, Texas	Reduction of jobs through realignment and consolidation of commands; general and supporting new construction and facility upgrades required (DBCRC 2005).
Naval Air Station Ingleside, Texas	Base closure under BRAC 2005; main property will revert to Port of Corpus Christi Authority. Electromagnetic Reduction Facility preferred re-use was for construction of a marine business park and marina. However, the property is currently in negotiations with Canyon Supply and Logistics to create an offshore oil service complex (DOD 2015).

Installation	Activity
Naval Support Area, Panama City, Florida	The Naval Support Area is expected to continue to expand in the future as the number of classes and students increases with increasing modernization of naval forces and advances in technology and as modern warfare increases research, design, testing and evaluation activities projects. Naval Support Area Panama City uses nine federally designated U.S. Navy Restricted Areas in St. Andrew Bay for near-shore, open water operations along with additional training areas in the Gulf of Mexico. (Bay County 2009).
Operating Training Area	Military activities that occur within the Gulf of Mexico waters can result in impacts to marine mammals, sea turtles, and other marine fauna although the areas restricted to military use may also function as MPAs when not in use. The U.S. Navy has developed range-complex monitoring plans to provide marine mammal and sea turtle monitoring in compliance with the MMPA and the EPA.

Table 6.B-5. Example shipping and maritime port projects the Gulf Coast region.

Texas	
Brownsville	Lease negotiations with a company based in China to develop a 35-acre site (Port of Brownsville 2012). Feasibility study on widening and deepening ship channel (USACE 2012).
Galveston	Cruise ship terminal improvements; proposed lease for 185-acre rail access and bulk cargo terminal on Pelican Island (Seaport Press Review 2012). Major capital improvements to existing cruise ship facilities were completed in 2011. In 2014, the Port of Galveston proposed $10 million towards expansion of an additional cruise terminal to be completed in 2015 (Port of Galveston 2013).
Houston	Bayport Container and Cruise Terminal full build out expected in 2030 (Port of Houston Authority 2012). The Port Authority has proposed to commit $275 million for various capital improvement projects in 2015 (Port of Houston Authority 2015). Beneficial Uses Group Project over 50 years would create 4,250 acres of intertidal salt marsh in Galveston Bay; create Evia Island for bird nesting habitat and restore Redfish and Goat Islands (FWS 2015).
Port Arthur, Beaumont	Rail yard rehabilitation and construction of a rail spur for intermodal connections (SETRPC 2010).
Port Lavaca-Point Comfort	Expansion of the turning basin, development of a dry bulk unloading dock and the Calhoun Terminal for liquefied natural gas (LNG) (World Port Source 2015).
Freeport	$30 billion capital investment plan including phased build out of Velasco Terminal and a future multimodal facility (Port Freeport 2014).
Texas City	Phased development of an international terminal on 1,000 acres to include six berths and 400 acres of container yard (Texas City 2009).
Corpus Christi	The Corpus Christi channel improvement project would create nearly 200 acres of shallow-water habitat using dredged material (Port Corpus Christi 2012).

Maintenance dredging	Corpus Christi Ship Channel, Freeport Harbor, Houston Ship Channel, Galveston and the Gulf Intracoastal Waterway (USACE 2012).
Louisiana	
New Orleans	Expansion and improvements to cruise ship facilities; proposed mixed use redevelopment including maritime and commercial uses; phased expansion of terminal (Port of New Orleans 2007, 2011, 2012a, 2012b). Relocation of the France Road and Jourdan Road terminals (Port of New Orleans 2012a).
Plaquemines	Dredged material project to build six bird islands of marsh, shrub/scrub, bare land, and beach habitats that form a chain about 2.5 miles long parallel to the seaward end of the Baptiste Collette Bayou channel. Unconfined dredged material was placed at subtidal elevations and was used for restoration of subsided and eroded intertidal marsh on the western side of Southwest Pass (Gagliano et al. 2008). Maintenance dredging Mississippi River outlets at Baptiste Collette Bar. West Pointe a la Hache wetlands project will recreate marsh habitat by harvesting sediment from the Mississippi River (Louisiana CWCRTF 2009).
Baton Rouge	Annual harbor dredging at Mississippi River (USACE 2012).
Lake Charles	Biennial maintenance dredging of ship channel (USACE 2012).
Port of South Louisiana	Globalplex Intermodal Terminal redevelopment including 150 acres for expansion (Port of South Louisiana 2015)).
Gulf Intracoastal Waterway, Louisiana	Maintenance dredging (USACE 2012).
Mississippi	
Pascagoula	New $1.1 billion terminal opened in October 2011. The Pascagoula Bar Channel was widened in 2014; the Pascagoula River Harbor completed its dredged material disposal projects in 2014. Bayou Casotte Channel widening feasibility study is underway and the project is expected to begin in late 2015.s (Port of Pascagoula 2015).
Biloxi Harbor	Dredged material from maintenance of Biloxi Harbor was used to create approximately 30 acres of tidal marsh on the north shore of the east end of the Deer Island (Great Lakes Commission 2010).
Alabama	
Perdido Pass	Maintenance dredging (USACE 2012).
Florida	
Port Manatee	Incentives for development of 5,000 acres adjacent to the port; planning for intermodal container yard development (Florida Ports Council 2015). Dredging and extension of Berth 12 and extension by 584 feet (USACE 2012).
Port Everglades	New cruise terminal constructed. Renovation of four other cruise terminals part of a 15-year agreement with Carnival Cruise lines; new 41-acre container terminal; 30-year lease and operating agreement to develop an intermodal container transfer facility (Florida Ports Council 2015).
Port of Pensacola	Land available for permanent dredged materials disposal (9 acres) and for future development (8.5 acres).

Port of Tampa	$100 million improvements including phased expansion of container facilities (two new terminals, expansion of container yard); plans for new product distribution center capacity; upgrading and expanding bulk cargo facilities; expanded cruise service (Florida Ports Council 2015).
Port of Panama City	Bulkhead maintenance and rehabilitation; general and bulk cargo area expansions; intermodal distribution center (Panama City Port Authority 2015). Deepening of channel and berthing areas (Panama City Port Authority 2015).
Port of Freeport	Deepening and widening (USACE 2012).
Maintenance dredging	Pensacola Harbor Entrance Channel, Port Everglades and Tampa harbors (USACE 2012).
Tampa Bay	Beneficial use placement in the planning stages for USACE projects, including the creation of wetlands and additional bird nesting habitat just south of Bird Island.

Table 6.B-6. Example tourism and recreation programs and initiatives within the Gulf Coast region.

Incentive Programs Texas	
Texas Nature Tourism Council	A council of the Texas Travel Industry Association whose mission is to promote the value of nature tourism in Texas and to educate Texans and visitors about the state's nature tourism resources. The Council also assists and educates businesses, individuals, and other entities that provide nature-based tourism services and facilities to the public (Texas Tourism Council 2012).
The Nature Tourism Program of Texas A&M Agrilife Extension	Provides educational and training programs, materials, and consultations to professionals, landowners, and the general public to assist people who are interested in nature tourism as a business enterprise, conservation, or community development program (TAMU 2015).
Texas Heritage Trail	The Texas Heritage Trail Program is an award-winning heritage tourism initiative that encourages communities, heritage regions, and the state to partner and promote historic and cultural resources. Local preservation efforts, combined with statewide marketing of heritage regions as tourism destinations, increase visitation to cultural and historic sites and is based on 10 scenic driving trails including the Gulf Coast Byway, a portion of the Texas Tropical Trail (THC 2012).
Houston Wilderness	Houston Wilderness is a broad-based alliance of business, environmental, and government interests that acts in concert to protect, preserve, and promote the unique biodiversity of the region's remaining ecological capital from bottomland hardwoods and prairie grasslands to pine forests and wetlands. These eco-region landscapes decrease repetitive flooding; improve water quality; and boost outdoor recreation, ecotourism, and economic growth (Houston Wilderness 2014).

Incentive Programs	
Texas Tourism	The Office of the Governor, Economic Development and Tourism (Texas Tourism) is responsible for promoting Texas as a premier travel destination. The office works in concert with its partners (convention and visitors bureaus, local chambers of commerce, private travel-related organizations, and associations) to promote travel to Texas in both the domestic and international tourism marketing arenas (Texas Office of the Governor 2015).
Louisiana	
Louisiana Office of Tourism	Louisiana provides grants and opportunities for partnering for tourism promotion within Louisiana to strengthen marketing opportunities (Louisiana Office of Tourism 2012).
Mississippi	
Mississippi Tourism Rebate Program	Program for qualifying new tourism projects that allows a portion of the sales tax paid by visitors to the eligible tourism-oriented enterprise project to reimburse eligible costs incurred during the construction of the project. Qualifying projects include tourism attractions, hotels, public golf courses and marinas, and resort developments (Mississippi Development Authority 2013).
Mississippi-Alabama	
Nature Tourism Initiative	Tourism initiative for coastal Alabama and Mississippi to evaluate nature-oriented businesses and to provide resources to meet their needs to in order to provide a "quality nature experience for the guests while also encouraging good stewardship and sustainability of the area's natural resources." The Mississippi-Alabama Sea Grant Consortium has developed goals and objects for sustainable development including a goal for developing "healthy coastal economies that include working waterfronts, an abundance of recreation and tourism opportunities, and coastal access for all citizens" (Mississippi-Alabama Sea Grant Consortium 2010).
Florida	
Partnership for Florida's Tourism	A grassroots coalition designed to raise awareness of the importance of tourism and to increase public funding of tourism marketing. The Partnership comprises the Florida Restaurant and Lodging Association, Florida Attractions Association, Florida Association of RV Parks and Campgrounds, Florida Association of Destination Marketing Organizations, and VISIT FLORIDA (Partnership for Florida's Tourism 2012).

Table 6.B-7. Example dredged material disposal projects in the Gulf region.

Texas	
USACE Galveston District	The Galveston District has averaged about 6 million cubic yards of material dredged per year disposed at ODMDSs over the last 10 years. Quantities may decrease slightly as more beneficial uses of dredged material onshore are identified.
Louisiana	
USACE New Orleans District	Current figures vary for how much of the average annual 75 million cubic yards that is dredged by the New Orleans District is available for the beneficial use of dredged materials program. An annual average of about 17 million cubic yards is used beneficially (about 21 percent of the annual average total). The remaining 79 percent is disposed in upland confined disposal facilities, in open water adjacent to the dredging reach, in ODMDSs, and in a temporary staging area located within the Mississippi River banks at Head of Passes (e.g., the Head of Passes hopper dredge disposal area ((USACE 2015).

Table 6.B-8. Example Outer Continental Shelf projects in the Gulf region.

Texas	
General Lands Office	The General Lands Office in Texas is collecting new geologic and geophysical data to describe potential resources in buried Pleistocene Sabine and Colorado River paleochannels, located offshore Jefferson and Brazoria Counties.
Louisiana	
Louisiana Office of Coastal Protection and Restoration	The Louisiana Office of Coastal Protection and Restoration and Louisiana State University have undertaken joint efforts, funded in part through BOEM, to identify potential sand resources in the Trinity and Tiger Shoal complex, located in the Vermilion and South Marsh Island leasing areas, and to examine the long-term effects of dredging sand on Ship Shoal, a large potential borrow area about 15 miles (24 kilometers) offshore Isle Dernieres, south-central Louisiana. The following five leases for OCS sand have been issued in the CPA: 1) Holly Beach, Cameron Parish, Louisiana; 2) the South Pelto test area, Terrebonne Parish, Louisiana; 3) Pelican Island shoreline restoration, Plaquemines Parish, Louisiana; 4) Raccoon Island marsh creation, Terrebonne Parish, Louisiana; and 5) St. Bernard Shoals, St. Bernard and Plaquemines Parishes, Louisiana. Two leases were issued in 2012 for Cameron Parish shoreline restoration in Cameron Parish, Louisiana, and for Caminada Headland shoreline restoration in Lafourche and Jefferson Parishes, Louisiana.

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Appendix C. Trustees' Correspondence

C.1 NOAA Correspondence Requesting Federal and State Cooperating Agency Participation

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

Cynthia K. Dohner, Regional Director
US Fish and Wildlife Service, SE Region
1875 Century Boulevard, Suite 400
Atlanta, GA 30345

Dear Ms. Dohner:

The National Oceanic and Atmospheric Administration (NOAA) is writing you to reaffirm the Department of Interior's status in regard to participating as a cooperating agency for the preparation of a Programmatic Environmental Impact Statement (PEIS) for the *Deepwater Horizon* (DWH) Oil Spill Programmatic Damage Assessment and Restoration Plan (PDARP). We initially invited your participation as a cooperating agency for preparing this PEIS in 2011, and due to the length of time since then we want to reaffirm your cooperating agency status.

In accordance with the National Environmental Policy Act (NEPA) of 1969, NOAA is preparing a PEIS to evaluate restoration alternatives. The PEIS will evaluate potential direct, indirect and cumulative impacts from a wide range of proposed restoration activities, and will facilitate decision-making in the restoration planning process. The PEIS is integrated with a PDARP being prepared under Oil Pollution Act.

To adequately develop the PEIS and evaluate the potential environmental effects of the restoration alternatives, NOAA is inviting the participation of the Department of Interior (DOI), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), and the U.S. Army Corps of Engineers (ACOE) as Federal cooperating agencies in accordance with the Council on Environmental Quality's (CEQ) regulation 40 CFR Part 1501, and CEQ Cooperating Agency guidance issued January 30, 2002. NOAA is also inviting each of the state Natural Resource Trustees for the DWH oil spill (Alabama, Florida, Louisiana, Mississippi, and Texas) to serve as a cooperating agency in preparation of the PEIS, due to each state's natural resource trusteeship and special expertise in their respective jurisdictions regarding environmental issues related to the DWH oil spill.

Responsibilities of the lead agency (NOAA) and cooperating agencies are outlined below.

LEAD AGENCY RESPONSIBILITIES:

1. Assume primary responsibility for meeting the requirements of NEPA, including the preparation of the draft and final PEIS. In this capacity, the lead agency will ensure that the PEIS includes information needed to address state and federal compliance requirements.
2. Consult with cooperating agencies regarding any issues of concern related to the PEIS.
3. Provide cooperating agencies with copies of the preliminary draft(s) of the PEIS in a timely manner.
4. Provide a schedule for review of the preliminary and final drafts of the PEIS by cooperating agencies.
5. Consider comments identified by cooperating agencies in revisions to drafts of the PEIS.

6. Ensure that cooperating agencies receive copies of all relevant comments received on the PEIS during the public comment period and provide an initial identification of those comments pertaining to an agencies' expertise or regulatory authority. This may require cooperating agencies to prepare written responses for inclusion in the final PEIS.
7. Ensure that the PEIS identifies cooperating agencies as such.

COOPERATING AGENCY RESPONSIBILITI ES:

1. Participate in the development of the PEIS.
2. Provide special expertise on environmental issues associated with restoration and the DWH oil spill.
3. Provide special expertise on environmental issues that fall under a cooperating agency's jurisdictional responsibilities.
4. Review preliminary documents and provide comments to the lead agency in accordance with specified timelines.
5. Provide the lead agency with timely identification of any significant issues raised based on each cooperating agency's special expertise on environmental issues and jurisdiction by law.

Thank you for your consideration in this matter. We look forward to your earliest response; please reply to Mr. Christopher Doley (chris.doley@noaa.gov) with a cc to Ms. Kristin O'Brien (kristin.o'brien@noaa.gov). If you have any questions, please contact Ms. Aileen Smith at 301-427-8625, or by email at aileen.smith@noaa.gov.

Sincerely yours,

Samuel D. Rauch III
Deputy Assistant Administrator for Regulatory Programs
NOAA National Marine Fisheries Service

cc: Pat Montanio, Office of Habitat Conservation

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

SEP 03 2015

Ken Kopocis
Senior Advisor, EPA Office of Water
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Mail Code: 4101M
Washington, DC 20460

Dear Mr. Kopocis:

The National Oceanic and Atmospheric Administration (NOAA) is writing you to reaffirm the U.S. Environmental Protection Agency's status in regard to participating as a cooperating agency for the preparation of a Programmatic Environmental Impact Statement (PEIS) for the *Deepwater Horizon* (DWH) Oil Spill Programmatic Damage Assessment and Restoration Plan (PDARP). We initially invited your participation as a cooperating agency for preparing this PEIS in 2011, and due to the length of time since then we want to reaffirm your cooperating agency status.

In accordance with the National Environmental Policy Act (NEPA) of 1969, NOAA is preparing a PEIS to evaluate restoration alternatives. The PEIS will evaluate potential direct, indirect and cumulative impacts from a wide range of proposed restoration activities, and will facilitate decision-making in the restoration planning process. The PEIS is integrated with a PDARP being prepared under Oil Pollution Act.

To adequately develop the PEIS and evaluate the potential environmental effects of the restoration alternatives, NOAA is inviting the participation of the Department of Interior (DOI), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), and the U.S. Army Corps of Engineers (ACOE) as Federal cooperating agencies in accordance with the Council on Environmental Quality's (CEQ) regulation 40 CFR Part 1501, and CEQ Cooperating Agency guidance issued January 30, 2002. NOAA is also inviting each of the state Natural Resource Trustees for the DWH oil spill (Alabama, Florida, Louisiana, Mississippi, and Texas) to serve as a cooperating agency in preparation of the PEIS, due to each state's natural resource trusteeship and special expertise in their respective jurisdictions regarding environmental issues related to the DWH oil spill.

Responsibilities of the lead agency (NOAA) and cooperating agencies are outlined below.

LEAD AGENCY RESPONSIBILITIES:

1. Assume primary responsibility for meeting the requirements of NEPA, including the preparation of the draft and final PEIS. In this capacity, the lead agency will ensure that the PEIS includes information needed to address state and federal compliance requirements.
2. Consult with cooperating agencies regarding any issues of concern related to the PEIS.
3. Provide cooperating agencies with copies of the preliminary draft(s) of the PEIS in a timely manner.

4. Provide a schedule for review of the preliminary and final drafts of the PEIS by cooperating agencies.
5. Consider comments identified by cooperating agencies in revisions to drafts of the PEIS.
6. Ensure that cooperating agencies receive copies of all relevant comments received on the PEIS during the public comment period and provide an initial identification of those comments pertaining to an agencies' expertise or regulatory authority. This may require cooperating agencies to prepare written responses for inclusion in the final PEIS.
7. Ensure that the PEIS identifies cooperating agencies as such.

COOPERATING AGENCY RESPONSIBILITI ES:

1. Participate in the development of the PEIS.
2. Provide special expertise on environmental issues associated with restoration and the DWH oil spill.
3. Provide special expertise on environmental issues that fall under a cooperating agency's jurisdictional responsibilities.
4. Review preliminary documents and provide comments to the lead agency in accordance with specified timelines.
5. Provide the lead agency with timely identification of any significant issues raised based on each cooperating agency's special expertise on environmental issues and jurisdiction by law.

Thank you for your consideration in this matter. We look forward to your earliest response; please reply to Mr. Christopher Doley (chris.doley@noaa.gov) with a cc to Ms. Kristin O'Brien (kristin.o'brien@noaa.gov). If you have any questions, please contact Ms. Aileen Smith at 301-427-8625, or by email at aileen.smith@noaa.gov.

Sincerely yours,

Samuel D. Rauch III
Deputy Assistant Administrator for Regulatory Programs
NOAA National Marine Fisheries Service

cc: Pat Montanio, Office of Habitat Conservation

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

Ann Mills
Deputy Under Secretary for Natural Resources and Environment
United States Department of Agriculture
1400 Independence Ave, S.W
Jamie L Whitten Building, Suite 240E
Washington, DC 20250

Dear Ms. Mills:

The National Oceanic and Atmospheric Administration (NOAA) is writing you to reaffirm the U.S. Department of Agriculture's status in regard to participating as a cooperating agency for the preparation of a Programmatic Environmental Impact Statement (PEIS) for the *Deepwater Horizon* (DWH) Oil Spill Programmatic Damage Assessment and Restoration Plan (PDARP). We initially invited your participation as a cooperating agency for preparing this PEIS in 2011, and due to the length of time since then we want to reaffirm your cooperating agency status.

In accordance with the National Environmental Policy Act (NEPA) of 1969, NOAA is preparing a PEIS to evaluate restoration alternatives. The PEIS will evaluate potential direct, indirect and cumulative impacts from a wide range of proposed restoration activities, and will facilitate decision-making in the restoration planning process. The PEIS is integrated with a PDARP being prepared under Oil Pollution Act.

To adequately develop the PEIS and evaluate the potential environmental effects of the restoration alternatives, NOAA is inviting the participation of the Department of Interior (DOI), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), and the U.S. Army Corps of Engineers (ACOE) as Federal cooperating agencies in accordance with the Council on Environmental Quality's (CEQ) regulation 40 CFR Part 1501, and CEQ Cooperating Agency guidance issued January 30, 2002. NOAA is also inviting each of the state Natural Resource Trustees for the DWH oil spill (Alabama, Florida, Louisiana, Mississippi, and Texas) to serve as a cooperating agency in preparation of the PEIS, due to each state's natural resource trusteeship and special expertise in their respective jurisdictions regarding environmental issues related to the DWH oil spill.

Responsibilities of the lead agency (NOAA) and cooperating agencies are outlined below.

LEAD AGENCY RESPONSIBILITIES:

1. Assume primary responsibility for meeting the requirements of NEPA, including the preparation of the draft and final PEIS. In this capacity, the lead agency will ensure that the PEIS includes information needed to address state and federal compliance requirements.
2. Consult with cooperating agencies regarding any issues of concern related to the PEIS.
3. Provide cooperating agencies with copies of the preliminary draft(s) of the PEIS in a timely manner.
4. Provide a schedule for review of the preliminary and final drafts of the PEIS by cooperating

agencies.

5. Consider comments identified by cooperating agencies in revisions to drafts of the PEIS.
6. Ensure that cooperating agencies receive copies of all relevant comments received on the PEIS during the public comment period and provide an initial identification of those comments pertaining to an agencies' expertise or regulatory authority. This may require cooperating agencies to prepare written responses for inclusion in the final PEIS.
7. Ensure that the PEIS identifies cooperating agencies as such.

COOPERATING AGENCY RESPONSIBILITI ES:

1. Participate in the development of the PEIS.
2. Provide special expertise on environmental issues associated with restoration and the DWH oil spill.
3. Provide special expertise on environmental issues that fall under a cooperating agency's jurisdictional responsibilities.
4. Review preliminary documents and provide comments to the lead agency in accordance with specified timelines.
5. Provide the lead agency with timely identification of any significant issues raised based on each cooperating agency's special expertise on environmental issues and jurisdiction by law.

Thank you for your consideration in this matter. We look forward to your earliest response; please reply to Mr. Christopher Doley (chris.doley@noaa.gov) with a cc to Ms. Kristin O'Brien (kristin.o'brien@noaa.gov). If you have any questions, please contact Ms. Aileen Smith at 301-427-8625, or by email at aileen.smith@noaa.gov.

Sincerely yours,

Samuel D. Rauch III
Deputy Assistant Administrator for Regulatory Programs
NOAA National Marine Fisheries Service

cc: Pat Montanio, Office of Habitat Conservation

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

SEP 03 2015

Mimi A. Drew
Special Advisor
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, MS 31
Tallahassee, FL 32399-3000

Dear Ms. Drew:

The National Oceanic and Atmospheric Administration (NOAA) is writing you to reaffirm the State of Florida's status in regard to participating as a cooperating agency for the preparation of a Programmatic Environmental Impact Statement (PEIS) for the *Deepwater Horizon* Oil Spill (DWH) Programmatic Damage Assessment and Restoration Plan (PDARP).

In accordance with the National Environmental Policy Act (NEPA) of 1969, NOAA is preparing a PEIS to evaluate restoration alternatives. The PEIS will evaluate potential direct, indirect and cumulative impacts from a wide range of proposed restoration activities, and will facilitate decision-making in the restoration planning process. The PEIS is integrated with a PDARP being prepared under Oil Pollution Act.

To adequately develop the PEIS and evaluate the potential environmental effects of the restoration alternatives, NOAA is inviting the participation of the Department of Interior (DOI), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), and the U.S. Army Corps of Engineers (ACOE) as Federal cooperating agencies in accordance with the Council on Environmental Quality's (CEQ) regulation 40 CFR Part 1501, and CEQ Cooperating Agency guidance issued January 30, 2002. NOAA is also inviting each of the state Natural Resource Trustees for the DWH oil spill (Alabama, Florida, Louisiana, Mississippi, and Texas) to serve as a cooperating agency in preparation of the PEIS, due to each state's natural resource trusteeship and special expertise in their respective jurisdictions regarding environmental issues related to the DWH oil spill.

Responsibilities of the lead agency (NOAA) and cooperating agencies are outlined below.

LEAD AGENCY RESPONSIBILITIES:

1. Assume primary responsibility for meeting the requirements of NEPA, including the preparation of the draft and final PEIS. In this capacity, the lead agency will ensure that the PEIS includes information needed to address state and federal compliance requirements.
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6. Ensure that cooperating agencies receive copies of all relevant comments received on the PEIS

during the public comment period and provide an initial identification of those comments pertaining to an agencies' expertise or regulatory authority. This may require cooperating agencies to prepare written responses for inclusion in the final PEIS.

7. Ensure that the PEIS identifies cooperating agencies as such.

COOPERATING AGENCY RESPONSIBILITI ES:

1. Participate in the development of the PEIS.
2. Provide special expertise on environmental issues associated with restoration and the DWH oil spill.
3. Provide special expertise on environmental issues that fall under a cooperating agency's jurisdictional responsibilities.
4. Review preliminary documents and provide comments to the lead agency in accordance with specified timelines.
5. Provide the lead agency with timely identification of any significant issues raised based on each cooperating agency's special expertise on environmental issues and jurisdiction by law.

Thank you for your consideration in this matter. We look forward to your earliest response; please reply to Mr. Christopher Doley (chris.doley@noaa.gov) with a cc to Ms. Kristin O'Brien (kristin.o'brien@noaa.gov). If you have any questions, please contact Ms. Aileen Smith at 301-427-8625, or by email at aileen.smith@noaa.gov.

Sincerely yours,

Samuel D. Rauch III
Deputy Assistant Administrator for Regulatory Programs
NOAA National Marine Fisheries Service

cc: Pat Montanio, Office of Habitat Conservation

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

SEP 03 2015

N. Gunter Guy, Jr.
Alabama Department of Conservation and Natural Resources
64 North Union Street
Montgomery, AL 36130

Dear Mr. Guy:

The National Oceanic and Atmospheric Administration (NOAA) is writing you to reaffirm the State of Alabama's status in regard to participating as a cooperating agency for the preparation of a Programmatic Environmental Impact Statement (PEIS) for the *Deepwater Horizon* Oil Spill (DWH) Programmatic Damage Assessment and Restoration Plan (PDARP).

In accordance with the National Environmental Policy Act (NEPA) of 1969, NOAA is preparing a PEIS to evaluate restoration alternatives. The PEIS will evaluate potential direct, indirect and cumulative impacts from a wide range of proposed restoration activities, and will facilitate decision-making in the restoration planning process. The PEIS is integrated with a PDARP being prepared under Oil Pollution Act.

To adequately develop the PEIS and evaluate the potential environmental effects of the restoration alternatives, NOAA is inviting the participation of the Department of Interior (DOI), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), and the U.S. Army Corps of Engineers (ACOE) as Federal cooperating agencies in accordance with the Council on Environmental Quality's (CEQ) regulation 40 CFR Part 1501, and CEQ Cooperating Agency guidance issued January 30, 2002. NOAA is also inviting each of the state Natural Resource Trustees for the DWH oil spill (Alabama, Florida, Louisiana, Mississippi, and Texas) to serve as a cooperating agency in preparation of the PEIS, due to each state's natural resource trusteeship and special expertise in their respective jurisdictions regarding environmental issues related to the DWH oil spill.

Responsibilities of the lead agency (NOAA) and cooperating agencies are outlined below.

LEAD AGENCY RESPONSIBILITIES:

1. Assume primary responsibility for meeting the requirements of NEPA, including the preparation of the draft and final PEIS. In this capacity, the lead agency will ensure that the PEIS includes information needed to address state and federal compliance requirements.
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pertaining to an agencies' expertise or regulatory authority. This may require cooperating agencies to prepare written responses for inclusion in the final PEIS.

7. Ensure that the PEIS identifies cooperating agencies as such.

COOPERATING AGENCY RESPONSIBILITI ES:

1. Participate in the development of the PEIS.
2. Provide special expertise on environmental issues associated with restoration and the DWH oil spill.
3. Provide special expertise on environmental issues that fall under a cooperating agency's jurisdictional responsibilities.
4. Review preliminary documents and provide comments to the lead agency in accordance with specified timelines.
5. Provide the lead agency with timely identification of any significant issues raised based on each cooperating agency's special expertise on environmental issues and jurisdiction by law.

Thank you for your consideration in this matter. We look forward to your earliest response; please reply to Mr. Christopher Doley (chris.doley@noaa.gov) with a cc to Ms. Kristin O'Brien (kristin.o'brien@noaa.gov). If you have any questions, please contact Ms. Aileen Smith at 301-427-8625, or by email at aileen.smith@noaa.gov.

Sincerely yours,

Samuel D. Rauch III
Deputy Assistant Administrator for Regulatory Programs
NOAA National Marine Fisheries Service

cc: Pat Montanio, Office of Habitat Conservation

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

SEP 03 2015

Gary Rikard
Executive Director
Mississippi Department of Environmental Quality
P.O. Box 2249
Jackson, MS 39225

Dear Mr. Rikard:

The National Oceanic and Atmospheric Administration (NOAA) is writing you to reaffirm the State of Mississippi's status in regard to participating as a cooperating agency for the preparation of a Programmatic Environmental Impact Statement (PEIS) for the Deepwater Horizon Oil Spill (DWH) Programmatic Damage Assessment and Restoration Plan (PDARP).

In accordance with the National Environmental Policy Act (NEPA) of 1969, NOAA is preparing a PEIS to evaluate restoration alternatives. The PEIS will evaluate potential direct, indirect and cumulative impacts from a wide range of proposed restoration activities, and will facilitate decision-making in the restoration planning process. The PEIS is integrated with a PDARP being prepared under Oil Pollution Act.

To adequately develop the PEIS and evaluate the potential environmental effects of the restoration alternatives, NOAA is inviting the participation of the Department of Interior (DOI), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), and the U.S. Army Corps of Engineers (ACOE) as Federal cooperating agencies in accordance with the Council on Environmental Quality's (CEQ) regulation 40 CFR Part 1501, and CEQ Cooperating Agency guidance issued January 30, 2002. NOAA is also inviting each of the state Natural Resource Trustees for the DWH oil spill (Alabama, Florida, Louisiana, Mississippi, and Texas) to serve as a cooperating agency in preparation of the PEIS, due to each state's natural resource trusteeship and special expertise in their respective jurisdictions regarding environmental issues related to the DWH oil spill.

Responsibilities of the lead agency (NOAA) and cooperating agencies are outlined below.

LEAD AGENCY RESPONSIBILITIES:

1. Assume primary responsibility for meeting the requirements of NEPA, including the preparation of the draft and final PEIS. In this capacity, the lead agency will ensure that the PEIS includes information needed to address state and federal compliance requirements.
2. Consult with cooperating agencies regarding any issues of concern related to the PEIS.
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during the public comment period and provide an initial identification of those comments pertaining to an agencies' expertise or regulatory authority. This may require cooperating agencies to prepare written responses for inclusion in the final PEIS.

7. Ensure that the PEIS identifies cooperating agencies as such.

COOPERATING AGENCY RESPONSIBILITI ES:

1. Participate in the development of the PEIS.
2. Provide special expertise on environmental issues associated with restoration and the DWH oil spill.
3. Provide special expertise on environmental issues that fall under a cooperating agency's jurisdictional responsibilities.
4. Review preliminary documents and provide comments to the lead agency in accordance with specified timelines.
5. Provide the lead agency with timely identification of any significant issues raised based on each cooperating agency's special expertise on environmental issues and jurisdiction by law.

Thank you for your consideration in this matter. We look forward to your earliest response; please reply to Mr. Christopher Doley (chris.doley@noaa.gov) with a cc to Ms. Kristin O'Brien (kristin.o'brien@noaa.gov). If you have any questions, please contact Ms. Aileen Smith at 301-427-8625, or by email at aileen.smith@noaa.gov.

Sincerely yours,

Samuel D. Rauch III
Deputy Assistant Administrator for Regulatory Programs
NOAA National Marine Fisheries Service

cc: Pat Montanio, Office of Habitat Conservation

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

SEP 03 2015

Kyle Graham
Executive Director
Louisiana Coastal Protection and Restoration Authority
P.O. Box 44027
Baton Rouge, LA 70804

Dear Mr. Graham:

The National Oceanic and Atmospheric Administration (NOAA) is writing you to reaffirm the State of Louisiana's status in regard to participating as a cooperating agency for the preparation of a Programmatic Environmental Impact Statement (PEIS) for the *Deepwater Horizon* Oil Spill (DWH) Programmatic Damage Assessment and Restoration Plan (PDARP).

In accordance with the National Environmental Policy Act (NEPA) of 1969, NOAA is preparing a PEIS to evaluate restoration alternatives. The PEIS will evaluate potential direct, indirect and cumulative impacts from a wide range of proposed restoration activities, and will facilitate decision-making in the restoration planning process. The PEIS is integrated with a PDARP being prepared under Oil Pollution Act.

To adequately develop the PEIS and evaluate the potential environmental effects of the restoration alternatives, NOAA is inviting the participation of the Department of Interior (DOI), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), and the U.S. Army Corps of Engineers (ACOE) as Federal cooperating agencies in accordance with the Council on Environmental Quality's (CEQ) regulation 40 CFR Part 1501, and CEQ Cooperating Agency guidance issued January 30, 2002. NOAA is also inviting each of the state Natural Resource Trustees for the DWH oil spill (Alabama, Florida, Louisiana, Mississippi, and Texas) to serve as a cooperating agency in preparation of the PEIS, due to each state's natural resource trusteeship and special expertise in their respective jurisdictions regarding environmental issues related to the DWH oil spill.

Responsibilities of the lead agency (NOAA) and cooperating agencies are outlined below.

LEAD AGENCY RESPONSIBILITIES:

1. Assume primary responsibility for meeting the requirements of NEPA, including the preparation of the draft and final PEIS. In this capacity, the lead agency will ensure that the PEIS includes information needed to address state and federal compliance requirements.
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during the public comment period and provide an initial identification of those comments pertaining to an agencies' expertise or regulatory authority. This may require cooperating agencies to prepare written responses for inclusion in the final PEIS.

7. Ensure that the PEIS identifies cooperating agencies as such.

COOPERATING AGENCY RESPONSIBILITI ES:

1. Participate in the development of the PEIS.
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Thank you for your consideration in this matter. We look forward to your earliest response; please reply to Mr. Christopher Doley (chris.doley@noaa.gov) with a cc to Ms. Kristin O'Brien (kristin.o'brien@noaa.gov). If you have any questions, please contact Ms. Aileen Smith at 301-427-8625, or by email at aileen.smith@noaa.gov.

Sincerely yours,

Samuel D. Rauch III
Deputy Assistant Administrator for Regulatory Programs
NOAA National Marine Fisheries Service

cc: Pat Montanio, Office of Habitat Conservation

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

SEP 03 2015

Carter Smith
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, TX 78744

Dear Mr. Smith:

The National Oceanic and Atmospheric Administration (NOAA) is writing you to reaffirm the State of Texas' status in regard to participating as a cooperating agency for the preparation of a Programmatic Environmental Impact Statement (PEIS) for the *Deepwater Horizon* Oil Spill (DWH) Programmatic Damage Assessment and Restoration Plan (PDARP).

In accordance with the National Environmental Policy Act (NEPA) of 1969, NOAA is preparing a PEIS to evaluate restoration alternatives. The PEIS will evaluate potential direct, indirect and cumulative impacts from a wide range of proposed restoration activities, and will facilitate decision-making in the restoration planning process. The PEIS is integrated with a PDARP being prepared under Oil Pollution Act.

To adequately develop the PEIS and evaluate the potential environmental effects of the restoration alternatives, NOAA is inviting the participation of the Department of Interior (DOI), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), and the U.S. Army Corps of Engineers (ACOE) as Federal cooperating agencies in accordance with the Council on Environmental Quality's (CEQ) regulation 40 CFR Part 1501, and CEQ Cooperating Agency guidance issued January 30, 2002. NOAA is also inviting each of the state Natural Resource Trustees for the DWH oil spill (Alabama, Florida, Louisiana, Mississippi, and Texas) to serve as a cooperating agency in preparation of the PEIS, due to each state's natural resource trusteeship and special expertise in their respective jurisdictions regarding environmental issues related to the DWH oil spill.

Responsibilities of the lead agency (NOAA) and cooperating agencies are outlined below.

LEAD AGENCY RESPONSIBILITIES:

1. Assume primary responsibility for meeting the requirements of NEPA, including the preparation of the draft and final PEIS. In this capacity, the lead agency will ensure that the PEIS includes information needed to address state and federal compliance requirements.
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pertaining to an agencies' expertise or regulatory authority. This may require cooperating agencies to prepare written responses for inclusion in the final PEIS.
7. Ensure that the PEIS identifies cooperating agencies as such.

COOPERATING AGENCY RESPONSIBILITI ES:

1. Participate in the development of the PEIS.
2. Provide special expertise on environmental issues associated with restoration and the DWH oil spill.
3. Provide special expertise on environmental issues that fall under a cooperating agency's jurisdictional responsibilities.
4. Review preliminary documents and provide comments to the lead agency in accordance with specified timelines.
5. Provide the lead agency with timely identification of any significant issues raised based on each cooperating agency's special expertise on environmental issues and jurisdiction by law.

Thank you for your consideration in this matter. We look forward to your earliest response; please reply to Mr. Christopher Doley (chris.doley@noaa.gov) with a cc to Ms. Kristin O'Brien (kristin.o'brien@noaa.gov). If you have any questions, please contact Ms. Aileen Smith at 301-427-8625, or by email at aileen.smith@noaa.gov.

Sincerely yours,

Samuel D. Rauch III
Deputy Assistant Administrator for Regulatory Programs
NOAA National Marine Fisheries Service

cc: Pat Montanio, Office of Habitat Conservation

C.2 Federal and State Correspondence Responding to Cooperating Agency Request

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

In Reply Refer To
FWS/R4/NRDAR

SEP 17 2015

Mr. Christopher Doley
United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Silver Spring, Maryland 20910

Dear Mr. Doley:

Thank you for your letter dated September 10, 2015, inviting us to participate as a cooperating agency in the preparation of a Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement (PDARP/PEIS) related to the *Deepwater Horizon* (DWH) Oil Spill.

We accept your invitation and also confirm that our role and assistance began when the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), as lead agency, initiated the preparation of the PDARP/PEIS. As both a DWH Trustee Council member and PDARP/PEIS cooperating agency under NEPA (40 CFR 1501.6), we will continue to provide information and analyses per our special expertise and jurisdictional responsibilities, make staff available to support this effort, and participate in the public review process.

I designate Dr. Kevin D. Reynolds, DOI DWH case manager, as the primary point of contact. Dr. Reynolds can be reached by telephone at 404-679-7292 or by email at kevin_reynolds@fws.gov. As a Trustee, DOI looks forward to participating in this process as a cooperating agency and working with NOAA to help restore our trust resources.

Sincerely yours,

Cynthia K. Dohner
Authorized Official
U.S. Department of the Interior

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 16 2015

OFFICE OF WATER

Mr. Samuel D. Rauch III
Deputy Assistant Administrator for Regulatory Programs
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
Silver Spring, Maryland 20910

Dear Mr. Rauch:

Thank you for your letter dated September 3, 2015, requesting that the EPA reaffirm its status as a cooperating agency for the National Oceanic and Atmospheric Administration's preparation of a Programmatic Environmental Impact Statement for the *Deepwater Horizon* Oil Spill Programmatic Damage Assessment and Restoration Plan.

As a Federal Trustee for the Deepwater Horizon Oil Spill, the EPA looks forward to our continued participation in this process as a cooperating agency and working with NOAA and our fellow Trustees in this matter. Please do not hesitate to contact me with any questions you may have at (202) 564-5700 or you may call Gale Bonanno of the Office of Wetlands, Oceans, and Watersheds at (202) 564-2243.

Sincerely,

Kenneth J. Kopocis

Kenneth J. Kopocis
Deputy Assistant Administrator

cc: Mary Kay Lynch
Tom Wall
Susan Bromm
Chris Doley (NOAA)
Kristin O'Brien (NOAA)

USDA

United States Department of Agriculture

Office of the Secretary
Washington, D.C. 20250

SEP 14 2015

Mr. Samuel D. Rauch, III
Deputy Assistant Administrator for Regulatory Programs
NOAA National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910

Dear Mr. Rauch, III:

Thank you for inviting the U.S. Department of Agriculture (USDA) to serve as a cooperating agency in the development of the Programmatic Environmental Impact Statement (PEIS) for the *Deepwater Horizon* (DWH) Oil Spill Programmatic Damage Assessment and Restoration Plan (PDARP).

USDA accepts this invitation. We also commit to our role as a cooperating agency per 40 CFR 1501.6. As such, we will participate in development of the PEIS and other documents. In addition, we will provide special expertise on environmental issues related to restoration for the DWH oil spill and for issues that fall under our jurisdictional responsibilities. Finally, we will make staff available to review and comment on documents, and to provide timely identification of any significant issues.

We look forward to continuing work with the Department of Commerce's National Oceanic and Atmospheric Administration on this project.

Sincerely,

Ann C. Mills
Deputy Under Secretary, Natural Resources and Environment

Re: DWH PDARP/PEIS Cooperating Agency Confirmation

1 message

Drew, Mimi <Mimi.Drew@dep.state.fl.us> Thu, Sep 10, 2015 at 11:33 AM
To: "Jeff P. Smith - NOAA Federal" <jeff.p.smith@noaa.gov>
Cc: Chris Doley <chris.doley@noaa.gov>, Craig R O'Connor - NOAA Federal <craig.r.o'connor@noaa.gov>, Kristin O'Brien <kristin.o'brien@noaa.gov>, Aileen Smith - NOAA Federal <aileen.smith@noaa.gov>, Jeff Shenot - NOAA Federal <jeff.shenot@noaa.gov>, Pat Montanio - NOAA Federal <pat.montanio@noaa.gov>

I confirm that Florida is a cooperating agency.

Mimi A. Drew
Florida NRDA Trustee and
RESTORE Council Representative
850-933-0202

---------- Forwarded message ----------
From: **Samek, Kelly** <Kelly.Samek@myfwc.com>
Date: Fri, Sep 18, 2015 at 2:27 PM
Subject: cooperating agency status
To: "jeff.p.smith@noaa.gov" <jeff.p.smith@noaa.gov>
Cc: Stephanie Willis - NOAA Federal <stephanie.willis@noaa.gov>

Jeff,

The attached request was forwarded to me from FDEP. On behalf of the Florida Fish and Wildlife Conservation Commission, I affirm our commitment to participate as a cooperating agency in the preparation of the Programmatic Environmental Impact Statement for the DWH Programmatic Damage Assessment and Restoration Plan.

Regards,

Kelly Samek

Gulf Restoration Coordinator

3900 Commonwealth Blvd., MS 7A5

Tallahassee, FL 32399

Florida Fish and Wildlife Conservation Commission
MyFWC.com

STATE OF ALABAMA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
64 NORTH UNION STREET, SUITE 468
MONTGOMERY, ALABAMA 36130
(334) 242-3486
FAX (334) 242-3489

ROBERT BENTLEY
GOVERNOR

N. GUNTER GUY, JR.
COMMISSIONER

CURTIS JONES
DEPUTY COMMISSIONER

VIA EMAIL

Christopher Doley
Chris.Doley@noaa.gov

Dear Mr. Doley:

This letter is to confirm that both of the Alabama natural resource damage trustees agreed to participate as cooperating agencies for the preparation of the Programmatic Environmental Impact Statement for the *Deepwater Horizon* Oil Spill Programmatic Damage Assessment and Restoration Plan. The primary point of contact on this matter continues to be N. Gunter Guy, Jr., Commissioner, Alabama Department of Conservation and Natural Resources.

We look forward to continuing to work with NOAA and the other trustees on this matter.

N. Gunter Guy, Jr.
Alabama Department of Conservation and Natural Resources
Commissioner of Conservation

Berry H. Tew, Jr.
Geological Survey of Alabama and State Oil and Gas Board of Alabama
State Geologist/Oil & Gas Supervisor

cc: Kristin O'Brien – Kristin.O'Brien@noaa.gov

STATE OF MISSISSIPPI
PHIL BRYANT
GOVERNOR
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
GARY C. RIKARD, EXECUTIVE DIRECTOR

September 17, 2015

VIA E-MAIL

Mr. Christopher Doley
NOAA
Silver Spring, MD 20910

Re: Programmatic Environmental Impact Statement (PEIS) for the Deepwater Horizon Oil Spill (DWH) Programmatic Damage Assessment and Restoration Plan (PDARP)

Dear Mr. Doley:

Thank you for requesting that the Mississippi Department of Environmental Quality (MDEQ) reaffirm its status to participate as a cooperating agency for the preparation of a Programmatic Environmental Impact Statement (PEIS) for the Deepwater Horizon Oil Spill (DWH) Programmatic Damage Assessment and Restoration Plan (PDARP).

MDEQ reaffirms its desire to participate and to continue to participate as a cooperating agency in the development of the PEIS for the PDARP. As you are aware, MDEQ's role and assistance in this regard began when the National Oceanic and Atmospheric Administration (NOAA) initiated the effort to develop the PEIS for the DWH Oil Spill. As both the natural resource trustee for the State of Mississippi and a cooperating agency under the National Environmental Policy Act (40 CFR 1501.6), MDEQ will continue to participate in the development of the PEIS for the PDARP, provide information and prepare analyses per its special expertise and jurisdictional responsibilities, make staff available to support interdisciplinary capability, and participate in public review processes.

MDEQ looks forward to continuing to work with NOAA on this project.

Sincerely,

Gary C. Rikard
Executive Director

cc: Ms. Kristin O'Brien
Mr. Marc Wyatt
Teri T. Wyly, Esq.

State of Louisiana

BOBBY JINDAL
GOVERNOR

September 10, 2015

Mr. Christopher Doley
United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Silver Spring, MD 20910

Dear Mr. Doley,

The State of Louisiana received your letter dated September 3, 2015, inviting the State to participate as a cooperating agency for the preparation of a Programmatic Environmental Impact Statement (PEIS) for the *Deepwater Horizon* Oil Spill (DWH) Programmatic Damage Assessment and Restoration Plan (PDARP). We accept your invitation to become a cooperating agency for this project as outlined in the letter, and will participate in the suggested activities.

We appreciate the opportunity to participate in this important process and look forward to doing so. If you have additional questions, please contact Alyson Graugnard, at Alyson.Graugnard@la.gov or (225) 342-2508, our primary agency representative for this project.

Sincerely,

Kyle Graham
Executive Director

Cc: Ms. Kristen O'Brien, kristin.o'brien@noaa.gov

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

September 16, 2015

Mr. Christopher Doley
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
1315 East-West Highway
Silver Spring, Maryland 20910
chris.doley@noaa.gov

Dear Mr. Doley:

Thank you for inviting the Texas Commission on Environmental Quality (TCEQ) to reaffirm its status as a cooperating agency in the development of the Programmatic Environmental Impact Statement (PEIS) for the Programmatic Damage Assessment and Restoration Plan related to the *Deepwater Horizon* (DWH) oil spill.

TCEQ accepts this invitation. We also reaffirm that our role and assistance in this regard began when the National Oceanic and Atmospheric Administration (NOAA) initiated the effort to develop the PEIS on behalf of the DWH Trustee Council. As both a Trustee Council member and National Environmental Policy Act cooperating agency (40 CFR 1508.5), TCEQ will participate in the development of the PEIS, provide special expertise on environmental issues associated with restoration and the DWH oil spill and on environmental issues falling under the commission's jurisdictional responsibilities, review preliminary documents and provide comments to the lead agency in accordance with specified timelines, and provide the lead agency with timely identification of any significant issues raised based on the commission's special expertise on environmental issues and jurisdiction by law.

Please consider Richard Seiler the primary point of contact for the commission. Mr. Seiler can be reached at (512) 239-2523 and by email at richard.seiler@tceq.texas.gov.

We look forward to continued cooperation with NOAA and the DWH Trustee Council on this project.

Sincerely,

Richard A. Hyde, P.E.
Executive Director

cc: Ms. Jane Atwood, Office of the Attorney General of Texas
Ms. Angela Sunley, Texas General Land Office
Mr. Don Pitts, Texas Parks and Wildlife Department
Ms. Kristin O'Brien, National Oceanic and Atmospheric Administration

TEXAS GENERAL LAND OFFICE
GEORGE P. BUSH, COMMISSIONER

September 14, 2015

Mr. Christopher Doley
National Oceanic and Atmospheric Administration
chris.doley@noaa.gov

Dear Mr. Doley:

Thank you for inviting the Texas General Land Office (GLO) to reaffirm its status as a cooperating agency in the development of the Programmatic Environmental Impact Statement (PEIS) for the Programmatic Damage Assessment and Restoration Plan related to the *Deepwater Horizon* (DWH) oil spill.

GLO accepts this invitation. We also reaffirm that our role and assistance in this regard began when the National Oceanic and Atmospheric Administration (NOAA) initiated the effort to develop the PEIS on behalf of the DWH Trustee Council. As both a Trustee Council member and National Environmental Policy Act cooperating agency (40 CFR 1508.5), GLO will participate in the development of the PEIS, provide special expertise on environmental issues associated with restoration and the DWH oil spill and on environmental issues falling under the office's jurisdictional responsibilities, review preliminary documents and provide comments to the lead agency in accordance with specified timelines, and provide the lead agency with timely identification of any significant issues raised based on the office's special expertise on environmental issues and jurisdiction by law.

Please consider Angela Sunley the primary point of contact for the office. Ms. Sunley can be reached at (512) 463-9309 and by email at angela.sunley@glo.texas.gov.

We look forward to continued cooperation with NOAA and the DWH Trustee Council on this project.

Sincerely,

Anne L. Idsal
Chief Clerk

cc: Jane Atwood, Office of the Attorney General of Texas
Richard Seiler, Texas Commission on Environmental Quality
Don Pitts, Texas Parks and Wildlife Department
Kristin O'Brien, National Oceanic and Atmospheric Administration

TEXAS PARKS & WILDLIFE

Life's better outside.®

September 17, 2015

Mr. Christopher Doley
National Oceanic and Atmospheric Administration
1315 East-West Highway, SSMC3
Silver Spring, MD 20910
chris.doley@noaa.gov

Dear Mr. Doley:

Thank you for inviting the Texas Parks and Wildlife Department (TPWD) to reaffirm its status as a cooperating agency in the development of the Programmatic Environmental Impact Statement (PEIS) for the Programmatic Damage Assessment and Restoration Plan related to the *Deepwater Horizon* (DWH) oil spill.

TPWD accepts this invitation. We also reaffirm that our role and assistance in this regard began when the National Oceanic and Atmospheric Administration (NOAA) initiated the effort to develop the PEIS on behalf of the DWH Trustee Council. As both a Trustee Council member and National Environmental Policy Act cooperating agency (40 CFR 1508.5), TPWD will participate in the development of the PEIS, provide special expertise on environmental issues associated with restoration and the DWH oil spill and on environmental issues falling under the department's jurisdictional responsibilities, review preliminary documents and provide comments to the lead agency in accordance with specified timelines, and provide the lead agency with timely identification of any significant issues raised based on the department's special expertise on environmental issues and jurisdiction by law.

We look forward to continued cooperation with NOAA and the DWH Trustee Council on this project. My colleague Don Pitts will be TPWD's point of contact for our agency. If you should have any questions or comments, please do not hesitate to contact Mr. Pitts at 512-389-8754 or by email at don.pitts@tpwd.texas.gov. Thank you.

Sincerely,

Carter Smith
Executive Director

CS:JM:dh

cc: Ms. Jane Atwood, Office of the Attorney General of Texas
Ms. Angela Sunley, Texas General Land Office
Mr. Richard Seiler, Texas Commission on Environmental Quality
Ms. Kristin O'Brien, National Oceanic and Atmospheric Administration
Mr. James Murphy, Texas Parks and Wildlife Department
Mr. Don Pitts, Texas Parks and Wildlife Department

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.texas.gov

C.3 NOAA Correspondence Requesting CZMA Consistency Determination

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

October 6, 2015 (via email)

Becky Prado
Coastal Program Administrator
3900 Commonwealth Boulevard
M.S. 235
Tallahassee, Florida. 32399
Rebecca.Prado@dep.state.fl.us

Keith Lovell
Assistant Secretary - Office of Coastal Management
Louisiana Department of Natural Resources
P.O. Box 44487
Baton Rouge, LA 70804-4487
Keith.Lovell@la.gov

Scott Brown
Alabama Department of Environmental Management
Mobile Branch I Coastal Section
3664 Dauphin Street, Suite B
Mobile, Alabama 36608
Fieldmail@adem.state.al.us

Phillip Hinesley
State Lands Division, Coastal Section
Alabama Department of Conservation and Natural Resources
31115 Five Rivers Boulevard
Spanish Fort, AL 36527
Phillip.Hinesley@dcnr.alabama.gov

Ray Newby, P.G.
Coastal Geologist
Texas General Land Office
Coastal Resources Program
P.O. Box 12873
Austin, TX 78711-2873
Ray.Newby@glo.texas.gov

Ms. Willa Brantley
Mississippi Department of Marine Resources
Bureau of Wetlands Permitting
1141 Bayview Avenue
Biloxi, MS 39530
Willa.Brantley@dmr. ms.gov

RE: Federal Consistency Determination for Draft Programmatic Damage Assessment and Restoration Plan and Draft Programmatic Environmental Impact Statement for the *Deepwater Horizon* Oil Spill

Dear State Coastal Program Coordinators:

On October 5, 2015, the Natural Resource Trustees for the *Deepwater Horizon* Oil Spill released a document entitled "Draft Programmatic Damage Assessment and Restoration Plan and Draft Programmatic Environmental Impact Statement for the Deepwater Horizon Oil Spill" ("Draft PDARP") to the public for formal review and comment. The Draft PDARP, if approved by the Trustees after consideration of public review and comment, would be applicable to and govern the future planning, identification, and selection of restoration actions that would restore for natural resources and services found to be injured and lost as a result of the *Deepwater Horizon* incident. The Draft PDARP is entirely "programmatic" in nature. As a programmatic plan, it does not identify or propose to select any specific restoration projects at this time. It would only provide the foundation for future planning of restoration actions, many of which would be subject to federal review for consistency with federally-approved Coastal Management Programs ("CMPs") in Florida, Alabama, Mississippi, Louisiana and Texas. Accordingly, the U. S. Department of the Interior (DOI), the National Oceanic and Atmospheric Administration (NOAA), the United States Department of Agriculture, and the United States Environmental Protection Agency (the "Federal Trustees"), have reviewed the programmatic plan as proposed in the Draft PDARP for consistency with the federally-approved CMPs in these States and have found the proposed plan to be consistent with all of these federally-approved CMPs. This letter submits that determination to each State for review on behalf of all Federal Trustees.

Background

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's Macondo well. Tragically, 11 workers were killed and 17 critically injured by the explosion and fire. Over a period 87 days after the explosion, oil and natural gas were also continuously and uncontrollably discharged from the well into the northern Gulf of Mexico. Approximately 3.19 million barrels (134 million gallons) of oil were determined to have been released into the ocean (U.S. District Court, E. D. LA, 2015), making the *Deepwater Horizon* spill the largest oil spill in the history of the United States. *Deepwater Horizon* oil spread from the deep ocean to the surface and nearshore environment, from Texas to Florida. Extensive response actions to prevent the oil from reaching sensitive resources and to try to reduce harm to people and the environment were undertaken, but many response actions also caused collateral harm to natural resources and services provided by these resources. The oil and other substances released from the well in combination with the extensive response actions undertaken collectively comprise the *Deepwater Horizon* oil spill incident (hereafter referred to as the "Spill").

The Spill is subject to the provisions of the Oil Pollution Act of 1990 ("OPA"). Among other things, OPA provides for liability to the public for natural resource damages for the injury, loss, lost use of and destruction of natural resources caused by the Spill. The *Deepwater Horizon* Trustees[1] are the government entities that are

[1] The *Deepwater Horizon* Trustees are the U.S. Department of the Interior; the National Oceanic and Atmospheric Administration, the U.S. Environmental Protection Agency; the U.S. Department of Agriculture and the following agencies as designated by the Governors of each State:

- For the State of Texas: the Texas Parks and Wildlife Department; the Texas General Land Office; and the Texas Commission on Environmental Quality;
- For the State of Louisiana: the Coastal Protection and Restoration Authority; the Louisiana Oil Spill Coordinator's Office; the Louisiana Department of Wildlife and Fisheries; the Louisiana Department of Environmental Quality; and the Louisiana Department of Natural Resources;
- For the State of Alabama: the Alabama Department of Conservation and Natural Resources and the Geological Survey of Alabama;
- For the State of Mississippi: the Mississippi Department of Environmental Quality;
- For the State of Florida: the Florida Department of Environmental Protection and the Florida Fish and Wildlife Conservation Commission

each authorized to act on behalf of the public under OPA to (1) assess the natural resource injuries and service losses resulting from the Spill, and (2) to develop and implement a restoration plan to compensate for those injuries. That process, known as a Natural Resource Damage Assessment (NRDA), was initiated in the earliest days of the Spill.

The *Deepwater Horizon* Trustees have worked together to conduct the NRDA for this Spill[2]. In assessing its impacts, the Trustees found that 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 mammals and that the Spill prevented people from fishing, going to the beach, and enjoying their typical recreational activities along the Gulf. The Trustees found they could not fully describe the injuries caused by the Spill at the level of a single species, a single habitat type, or a single region. Rather, there were injuries to such a wide array of linked resources over such an enormous area that the Trustees found that the effects of the Spill must be described as constituting an ecosystem-level injury. Given the ecosystem-level nature of the injuries, the *Deepwater Horizon* Trustees decided to prepare a *programmatic* DARP—in other words, a DARP that reflects use of a comprehensive, integrated ecosystem approach to appropriately address these ecosystem-level injuries and that provides long-term direction for restoring the full suite of injured natural resources and services. Instead of identifying specific restoration projects, the Draft PDARP incorporates guidance for identifying, evaluating, and selecting future restoration projects that would be carried out by several Trustee Implementation Groups ("TIG"s). A summary of the proposed programmatic plan described in the Draft PDARP is provided below. The Draft PDARP is available at: http://www.gulfspillrestoration.noaa.gov and *https://www.doi.gov/deepwaterhorizon*. It may also be downloaded from: http://www.justice.gov/enrd/deepwater-horizon.

The Draft PDARP was released for public review and comment on October 5, 2015 (80 FR 60126) and is available for public review and comment until December 4, 2015. During this formal comment period, the Trustees welcome comments from your respective offices that may enhance their ability of the TIGs to plan for and select restoration projects in the future that will be consistent with the federally-approved CMP for your State. Directions for submitting written comments on the Draft PDARP are included in the Federal Register notice announcing its availability.

On July 2, 2015, BP Exploration and Production, Inc. (BP), the major party responsible for the *Deepwater Horizon* spill, proffered terms for settlement to the court to pay damages, including natural resource damages, for the Spill (DOJ 2015a). A proposed Consent Decree - embodying a proposed settlement between BP and plaintiffs United States and the Gulf States - was recently lodged in *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.)*. Like the Draft PDARP, the proposed Consent Decree is subject to its own public comment process. If, upon conclusion of the public comment process, all parties and the Court find entry of the Decree to be proper, the settlement will become final and secure, among other things, in excess of $8

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[2] Faced with impacts to natural resources and services that were unprecedented in nature in scope, the Trustees also felt compelled to act on the public's behalf to accelerate and to begin restoring for impacts to clearly affected resources and services while the NRDA process was underway. The Trustees entered into the "Framework for Early Restoration Addressing Injuries Resulting from the *Deepwater Horizon* Oil Spill" (Framework Agreement) with BP in April 2011. Under that agreement, BP committed to provide up to $1 billion for early restoration projects in the Gulf "to commence implementation of early restoration projects that will provide meaningful benefits to accelerate restoration in the Gulf as quickly as practicable" prior to completion of the NRDA process or resolution of their liability for natural resource damages. Since that time, 64 early restoration projects across the Gulf, with a total cost of approximately $832 million, have been selected and funded. (Phase I Final Early Restoration Plan, April 18, 2012; Phase II Early Restoration Plan, December 21, 2012; Phase III Programmatic and Early Restoration Plan and Early Restoration Programmatic Environmental Impact Statement (Phase III Plan), October 31, 2014); and Phase IV Early Restoration Plan, September 23, 2015).

billion[3] for the Trustees use to plan and implement comprehensive restoration to address the suite of injured natural resources and services harmed by the Spill. If adopted by the Trustees, the PDARP would become operational upon entry by the Court of the proposed Consent Decree. If the proposed Decree becomes final, proceeds designated as natural resource damages under the Decree will be expended in conformance with the PDARP. The Draft PDARP is compatible with the proposed Consent Decree. The public is encouraged to review and comment on both documents and all proposed decisions.

Description of Proposed Programmatic Restoration Plan:

In the Draft PDARP, the Trustees have jointly examined and assessed the extent of injury and evaluated restoration alternatives, with particular consideration of approaches to restoring, replacing, rehabilitating, or acquiring the equivalent of the injured natural resources and services. It integrates and is supported by a draft Programmatic Environmental Impact Statement. Development of the PDARP was informed by public scoping processes undertaken by the Trustees in accordance with NEPA for development of both a comprehensive DARP, the Phase III Programmatic Early Restoration Plan adopted in October 2014, and by public comments received across all phases of Early Restoration planning to date.

The preferred alternative described in the Draft PDARP is a comprehensive, integrated ecosystem restoration plan based on the Trustees' programmatic goals and an integrated restoration portfolio. The restoration portfolio incorporates and will implement a range of approaches to address: 1) assessed injuries to natural resources and services, including lost recreational use and 2) inferred injuries to ecosystem components and services. The integrated restoration portfolio encompasses restoration types based on the Trustees' understanding of injury and the capacity of each programmatic goal and restoration type to restore for injuries. Additionally, the Draft PDARP geographically allocates investments of restoration funding based on the Trustees' understanding and evaluation of exposure, of injury to natural resources and services, and of where investments in the various restoration types will be most beneficial within the ecosystem-level restoration portfolio. These "geographic restoration areas" include each of the five Gulf states (Alabama, Florida, Louisiana, Mississippi, and Texas), Open Ocean, and Region-wide, as well as a category entitled Unknown Conditions and Adaptive Management. The allocation of investments of restoration funding across resources, supporting habitats, and geographic areas is viewed by the Trustees as the best means of maximizing the likelihood of providing long-term benefits to those resources and services injured by the Spill, including at the ecosystem level. Under the proposed programmatic plan, the Trustees will also implement monitoring, assessment, and scientific support activities to evaluate the response of resources and services to restoration and to better inform ongoing restoration and management decisions within an adaptive management framework. The Trustees will also factor in contingencies to address future unknown conditions, commensurate with the unprecedented scale of restoration required and the number of years that it will take to implement this plan.

The restoration portfolio includes the following restoration types nested within five programmatic goals, as outlined below:

1) Goal: **Restore and Conserve Habitat**
   - Wetlands, Coastal, and Nearshore Habitats
   - Habitat Projects on Federally Managed Lands

2) Goal: **Restore Water Quality**
   - Nutrient Reduction (nonpoint source)

[3] Includes remainder of funds BP pledged to initiate early restoration under the Framework Agreement (i.e., those funds not already used or obligated for implementation of selected projects) and additional funds to be paid under an approved Decree.

- Water Quality

3) Goal: **Replenish and Protect Living Coastal and Marine Resources**
- Fish and Water Column Invertebrates
- Sturgeon
- Submerged Aquatic Vegetation (SAV)
- Oysters
- Sea Turtles
- Marine Mammals
- Birds
- Mesophotic Reefs and Deep Benthic Habitats

4) Goal: **Provide and Enhance Recreational Opportunities**
- Provide and Enhance Recreational Opportunities

5) Goal: **Provide for Monitoring, Adaptive Management, and Administrative Oversight**
- Monitoring and Adaptive Management
- Administrative Oversight and Comprehensive Planning
- Adaptive Management Natural Resource Damage Payment for Unknown Conditions

The restoration portfolio incorporates a substantive focus on northern Gulf of Mexico coastal habitats to restore resource-to-habitat and habitat-to-habitat linkages in the northern Gulf of Mexico system. This focus on coastal habitats is complemented by additional restoration that addresses specific injuries or aspects of injuries not fully addressed by coastal habitat restoration to ensure that the full range of injuries caused by this spill is addressed. This portfolio includes opportunities to restore a combination of nearshore and coastal habitats that collectively contribute to productivity in the Gulf of Mexico and can benefit a large variety of injured species and ecological functions. This approach is the foundation for the preferred alternative in the proposed programmatic plan because of the multiple benefits that can be derived through habitat projects. A description of restoration approaches and performance monitoring strategies for this restoration type, as well as the other restoration types, can be found in Chapter 5 of the Draft PDARP.

Under the Draft PDARP, the Trustees will continue to function as a Trustee Council with overall responsibility for assuring restoration is achieved with appropriate financial accountability and that obligations set forth in OPA, the Consent Decree, the PDARP, and future restoration plans are met. The Draft PDARP proposes to distribute responsibility for development and implementation of future restoration plans for each of the eight "geographic restoration areas" to Trustee Implementation Groups (TIGs). Under this distributed governance structure, each TIG will prepare and propose restoration plans and select specific projects for implementation, consistent with the PDARP and with opportunity for public review and comment on proposed actions. Each TIG will develop, select, and implement restoration projects on a consensus basis[4]. The Draft PDARP includes guidance for the TIGs to follow in carrying out these responsibilities.

The Trustees will establish agreements and procedures such as Memoranda of Agreement (MOAs), Memoranda of Understanding (MOUs), and Standard Operating Procedures (SOP). The Trustees will revise their existing MOA for the Trustee Council to reflect and form the basis for their administration and functioning under the PDARP. Each TIG may develop additional MOAs or SOPs specific to their

[4] For the five TIGs for each of the five Gulf states, consensus requires that a proposed action or decision be supported by both the United States (as decided by the federal Trustees as a group) and the state (as decided by the state Trustees as a group). The federal Trustees will develop an MOU setting forth their approach and procedures for speaking with a single voice on decisions made within the TIGs for each of the five Gulf states and the designated Trustees for each state will develop an MOU setting forth their approach and procedures for speaking with a single voice on decisions made within the TIGs for each of the Gulf states.

administration and functioning within their specific restoration area, consistent with the Trustee Council MOA and the PDARP.

Federal Consistency Review of Draft PDARP

The Draft PDARP outlines and describes a programmatic structure that would serve as the Trustees' overarching "blueprint" under which project-specific restoration plans would be developed, proposed and selected in the future, with substantial and meaningful opportunities for public participation in that process. It includes elements that would establish and guide the development of such plans. It also identifies the responsibilities and principles that the Trustees would apply, individually and collectively, at every level of planning to govern and fulfill every Trustee's duty on behalf of the public to restore, replace, rehabilitate or acquire natural resources and resource services that were lost, injured or destroyed as a result of the *Deepwater Horizon* oil spill, both to provide for the recovery of and to otherwise compensate for those injured resources and services.

Although the Draft PDARP itself does not propose any specific restoration actions or projects, the Federal Trustees recognize that, if adopted, it will result in restoration projects being selected in the future that will affect coastal uses and resources in each of the Gulf states. Accordingly, the Federal Trustees have evaluated the consistency of the proposed programmatic structure, processes, and principles for conducting future restoration planning with the policies included in the federally-approved coastal management programs (CMPs) of each of the Gulf states. Review for federal consistency at the program-level is considered by the Federal Trustees as a foundational step for ensuring that the future identification and selection of specific restoration projects pursuant to the programmatic plan described in the Draft PDARP will be consistent with the CMPs in each Gulf state. The Federal Trustees' evaluations of the consistency of the proposed programmatic structure, processes, and principles for conducting future restoration planning, as presented in the Draft PDARP, with the federally-approved CMPs in Texas, Louisiana, Alabama, Mississippi, and Florida are summarized, state-by-state, in Appendix A.

Conclusion:

Based on that review, the Federal Trustees find the Draft PDARP to be consistent with the federally-approved CMPs in Texas, Louisiana, Alabama, Mississippi, and Florida. This letter submits that determination for review by each state coincident with public review of this document.

For the Federal Trustees, this represents the earliest opportunity for consideration of the consistency of the Draft PDARP with the federally-approved CMPs in Florida, Alabama, Mississippi, Louisiana and Texas. Early consideration of the consistency of the Draft PDARP with these approved CMPs will assist all participating federal, state and local agencies to expeditiously develop plans for and implement restoration across the Gulf if the Draft PDARP is adopted. The development of future restoration plans under a final PDARP, including the selection and implementation of any future restoration projects, will remain subject to additional consistency reviews as may be required at later stages of planning, under applicable CMPs.

The Federal Trustees are requesting and would deeply appreciate a response to this determination of consistency as soon as is practicable. We thank you in advance for your efforts to accommodate this request.

Respectfully,

Christopher D. Doley
Designated Trustee Representative for Deepwater Horizon
National Oceanic & Atmospheric Administration

APPENDIX A:

STATE-BY-STATE SUMMARY OF FEDERAL CONSISTENCY REVIEW

FOR

DRAFT PROGRAMMATIC DAMAGE ASSESSMENT AND RESTORATION PLAN AND DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT FOR THE DEEPWATER HORIZON OIL SPILL

Consistency with federally approved TEXAS CMP (TCMP):

The policies of the TCMP with potential present applicability to the proposed programmatic structure, processes, and principles described in the Draft PDARP are found in Chapter 31, Subchapter B of the Texas Administrative Code, specifically at Section 501.12 (goals of the TCMP), Section 501.15 (policies for "major action"), and Section 501.20 (policies for prevention, response and remediation of oil spills).

Goals of the TCMP (Section 501.12)

The policies of the TCMP are intended to improve the management of the state's coastal natural resource areas (CNRAs), which are areas designated to be of particular concern to the state, and to ensure the long-term ecological and economic productivity of the Texas coast. The programmatic restoration plan proposed in the Draft PDARP is consistent-in-principle with all goals of the TCMP. Further, as restoration planning is carried out under this structure, it will remain so because each specific restoration project identified and proposed in the future will remain subject to the requirement for federal consistency with the TCMP when and to the extent that effects on coastal resources or uses in Texas are reasonably foreseeable. The following are some of the other TCMP policies that Federal Trustees commonly find to be applicable to proposed restoration actions, depending on the nature of the proposed action and its anticipated effect on coastal resources or uses in Texas: 501.23 (Development in Critical Areas); 501.24 (Construction of Waterfront Facilities and Other Structures on State Submerged Lands); 501.25 (Dredging, Dredged Material and Placement); 501.26 (Construction in Beach/Dune System); 501.27 (Development in Coastal Hazard Areas); 501.28 (Development within Coastal Barrier Resource System Units and Other Protected Areas on Coastal Barriers); 501.29 (Development in State Parks, Wildlife Management Areas or Preserves; and 501.31 (Transportation Projects).

Policies for Prevention, Response and Remediation of Oil Spills (31 TAC 501.20)

This section requires that the public be involved in the restoration planning process for an oil spill and that such plans be designed to promote the restoration of the injured resources with all deliberate speed. The Draft PDARP is entirely consistent with these TCMP policies. Indeed, the policies and goals of TAC 501.20 are highly similar to those of the OPA, under which the Draft PDARP was developed. The Draft PDARP was developed with the participation and approval of Texas' OPA-designated trustee officials for the TGLO, the TCEQ, and TPWD.

Under the OPA, the objective of restoration is to restore or replace habitats, species, and natural resource services as were injured or lost as the result of an oil spill in U.S. waters. OPA further requires that natural resources trustees seek public review and input on all restoration actions that they may plan to use to address or compensate for injuries and losses to the public's natural resources due to such incidents.

The Draft PDARP incorporates both OPA requirements into the development of all restoration plans and choice of restoration projects under its auspices. All future restoration activities planned under the proposed programmatic restoration plan will be for the purpose of restoring or replacing habitats, species, and natural resource services as were injured or lost as result of the Spill. The proposed programmatic plan presented in the Draft PDARP will allow for and support future, project-specific restoration planning for the Spill, with substantial public involvement, including by the TIG comprised of Federal Trustees and the designated trustees in Texas. That "Texas TIG" will plan and implement restoration projects that will aid in the recovery of and compensate for specific Spill-related injuries and losses to natural resources under Texas' jurisdiction including, as needed, projects to address the public's lost access to, recreational use and enjoyment of natural resources in Texas. As provided for in the PDARP, the public will be afforded a meaningful and reasonable opportunity to review and comment on all proposed restoration actions.

The Draft PDARP itself was developed consistent with these TCMP policies. Public engagement in restoration planning for the Spill to date has been extensive, from the scoping process to support development of this PEIS initiated in February 2011, through four phases of early restoration planning, up to the current public review and comment on the Draft PDARP. Along this timeline, to facilitate public involvement, the Trustees have provided the public with injury assessment information, updates about ongoing NRDA activities, information about restoration planning, and access to administrative record materials. The identification of meaningful restoration projects for this Spill will continue to benefit from the opportunities for public input, as provided for in the proposed programmatic restoration plan.

Policies for Major Actions (31 T.A.C. 501.15) - Under the TCMP, a "major action" is "an activity for which a federal environmental impact statement (EIS) under the National Environmental Policy Act is required." 31 T.A.C. 501.15(a). Under the major actions policy, agencies with jurisdiction over the activity must meet and coordinate their actions and, to the greatest extent possible, consider the cumulative and secondary adverse effects, as described in the federal environment impact assessment process, of each major action relating to the activity, 31 T.A.C. 501.15(b). Actions subject to this policy are not to be taken if inconsistent with the TCMP goals and policies, and are to avoid and otherwise minimize cumulative adverse effects to coastal natural resource areas, 31 T.A.C. 501.15(c).

The Draft PDARP is itself consistent with these policies as the Trustees developed and incorporated a PEIS into the process of preparing it. The decision to develop the PEIS served a broad purpose: to inform decisions on the programmatic structure of future restoration planning for this Spill, including to inform the guidance, principles and processes that would be applied in the future by TIGs as they proceed to plan and select future restoration projects for the Spill. The Draft PDARP includes evaluations of programmatic alternative(s) and potential consequences and cumulative effects of the programmatic plan on Spill-related restoration planning. Further, as Federal Trustees will be members of each TIG, compliance with NEPA will be a hallmark of the future restoration plans developed by each TIG. For any proposed restoration action, this will include coordination with other agencies, consideration of cumulative and secondary adverse effects, inclusion of measures and practices to avoid and mitigate for anticipated adverse effects prior to taking action and, where an action has the potential to significantly affect the environment, development of an EIS. The extent to which a future proposed restoration project may be a "major action" under the TCMP cannot be known at this time, but any specific restoration actions proposed or selected under the proposed programmatic restoration plan would remain subject to the requirement for determinations of federal consistency with all federally-approved TCMP policies, as are applicable.

Consistency with federally approved MISSISSIPPI CMP (MCMP):

The federally-approved MCMP is comprised of a network of agencies with authority in the state's coastal zone. The primary authority guiding the MCMP is the Mississippi Coastal Wetlands Protection Act. The MCMP is built around the following goals:

1. To provide for reasonable industrial expansion in the coastal area and to insure efficient utilization of waterfront industrial sites so that suitable sites are conserved for water dependent industry;
2. To favor the preservation of the coastal wetlands and ecosystems, except where a specific alteration of a specific coastal wetland would serve a higher public purpose in accordance with the public purposes of the public trust in which the coastal wetlands are held;
3. To protect, propagate, and conserve the state's seafood and aquatic life in connection with the revitalization of the seafood industry in the State of Mississippi;
4. To conserve the air and waters of the state, and to protect, maintain, and improve the quality thereof for public use, for the propagation of wildlife, fish and aquatic life, and for domestic, agricultural, industrial, recreational, and other legitimate beneficial uses;
5. To put to beneficial use to the fullest extent of which they are capable the water resources of the state, and to prevent the waste, unreasonable use, or unreasonable method of use of water;
6. To preserve the state's historical and archaeological resources, to prevent their destruction, and to enhance these resources wherever possible;
7. To encourage the preservation of natural scenic qualities in the coastal area;
8. To consider the national interest involved in planning for and in the siting of facilities in the coastal area;
9. To assist local governments in the provision of public facilities services in a manner consistent with the coastal program; and
10. To insure the effective, coordinated implementation of public policy in the coastal area of Mississippi comprised of Hancock, Harrison and Jackson Counties.

The proposed programmatic plan presented in the Draft PDARP is consistent in principle with all of the above goals of the federally-approved MCMP. The proposed programmatic plan presented in the Draft PDARP will allow for and support future, project-specific restoration planning for the Spill, with substantial public involvement, including by the TIG comprised of Federal Trustees and the designated trustees in Mississippi. That "Mississippi TIG" will plan and implement restoration projects that will aid in the recovery of and compensate for specific Spill-related injuries and losses to natural resources under Mississippi's jurisdiction including, as needed, projects to address the public's lost access to, recreational use and enjoyment of natural resources in Mississippi. Further, each specific restoration project identified and proposed in the future will remain subject to the requirement for federal consistency with the MCMP when and to the extent that effects on coastal resources or uses in Mississippi are reasonably foreseeable. In Mississippi, proposed future restoration projects will include activities that require consideration of one or more of the MCMP's goals during planning, including but not limited to the MCMP goals to preserve coastal wetlands and ecosystems, to protect habitat adjacent to coastal wetlands, to protect habitat of endangered species, to protect, propagate, and conserve the state's seafood and aquatic life, to aid in the protection and propagation of wildlife within and along Mississippi's coastal area, to preserve the scenic qualities of barrier islands and their surrounding ecosystems, to conserve the air and waters of the state, and to protect, maintain, and improve the quality thereof for public use and enjoyment.

Consistency with federally approved ALABAMA CMP:

Alabama's CMP, known as the Alabama Coastal Area Management Program (ACAMP), guides activities in Alabama's coastal zone in order to protect coastal resources and to provide adequate public access for recreation and commerce. Its policies are designed to regulate various activities on Alabama coastal lands

and waters in order to preserve, enhance, and develop Alabama's valuable coastal resources for present and future generations.

The programmatic restoration plan presented in Draft PDARP is consistent in principle with these general purposes and stated goals of the federally–approved ACAMP for management of activities and uses in Alabama's coastal zone. The proposed programmatic plan presented in the Draft PDARP will allow for and support future, project-specific restoration planning for the Spill, with substantial public involvement, including by the TIG comprised of Federal Trustees and the designated trustees in Alabama. That "Alabama TIG" will plan and implement restoration projects that will aid in the recovery of and compensate for specific Spill-related injuries and losses to natural resources under Alabama's jurisdiction including, as needed, projects to address the public's lost access to, recreational use and enjoyment of natural resources in Alabama. Restoration projects planned for these purposes will contribute to the preservation, enhancement and development of Alabama's coastal resources for present and future generations. Further, each specific restoration project identified and proposed in the future will remain subject to the requirement for federal consistency with the ACAMP when and to the extent that effects on coastal resources or uses of the state's coastal zone are reasonably foreseeable.

Specific policies of the ACAMP are contained in the Alabama Department of Environmental Management's Coastal Program rules at ALA ADMIN CODE r.335-8-1 *et seq*. These rules specify the uses, subject to the rules and regulations that must be complied with, that would be consistent with ACAMP. The Federal Trustees have reviewed these ACAMP policies and rules, including those at ALA ADMIN CODE r. 335-8-2-.01 (General Rules Applicable to All Uses), at ALA ADMIN CODE r. 335-8-2-.02 through -.12 (containing requirements for specific types of coastal projects), and at ALA. ADMIN CODE r. 335-8-1-.05 (Permissible Uses) and observe that they are very action- or project-specific. None are directly applicable to the proposed programmatic structure, processes, and principles described in the Draft PDARP. As noted above, the programmatic restoration plan presented in Draft PDARP provides that each action related to a specific restoration project identified and proposed in the future will be subject to the requirement for determinations of federal consistency with the ACAMP whenever there are reasonably foreseeable effects from taking that action on coastal lands and waters that are subject to Alabama's federally-approved CMP.

Consistency with federally approved FLORIDA CMP (FCMP):

The federally-approved FCMP is a networked program comprised of twenty-four statutes administered by nine state agencies and five water management districts. The policies of the FCMP with present applicability to the proposed programmatic restoration plan described in the Draft PDARP are found in Chapter 376, Fla. Stat. (relating to the prevention, response and remediation of oil spills and other pollutant discharges). The policies and goals of Chapter 376 are highly similar to those of the OPA, under which the Draft PDARP was developed. In addition to prohibiting the discharge of oil, into or upon any coastal water, estuary, tidal flat, beach or lands adjoining the seacoast in Florida, Chapter 376 grants the State the authority to assess and recover natural resource damages for discharges of oil. When the State is performing a damage assessment with Federal agencies, as it is in the case in the *Deepwater Horizon* Spill, it may assess natural resource damages in accordance with the federal rules implementing OPA at 15 C.F.R. Part 990.

The Draft PDARP was developed pursuant to OPA and consistent with these regulations. The proposed programmatic plan presented in the Draft PDARP will allow for and support future, project-specific restoration planning for the Spill, including by the TIG comprised of Federal Trustees and the designated trustees in Florida, with substantial public involvement. That "Florida TIG" would be responsible for planning and implementing restoration projects that will aid in the recovery of and compensate for specific Spill-related injuries and losses to natural resources under Florida's jurisdiction including, as needed, projects to address the public's lost access to, recreational use and enjoyment of natural resources

in Florida. The Draft PDARP was developed with the participation and approval of the Florida's OPA-designated trustee officials for the FDEP and the FWC. The programmatic structure, processes, and principles for conducting future restoration planning presented in the Draft PDARP are consistent with OPA and the OPA rule at 15 C.F.R Part 990, and are designed to lead to restoration of natural resources and resource services that were injured or lost as a result of the *Deepwater Horizon* Spill and that are appropriate to provide for the recovery of injured resources and services as well as to compensate the environment and the public for losses that will continue until resources and services recover to conditions that existed before the Spill occurred.

There are many other policies within the FCMP that may have bearing on future project-specific restoration plans, depending on the nature of the projects proposed for implementation. Depending on the nature of the proposed action, applicable policies may include, but are not limited, to those found within Fla. Stat. Chapters 161 (Beach and Shore Preservation), 163 (Growth Policy; County and Municipal Planning; Land Development Regulation), 186 (State and Regional Planning), 253 (State Lands), 258 (State Parks and Preserves); 260 (Florida Greenways and Trails Act); 267 (Historical Resources); ; 373 (Water Resources); 379 (Fish and Wildlife Conservation); 403(Environmental Control); and 553(Building Construction Standards). Each specific restoration project identified and proposed in the future will remain subject to the requirement for federal consistency with the FCMP when and to the extent that effects on coastal resources or uses of the state's coastal zone are reasonably foreseeable.

Consistency with federally approved LOUISIANA CMP:

The overall goal of the Louisiana Coastal Resource Program (LCRP), as Louisiana's CMP is known, is to protect, develop, and restore or enhance the resources of Louisiana's coastal zone through the regulation of uses in that coastal zone, especially those uses that have a direct and significant impact on coastal waters. The LCRP policies applicable to activities within the state's coastal zone are found within the State's Coastal Use Guidelines (Guidelines), at La. Admin Code 43:I.701 - .719. These include Guidelines specific to categories of Coastal Uses as well as §701's Guidelines Applicable to All Uses. As the Draft PDARP does not propose any specific restoration actions or projects at this time, none of the Guidelines specific to categories of Coastal Uses in the LCRP are directly applicable to the proposed programmatic structure, processes, and principles described in the Draft PDARP. The Federal Trustees, therefore, reviewed the proposed programmatic restoration plan described in the Draft PDARP only for consistency with the §701 Guidelines Applicable to All Uses.

The LRCP's §701 Guidelines Applicable to All Uses largely include information and guidance bearing on the use, interpretation, and legal effect of the Guidelines themselves and on the information to be considered by and the responsibilities of permitting authorities in the process of systematically considering and making determinations with respect to the permitting of activities in Louisiana's coastal zone. These guidelines, however, also summarize general policies with respect to activities in the coastal zone that are focused on maintaining the long term viability and productivity of the coastal ecosystem. The guidelines provide that activities are to be planned, sited, designed, constructed, operated, and maintained to avoid significant adverse impacts to the coastal environment by a wide variety of activities, including from discharges of inorganic nutrient compounds; alterations in natural oxygen concentrations in coastal waters; destruction or alteration of wetlands and water bottoms; changes in salinity regimes; changes in littoral and sediment transport processes; discharges of suspended solids (including from dredging); land loss through erosion and subsidence; and impacts from floods, hurricanes and other storms. The guidelines also seek to ensure conformance with applicable water and air quality laws, standards and regulations, to avoid compromise of the State's interest in granted and donated lands or water bottoms, to allow for multiple concurrent uses appropriate to location, and to avoid unnecessary conflicts in uses. The LCMP's Coastal Use Permit system is the principal means for implementing these Guidelines for Louisiana's coastal zone.

The programmatic restoration plan presented in the Draft PDARP is consistent in principle with these general purposes and stated goals of the federally–approved LCRP for management of activities and uses in Louisiana's coastal zone. The proposed programmatic plan presented in the Draft PDARP will allow for and support future, project-specific restoration planning for the Spill, with substantial public involvement, including by the TIG comprised of Federal Trustees and the designated trustees in Louisiana. That "Louisiana TIG" will plan and implement restoration projects that will aid in the recovery of and compensate for specific Spill-related injuries and losses to natural resources under Louisiana's jurisdiction including, as needed, projects to address the public's lost access to, recreational use and enjoyment of natural resources in Louisiana. The identification of restoration projects under the proposed programmatic plan will be aided by and reflect efficiencies gained from the proactive, collaborative planning efforts undertaken in Louisiana through its Regional Restoration Planning Program.

The processes to be followed in planning future restoration projects are also highly similar and very compatible with Louisiana's Oil Spill Prevention and Response Act (OSPRA), La. R. S.30:2451 *et seq.*, as amended, and its State NRDA Regulations at La. Admin. Code tit. 43 Part XXIX. Restoration projects planned for these purposes will contribute to maintaining the long term viability and productivity of Louisiana's coastal ecosystem in a manner that is consistent with Louisiana's own laws and prior restoration planning initiatives. Further, each specific restoration project identified and proposed in the future will remain subject to the requirement for federal consistency with the LCRP when and to the extent that effects on coastal resources or uses of the coastal zone of Louisiana are reasonably foreseeable.

Many of the Guidelines specific to categories of Coastal Uses in the LCRP will have bearing on future project-specific restoration plans, depending on the nature of the projects proposed for implementation. Depending on the nature of the proposed action, applicable policies may include, but are not limited, to those found in: §703 (Guidelines for Levees); §705 (Guidelines for Linear Facilities); §707 (Guidelines for Dredged Spoil Deposition); §709 (Guidelines for Shoreline Modification); §711 (Guidelines for Surface Alterations); §713 (Guidelines for Hydrologic and Sediment Transport Modifications); §715 (Guidelines for Disposal of Wastes); and §717 (Guidelines for Uses that Result in the Alteration of Waters Draining into Coastal Waters). Further, for any proposed restoration action, compliance with other laws will require coordination with other agencies, consideration of adverse effects, and inclusion of measures and practices to avoid and mitigate for anticipated adverse effects prior to taking action.

C.4 State Correspondence Responding to CZMA Consistency Determination

Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

December 4, 2015

Ms. Stephanie L. Willis, Senior Attorney
Office of General Counsel, Natural Resources Section
National Oceanic and Atmospheric Administration
263 13th Avenue South, Suite 177
St. Petersburg, FL 33701

RE: U.S. Department of the Interior and National Oceanic and Atmospheric Administration - Natural Resource Damage Assessment - Deepwater Horizon Oil Spill, Draft Programmatic Damage Assessment and Restoration Plan and Draft Programmatic Environmental Impact Statement (Draft PDARP/PEIS) - Northwest Florida.
SAI # FL201510067460C

Dear Ms. Willis:

The Florida State Clearinghouse has coordinated the state's review of the referenced Draft Programmatic Damage Assessment and Restoration Plan and Draft Programmatic Environmental Impact Statement (Draft PDARP/PEIS) under the following authorities: Presidential Executive Order 12372; § 403.061(42), *Florida Statutes*; the Coastal Zone Management Act (16 U.S.C. §§ 1451 *et seq.*, as amended); and the National Environmental Policy Act (42 U.S.C. §§ 4321-4347, as amended).

Based on the information contained in the Draft PDARP/PEIS and state agency staff review, the state has determined that, at this stage, the proposed federal activities are consistent with the Florida Coastal Management Program (FCMP). The state's continued concurrence will be based on the activities' compliance with FCMP authorities, including federal and state monitoring of the activities to ensure their continued conformance, and the adequate resolution of any issues identified during subsequent regulatory reviews. The state's final concurrence of the projects' consistency with the FCMP will be determined during the environmental permitting process, if applicable, in accordance with Section 373.428, *Florida Statutes.*

Thank you for the opportunity to review the draft document. Should you have any questions regarding this letter, please don't hesitate to contact me at Chris.Stahl@dep.state.fl.us or (850) 245-2169.

Yours sincerely,

Chris Stahl

Chris Stahl, Coordinator
Florida State Clearinghouse
Office of Intergovernmental Programs

ec: Harriet Deal, DOI Office of the Solicitor
Gary Fremerman, USDA Office of the General Counsel
James Bove, EPA Office of General Counsel
Nanciann Regalado, USFWS DWH NRDAR Case Management
Mimi Drew, DEP Trustee Representative
Gareth Leonard, DEP Office of General Counsel
Rebecca Prado, DEP Florida Coastal Office
Shawn Hamilton, DEP Northwest District
Nick Wiley, FWC Executive Director, Trustee
Kelly Samek, FWC Office of the Executive Director
Scott Sanders, FWC Conservation Planning Services

Project Information	
Project:	FL201510067460C
Comments Due:	11/17/2015
Letter Due:	12/04/2015
Description:	U.S. DEPARTMENT OF THE INTERIOR AND NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION - NATURAL RESOURCE DAMAGE ASSESSMENT - DEEPWATER HORIZON OIL SPILL, DRAFT PROGRAMMATIC DAMAGE ASSESSMENT AND RESTORATION PLAN AND DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT (DRAFT PDARP/PEIS) - NORTHWEST FLORIDA.
Keywords:	DOI/NOAA - NRDA DEEPWATER HORIZON OIL SPILL DRAFT PDARP/PEIS
CFDA #:	15.658
Agency Comments:	
ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION	
Released Without Comment	
STATE - FLORIDA DEPARTMENT OF STATE	
No Final Comments Received	
AGRICULTURE - FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES	
No Comment at this time	
FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION	
NO COMMENT BY KELLY SAMEK ON 10/18/15.	
NORTHWEST FLORIDA WMD - NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT	
No Comments	

For more information or to submit comments, please contact the Clearinghouse Office at:

3900 COMMONWEALTH BOULEVARD, M.S. 47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2170
FAX: (850) 245-2189

Visit the Clearinghouse Home Page to query other projects.

Lance R. LeFleur
Director

Robert J. Bentley
Governor

Alabama Department of Environmental Management
adem.alabama.gov

1400 Coliseum Blvd. 36110-2400 ■ Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700 ■ FAX (334) 271-7950

November 17, 2015

Christopher D. Doley, Designated Trustee Representative for Deepwater Horizon
U. S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
1315 East West Highway
Silver Spring, MD, 20910

RE: State of Alabama Coastal Consistency Concurrence
Draft Programmatic Damage Assessment and Restoration Plan (PDARP) and DEIS for the Deepwater Horizon Oil Spill
Alabama Department of Environmental Management (ADEM) Tracking Code: 2016-010-FC-FAA-NRDA

Dear Mr. Doley:

The ADEM received the documents for the referenced activity on October 6, 2015. The ADEM **concurs** with the Trustee's determination that the proposed activity is consistent with the enforceable policies of the Alabama Coastal Area Management Program.

Contact the Mobile-Coastal office anytime with questions. Always include the ADEM tracking code above when corresponding on this matter.

Sincerely,

Anthony Scott Hughes, Chief
Field Operations Division

ASH/jsb/cap

File: CZCERT

eCopy: Joy Earp, USACE
Phillip Hinesley, ADCNR
Linda McCool, ADCNR
William H. Brantley, ADCNR-SLD

Birmingham Branch
110 Vulcan Road
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(205) 942-6168
(205) 941-1603 (FAX)

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(251) 479-2593 (FAX)

Mobile-Coastal
3664 Dauphin Street, Suite B
Mobile, AL 36608
(251) 304-1176
(251) 304-1189 (FAX)

BOBBY JINDAL
GOVERNOR

STEPHEN CHUSTZ
SECRETARY

State of Louisiana

DEPARTMENT OF NATURAL RESOURCES

OFFICE OF COASTAL MANAGEMENT

October 29, 2015

Stephanie Willis,
Senior Attorney
NOAA General Counsel Office, Natural Resources Section
263 13th Ave. S, Suite 177
St. Petersburg, FL 33701
Via e-mail: stephanie.willis@noaa.gov

RE: **C20150187,** Coastal Zone Consistency
National Oceanic and Atmospheric Administration (NOAA)
Deepwater Horizon Oil Spill Draft Programmatic Damage Assessment and Restoration Plan (PDARP) and Draft Programmatic Environmental Impact Statement
Direct Federal Action
Coastwide, **Louisiana**

Dear Ms. Willis:

The Office of Coastal Management (OCM) has received the "The Deepwater Horizon Oil Spill Draft Programmatic Damage Assessment and Restoration Plan (PDARP) and Draft Programmatic Environmental Impact Statement" submitted on behalf of the U.S. Department of the Interior, The National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (USEPA).

After a review of the Draft PDARP it has been determined that the plan is broadly consistent with the approved Louisiana Costal Resource Program (LCRP).

Please be aware that plans for each individual restoration project selected from the PDARP should be made available, by the appropriate applicant, to the OCM for final determination of consistency with the LCRP.

If you have any questions concerning this determination please contact Jim Bondy of the Consistency Section at (225) 342-3870 or 1-800-267-4019.

Sincerely,

/S/ Don Haydel
Acting Administrator
Interagency Affairs/Field Services Division

DH/CMC/jab

cc: Martin Mayer, COE-NOD
Dave Butler, LDWF
Sydney Dobson, CPRA

STATE OF MISSISSIPPI
Phil Bryant
Governor

MISSISSIPPI DEPARTMENT OF MARINE RESOURCES
Jamie M. Miller, Executive Director

December 23, 2016

Stephanie L. Willis
Senior Attorney
National Oceanic & Atmospheric Administration
Office of General CounselNatural Resources
Southeast Region
263 13th Avenue South, Suite 177
St. Petersburg, FL 33701

Re: DMR-160141; Draft Programmatic Damage Assessment and Restoration Plan (Draft PDARP)

Dear Ms. Willis:

The Department of Marine Resources (Department) in cooperation with other state agencies is responsible under the Mississippi Coastal Program (MCP) for managing the coastal resources of Mississippi. Proposed activities in the coastal area are reviewed to insure that the activities are in compliance with the MCP.

The Department has reviewed the proposed five (5) programmatic goals within the plan based upon provisions of the Mississippi Coastal Program and Section 307 of the Coastal Zone Management Act of 1972 (as amended). The proposed goals identified in the Draft PDARP have been determined to be consistent to the maximum extent practicable with the Mississippi Coastal Program.

It appears from the goals listed in the Draft PDARP that the future projects will likely contain impacts regulated by both this Department and the U. S. Army Corps of Engineers. Once the plans for the projects have been finalized, applications should be submitted to this office for review. An application packet has been included with this letter, and the application form can also be found on the Department's web site at http://dmr.ms.gov/images/permitting/joint-application-notification-form2.pdf.

The above granted consistency certification was based upon the information presented. If you have any questions regarding this letter, please contact Greg Christodoulou with the Bureau of Wetlands Permitting at (228) 523-4109 or greg.christodoulou@dmr.ms.gov.

Sincerely,

Jamie M. Miller

Jamie M. Miller
Executive Director
Mississippi Department of Marine Resources

JMM/gsc

Enclosures

cc: Christopher D. Doley, NOAA

TEXAS GENERAL LAND OFFICE
GEORGE P. BUSH, COMMISSIONER

January 6, 2015

Christopher D. Doley
Designated Trustee Representative for Deepwater Horizon
NOAA Restoration Center
1315 East-West Highway
Silver Spring, MD 20910

Re: Texas Coastal Management Program Consistency Determination of Draft Programmatic Damage Assessment and Restoration Plan and Draft Programmatic Environmental Impact Statement for the Deepwater Horizon Oil Spill
CMP#: 16-1090

Dear Mr. Doley:

Pursuant to 31 Tex. Admin. Code Part 16 and the applicable federal regulations, the Draft Programmatic Damage Assessment and Restoration Plan and Draft Programmatic Environmental Impact Statement (Draft PDARP) for the Deepwater Horizon Oil Spill has been reviewed for consistency with the goals and policies of the Texas Coastal Management Program (TCMP).

The Draft PDARP has been reviewed for potential impacts to coastal natural resource areas. It has been determined that the programmatic restoration plan proposed in the PDARP would be implemented in a manner that is consistent with the applicable, enforceable polices of the TCMP. Therefore, the GLO concurs with the Federal Trustees' consistency determination for the PDARP.

Please note that this letter does not authorize the use of Coastal Public Land. No work may be conducted or structures placed on State-owned land until you have obtained all necessary authorizations, including any required by the General Land Office and the U.S. Army Corps of Engineers.

Please forward this letter to applicable parties. If you have any questions or concerns, please contact me at (512) 475-3624 or at federal.consistency@glo.texas.gov.

Sincerely,

Ray Newby, P.G.
Coastal Geologist
Texas General Land Office
Coastal Resources Program

Email cc: Chauncey Kelly, NOAA

C.5 Correspondence Initiating ESA Consultations

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

October 8, 2015

Mr. David Bernhart
Assistant Regional Administrator for Protected Resources
National Marine Fisheries Service, Southeast Regional Office
263 13th Ave South
St Petersburg, FL 33701

Re: Request for Programmatic Consultation on the Preferred Alternative within the "*Deepwater Horizon* Oil Spill Draft Programmatic Damage Assessment and Restoration Plan and Draft Programmatic Environmental Impact Statement"

Dear Mr. ~~Bernhart~~ David:

The National Oceanic and Atmospheric Administration Restoration Center (NOAA RC), the Lead Federal Agency, is requesting formal consultation under Section 7(a)(2) of the Endangered Species Act (ESA) on behalf of the Natural Resource Trustees (Trustees) for the *Deepwater Horizon* Oil Spill on the Draft Programmatic Damage Assessment and Restoration Plan. The Draft PDARP is integrated with a Draft Programmatic Environmental Impact Statement. The complete integrated document is referred to here as the Draft PDARP/PEIS.

The Trustees include representatives of the National Oceanic and Atmospheric Administration (for the U.S. Department of Commerce); the U.S. Department of the Interior; the U.S. Environmental Protection Agency; the U.S. Department of Agriculture; and designated agencies representing each of the five Gulf states: Florida, Alabama, Mississippi, Louisiana, and Texas. The Trustees developed this Draft PDARP/PEIS for public comment under the requirements of the Oil Pollution Act of 1990 (OPA) and National Environmental Policy Act (NEPA). The OPA requires the Trustees to develop a restoration plan, while NEPA requires an evaluation of environmental consequences.

The Draft PDARP/PEIS considers programmatic alternatives to restore natural resources, ecological services, and recreational use services injured or lost as a result of the *Deepwater Horizon* oil spill. The Trustees have developed restoration alternatives, comprised of various restoration types, to address injuries to natural resources and resource services resulting from the *Deepwater Horizon* oil spill and associated response activities (referred to collectively as the *Deepwater Horizon* incident). Criteria and evaluation standards under the OPA natural resource damage assessment regulations guided the Trustees' consideration of programmatic restoration alternatives. The Draft PDARP/PEIS also evaluates the environmental consequences of the restoration alternatives under NEPA. The Draft PDARP/PEIS describes regulatory authorities, including ESA, that apply to the Draft PDARP/PEIS to streamline compliance with other laws in the future and that may be most relevant to future proposed actions in subsequent restoration plans. The Trustees considered restoration types and approaches to restore, replace, rehabilitate, or acquire the equivalent of the injured natural resources and their services. The Trustees expect that the proposed restoration plan and the future projects that ultimately result from this Draft PDARP/PEIS will have a significant net benefit to the Gulf of Mexico ecosystem.

The Draft PDARP/PEIS is a framework action (see 50 CFR 402.02, as amended); it describes the framework by which subsequent project- specific restoration plans will be identified and developed, and sets forth the restoration types (inclusive of more specific restoration approaches) the Trustees will consider in developing future projects for consideration in each of the restoration areas. The Trustees' proposed action is to select a comprehensive restoration plan (Alternative A, the preferred alternative,) to guide and direct subsequent restoration planning and implementation during the coming decades. The proposed action also includes the funding allocations to restoration types and restoration areas described in Section 5.10.2 and subsequent restoration planning process as described in Section 5.10.4 and the governance process described in Chapter 7.

Based on the outcome of pre-consultation discussions with National Marine Fisheries Service (NMFS) since 2013, and the types of future projects to be proposed and implemented under the program described in the preferred alternative, we conclude that the proposed action may affect ESA listed species under NMFS' jurisdiction (Table 1). NOAA RC requests, on behalf of the Trustees, a programmatic ESA consultation on the preferred alternative, including consideration of the governance and future decision making processes identified in the October 5, 2015 Draft PDARP/PEIS.

Programmatic consultations have the greatest potential to increase the effectiveness and efficiency of the section 7 consultation process for the action agency(s) and NMFS. A programmatic consultation also allows for analysis at the program level that can be relied upon in the future for project-specific consultations. The Trustees expect that the programmatic consultation will establish a framework and process for how and when the trustees will consult with NMFS on project-specific actions that will be part of the preferred alternative program and also will identify opportunities for streamlining project-specific consultations in the future.

Table 1. ESA-listed and Proposed Species and Designated Critical Habitats in the Gulf of Mexico under NMFS Jurisdiction

Marine Mammal Species	**Scientific Name**	**Status and Agency Jurisdiction**	**Critical Habitat in Gulf of Mexico?**
fin whale	*Balaenoptera physalus*	Endangered - NMFS	No CH designated
humpback whale	*Megaptera novaeangliae*	Endangered - NMFS	No CH designated
sei whale	*Balaenoptera borealis*	Endangered - NMFS	No CH designated
sperm whale	*Physeter macrocephalus*	Endangered - NMFS	No CH designated
Sea Turtle Species	**Scientific Name**	**Status and Agency Jurisdiction**	**Critical Habitat in Gulf of Mexico?**
green sea turtle	*Chelonia mydas*	Threatened[1] – Joint NMFS/USFWS	No
hawksbill sea turtle	*Eretmochelys imbricata*	Endangered – Joint NMFS/USFWS	No
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered – Joint NMFS/USFWS	No CH designated
leatherback sea turtle	*Dermochelys coriacea*	Endangered – Joint NMFS/USFWS	No

loggerhead sea turtle (NW Atlantic DPS)	*Caretta caretta*	Threatened[2] – Joint NMFS/USFWS	Yes
Fish Species	**Scientific Name**	**Status and Agency Jurisdiction**	**Critical Habitat in Gulf of Mexico?**
gulf sturgeon	*Acipenser oxyrinchus desotoi*	Threatened -- Joint NMFS/USFWS	Yes
smalltooth sawfish	Pristis pectinata	Endangered -NMFS	Yes
Invertebrate Species	**Scientific Name**	**Status and Agency Jurisdiction**	**Critical Habitat in Gulf of Mexico?**
lobed star coral	*Orbicella annularis*	Threatened - NMFS	No
mountainous star coral	*Orbicella faveolata*	Threatened - NMFS	No
boulder star coral	*Orbicella franksi*	Threatened - NMFS	No
elkhorn coral	*Acropora palmate*	Threatened[3] - NMFS	yes (FL keys)
Proposed Species	**Scientific Name**	**Status and Agency Jurisdiction**	**Critical Habitat in Gulf of Mexico?**
Nassau grouper	*Epinephelus striatus*	Proposed as Threatened - NMFS	N/A

[1] Florida's breeding population is listed as endangered.
[2] Northwest Atlantic Ocean Distinct Population Segment.
[3] Colonies located at Flower Garden Banks National Marine Sanctuary.
Sources: *http://sero.nmfs.noaa.gov/protected_resources/section_7/threatened_endangered/Documents/gulf_of_mexico.pdf*
http://www.nmfs.noaa.gov/pr/species/esa/candidate.htm#proposed
http://www.nmfs.noaa.gov/pr/species/esa/listed.htm

The Draft PDARP/PEIS integrates both its restoration plan and NEPA evaluation into a single document. Table 2 below outlines the parts of the document that comprise the elements of a Biological Assessment.

Table 2. Location of information needed for ESA consultation within the draft PDARP/PEIS

Proposed action	
Chapter 5	5.5 Comprehensive Integrated Ecosystem Restoration Alternative (Preferred Alternative) 5.10.1 Summary of Preferred Alternative 5.10.2 Funding Allocations 5.10.4 Subsequent Restoration Planning Appendix 5.D: Restoration Approaches Appendix 5.E: Monitoring and Adaptive Management Framework
Chapter 7	Governance (entire chapter)
Action Area	
Chapter 6	6.2 Approach to Affected Environment
Environmental Baseline	
Chapter 2	Incident Overview (entire chapter)
Chapter 3	Ecosystem Setting (entire chapter)
Chapter 4	4.4 Water Column 4.5 Benthic resources 4.6 Nearshore Marine Ecosystem 4.6.7 Gulf Sturgeon Assessment 4.8 Sea Turtles 4.9 Marine Mammals 4.11 Injury Assessment: Summary and Synthesis of Findings
Chapter 5	5.2.2 Scope and Programmatic Context of Restoration 5.3.1. Trustee Programmatic Goals

	5.4.3 Early Restoration Appendix 5.B: Early restoration projects, Phases I-IV (DWH Early Restoration actions that have completed or are undergoing ESA consultation)
Chapter 6	Appendix 6.B: Additional Actions for Consideration in Cumulative Impacts Analysis (Past actions)
Effects of the Action	
Chapter 6	6.4 Evaluation of Environmental Consequences of Alternative A – see particularly the subsections for 'Biological Resources' evaluating, at a programmatic level, potential environmental impacts for restoration approaches proposed within each restoration type for the preferred alternative 6.9.1 Compliance with Other Applicable Authorities: Endangered Species Act 6.15 Best Practices 6.17 NEPA Considerations and Tiering Future Restoration Appendix 6.A: Best Practices
Cumulative Effects	
Chapter 6	6.6 Cumulative Impacts Appendix 6.B: Additional Actions for Consideration in Cumulative Impacts Analysis (Future state or private actions reasonably certain to occur)

Adverse impacts are described broadly in the PEIS, since this is a programmatic analysis. The analysis therefore does not identify specific adverse impacts to listed species or modification of critical habitats, but more generally describes the types of impacts that could occur to biological resources and the physical environment. Chapter 7 (governance) discusses the process for developing and proposing projects in subsequent restoration plans and the need for early engagement with regulatory agencies. Some of the effects described below may be reduced by implementation of the *Sea Turtle and Smalltooth Sawfish Construction Conditions* and *Measures for Reducing Entrapment Risk to Protected Species* that the Trustees have already adopted for use (see Chapter 6, Appendix 6.A).

The preferred alternative will ultimately result in projects that are specifically intended to benefit ESA listed species (see, for example, 5.5.7 Sturgeon, and 5.5.10 Sea Turtles). However, some future restoration projects also may adversely affect ESA-listed species. Adverse impacts in the PEIS are typically a result of, but not limited to:

- Habitat replacement: Impacts associated with replacement of existing habitat by the newly created or restored habitat (e.g., burial with sediment for dune creation), or displacement or loss of species due to habitat replacement. For example, restoration of marsh habitats may require dredging to restore hydrologic and hydraulic connectivity, as well as sediment borrow sites and placement for establishment of vegetation at appropriate elevations. As another example, Restore and Preserve Mississippi-Atchafalaya River Processes (see 6.4.1.2) describes the potential short-term and potentially long-term, moderate to major adverse impacts to biological resources (e.g., estuarine-dependent fish species and oysters).
- Construction-related: short-term, minor adverse impacts anticipated include reduced water quality, air quality, and ambient noise conditions primarily due to construction in water, wetlands, and on land; and blocked migration and turbidity resulting from construction of building and enhancing oyster reefs, living shorelines and marshes, removal of barriers. For example, Restore Oyster Reef Habitat (see 6.4.12.1) describes the possible injury or mortality to fish, turtles, and (albeit unlikely) marine mammals due to cultch placement activities, including entrainment.

- Changes to human use patterns: Enhance Public Access to Natural Resources for Recreational Use describes the possible impacts to marine mammals and sea turtles from vessel traffic increased by improving public access to restore for lost recreational uses (see 6.4.13.1).

The Trustees respectfully request a programmatic biological opinion by January 15, 2016 to meet the anticipated deadlines for the Final PDARP/PEIS and Record of Decision.

Sincerely,

Christoper D. Doley
Principal Trustee Representative
National Oceanic and Atmospheric Administration

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

FEB 01 2016

In Reply Refer To:
FWS/R4/DH NRDAR

Memorandum

To: Leopoldo Miranda, USFWS Southeast Regional Office, Atlanta, Georgia

From: for Cynthia K. Dohner, Authorized Official, *Deepwater Horizon* Department of the Interior Natural Resource Damage Assessment and Restoration (NRDAR) Kevin D. Reynolds

Subject: Formal Consultation and Conference Request for the *Deepwater Horizon* Draft Programmatic Damage Assessment and Restoration Plan

As you are no doubt aware, 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's Macondo well. Tragically, 11 workers were killed and 17 injured by the explosion and fire. 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, making the incident by far the largest offshore oil spill in the history of the United States. In addition, various response actions were undertaken in an attempt to minimize impacts from spilled oil.

As an oil pollution incident, the *DWH* spill was subject to the provisions of the Oil Pollution Act (OPA) of 1990[1], 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 Natural Resource Trustees (Trustees) convened, 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. The Trustees include designated agencies representing each of the five Gulf states (Alabama, Florida, Louisiana, Mississippi, and Texas) and four federal agencies: National Oceanic and Atmospheric Administration (NOAA), Department of the Interior (DOI), Environmental Protection Agency (EPA), and United States Department of Agriculture (USDA). Pursuant to OPA, the Trustees have conducted a natural resource damage assessment (NRDA) and prepared the *Deepwater Horizon* Oil Spill Draft Programmatic Damage Assessment and Restoration Plan (Draft PDARP), which describes the Trustees' injury assessment and proposed restoration plan.

1. Oil Pollution Act (OPA) of 1990 (33 USC §§ 2701 *et seq*).

The U.S. Fish and Wildlife Service (USFWS) prepared this biological assessment (BA) pursuant to sections 7(a)(2) and 7(c) of the Endangered Species Act (ESA) (16 USC §§ 1536(a)(2)-(c)) to evaluate the Proposed Action described in the Draft PDARP. ESA section 7(a)(2) requires federal agencies to consult with the Secretary of the Interior to insure that any action authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat for those species. ESA section 7(c) requires federal agencies to prepare a BA for the purpose of identifying any endangered species or threatened species which is likely to be affected by an agency action. As discussed in Section 2 of the BA, the Proposed Action in the Draft PDARP is "Alternative A: Comprehensive Integrated Ecosystem Restoration," to permit the Trustees, including the Department of the Interior, to restore, rehabilitate, replace, and acquire natural resources injured by the *Deepwater Horizon* oil spill. The restoration types and approaches included in Alternative A are outlined in Table 1 of this BA, and are further described (along with example restoration techniques) in Appendix A to the BA.

The USFWS is evaluating the Draft PDARP Proposed Action as a framework programmatic action in this BA. The regulations implementing the ESA define a framework programmatic action to mean that "for purposes of an incidental take statement, a Federal action that approves a framework for the development of future action(s) that are authorized, funded, or carried out at a later time, and any take of a listed species would not occur unless and until those future action(s) are authorized, funded, or carried out and subject to further section 7 consultation." 50 CFR § 402.02. The Proposed Action in the Draft PDARP is a framework programmatic action because "[i]nstead of identifying specific restoration projects, the PDARP provides direction and guidance for identifying, evaluating, and selecting future restoration projects to be carried out by Trustee implementation groups." Draft PDARP § 1.3.1. As recognized by the USFWS and NOAA in the preamble to the Final Rule regarding incidental take statements, "the level of detail available at the program (framework) level is often insufficient to identify with particularity where, when, and how the program will affect listed species." 80 FR 26832. This challenge is particularly true when evaluating the effects of the Proposed Action to listed species and critical habitats.

As discussed in greater detail in this BA, the large geographic scope of the Proposed Action combined with the lack of detail as to specifically where, when, and how much a particular restoration type, approach, or technique will be implemented is generally insufficient to identify with particularity how the Proposed Action will affect listed, proposed, and candidate species. Additionally, as recognized by the USFWS and NOAA in the Final Rule regarding incidental take statements, "without such detail, it is difficult to write sufficiently specific and meaningful terms and conditions intended to minimize the impact of the taking for the benefit of the listed species." 80 FR 26832. While this statement relates to incidental take statements, it is also applicable to this BA and its analysis of how the Proposed Action will affect listed, proposed, and candidate species. The Proposed Action is designed to accomplish comprehensive ecosystem restoration and therefore will provide direct and indirect benefits to listed, proposed, and candidate species and their designated and proposed critical habitats. However, without knowing details of where, when, and how much a particular restoration approach will be implemented, it is difficult to identify meaningful best practices intended to avoid or minimize potential adverse effects to listed, proposed, and candidate species. In this BA, the term "best practices" includes those practices, such as best management practices and conservation measures, that are intended to avoid or minimize

adverse effects to listed, proposed, and candidate species and designated and proposed critical habitats. Incidental take statements include "reasonable and prudent measures" that are necessary and appropriate to minimize the impact of the incidental take and "terms and conditions" for implementing the reasonable and prudent measures. This BA does not request any incidental take associated with implementing the Draft PDARP. In accordance with 50 CFR § 402.14 for a framework programmatic action, an incidental take statement is not required at the programmatic level; any incidental take resulting from any action subsequently authorized, funded, or carried out under the program will be addressed in subsequent Section 7 consultation, as appropriate.

In this BA, the USFWS assessed potential effects to species within the Action Area by examining the intersection of proposed restoration activities with listed, proposed, and candidate species, species occurrence within the Action Area, and designated critical habitat and associated primary constituent elements (PCEs) within the Action Area (see Appendix B to this BA). Impacts to listed, proposed, and candidate species and designated and proposed critical habitats are anticipated to vary depending on the specifics of the location and design of future restoration actions. In light of the uncertainties regarding the effects of the Proposed Action on listed, proposed, and candidate species and designated and proposed critical habitats, as well as the related difficulties with developing best practices to minimize adverse effects to listed, proposed, and candidate species and designated and proposed critical habitats, the USFWS believes it is appropriate to exercise caution in its effects determinations. To address these uncertainties, the USFWS believes it is reasonable to conclude that at the framework programmatic level and in the absence of project-specific information, the Proposed Action may affect 115 listed, proposed, or candidate species and 39 designated or proposed critical habitats (summarized in Table 2) identified in this BA. Accordingly, the USFWS will consult under ESA section 7(a)(2) for future restoration projects developed under the Proposed Action for these 115 species and 39 critical habitats. As part of these consultations for subsequent restoration planning, the USFWS may consider pursing additional programmatic ESA consultation for groups or certain types of projects that can be evaluated efficiently. Section 5.2 of this BA includes a list of measures that could be incorporated, as appropriate, on a project-specific basis to avoid, minimize, or reduce potential adverse effects to many of the species evaluated in this BA. Best Practices to minimize adverse effects to listed species and critical habitats have not been developed for all species evaluated in this BA. The USFWS and NOAA will work cooperatively, when appropriate, to identify these best practices in subsequent project-specific consultations.

By this memo, we are requesting initiation of formal consultation and conference under section 7 of the Endangered Species Act of 1973. If you have questions or concerns regarding this request for consultation, please contact Erin Chandler, Fish and Wildlife Biologist, at 361-244-3540 or erin_chandler@fws.gov or Colette Charbonneau, *DWH* Restoration Program Manager, at 303-236-4374 or colette_charbonneau@fws.gov.

Attachment: Biological Assessment for the *Deepwater Horizon* Draft Programmatic Damage Assessment and Restoration Plan

C.6 Clean Air Act Section 309—EPA Correspondence

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

November 30, 2015

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

Ms. Cindy K. Dohner
Regional Director
Southeast Region
U.S. Fish and Wildlife Service
P.O. Box 49567
Atlanta, GA 30345

Dear Ms. Dohner,

In accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act, the Environmental Protection Agency (EPA) has reviewed the Federal and State natural resource trustee agencies' draft Programmatic Damage Assessment and Restoration Plan and Draft Programmatic Environmental Impact Statement (PDARP/PEIS) for the Deepwater Horizon oil spill.

As Federal and State natural resource trustees (Trustees), the U.S. Department of Interior (DOI), the National Oceanic and Atmospheric Administration (NOAA), the EPA, the U.S. Department of Agriculture (USDA), Alabama, Florida, Mississippi, Louisiana, and Texas prepared this draft PDARP/PEIS to describe the process for subsequent restoration planning to select specific projects to restore natural resources, ecological services, and recreational use services injured or lost as a result of the Deepwater Horizon oil spill. We appreciate the Trustees' commitment to ensuring that subsequent restoration plans are consistent with this PDARP and integrated with a NEPA analysis tiered from this PEIS to ensure project-specific impacts and mitigation are considered.

The draft PDARP/PEIS analyzed three restoration alternatives, in addition to the no action alternative, including: 1) the Preferred Alternative which provides an integrated restoration portfolio to maximize potential synergies among restoration types and approaches, 2) a resource-specific restoration alternative which focuses on maximizing the benefits to individual resources and human uses based on well-defined relationships between injured resources and outcomes of restoration actions, and 3) an alternative that defers development of a comprehensive restoration plan until greater scientific understanding of the injury determination is achieved.

Based on our review of the draft PDARP/PEIS, we offer the following comments:

EPA fully supports the comprehensive, integrated ecosystem restoration approach identified as the Preferred Alternative in the draft PDARP/PEIS. This approach would include a substantive focus on northern Gulf of Mexico coastal and nearshore habitat restoration. Several of the techniques proposed for implementation under this alternative, including barrier island restoration, river diversion and marsh creation/enhancement using dredged material, are

consistent with the EPA's longstanding coastal restoration priorities in Louisiana. Pursuant to the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA), federal and state partners have had considerable success planning, designing and implementing these and other similar techniques to restore Louisiana coastal wetland habitat.

Many of the proposed restoration approaches identified in the draft PDARP/PEIS may entail a discharge of dredge or fill material into waters of the U.S. As the planning and design for restoration projects moves forward, EPA is committed to working with implementation agencies, the U.S. Army Corps of Engineers, and other federal and state regulatory partners to help ensure an efficient and effective review process under Section 404 of the Clean Water Act.

EPA appreciates the draft PDARP/PEIS's discussion of environmental justice considerations in its future restoration planning and the commitment to ensure that impacts to environmental justice communities will be analyzed and appropriately considered in future projects tiered from this PDARP/PEIS. We recommend that the Trustees' consider using EJSCREEN, EPA's environmental justice screening and mapping tool that utilizes standard and nationally-consistent data to highlight places that may have higher environmental burdens and vulnerable populations, when considering potential project-specific impacts to minority and low-income populations.

The draft PDARP/PEIS includes a detailed discussion on impacts of the restoration approaches on GHG emissions, the potential changes to the environment that may result from climate change impacts and the important of considering climate adaptation measures based on how future climate scenarios may impact the southeastern United States and the restoration alternatives. In addition, the Preferred Alternative includes a specific focus on achieving large-scale benefits to coastal habitats that are expected to contribute to the overall health and resiliency of northern Gulf of Mexico coastal environment and resources. We support the Trustees' determination to conduct an appropriate GHG and climate change analysis for subsequent project-specific restoration actions and recommend that the Trustees use the Council on Environmental Quality's December 2014 revised draft guidance for Federal agencies' consideration of GHG emissions and climate change impacts in NEPA to help outline the framework for its project-specific analysis of these issues.

In summary, EPA believes the actions proposed under the PDARP/PEIS will address injuries to natural resources and resource services resulting from the Deepwater Horizon oil spill. Therefore, we have rated the proposed action a "LO" (Lack of Objections). A copy of EPA's rating criteria is enclosed. If we can provide further explanation of our comments, I can be reached at 202-564-5400, or you can contact Jessica Trice of my staff at 202-564-6646.

Sincerely,

Susan E. Bromm
Director
Office of Federal Activities

Appendix D. Other Laws and Executive Orders

D.1 Federal Laws

Americans with Disabilities Act
Antiquities Act of 1906
Archeological Resource Protection Act of 1979
Bald and Golden Eagle Protection Act
Clean Air Act
Clean Water Act (Federal Water Pollution Control Act)
Coastal Barrier Resources Act
Coastal Wetlands Planning, Protection and Restoration Act of 1990
Coastal Zone Management Act
Comprehensive Environmental Response, Compensation, and Liability Act of 1980
Endangered Species Act of 1973
Estuary Protection Act
Farmland Protection Policy Act
Fish and Wildlife Conservation Act
Fish and Wildlife Coordination Act
Magnuson-Stevens Fishery Conservation and Management Act
Marine Mammal Protection Act
Marine Protection, Research and Sanctuaries Act
Migratory Bird Treaty Act of 1918
National Environmental Policy Act of 1969
National Historic Preservation Act of 1966
National Marine Sanctuaries Act
National Wildlife Refuge System Improvement Act of 1997
Native American Graves Protection and Repatriation Act
Oil Pollution Act of 1990
Outer Continental Shelf Lands Act
Park System Resource Protection Act
Rivers and Harbors Act
Water Resources Development Acts

D.2 Federal Executive Orders and Regulations

Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of NEPA
DOI NEPA Procedures
DOI Regulations for Implementing NEPA
NOAA NEPA Procedures
NOAA Regulations for NRDA
Executive Order 11514—Protection and Enhancement of Environmental Quality as amended by Executive Order 11991
Executive Order 11593—Protection and Enhancement of the Cultural Environment
Executive Order 11988—Floodplain Management
Executive Order 11990—Protection of Wetlands
Executive Order 12580—Implementation of Section 311 of the Federal Water Pollution Control Act and OPA as amended by Executive Order 12777
Executive Order 12898—Environmental Justice
Executive Order 12962—Recreational Fisheries
Executive Order 13007—Indian Sacred Sites
Executive Order 13089—Coral Reef Protection
Executive Order 13112—Invasive Species
Executive Order 13158—Marine Protected Areas
Executive Order 13175—Consultation and Coordination with Indian Tribal Governments
Executive Order 13186—Responsibilities of Federal Agencies to Protect Migratory Birds
Executive Order 13352—Facilitation of Cooperative Conservation
Executive Order 13547—Stewardship of the Ocean, Our Coasts, and the Great Lakes
Executive Order 13554—Gulf Coast Ecosystem Restoration Task Force
Executive Order 13653—Preparing the United States for the Impacts of Climate Change
Executive Order 13693—Planning for Federal Sustainability in the Next Decade