Deepwater Horizon Oil Spill

Alabama Trustee Implementation Group

Draft Restoration Plan II and Environmental Assessment:

Restoration of Wetlands, Coastal, and Nearshore Habitats; Habitat Projects on Federally Managed Lands; Nutrient Reduction (Nonpoint Source); Sea Turtles; Marine Mammals; Birds; and Oysters

MARCH 2018

EXECUTIVE SUMMARY

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

As an oil pollution incident, the DWH oil spill was subject to the provisions of the Oil Pollution Act (OPA) of 1990, which addresses preventing, responding to, and paying for oil pollution incidents in navigable waters, adjoining shorelines, and the exclusive economic zone of the United States. Under the authority of OPA, a council of federal and state “Trustees” was established on behalf of the public to assess natural resource injuries resulting from the incident and to work to make the environment and public whole for those injuries. As required under OPA, the Trustees conducted a natural resource damage assessment (NRDA) and prepared the Final Programmatic Damage Assessment and Restoration Plan/Programmatic Environmental Impact Statement (Final PDARP/PEIS).

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

- Assess the impacts of the DWH oil spill on natural resources in the Gulf of Mexico and the services those resources provide.
- Determine the type and amount of restoration needed to compensate the public for these impacts.

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

In the Final PDARP/PEIS, the DWH Trustees adopted a portfolio of Restoration Types that addresses the diverse suite of injuries that occurred at both regional and local scales. The DWH Trustees identified the need for a comprehensive restoration plan at a programmatic level to guide and direct the ecosystem level restoration effort, based on the following five restoration goals:

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

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

The Final PDARP/PEIS included the funding allocations for each restoration goal. In the 2016 Consent Decree resolving the DWH Trustees' claims against BP for natural resource injuries under OPA, BP agreed to pay $8.1 billion in natural resource damages (which includes the $1 billion that BP previously committed to pay for Early Restoration projects) over a 15-year period.

Draft Restoration Plan II and Environmental Assessment

The Alabama Trustee Implementation Group (AL TIG) prepared this document, the Alabama Trustee Implementation Group Draft Restoration Plan II and Environmental Assessment: Restoration of Wetlands, Coastal, and Nearshore Habitats; Habitat Projects on Federally Managed Lands; Nutrient Reduction (Nonpoint Source); Sea Turtles; Mammals; Birds; and Oysters (draft RP II/EA) pursuant to OPA and NEPA. The content and findings included in this document are consistent with the DWH Trustees' findings in the Final PDARP/PEIS, which it tiers from. The AL TIG includes two state trustee agencies and four federal trustee agencies: the Alabama Department of Conservation and Natural Resources (ADCNR); the Geological Survey of Alabama; the United States Department of Commerce, represented by the National Oceanic and Atmospheric Administration (NOAA); the United States Department of the Interior (USDOI), represented by the United States Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), and National Park Service (NPS); the United States Department of Agriculture (USDA); and the United States Environmental Protection Agency (USEPA) (collectively the AL TIG).

The AL TIG prepared this draft RP II/EA to (1) inform the public about DWH NRDA restoration planning efforts, (2) present analysis on the potential restoration benefits and environmental consequences of the alternatives, and (3) seek public comment on the 26 alternatives presented in Table ES-1.[1]

In identifying proposed projects/alternatives[2] for this draft RP II/EA, the AL TIG considered (1) the OPA screening criteria, (2) the Restoration Goals and other criteria identified by the DWH Trustees in the Final PDARP/PEIS, (3) goals developed by the AL TIG for this restoration plan, (4) input from the public, (5) the current and future availability of funds under the DWH oil spill NRDA settlement payment schedule, (6) and Monitoring and Adaptive Management (MAM) priorities of the AL TIG. Of these 26 projects, the AL TIG identified 20 preferred alternatives to be fully funded from Restoration Type Funds,

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[1] While Table ES-1 has 28 total projects, 2 projects are split across Restoration Types, resulting in 26 unique projects evaluated along with the no action alternative for each Restoration Type.

[2] For the purposes of this draft RP II/EA, each proposed project is considered a separate alternative; therefore, the terms "project" and "alternative" are used interchangeably.

1 preferred alternative to be partially funded from Restoration Type funds and partially funded from MAM funds, and 1 activity to be fully funded using MAM funds.

Table ES-1 shows the range of alternatives, noting those that are considered preferred in this draft RP II/EA. Projects proposed for engineering and design only at this time are designated with "E&D." For further information on E&D projects in restoration planning, see Section 1.3.2 of this draft RP II/EA and Section 6.4.14 of the Final PDARP/PEIS.

Table ES-1: Range of Alternatives Evaluated

Reasonable Range of Alternatives	Cost	Totals By Type
Wetlands, Coastal, and Nearshore Habitats		
Perdido River Land Acquisition (Molpus Tract)	$4,324,460	
Magnolia River Land Acquisition (Holmes Tract) – Preferred	$4,144,162	
Weeks Bay Land Acquisition East Gateway Tract – Preferred	$4,247,000	
Weeks Bay Land Acquisition Harrod Tract – Preferred	$3,606,900	
Lower Perdido Islands Restoration Phase I (E&D) – Preferred	$994,523	
Southwestern Coffee Island Habitat Restoration Project—Phase I (E&D) (also evaluated under the Birds Restoration Type) – Preferred	$825,225	
		$18,142,270
Habitat Projects on Federally Managed Lands		
Little Lagoon Living Shoreline – Preferred	$210,999	
Restoring the Night Sky–Assessment, Training, and Outreach (E&D) (also evaluated under Sea Turtles Restoration Type) – Preferred	$183,003	
		$394,002
Nutrient Reduction (Nonpoint Source)		
Bayou La Batre Nutrient Reduction	$1,000,000	
Toulmins Spring Branch E&D (E&D) – Preferred	$479,090	
Fowl River Nutrient Reduction – Preferred	$1,000,000	
Weeks Bay Nutrient Reduction – Preferred	$2,000,000	
		$4,479,090
Sea Turtles		
Coastal Alabama Sea Turtle (CAST) Conservation Program – Preferred	$935,061	
CAST Triage – Preferred	$622,915	
CAST Habitat Usage and Population Dynamics – Preferred	$1,631,696	

Reasonable Range of Alternatives	Cost	Totals By Type
CAST Protection: Enhancement and Education – Preferred	$906,874	
Restoring the Night Sky–Assessment, Training, and Outreach (E&D) (also evaluated under the Habitat Projects on Federally Managed Lands Restoration Type)[3]	$216,655	
		$4,313,201
Marine Mammals		
Enhancing Capacity for the Alabama Marine Mammal Stranding Network – Preferred	$2,432,389	
Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health	$3,059,229	
Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education – Preferred	$686,374	
		$6,177,992
Birds		
Southwestern Coffee Island Habitat Restoration Project—Phase I (E&D) (also evaluated under the Wetlands, Coastal, and Nearshore Habitats Restoration Type) – Preferred	$825,225	
Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species	$2,322,144	
Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species – Preferred	$1,547,500	
		$3,301,869
Oysters		
Oyster Cultch Relief and Reef Configuration – Preferred	$480,262	
Side-scan Mapping of Mobile Bay Relic Oyster Reefs (E&D) – Preferred	$104,229	
Oyster Hatchery at Claude Peteet Mariculture Center–High Spat Production with Study – Preferred	$2,949,472	
Oyster Hatchery at Claude Peteet Mariculture Center–Low Spat Production without Study	$2,018,109	
Oyster Grow-Out and Restoration Reef Placement – Preferred	$962,370	
		$6,514,441
Grand Total		$43,322,865

[3] As noted in Section 2.7, Preferred Alternative, ultimately this project was considered appropriate for MAM funding and would be implemented using that funding, rather than from the Sea Turtles Restoration Type.

TABLE OF CONTENTS

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LIST OF TABLES

LIST OF FIGURES

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LIST OF ACRONYMS

ACF	Alabama Coastal Foundation
ADCNR	Alabama Department of Conservation and Natural Resources
ADEM	Alabama Department of Environmental Management
ALMMSN	Alabama Marine Mammal Stranding Network
ALSTSSN	Alabama Sea Turtle Stranding and Salvage Network
AL TIG	Alabama Trustee Implementation Group
AMRD	Alabama Department of Conservation and Natural Resources, Marine Resources Division
BFE	base flood elevation
BLM	Bureau of Land Management
BMP	best management practice
BP	British Petroleum Exploration and Production
BSNWR	Bon Secour National Wildlife Refuge
CAST	Coastal Alabama Sea Turtle
CBMPP	Construction Best Management Practices Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cm TL	centimeters total length
CO	carbon monoxide
CO_2	carbon dioxide
CPS	conservation practice standard(s)
CZMA	Coastal Zone Management Act
DISL	Dauphin Island Sea Lab
DWH	Deepwater Horizon
DWH Trustees	Deepwater Horizon Oil Spill for the affected natural resources
E&D	engineering and design
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FMP	Fisheries Management Plan
FR	Federal Register
GEBF	Gulf Environmental Benefit Fund

GHG	greenhouse gas
GIWW	Gulf Intracoastal Waterway
GMFMC	Gulf of Mexico Fishery Management Council
$\mu g/m^3$	microgram per cubic meter
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MAM	monitoring and adaptive management
MMPA	Marine Mammal Protection Act of 1972
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFWF	National Fish and Wildlife Foundation
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRDA	Natural Resource Damage Assessment
O_3	ozone
OPA	Oil Pollution Act of 1990
PDARP/PEIS	Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement
$PM_{2.5}$	particles with a diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particles with a diameter less than or equal to a nominal 10 micrometers
ppb	parts per billion
ppm	parts per million
ROD	Record of Decision
RP I/EIS	Restoration Plan I/Environmental Impact Statement
RP II/EA	Restoration Plan II/Environmental Assessment
SAFMC	South Atlantic Fishery Management Council
SAV	submerged aquatic vegetation
SGCN	species of greatest conservation need
SO_2	sulfur dioxide
TED	turtle excluder device

TIG	Trustee Implementation Group
TMDL	total maximum daily load
TNC	The Nature Conservancy
Trustee Council SOP	2016 Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH oil spill
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDOI	United States Department of the Interior
USEPA	United States Environmental Protection Agency
USDA	United States Department of Agriculture
USDA-NRCS	United States Department of Agriculture-Natural Resources Conservation Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VHF	very high frequency
WBF	Weeks Bay Foundation
Weeks Bay NERR	Weeks Bay National Estuarine Research Reserve

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DOCUMENT ORGANIZATION

This document is organized as follows:

- Chapter 1: Introduction—describes why this RP II/EA was written and under what authorities. It also discusses the purpose and need for action, provides a brief description of the planning process and the alternatives being considered, and details the public involvement in the planning process and opportunities for public comment.
- Chapter 2: Project Screening and Alternatives—provides an overview of the screening process for potential alternatives, and the alternatives both carried forward for detailed analysis and those considered but not carried forward for detailed analysis. The range of alternatives evaluated and those selected as preferred alternatives are discussed.
- Chapter 3: OPA Evaluation of Alternatives—provides the OPA evaluation of the restoration alternatives.
- Chapter 4: NEPA Affected Environment–Coastal Alabama—provides an overview of the Alabama coastal ecosystem and its diverse natural resources and associated services to provide context for the environmental consequences. Resource considerations specific to each site are considered by project in Chapters 7–13.
- Chapter 5: NEPA Environmental Consequences–General Approach to Impact Analysis–provides an overview of the methodology used to evaluate impacts under each specific Restoration Type, for each considered alternative. Alternative-specific impacts are provided in Chapters 7–13.
- Chapter 6: NEPA Environmental Analysis–Engineering and Design Only Projects–provides the impacts for projects that are currently being considered for E&D.
- Chapters 7–13: NEPA Analysis, by Resource Type—each of these chapters provides the site-specific Affected Environment and Environmental Consequences required under NEPA. Chapters are organized by Restoration Type.
- Chapter 14: Cumulative Impacts—pursuant to NEPA, provides the cumulative impacts related to the range of Restoration Types evaluated in this draft RP II/EA.
- Chapter 15: Compliance with Other Laws and Regulations—summarizes the body of laws, regulations, executive orders, and other applicable laws that the DWH Trustees considered in the Final PDARP/PEIS and that the AL TIG reviewed for applicability to this plan.
- Chapter 16: Draft Monitoring and Adaptive Management Plans—contains a summary of how MAM plans were developed for the preferred alternatives. Appendix G contains the draft plan for each preferred alternative.
- Chapter 17: List of Preparers, Agencies, and Persons Consulted
- Chapter 18: List of Repositories
- Chapter 19: Literature Cited

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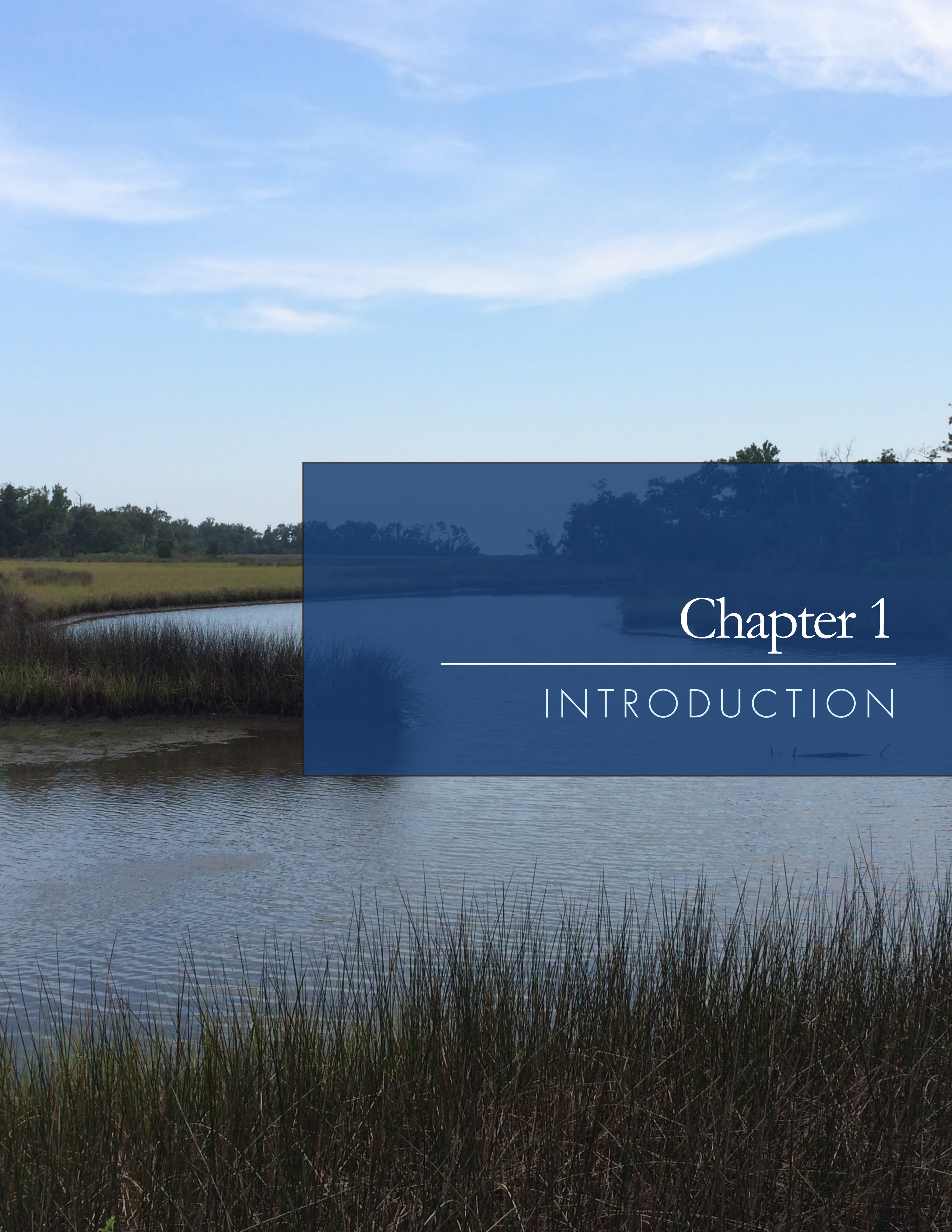

Chapter 1

INTRODUCTION

1.0 INTRODUCTION

The Alabama Trustee Implementation Group (AL TIG) prepared this Alabama Trustee Implementation Group Draft Restoration Plan II and Environmental Assessment: Restoration of Wetlands, Coastal, and Nearshore Habitats; Habitat Projects on Federally Managed Lands; Nutrient Reduction (Nonpoint Source); Sea Turtles; Mammals; Birds; and Oysters (draft RP II/EA) to continue restoration planning and restoration of lost natural resources and their services in Alabama as a result of the *Deepwater Horizon* (DWH) oil spill incident. The AL TIG is responsible for restoring the natural resources and resource services in the Alabama Restoration Area that were injured by the DWH oil spill and the associated spill response efforts. The AL TIG prepared this RP II/EA to (1) inform the public about its DWH natural resource damage assessment (NRDA) restoration planning efforts, (2) analyze the potential restoration benefits and environmental consequences of projects/alternatives[4] proposed for implementation to help restore the target Restoration Types, and (3) seek public comment on the restoration alternatives considered in this document. The purpose of restoration, as discussed in this document and detailed more fully in the *Deepwater Horizon Oil Spill*: Final Programmatic Damage Assessment and Restoration Plan/Programmatic Environmental Impact Statement (Final PDARP/PEIS), is to make the environment and the public whole for injuries resulting from the DWH oil spill (NOAA, 2016a). Designated Trustees accomplish this by implementing restoration actions that return injured natural resources and resource services to baseline conditions and compensate for interim losses, in accordance with the Oil Pollution Act of 1990 (OPA) and associated NRDA regulations. The Final PDARP/PEIS and Record of Decision (ROD) can be found at http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan.

The Trustees for the DWH NRDA are organized into seven geographic TIGs as follows and as discussed under Section 1.1.1. The AL TIG includes two state trustee agencies and four federal trustee agencies: the Alabama Department of Conservation and Natural Resources (ADCNR); the Geological Survey of Alabama; the United States Department of Commerce, represented by the National Oceanic and Atmospheric Administration (NOAA); the United States Department of the Interior (USDOI), represented by the United States Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), and National Park Service (NPS); the United States Department of Agriculture (USDA); and the United States Environmental Protection Agency (USEPA). For this restoration plan, the USDA serves as the lead federal agency for National Environmental Policy Act (NEPA) compliance. Each of the other federal and state co-Trustees are participating as cooperating agencies pursuant to NEPA (40 Code of Federal Regulations [CFR] 1508.5). In accordance with 40 CFR 1506.3(a), each of the three federal cooperating agencies (USDOI, USEPA, and NOAA) participating on the AL TIG will review the draft RP II/EA for adequacy in meeting the standards set forth in its own NEPA implementing procedures and decide whether to adopt the analysis in the Final RP II/EA. Adoption of the EA would be completed via signature on the relevant NEPA decision document.

1.1 BACKGROUND AND SUMMARY OF THE SETTLEMENT

On or about April 20, 2010, the DWH mobile drilling unit exploded, caught fire, and eventually sank in the Gulf of Mexico, resulting in a massive release of oil from the British Petroleum Exploration and Production (BP) Macondo well, causing loss of life and extensive natural resource injuries. Initial efforts to cap the well following the explosion were unsuccessful, and, for 87 days after the explosion, the well continuously and uncontrollably discharged oil and natural gas into the northern Gulf of Mexico. Approximately 3.19 million barrels (134 million gallons) of oil were released into the ocean (*U.S. v. BP et*

[4] For the purposes of this draft RP II/EA, each proposed project is considered a separate alternative; therefore, the terms “project” and “alternative” are used interchangeably.

al., 2015). Oil spread from the deep ocean to the surface and nearshore environment from Texas to Florida. Extensive response actions were undertaken to try to reduce harm to people and the environment. However, many of these response actions had collateral impacts on the environment and natural resource services.

On February 19, 2016, the DWH Oil Spill Trustees for the affected natural resources (DWH Trustees) issued a Final PDARP/PEIS detailing a proposed plan to fund and implement restoration projects across the Gulf of Mexico region, into the future, as DWH restoration funds become available over a 15-year period. That document describes Restoration Types that meet the programmatic restoration goals that the DWH Trustees should use to guide restoration planning. On March 29, 2016, in accordance with OPA and NEPA, the DWH Trustees published a Notice of Availability of a ROD for the Final PDARP/PEIS in the *Federal Register* (FR) (81 FR 17438). Based on the DWH Trustees' injury determination established in the Final PDARP/PEIS, the ROD set forth the basis for the DWH Trustees' decision to select Alternative A: Comprehensive Integrated Ecosystem Alternative. The DWH Trustees' selection of Alternative A includes the funding allocations established in the Final PDARP/PEIS.

On April 4, 2016, the United States District Court for the Eastern District of Louisiana entered a Consent Decree resolving the DWH Trustees' claims against BP for natural resource damages under OPA. Under the *Consent Decree among Defendant BP Exploration & Production Inc. ("BPXP"), The United States of America, and the States of Alabama, Florida, Louisiana, Mississippi, and Texas* (Consent Decree), BP agreed to pay $8.1 billion in natural resource damages (which includes the $1 billion that BP previously committed to pay for Early Restoration projects[5]) over a 15-year period. As part of the Consent Decree, BP also agreed to pay up to an additional $700 million for adaptive management or to address injuries to natural resources that are presently unknown but may become known in the future. The settlement allocated a specific sum of money to the Restoration Areas in each of the Gulf States, as well as to the Region-wide and Open Ocean Restoration Areas, to conduct restoration within each Restoration Area and for specific Restoration Types (NOAA, 2016b; U.S. Department of Justice, 2016).

Each Restoration Area has a specific monetary allocation to each of the Restoration Types within the five restoration goals specified in the Consent Decree. The DWH settlement allocation for the AL TIG by Restoration Type is set forth in Table 1-1.[6] Funding was also allocated to Monitoring and Adaptive Management, also known as MAM. As described in Section 7.5 of the Final PDARP/PEIS, specific funding for the MAM component of the restoration goals has been allocated to the TIGs. MAM supports all restoration activities under the Final PDARP/PEIS by tracking and evaluating progress toward restoration goals, determining the need for corrective actions, addressing key uncertainties, developing data and other information to inform and enhance future restoration, and ensuring compliance with appropriate regulations. As described in Section 2.7, MAM funds are being proposed for this plan to address uncertainties with existing data to inform and enhance future restoration.

[5] BP agreed to provide up to $1 billion toward Early Restoration projects in the Gulf of Mexico to address injuries to natural resources caused by the DWH oil spill in the Early Restoration Framework Agreement. Early Restoration proceeded in phases, with each phase adding additional projects to partially address injuries to nearshore resources, birds, fish, sea turtles, federally managed lands, and recreational uses. Sixty-five projects with a total cost of approximately $877 million were selected through the five phases of Early Restoration planning.

[6] Table 1-1 is a modified version of Table 5.10-1 of the Final PDARP/PEIS.

Table 1-1: Allocation of Deepwater Horizon Settlement Funds for the Alabama Restoration Area by Restoration Type

Final PDARP/PEIS Programmatic Restoration Goals and Underlying Restoration Types	Alabama Total Allocation	Already Allocated to Restoration Projects
1. Restore and Conserve Habitat	**$96,110,000**	
Wetlands, Coastal, and Nearshore Habitats	$65,000,000	
Habitat Projects on Federally Managed Lands	$3,000,000	
Early Restoration		$28,110,000
2. Restore Water Quality	**$5,000,000**	
Nutrient Reduction (Nonpoint Source)	$5,000,000	
3. Replenish and Protect Living Coastal and Marine Resources	**$53,974,000**	
Sea Turtles	$5,500,000	
Marine Mammals	$5,000,000	
Birds	$30,000,000	
Early Restoration Birds		$145,000
Oysters	$10,000,000	
Early Restoration Oysters		$3,329,000
4. Provide and Enhance Recreational Opportunities	**$110,505,305**	
Early Restoration of Recreational Loss and AL TIG Restoration Plan I/Environmental Impact Statement		$99,900,305
5. Monitoring, Adaptive Management, Administrative Oversight	**$30,000,000**	
Monitoring and Adaptive Management	$10,000,000	
Administrative Oversight and Comprehensive Planning	$20,000,000	
TOTAL	**$295,589,305**	

Source: DWH Consent Decree. Available at: https://www.justice.gov/enrd/deepwater-horizon

Additional detail on the background of the DWH oil spill, the impact of the spill on the Gulf of Mexico ecosystem, and additional context for the settlement and allocation of funds are found in Chapter 2 of the Final PDARP/PEIS.

1.1.1 DWH Trustees, Trustee Council, and Trustee Implementation Groups

The DWH Trustees are the government entities authorized under OPA to act as Trustees on behalf of the public to (1) assess the natural resource injuries resulting from the DWH oil spill, and (2) develop and implement a restoration plan to compensate for those injuries. Trustees fulfill these responsibilities by developing restoration plans, providing the public with a meaningful opportunity to suggest restoration projects and review and comment on proposed plans, implementing and monitoring restoration projects, managing natural resource damage funds, and documenting Trustee decisions through a public Administrative Record. To work collaboratively on the NRDA, the DWH Trustees organized a Trustee Council composed of Designated Natural Resource Trustee Officials, or their alternates, for each of the DWH Trustee agencies. Collectively, these Trustees comprise the DWH Trustee Council.

The following federal and state agencies are the designated DWH Trustees under OPA for the DWH oil spill:

- NOAA, on behalf of the U.S. Department of Commerce
- NPS, USFWS, and BLM, on behalf of USDOI
- USEPA
- USDA
- The State of Alabama’s ADCNR and the Geological Survey of Alabama
- The State of Florida’s Department of Environmental Protection and Fish and Wildlife Conservation Commission
- The State of Louisiana’s Coastal Protection and Restoration Authority, Oil Spill Coordinator’s Office, Department of Environmental Quality, Department of Wildlife and Fisheries, and Department of Natural Resources
- The State of Mississippi’s Department of Environmental Quality
- The State of Texas’ Parks and Wildlife Department, General Land Office, and Council on Environmental Quality (CEQ)

The settlement funding distribution among Restoration Areas was based on the DWH Trustees’ understanding and evaluation of exposure and injury to natural resources and services, as well as its evaluation of where restoration spending for the various Restoration Types would be most beneficial within the ecosystem-level restoration portfolio. TIGs are composed of individual DWH Trustee agency representatives that make all restoration decisions for the funding allocated to each Restoration Area and ensure the agency actions are fully consistent with OPA and NEPA requirements. Each TIG develops plans for, chooses, and implements specific restoration actions under the Final PDARP/PEIS (see Chapter 7 of the Final PDARP/PEIS).

For purposes of discussion, the following definitions are helpful:

- **Trustees**: As specified in OPA, natural resource Trustees are designated to act on behalf of the public to assess and recover damages, develop implementation plans, and implement restoration plans (see Section 7.1 of the Final PDARP/PEIS for further detail).
- **Trustee Implementation Groups (TIGs)**: Are established by the DWH settlement agreement and are composed of Individual Trustee Agency representatives.

1.2 NRDA PLANNING BY THE AL TIG TO DATE

Restoration planning from the DWH oil spill began in Alabama under Early Restoration. There were five phases of Early Restoration. Projects in Alabama under each phase included:

- Phase I:
  - Alabama Dune Restoration Cooperative Project—$1,480,000
  - Marsh Island (Portersville Bay) Restoration Project—$11,280,000
- Phase II:
  - Enhanced Management of Avian Breeding Habitat Injured by Response in the Florida Panhandle, Alabama, and Mississippi—$4,658,118 (across three states)
  - Improving Habitat Injured by the Spill Response: Restoring the Night Sky - $4,321,165 (across Alabama and Florida)
- Phase III:
  - Alabama Swift Tract Living Shoreline—$5,000,080
  - Gulf State Park Enhancement Project—$29,221,693[7]
  - Alabama Oyster Cultch Restoration—$3,239,485
- Phase IV:
  - Bon Secour National Wildlife Refuge Trail Enhancement Project, Alabama—$545,110
  - Osprey Restoration in Coastal Alabama—$45,000
  - Point aux Pins Living Shoreline—$2,300,000
  - Shell Belt and Coden Belt Roads Living Shoreline—$8,050,000[8]
- Phase V: Phase V of Early Restoration did not include any projects in the Alabama Restoration Area.

Following the 2016 settlement described in Section 1.1 and Table 1-1, the AL TIG began the restoration planning process by requesting project ideas for the Restoration Plan I/Environmental Impact Statement (RP I/EIS), which addressed recreational use losses. The RP I/EIS was finalized in May 2017 and identified six preferred projects in Baldwin and Mobile counties. The total cost of the projects was $70.7 million. The projects included:

- Gulf State Park Lodge and Associated Public Access Amenities Project—$56,300,000
- Fort Morgan Pier Rehabilitation—$3,075,000
- Laguna Cove Little Lagoon Natural Resource Protection—$4,400,000

[7] $58.5 million of funds under the Phase III Gulf State Park Enhancement Project were enjoined (less the $2,216,388.21 spent prior to the injunction) by the court in *Gulf Restoration Network v. Jewell et al*. These funds then were evaluated in RP I/EIS under the Gulf State Park Lodge and Associated Public Amenities Project.

[8] ADCNR, as the implementing Trustee of the project, and the Alabama TIG have determined that implementation of the project is not feasible at this time because of changes at the proposed site and constructability issues.

- Bayfront Park Restoration and Improvement (engineering and design [E&D] only)—$1,000,000
- Dauphin Island Eco-Tourism and Environmental Education Area—$4,000,000
- Mid-Island Parks and Public Beach Improvements (Parcels B and C)—$1,900,000

1.3 AUTHORITIES AND REGULATIONS

1.3.1 OPA Compliance

A primary goal of OPA is to make the environment and public whole for injuries to natural resources and services resulting from an incident involving an oil discharge or substantial threat of an oil discharge. Under OPA, each party responsible for a vessel or facility from which oil is discharged, or which poses the substantial threat of a discharge, is liable for, among other things, removal costs and damages for injury to, destruction of, loss, or loss of use of natural resources, including the reasonable cost of assessing the damage.

This process of injury assessment and restoration planning is referred to as natural resource damage assessment (NRDA). NRDA is described under Section 1006 of OPA (33 United States Code [U.S.C.] § 2706) and the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300.600). Under the OPA NRDA regulations (15 CFR Part 990), the NRDA process consists of three phases:

- Pre-assessment, in which the Trustees evaluate the potential for injuries to natural resources resulting from the incident;
- Restoration planning, in which the Trustees evaluate and quantify the extent of injuries to natural resources to determine the need for, type of, and extent of restoration; and
- Restoration implementation, in which the Trustees ensure that restoration is implemented.

The DWH Trustees, through the TIGs, are performing restoration planning, and where appropriate are initiating the restoration implementation phase of the NRDA for the DWH oil spill. To continue restoration implementation, the AL TIG prepared this RP II/EA, which identifies a reasonable range of restoration alternatives in the Alabama Restoration Area, evaluates those alternatives under applicable criteria, and proposes a suite of preferred alternatives for implementation under either Restoration Type or MAM funding.

1.3.2 NEPA Compliance

NEPA requires federal agencies to consider the potential environmental impacts of proposed actions. It provides a mandate and framework for federal agencies to determine if their proposed actions have significant environmental effects and related social and economic effects. It also mandates that federal agencies consider these effects when choosing between alternative approaches and inform and involve the public in the environmental analysis and decision-making process. NEPA and its implementing regulations (40 CFR Parts 1500–1508) outline the responsibilities of federal agencies in the NEPA process. Many federal agencies have also developed their own NEPA procedures that supplement the CEQ NEPA regulations. In this document, the AL TIG addresses CEQ and agency-specific NEPA requirements by tiering from environmental analyses conducted in the Final PDARP/PEIS, evaluating existing analyses, and, where applicable, incorporating by reference relevant information and analyses from existing project EAs and conservation plans into this RP II/EA.

The draft RP II/EA also evaluates projects that only address the preliminary phases of restoration planning, also referred to in this plan as “engineering and design” (E&D) projects. The necessary NEPA compliance for these E&D projects is contained in Section 6.4.14 of the Final PDARP/PEIS, where the DWH Trustees analyzed the environmental consequences of E&D activities, including activities necessary to characterize the environment, determine the best restoration approach from an engineering standpoint, and predict and compare results and conditions with and without a project. As a result, the NEPA compliance for the E&D projects proposed as preferred alternatives in this draft RP II/EA is summarized in Chapter 6 of this draft RP II/EA and provided in detail in Section 6.4.14 of the Final PDARP/PEIS. Table 1-2 notes projects that fall under the E&D category for this draft RP II/EA.

1.4 TRUSTEE COUNCIL STANDARD OPERATING PROCEDURES

Another document that guides restoration planning is the 2016 Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH oil spill (Trustee Council SOP).[9] The Trustee Council developed the Trustee Council SOP for administration, implementation, and long-term management of restoration under the Final PDARP/PEIS. The Trustee Council SOP documents the overall structure, roles, and decision-making responsibilities of the Trustee Council and provides the common procedures to be used by all TIGs. The Trustee Council SOP addresses, among other issues, the following topics: decision-making and delegation of authority, funding, administrative procedures, project reporting, MAM, consultation opportunities among the DWH Trustees, public participation, and the Administrative Record.

The Trustee Council SOP was developed and approved by consensus of the Trustee Council and may be amended as needed. The division of responsibilities among the Trustee Council, TIGs, and individual Trustee Agencies is summarized in Table 7.2-1 of the Final PDARP/PEIS.

1.5 RESTORATION PURPOSE AND NEED

The AL TIG has undertaken this restoration planning effort to meet the purpose of contributing to the compensation for and restoration of natural resources and resource services injured in the Alabama Restoration Area as a result of the DWH oil spill. This RP II/EA is consistent with the Final PDARP/PEIS (2016), which identifies extensive and complex injuries to natural resources and resource services across the Gulf of Mexico, as well as a need and plan for comprehensive restoration consistent with OPA. This RP II/EA falls within the scope of the purpose and need identified in the Final PDARP/PEIS. As described in Section 5.3 of the Final PDARP/PEIS, the five Trustee programmatic restoration goals (Table 1-1) work independently and together to benefit injured resources and services. The proposed alternatives in this RP II/EA address three of the five Trustee programmatic restoration goals: (1) Restore and Conserve Habitat, (2) Restore Water Quality, and (3) Replenish and Protect Living Coastal and Marine Resources. MAM funds are also being proposed for this plan to address uncertainties with existing data to inform and enhance future restoration. Additional information about the purpose and need for DWH NRDA restoration can be found in Section 5.3.2 of the Final PDARP/PEIS.

1.6 OVERVIEW OF THE PLANNING PROCESS

For this draft RP II/EA, the AL TIG conducted a screening process to identify a reasonable range of restoration alternatives under each of the seven Restoration Types included in this plan to contribute to compensating the public and restoring for Alabama's natural resource injuries resulting from the DWH oil spill. See Section 2.4. Each of these restoration alternatives was evaluated under both OPA and NEPA to determine the potential restoration benefits and environmental consequences, respectively, of those

[9] The Trustee Council SOP is available through the NOAA Restoration Portal at: http://www.gulfspillrestoration.noaa.gov/sites/default/files/wp-content/uploads/DWH-SOPs.pdf.

alternatives. See generally Chapters 3 and 6–13. Based on the OPA and NEPA evaluations, the AL TIG then selected a set of preferred restoration alternatives to be funded wholly or in part under the AL TIG's Wetlands, Coastal, and Nearshore Habitat; Habitat Projects on Federally Managed Lands; Nutrient Reduction; Sea Turtles; Marine Mammals; Birds; and Oysters Restoration Type allocations. The preferred restoration alternatives proposed for Restoration Type funding in this draft RP II/EA include (1) projects proposed for implementation under this plan, (2) E&D projects, and (3) data collection projects intended to inform and enhance future DWH natural resource restoration efforts. Those projects not selected as preferred restoration alternatives proposed for Restoration Type funding under this RP II/EA were then considered for potential MAM funding by the AL TIG.

The final DWH settlement agreement allocates $10 million in funding for MAM activities by the AL TIG. As identified in the Final PDARP/PEIS and the four Strategic Frameworks developed by the Trustees to assist with restoration planning (Strategic Frameworks),[10] there are knowledge gaps in restoration science that currently constrain the development of DWH restoration projects, including restoration projects in the Alabama Restoration Area. The AL TIG has worked to both identify those knowledge gaps and to design project proposals to fill these gaps, which in turn would inform and enhance future restoration planning. These data collection projects are suitable for funding using the AL TIG's MAM allocation. Accordingly, in this draft RP II/EA, the AL TIG proposes to use a portion of the AL TIG's allocation of MAM funds to fund two of the Restoration Type restoration alternatives evaluated under OPA and NEPA, but which are not proposed as preferred restoration alternatives for Restoration Type funding. The proposal to select these projects for MAM funding is addressed in Section 2.7.

1.7 RESTORATION ALTERNATIVES EVALUATED IN THE PLAN

The AL TIG considered the programmatic restoration goals found in the Final PDARP/PEIS for each Restoration Type proposed for funding in this RP II/EA (Final PDARP/PEIS, Sections 5.5.2 through 5.5.14). These Restoration Type-specific goals help to guide restoration planning and project selection for each Restoration Type across Alabama. To help meet these goals, implementation of this RP II/EA would use the approaches in the Alabama Restoration Area, which are listed below, and which are a subset of the approaches described in the Final PDARP/PEIS, for the following Restoration Types:

- Wetlands, Coastal, and Nearshore Habitats: create, restore, and enhance coastal wetlands; restore and enhance dunes and beaches; and protect and conserve marine, coastal, estuarine, and riparian habitats.
- Habitat Projects on Federally Managed Lands: create, restore, and enhance coastal wetlands; restore and enhance submerged aquatic vegetation (SAV); protect and conserve marine, coastal, estuarine, and riparian habitats; and promote environmental stewardship, education, and outreach.
- Nutrient Reduction (Nonpoint Source): reduce nutrient loads to coastal watersheds.
- Sea Turtles: enhance sea turtle hatchling productivity and restore and conserve nesting beach habitat; increase sea turtle survival through enhanced mortality investigation and early detection of and response to anthropogenic threats and emergency events; reduce sea turtle bycatch in commercial fisheries through enhanced state enforcement effort to improve compliance with existing sea turtle conservation requirements (law enforcement element); reduce sea turtle bycatch in commercial fisheries through identification and implementation of

[10] Available at http://www.gulfspillrestoration.noaa.gov/2017/06/trustees-release-strategic-frameworks-restoration.

conservation measures (small bar spacing turtle excluder devices [TEDs]); reduce sea turtle bycatch in commercial fisheries through enhanced training and outreach to the fishing community; and reduce sea turtle bycatch in recreational fisheries through development and implementation of conservation measures.

- Marine Mammals: 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; reduce injury, harm, and mortality to bottlenose dolphins by reducing illegal feeding and harassment activities; and reduce marine mammal takes through enhanced state enforcement related to the Marine Mammal Protection Act of 1972 (MMPA) (NOAA, 2016c).
- Birds: create and conserve bird nesting and foraging habitat.
- Oysters: restore oyster reef habitat.

Public involvement is an important component of restoration planning (Final PDARP/PEIS, Section 1.7). Projects incorporated in the range of alternatives considered in this RP II/EA were developed through review of public comment, including all public comments received for projects proposed in Alabama on the DWH restoration planning portal since initiating restoration planning in 2010. In total, the AL TIG evaluated 26 different restoration projects and a no action alternative under each Restoration Type as the reasonable range of alternatives for that Restoration Type in this draft RP II/EA. These projects are intended to contribute to the restoration of habitats, species, and services in the Alabama Restoration Area. Through the alternatives evaluation processes described in the remainder of this document, of these 26 projects, the AL TIG identified 20 preferred alternatives to be fully funded from Restoration Type Funds, 1 preferred alternative to be partially funded from Restoration Type funds and partially funded from MAM funds, and 1 activity to be fully funded using MAM funds (see Section 2.7).

The projects evaluated by the AL TIG in this draft RP II/EA would be initiated over a time frame of approximately 3 years. The projects would provide restoration for the following Restoration Types in the Alabama Restoration Area: Wetlands, Coastal, and Nearshore Habitats; Habitat Projects on Federally Managed Lands; Nutrient Reduction (Nonpoint Source); Sea Turtles; Marine Mammals; Birds; and Oysters. Table 1-2 identifies the restoration alternatives considered for funding in this plan, by Restoration Type, and the costs of those proposed projects. Figure 1-1 shows the location of all evaluated restoration alternatives.

Table 1-2: Restoration Alternatives Evaluated

Reasonable Range of Alternatives	Cost	Totals By Type
Wetlands, Coastal, and Nearshore Habitats		
Perdido River Land Acquisition (Molpus Tract)	$4,324,460	
Magnolia River Land Acquisition (Holmes Tract) – Preferred	$4,144,162	
Weeks Bay Land Acquisition East Gateway Tract –- Preferred	$4,247,000	
Weeks Bay Land Acquisition Harrod Tract – Preferred	$3,606,900	
Lower Perdido Islands Restoration Phase I (E&D) – Preferred	$994,523	
Southwestern Coffee Island Habitat Restoration Project—Phase I (E&D) (also evaluated under the Birds Restoration Type) – Preferred	$825,225	

Reasonable Range of Alternatives	Cost	Totals By Type
		$18,142,270
Habitat Projects on Federally Managed Lands		
Little Lagoon Living Shoreline – Preferred	$210,999	
Restoring the Night Sky–Assessment, Training, and Outreach (E&D) (also evaluated under Sea Turtles Restoration Type) – Preferred	$183,003	
		$394,002
Nutrient Reduction (Nonpoint Source)		
Bayou La Batre Nutrient Reduction	$1,000,000	
Toulmins Spring Branch E&D (E&D) – Preferred	$479,090	
Fowl River Nutrient Reduction – Preferred	$1,000,000	
Weeks Bay Nutrient Reduction – Preferred	$2,000,000	
		$4,479,090
Sea Turtles		
Coastal Alabama Sea Turtle (CAST) Conservation Program – Preferred	$935,061	
CAST Triage – Preferred	$622,915	
CAST Habitat Usage and Population Dynamics – Preferred	$1,631,696	
CAST Protection: Enhancement and Education – Preferred	$906,874	
Restoring the Night Sky–Assessment, Training, and Outreach (E&D) (also evaluated under the Habitat Projects on Federally Managed Lands Restoration Type)[11]	$216,655	
		$4,313,201
Marine Mammals		
Enhancing Capacity for the Alabama Marine Mammal Stranding Network – Preferred	$2,432,389	
Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health	$3,059,229	
Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education – Preferred	$686,374	
		$6,177,992

[11] As noted in Section 2.7, Preferred Alternative, ultimately this project was considered appropriate for MAM funding and would be implemented using that funding, rather than from the Sea Turtles Restoration Type.

Reasonable Range of Alternatives	Cost	Totals By Type
Birds		
Southwestern Coffee Island Habitat Restoration Project—Phase I (E&D) (also evaluated under the Wetlands, Coastal, and Nearshore Habitats Restoration Type) – Preferred	$825,225	
Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species	$2,322,144	
Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species – Preferred	$1,547,500	
		$3,301,869
Oysters		
Oyster Cultch Relief and Reef Configuration – Preferred	$480,262	
Side-scan Mapping of Mobile Bay Relic Oyster Reefs (E&D) –-Preferred	$104,229	
Oyster Hatchery at Claude Peteet Mariculture Center–High Spat Production with Study –- Preferred	$2,949,472	
Oyster Hatchery at Claude Peteet Mariculture Center–Low Spat Production without Study	$2,018,109	
Oyster Grow-Out and Restoration Reef Placement – Preferred	$962,370	
		$6,514,441
Grand Total		$43,322,865

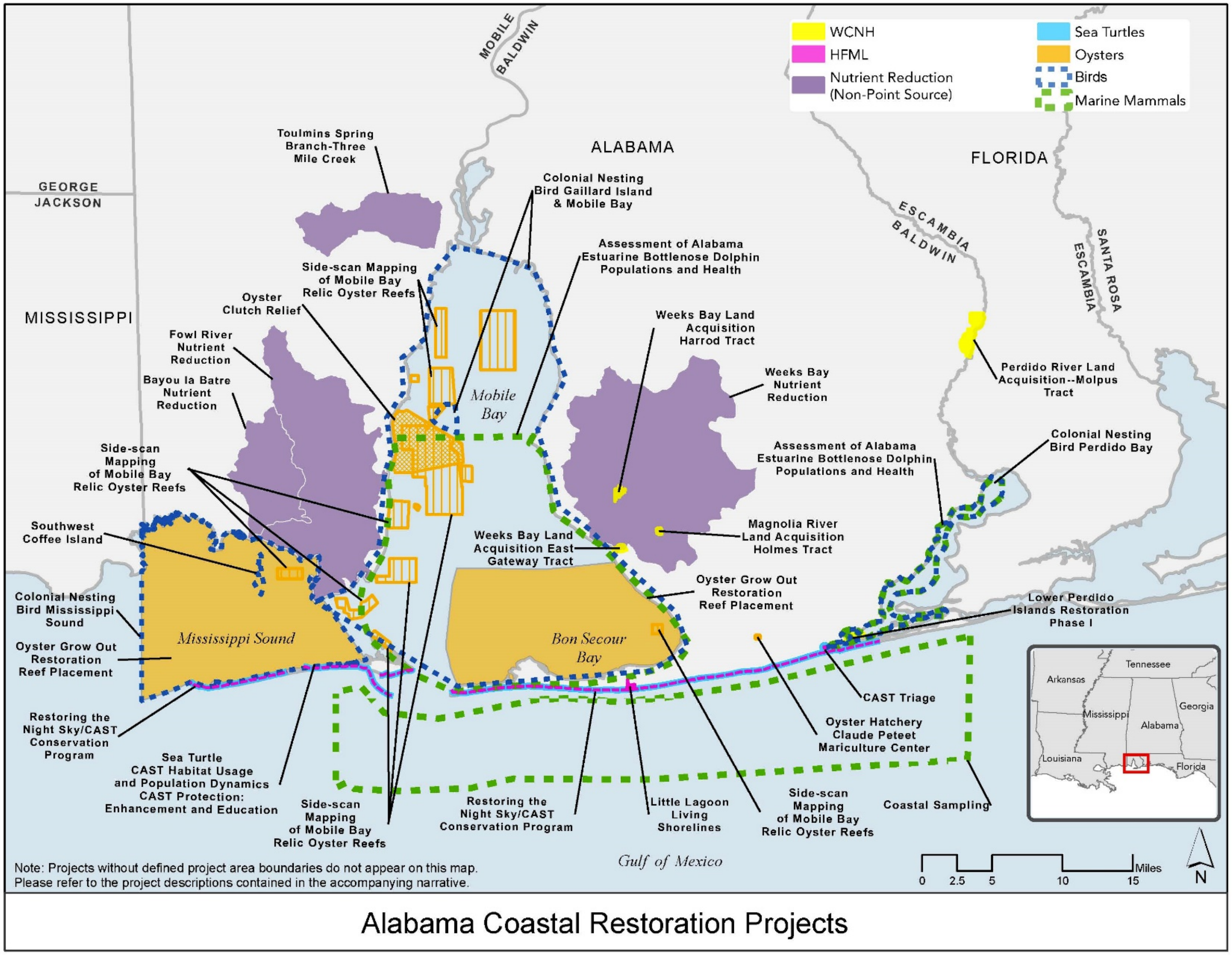

Figure 1-1: Locations of Evaluated Alternatives in the Draft RP II/EA

Details on each of these projects are discussed in Chapter 2. Of the 26 restoration alternatives discussed in Chapter 2, 5 are E&D projects; the balance, 17, propose restoration actions for full implementation.

The AL TIG will evaluate additional projects in subsequent restoration plans that address all Restoration Types for which Alabama has funds remaining for implementation in the Alabama Restoration Area.

1.8 PROPOSED ACTION: AL TIG RESTORATION PLAN II/EA

In an effort to contribute to the restoration of natural resources and resource services injured in the Alabama Restoration Area as a result of the DWH oil spill, the AL TIG proposes to fund the preferred restoration alternatives identified in Section 2.7 with Restoration Type funds allocated to the AL TIG for the restoration of Wetlands, Coastal, and Nearshore Habitats; Habitat Projects on Federally Managed Lands; Nutrient Reduction; Sea Turtles; Marine Mammals; Birds; and Oysters. Additionally, the AL TIG proposes to fund the Restoring the Night Sky Assessment, Training, and Outreach project, in part, and the Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health project, in total, with funds from the AL TIG's MAM allocation.

1.9 SEVERABILITY OF PROJECTS

In this draft RP II/EA, the AL TIG proposes 20 preferred alternatives to be fully funded from Restoration Type Funds, 1 preferred alternative to be partially funded from Restoration Type funds and partially funded from MAM funds, and 1 activity to be fully funded using MAM funds, with proposed total funding of $31,775,269. The alternatives presented in this draft RP II/EA are independent of each other and may be individually selected for implementation. The AL TIG may consider alternatives not identified as preferred in this draft RP II/EA in future restoration plans.

1.10 COORDINATION WITH OTHER GULF RESTORATION PROGRAMS

As discussed in Section 1.5.6 of the Final PDARP/PEIS, the DWH Trustees are committed to coordinating with other Gulf of Mexico restoration programs to maximize the overall ecosystem impact of DWH NRDA restoration efforts. During the course of the restoration planning process, the AL TIG has coordinated and will continue to coordinate with other DWH oil spill and Gulf of Mexico restoration programs, including the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act as implemented by the Gulf Coast Ecosystem Restoration Council; the Gulf Environmental Benefit Fund (GEBF) managed by the National Fish and Wildlife Foundation (NFWF); and other state and federal funding sources. These other restoration efforts are considered in the analysis of cumulative impacts in this draft RP II/EA (Chapter 14).

As part of its coordination efforts, the AL TIG has been reviewing the implementation of projects in other coastal restoration programs and is working to create synergies with those programs to ensure the most effective use of available funds for the maximum cost benefit. This coordination will ensure that funds are allocated for critical restoration projects across the affected regions of the Gulf of Mexico and within appropriate coastal Alabama areas. The AL TIG will continue to collaborate with other restoration programs to maximize cost savings and restoration benefits to the resources in coastal Alabama that were injured by the DWH oil spill defined above.

1.11 PUBLIC PARTICIPATION

OPA, NEPA, and the Trustee Council SOP require the DWH Trustees to consider public comments on the restoration planning process associated with the incident. Public review of the draft RP II/EA is an integral component of the restoration planning process. On October 1, 2010, the DWH Trustees published a Notice of Intent to Conduct Restoration Planning (75 FR 60800). Since then, the AL TIG Trustees have sought restoration project ideas from the public for the Alabama Restoration Area through two websites: the DWH Trustee website (NOAA Gulf Spill web portal) http://www.gulfspillrestoration.noaa.gov, and the ADCNR Project Portal at http://www.alabamacoastalrestoration.org/. In preparation for this draft RP II/EA, on December 20, 2016, the AL TIG requested the public submit project ideas through the two websites for projects in the Alabama Restoration Area. As part of the project solicitation, the AL TIG indicated its intention to focus on seven Restoration Types for the current round of restoration planning:

- Wetlands, Coastal, and Nearshore Habitats
- Habitat Projects on Federally Managed Lands
- Nutrient Reduction (Nonpoint Source)
- Sea Turtles
- Marine Mammals
- Birds
- Oysters

1.11.1 Comment Period

The public is encouraged to review and comment on this draft RP II/EA. Following public notice, the draft RP II/EA will be available to the public for a 30-day comment period. The deadline for submitting written comments on the draft RP II/EA is specified in the public notice published in the *Federal Register* and on NOAA Gulf Spill web portals. Comments must be postmarked no later than 30 days after the start of the comment period. Comments on the draft RP II/EA can be submitted during the comment period by one of following methods:

- Online, at: http://parkplanning.nps.gov/restorealabamaP2
- By mail (hard copy), addressed to: U.S. Fish and Wildlife Service, P.O. Box 49567, Atlanta, GA 30345

Please note that personal identifying information included in submitted comments (e.g., address, phone number, and email address) may be made publicly available.

1.11.2 Public Meeting Information

The AL TIG will hold a public meeting to facilitate the public review and comment process for the draft RP II/EA. This meeting will also serve as the annual meeting of the AL TIG. An open house will be held on April 18, 2018, at 6:00 p.m. at the Five River Tensaw Theater, located at 3115 Fiver River Boulevard in Spanish Fort, Alabama. A public meeting will follow at 6:30 p.m. Meeting dates and times are also specified in the notice announcing release of this document. After the close of the public comment period, the AL TIG will consider all comments received and revise the draft RP II/EA as appropriate. A summary of comments received and the AL TIG's responses (where applicable) will be included in the Final RP II/EA.

1.11.3 Decisions to Be Made

This draft RP II/EA is intended to provide the public with information and analyses needed to enable meaningful review and comment on the AL TIG's proposal to proceed with selection and implementation (which may include selection for E&D only, projects that are studies, or selection for construction or acquisition) of one or more of the alternatives proposed in this plan. Projects not identified for inclusion in the Final RP II/EA may continue to be considered for evaluation in future restoration plans.

1.11.4 Administrative Record

The DWH Trustees opened a publicly available Administrative Record for the NRDA for the DWH oil spill, including restoration planning activities, concurrently with publication of the 2010 Notice of Intent (pursuant to 15 CFR 990.45). USDOI is the lead federal Trustee for maintaining the Administrative Record, which can be found at http://www.doi.gov/deepwaterhorizon/adminrecord.

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

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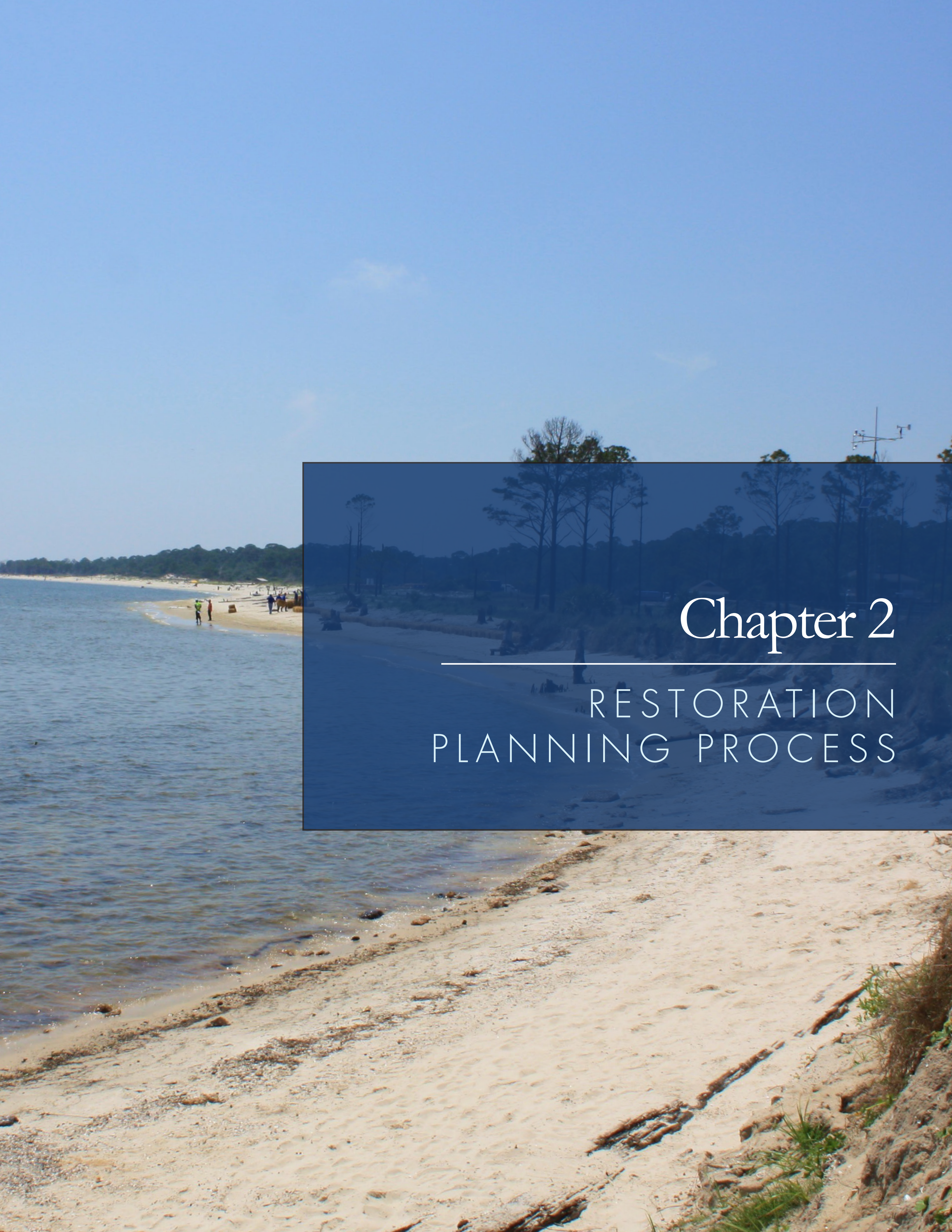

Chapter 2

RESTORATION PLANNING PROCESS

2.0 RESTORATION PLANNING PROCESS

NRDA restoration under OPA is a process that includes evaluating injuries to natural resources and natural resource services to determine the types and extent of restoration needed to address the injuries. Restoration activities must produce benefits that are related to or have a nexus (connection) to natural resource injuries and service losses resulting from a spill. Trustees must identify a reasonable range of restoration alternatives and then evaluate those proposed alternatives. The OPA NRDA regulations (15 CFR 990.54) provide factors for Trustees to consider when evaluating projects designed to compensate the public for injuries caused by oil spills. Under the OPA regulations (15 CFR 990.53), the AL TIG developed a screening process to identify a reasonable range of alternatives to be further evaluated in this RP II/EA.

This chapter describes the screening process that the AL TIG used to identify a reasonable range of alternatives to include in this RP II/EA under both OPA and NEPA. The reasonable range of alternatives identified is consistent with the DWH Trustees' selected programmatic alternative and the goals identified in the Final PDARP/PEIS. Consequently, this chapter also summarizes the restoration decisions stated in the Final PDARP/PEIS and ROD, the relationship of the Final PDARP/PEIS to this document, injuries addressed by this restoration plan, and the projects considered in the reasonable range of alternatives. The restoration planning process was also conducted in accordance with the Consent Decree, Trustee Council SOP, OPA regulations, and NEPA regulations.

2.1 FINAL PDARP/PEIS AND RECORD OF DECISION

Given the potential magnitude and breadth of restoration for injuries resulting from the DWH oil spill, the DWH Trustees prepared a Final PDARP/PEIS under OPA and NEPA to analyze alternative restoration approaches and establish goals specific to each Restoration Type to consistently guide restoration decisions. On February 19, 2016, the DWH Trustees issued the Final PDARP/PEIS detailing a programmatic plan to fund and implement restoration projects across the Gulf of Mexico region over the next 15 years. Based on the DWH Trustees' thorough assessment of impacts on the Gulf's natural resources, the Trustees proposed a comprehensive, integrated ecosystem restoration approach for restoration implementation.

On March 29, 2016, in accordance with OPA and NEPA, the DWH Trustees published a Notice of Availability of a ROD for the Final PDARP/PEIS in the *Federal Registe*r (81 FR 17438). Based on the DWH Trustees' injury determination established in the Final PDARP/PEIS, the ROD sets forth the basis for the DWH Trustees' decision to select Alternative A: Comprehensive Integrated Ecosystem Alternative. The DWH Trustees' selection of Alternative A includes the funding allocations established in the Final PDARP/PEIS. More information about Alternative A can be found in Sections 5.5 and 5.10 of the Final PDARP/PEIS.

2.2 RELATIONSHIP OF THIS RP II/EA TO THE FINAL PDARP/PEIS

As a programmatic restoration plan, the Final PDARP/PEIS provides direction and guidance for identifying, evaluating, and selecting future restoration projects to be carried out by the TIGs (Section 5.10.4 and Chapter 7 of the Final PDARP/PEIS). The DWH Trustees elected to prepare a programmatic EIS to (1) support the analysis of the environmental impacts of the reasonable range of alternatives, (2) consider the multiple related actions that may occur because of restoration planning efforts, and (3) allow for a better analysis of cumulative impacts of potential actions.

In the Final PDARP/PEIS, the DWH Trustees developed a set of Restoration Types for inclusion in programmatic alternatives with an objective of seeking a diverse set of projects with benefits to a broad array of potentially injured resources and the services they provide. Ultimately, this process resulted in the inclusion of multiple Restoration Types related to the five Trustee programmatic restoration goals. The Consent Decree and Final PDARP/PEIS allocated funding in the Alabama Restoration Area for eight Restoration Types, including Early Restoration within some of those, as well as MAM and administrative oversight (see Table 2-1).

Table 2-1: Restoration Types in the Alabama Restoration Area Related to the Five Trustee Programmatic Restoration Goals

Restoration Goal	Restoration Type	Total Alabama Settlement Funds
Restore and Conserve Habitat	Wetlands, Coastal, and Nearshore Habitats	$65,000,000
Restore and Conserve Habitat	Habitat Projects on Federally Managed Lands	$3,000,000
Restore and Conserve Habitat	*Early Restoration*	$28,110,000
Restore Water Quality	Nutrient Reduction (Nonpoint Source)	$5,000,000
Replenish and Protect Living Coastal and Marine Resources	Sea Turtles	$5,500,000
Replenish and Protect Living Coastal and Marine Resources	Marine Mammals	$5,000,000
Replenish and Protect Living Coastal and Marine Resources	Birds	$30,145,000
Replenish and Protect Living Coastal and Marine Resources	Oysters	$13,329,000
Provide and Enhance Recreational Opportunities	Provide and Enhance Recreational Opportunities	$25,000,000
Provide and Enhance Recreational Opportunities	*Early Restoration*	$85,505,305
Monitoring, Adaptive Management, Administrative Oversight	Monitoring and Adaptive Management	$10,000,000
Monitoring, Adaptive Management, Administrative Oversight	Administrative Oversight and Comprehensive Planning	$20,000,000

Source: Final PDARP/PEIS, 2016

As discussed in Section 1.2, the AL TIG released its first restoration plan *Final Restoration Plan I and Environmental Impact Statement: Provide and Enhance Recreational Opportunities* in May 2017 and selected six restoration projects in Baldwin and Mobile counties to address one Restoration Type, "Provide and Enhance Recreational Opportunities."

For the remaining seven Restoration Types, in December 2016, as part of its restoration planning efforts, the AL TIG asked the public for project ideas that could benefit Wetlands, Coastal, and Nearshore

Habitats; Habitat Projects on Federally Managed Lands; Nutrient Reduction (Nonpoint Source); Sea Turtles; Marine Mammals; Birds; and Oysters in the Alabama Restoration Area. The project submissions received through this process, along with projects previously submitted during prior restoration planning processes, resulted in the project ideas that are discussed further in Section 2.4, Screening for Reasonable Range of Alternatives.

2.3 SUMMARY OF INJURIES ADDRESSED IN THE RP II/EA

The DWH oil spill introduced numerous contaminants into the environment. Estimated releases included 3.19 million barrels (134 million gallons) of oil, 7.7 billion standard cubic feet of natural gas discharged into the deep sea, 1.84 million gallons of chemical dispersants used in response to the spill, and an unknown volume (up to 30,000 barrels) of synthetic-based drilling mud released during the blowout and response. Each of these contaminants introduced chemicals of known and unknown toxicity into the northern Gulf of Mexico. Natural weathering processes (e.g., photo-oxidation) and intentional burning of the floating oil at sea formed additional contaminants of known and unknown toxicity.

Chapter 4 of the Final PDARP/PEIS summarizes the injury assessment which documented the nature, degree, and extent of injuries from the incident to both natural resources and the services they provide. Restoration projects proposed in this draft RP II/EA and in future AL TIG restoration plans are designed to address injuries in the Alabama Restoration Area resulting from the incident. This draft RP II/EA proposes alternatives for the following Restoration Types described in the Final PDARP/PEIS: Wetlands, Coastal, and Nearshore Habitats; Habitat Projects on Federally Managed Lands; Nutrient Reduction (Nonpoint Source); Sea Turtles; Marine Mammals; Birds; and Oysters. This section summarizes the information from the Final PDARP/PEIS injury assessment (Chapter 4) with specific reference to the injuries in Alabama that inform the selection of the restoration alternatives proposed in this plan.

2.3.1 Wetlands, Coastal, and Nearshore Habitats

The DWH Trustees evaluated impacts on the nearshore marine ecosystem as part of the injury assessment (Final PDARP/PEIS, Section 4.6). The spill and response activities caused extensive injuries to wetland, coastal, and nearshore habitats across the northern Gulf of Mexico and in Alabama specifically. Injuries that informed the AL TIG's restoration planning for wetlands, coastal, and nearshore habitats occurred to estuarine coastal wetland and nearshore complexes and to sand beach habitats.

Wetland injuries occurred over hundreds of miles of coastline in the northern Gulf of Mexico, within multiple interconnected shoreline habitats, affecting diverse species that use these coastal habitats for some or all of their life cycle. Injuries were extensive and pervasive, including impacts on marsh vegetation, such as decreases in plant cover and aboveground biomass. Animals that live in the marsh (e.g., sediment-dwelling invertebrates, snails, insects, shrimp, fish, and oysters) were also injured. For example, substantial decreases in secondary production (50 percent to 90 percent decline) are expected for periwinkles, brown and white shrimp, and southern flounder in areas of the northern Gulf adjacent to shorelines that experienced heavy, persistent oiling, compared to shoreline areas that had no observed oil. Physical impacts include an increase in the rates of marsh-edge habitat erosion.

More than 600 miles of sand beach and dune habitat along shorelines and barrier islands across the northern Gulf of Mexico were injured as a result of a combination of the direct effects of oil and ancillary adverse impacts of response activities undertaken to clean up the oil. Injuries include reduced abundance of crabs, amphipods, insects, and other macrofauna that live in the sand and wrack (decomposing vegetation that serves as habitat and food source for many beach organisms); impacts on beach mice; and disruption of bird and sea turtle nesting habitat.

In Alabama, 95 miles of shoreline were oiled. Response activities occurred on 84 miles of shoreline. The Final PDARP/PEIS summarizes studies in Alabama demonstrating the presence of DWH oil in nearshore sediments and at wetland sites; reductions of live biomass in salt marshes; losses in the numbers of nearshore oysters; increased shoreline erosion because of the loss of oysters; and other physical and biological injuries to beach, wetland, and nearshore habitats resulting from oiling and response activities in the state.

2.3.2 Habitat Projects on Federally Managed Lands

The DWH oil spill and response activities caused extensive injuries to wetlands, coastal, and nearshore habitat projects on federally managed lands across the northern Gulf of Mexico. In total, the spill oiled 4,225 acres along 185 miles of federally managed shoreline in the five affected Gulf states. In Alabama, this included 244 acres along 12 miles of shoreline located at the Bon Secour National Wildlife Refuge (BSNWR) on Fort Morgan Peninsula and Little Dauphin Island, Grand Bay National Wildlife Refuge, and several small parcels of BLM property. Response activities affected the entire 12 miles of shoreline and 1.2 miles of marsh on federal lands. Federally managed lands in Alabama include important sea turtle nesting beaches that were injured by the spill and related response actions (see Section 2.3.4).

2.3.3 Nutrient Reduction (Nonpoint Source)

Nutrient reduction projects are included as a Restoration Type because the water quality improvements associated with nutrient reduction projects exhibit strong ecological linkages to Alabama's estuarine and coastal habitats and communities. This connectivity to the larger Gulf of Mexico ecosystem is expected to result in cascading ecological benefits, increasing the overall health and productivity of the Gulf of Mexico ecosystem, thereby restoring natural resources injured by the DWH oil spill. In coastal Alabama, an ongoing watershed planning process documents these linkages.[12]

2.3.4 Sea Turtles

The DWH Trustees evaluated impacts on sea turtles as part of the injury assessment (Final PDARP/PEIS, Section 4.8). The Trustees quantified injury resulting from the DWH oil spill to four of the five species of sea turtles that inhabit the Gulf of Mexico (loggerhead, Kemp's ridley, green, and hawksbill). Leatherbacks were also determined to have been injured, but the injury could not be quantified. All these species are listed as threatened or endangered under the Endangered Species Act (ESA), are long-lived, travel widely, and use a variety of habitats across the Gulf of Mexico and beyond.

Sea turtles were injured by oil or response activities in open ocean, nearshore, and shoreline environments, and the resulting mortality spanned multiple life stages. The Trustees estimated that between 4,900 and up to 7,600 large juvenile and adult sea turtles (Kemp's ridleys, loggerheads, and hard-shelled sea turtles not identified by species) and between 55,000 and up to 160,000 small juvenile sea turtles (Kemp's ridleys, green turtles, loggerheads, hawksbills, and hard-shelled sea turtles not identified by species) were killed by the DWH oil spill. Nearly 35,000 hatchling sea turtles (loggerheads, Kemp's ridleys, and green turtles) were injured by response activities, and thousands more Kemp's ridley and loggerhead hatchlings were lost because of unrealized reproduction by adult sea turtles that were killed by the DWH oil spill. In addition, leatherback turtles were determined to have been injured, but this injury could not be quantified.

[12] See http://www.mobilebaynep.com/the_watersheds

In Alabama, injuries resulted from both oiling and response activities along the state's sea turtle nesting beaches. The assessment reports that, as a result of response activities, approximately 30 loggerhead nests, equivalent to 2,000 loggerhead hatchlings, were lost. In addition, nests from three species—loggerheads, Kemp's ridleys, and green sea turtles—were excavated prior to hatchling emergence, and eggs were translocated from Florida and Alabama beaches to a protected hatchery on the Atlantic coast of Florida. A total of 28,681 eggs from 274 nests in Alabama and Florida (16 nests from Alabama and 258 nests from Florida) were translocated, and 14,796 hatchling turtles emerged and were released into the Atlantic Ocean. Because these hatchlings entered the Atlantic Ocean and are believed unlikely to return to the Gulf, the assessment assumes these hatchlings were lost to the Gulf of Mexico breeding population because of the spill.

2.3.5 Marine Mammals

The DWH Trustees evaluated impacts on marine mammals as part of the injury assessment (Final PDARP/PEIS, Section 4.9). The spill resulted in the contamination of prime marine mammal habitat in the nearshore and offshore waters of the northern Gulf of Mexico. After inhaling, ingesting, aspirating, and potentially absorbing oil components, animals suffered from physical damage and toxic effects to a variety of organs and tissues, including lung disease, adrenal disease, poor body condition, immunosuppression, and a suite of other adverse health effects. Animals that succumbed to these adverse health effects contributed to the largest and longest marine mammal unusual mortality event on record in the northern Gulf of Mexico. The dead, stranded dolphins in the unusual mortality event included near-term fetuses from failed pregnancies. Nearly all of the assessed marine mammal stocks that overlap with the DWH oil spill footprint had demonstrable, quantifiable injuries. The remaining stocks were also likely injured, but there was not enough information to make such a determination at the time of the assessment.

The Barataria Bay and Mississippi Sound bottlenose dolphin stocks were two of the most severely injured populations, with a 52 percent and 62 percent maximum reduction in their population sizes, respectively. Because cetaceans are long-lived animals, give birth to only one calf every few years, and are slow to reach reproductive maturity, these stocks will take many decades to recover without active restoration.

In Alabama, the assessment reported that the DWH oil spill contributed to a large increase in monthly marine mammal strandings, with 2011 being one of the highest stranding years on record. Researchers also reported high levels of apparent mortality (i.e., unexplainable disappearances). High levels of reproductive failure in Mississippi Sound were also attributed to the spill between 2010 and 2014, consistent with field and laboratory results reported in the scientific literature. Finally, researchers conclude from health assessments of Mississippi Sound bottlenose dolphins that the DWH oil spill caused a wide array of adverse health effects, including lung disease, adrenal disease, and poor body condition.

2.3.6 Birds

The DWH Trustees evaluated impacts on birds as part of the injury assessment (Final PDARP/PEIS, Section 4.7). At least 93 species of birds, including both resident and migratory species and across all five Gulf Coast states, were exposed to DWH oil in multiple northern Gulf of Mexico habitats, including open water, islands, beaches, bays, and marshes. Laboratory studies showed that exposure to DWH oil led to injuries, including feather damage, abnormal blood attributes, organ damage, and death.

Trustee scientists estimate that between 51,600 and 84,500 birds died because of the DWH oil spill. Of those quantified dead birds, breeding-age adults would have produced an estimated 4,600 to 17,900 fledglings. The Trustees also recognize that additional injury occurred that is unquantified; true bird mortality is likely closer to the upper ranges than the lower (Final PDARP/PEIS, Section 4.7.5).

Although the precise number of birds injured and killed in the Alabama Restoration Area is not quantified in the assessment, impacts there occurred both as a result of exposure to oil and from the effects of response activities.

2.3.7 Oysters

The DWH Trustees evaluated impacts on oysters as part of the injury assessment (Final PDARP/PEIS, Section 4.6). Substantial injury to intertidal and subtidal oysters in the northern Gulf of Mexico occurred as the result of the DWH oil spill and response actions. Nearshore oyster cover in the northern Gulf was significantly reduced over 155 miles of shoreline and resulted in the loss of 8.3 million adult-equivalent oysters because of the impacts of response activities and physical fouling by oil. An additional estimated 5.7 million oysters per year (adult equivalents) are unable to settle because of the loss of oyster shell cover. The loss of nearshore oyster cover also contributed to an increase in shoreline erosion rates and wetland loss. In addition, the injuries to nearshore oysters caused a lack of recruitment and recovery throughout the region. The long-term sustainability of nearshore and subtidal oysters throughout the north-central Gulf of Mexico has been compromised as a result of the combined effects of reduced spawning stock, larval production, spat settlement, and spat substrate availability caused by the spill.

The Final PDARP/PEIS indicates that the spill severely affected oyster reproduction in Mississippi Sound. It concludes that the spill resulted in reduced larval production, spat settlement, and spat substrate availability there that compromises the long-term sustainability of oyster reefs. In addition, losses of intertidal oysters occurred because of oiling and cleanup actions, resulting in the destruction of oyster cover, which has been associated with accelerated coastal erosion. The assessment notes this effect was observed along oiled shorelines in Alabama.

2.4 SCREENING FOR REASONABLE RANGE OF ALTERNATIVES

As described in Chapter 1, this RP II/EA continues the restoration planning process begun during Early Restoration and continued by the AL TIG in RP I/EIS. In this RP II/EA, the AL TIG is focusing on projects for seven of the Restoration Types identified in the Final PDARP/PEIS:

1. Wetlands, Coastal, and Nearshore Habitats
2. Habitat Projects on Federally Managed Lands
3. Nutrient Reduction (Nonpoint Source)
4. Sea Turtles
5. Marine Mammals
6. Birds
7. Oysters

The AL TIG selected these Restoration Types for RP II/EA because either (1) the ecological benefits of further investment of restoration funds in these Restoration Types at this time are expected to be substantial; or (2) the Restoration Types have received limited or no project funding to date.

2.4.1 Restoration Type Screening Process Overview

The goal of the AL TIG's screening process is to identify a set of restoration projects under the seven Restoration Types included in this plan that provides a reasonable range of alternatives that will contribute to compensating the public and restoring for Alabama's natural resource injuries resulting from the DWH oil spill. The results of the screening represent those restoration projects with a reasonable likelihood of satisfying the OPA criteria and, from preliminary investigation, with no obvious major adverse environmental impacts (recognizing that a lack of adverse impacts cannot be assured until more thorough OPA/NEPA evaluations are completed). The phased and sequential screening process included three primary steps.[13]

Step 1—Eligibility Screening

To begin the screening process, the AL TIG assembled a master database of potential restoration projects and applied a basic eligibility screen to the full set of 566 projects in this database (Appendix A). Projects in the database were compiled from three sources:

- the DWH public comment portal established in 2011—and in operation continuously since that date—to allow the public to submit projects for the DWH Trustees' consideration;[14]
- a similar web-based public portal created in 2014 by the State of Alabama (Alabama Project Portal);[15] and
- projects developed by the DWH Trustees.

This initial eligibility screening involved AL TIG review to determine the objectives of each project in the master database (Appendix A), followed by coding of each project according to its Restoration Type(s). Projects were then sorted to identify those relevant to each of the seven Restoration Types addressed by this plan.

Step 2—Initial Project Screening Criteria

The Step 2 screening considered a variety of criteria developed by the AL TIG to determine whether a project would likely be an effective way of addressing injuries from the spill. A primary criterion of Step 2 was a determination of whether a project met the AL TIG's restoration goals for the Restoration Type(s) for which it was coded under Step 1. The AL TIG developed restoration goals for each Restoration Type that are tailored to the Alabama Restoration Area. These goals, while based on the goals for restoration established in the Final PDARP/PEIS, are adapted to more directly reflect (1) the nature of those natural resource and resource service injuries not yet restored for any remaining uncompensated injury in the Alabama Restoration Area, as well as (2) the AL TIG's local and regional knowledge regarding the restoration context and the potential restoration needs and challenges associated with each Restoration Type in the Alabama Restoration Area. For some Restoration Types,

[13] The process was modified for the Nutrient Reduction (Nonpoint Source) Restoration Type to accommodate an additional screening step needed to address additional complexity involved in determining if a project addressed water pollution generally or nutrients specifically. This topic is discussed in detail in Section 2.4.1.4, Screening Nutrient Reduction (Nonpoint Source) Restoration Projects.

[14] See http://www.gulfspillrestoration.noaa.gov/restoration/give-us-your-ideas/. This portal includes projects submitted in response to the December 2016 notice soliciting project ideas for this restoration plan—see http://www.gulfspillrestoration.noaa.gov/2017/08/alabama-trustee-implementation-group-begins-drafting-its-second-restoration-plan

[15] See http://www.alabamacoastalrestoration.org

the restoration goals explicitly identify opportunities for data collection activities in Alabama, including needs to fill significant information or knowledge gaps related to the available baseline data or restoration science for a Restoration Type.

Although all Step 2 evaluations included determinations of whether projects met the AL TIG's restoration goals, the Step 2 criteria vary across Restoration Types. Examples of representative questions addressed include:

- Is the project more likely to be implemented appropriately through restoration efforts of the AL TIG than through actions by another Restoration Area TIG (e.g., other restoration planning efforts or Open Ocean)?
- Does the project have a reasonable likelihood of success?
- Is the available information sufficient to permit screening of the project?
- Are the project activities already required by local, state, or federal law, order, or permit?
- Is the project already fully funded?
- Is the project duplicative of other projects on the list?

Projects not meeting all the applicable Step 2 criteria were eliminated from further consideration. The outcomes of the Step 2 screening process are discussed below for each of the Restoration Types considered in this RP II/EA, highlighting key details for each Restoration Type. Appendix B contains the detailed screening criteria developed by the AL TIG for each Restoration Type.

Step 3—Project Specific Screening Considerations

For projects that reached Step 3 of the screening process, the AL TIG found it necessary in most cases to conduct more detailed project research, development, and refinement. Typically, and depending on the Restoration Type and the specific challenges involved in the development of the project, this research addressed a wide array of issues. The AL TIG collected additional information from project proponents to better understand issues like project design, cost, and/or potential ecological or data collection benefits. Although the criteria and associated questions differed by Restoration Type, the following questions are representative of the issues addressed during Step 3 of the screening:

- Can the project be implemented within a reasonable time frame?
- Is the project consistent with existing management plans?
- Does the project have a significant potential to result in adverse environmental or human health impacts?
- Can the project be implemented within the available budget for this restoration plan, or is there a source of other funds that can be leveraged in conjunction with NRDA funds available to allow implementation?
- Is the project generally expected to be cost-effective?
- Is the project expected to yield significant public benefits?
- Are there any other impediments to carrying the project forward as part of the reasonable range of alternatives designated for more detailed OPA and NEPA analysis (e.g., environmental compliance or permitting issues)?

In some cases, this resulted in the AL TIG refining project scopes and/or budgets. In other cases, the TIG merged projects with similar scopes to take advantage of efficiencies.

The AL TIG decisions to advance projects from Step 3 to the reasonable range of alternatives are based on a balancing of the considerations outlined above, and in the context of the full suite of restoration alternatives being advanced for analysis in this restoration plan. As a result, a project considered in Step 3 may have received a generally favorable review, but the TIG may still have decided not to advance it to the reasonable range of alternatives for this plan. The reason (or reasons) a project is not carried forward at this time is documented below in tables for each Restoration Type. The remainder of this section provides a more detailed discussion of the screening process, by Restoration Type, and rationale for the results for each of the seven Restoration Types considered in this RP II/EA.

2.4.2 Screening Wetlands, Coastal, and Nearshore Habitats Projects

Based on its review of the Final PDARP/PEIS goals and knowledge of local restoration needs and conditions, the AL TIG developed the following restoration goals for Wetlands, Coastal, and Nearshore Habitats restoration projects in Alabama. At a minimum, projects must:

1. Restore a continuum of habitats (e.g., nearshore reef to salt marsh to coastal freshwater wetlands and adjacent upland buffer) within the nearshore ecosystem to contribute to an integrated, connected food web; and
2. Be located in areas identified as high priority for wetlands, coastal, and nearshore habitats restoration by the AL TIG—specifically the estuarine portions of Mississippi Sound, Grand Bay, Fowl River, Weeks Bay, and Perdido Bay/River watersheds are targeted by this plan.

Protection and restoration of the complex habitats in the high priority areas were identified as initiatives with the greatest potential for integrated, connected food web and water quality benefits.

The full set of screening criteria for projects to restore Wetlands, Coastal, and Nearshore Habitats in Alabama is included in Appendix B.

The Step 1 screening process identified 163 potential Wetlands, Coastal, and Nearshore Habitats restoration projects in the master database (Appendix A). In Step 2, the TIG evaluated projects against the Trustees' restoration goals and other Step 2 criteria. Based on the Step 2 evaluations, the AL TIG determined that 50 of these projects would occur or potentially occur in the high priority areas. Of these, 28 did not meet the other Step 2 criteria (Table 2-2). The reasons why these projects were not advanced for Step 3 evaluation were varied. Many of the projects did not propose active measures for restoration, which the AL TIG considered essential if projects were to provide substantial benefits. Others did not meet the Trustees' ecological objectives, had already been funded, or duplicated other initiatives that were advanced to Step 3.

During the more detailed Step 3 evaluation and refinement of Wetlands, Coastal, and Nearshore Habitats restoration projects, the AL TIG considered the 24 remaining projects and added 2 new projects that were modifications of proposed initiatives eliminated at Step 2.[16] From this set, the TIG selected 6 projects to include in the reasonable range of alternatives. The reasons for not advancing the other 18

[16] The more focused Perdido River Land Acquisition (Molpus Tract) was developed by the TIG to replace the broader initiative submitted under Project ID 318. The Lower Perdido Islands Restoration Phase I project was added to support an E&D initiative, which the TIG found to be more appropriate at this time than the proposed restoration effort submitted under Project ID 86.

projects to the reasonable range of alternatives involved site-specific considerations. In some cases, projects had already been completed (Table 2-3).[17] In others, further investigation and project development revealed that they would not effectively meet the Trustees' restoration goals. In several cases, the AL TIG made decisions to merge projects with similar scopes of work and goals, or deferred decisions pending the outcomes of other related, ongoing initiatives.

Based on the Step 3 screening and further refinement of project options, the AL TIG selected the following six Wetlands, Coastal, and Nearshore Habitats restoration projects for inclusion in the reasonable range of alternatives:

- Perdido River Land Acquisition (Molpus Tract)
- Magnolia River Land Acquisition (Holmes Tract)
- Weeks Bay Land Acquisition (East Gateway Tract)
- Weeks Bay Land Acquisition (Harrod Tract)
- Lower Perdido Islands Restoration Phase I
- Southwestern Coffee Island Habitat Restoration Project—Phase 1[18]

The screening analysis makes clear that there are a large number of potentially valuable Wetlands, Coastal, and Nearshore Habitats projects in these and other coastal Alabama watersheds. Those selected for the reasonable range of alternatives in this RP II/EA should be viewed as the early stages of the AL TIG's efforts for this Restoration Type.

[17] These projects would have been screened out at Step 2, but information indicating they had been completed only became available at the time of the more detailed Step 3 review.

[18] This project is discussed in the reasonable range of alternatives in this RP II/EA under both the Wetlands, Coastal, and Nearshore Habitats and Birds Restoration Types. It would potentially be funded with monies from both Restoration Type allocations. If this project is ultimately selected in a final restoration plan, the Restoration Type (or combination of Restoration Types) funding source will be determined at that time.

Table 2-2: Wetlands, Coastal, and Nearshore Habitats Projects Not Carried Forward from Step 2 to Step 3 Analysis

Wetlands, Coastal, and Nearshore Habitats Projects Not Carried Forward from Step 2 to Step 3 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Coastal Land Acquisition in Alabama	5113	Steve Northcutt	$125,000,000	No specific project proposed. Also, project budget far exceeds amounts available for this restoration plan.
Safe Harbor Marsh Restoration	666	Eric Brunden	$822,375	Project already funded.
Restoration and Protection: Swift Tract Weeks Bay National Estuarine Research Reserve, AL	827	Mel Landry	$3,000,000	Project already funded.
Restoration of Tidal Flow to Meadows Tract	11410	Walter Ernest/Pelican Coast Conservancy	$1,000,000	Project already funded.
Andrew Benton Tract—Protection and Restoration of Coastal Alabama—A Coastal Resource Recovery Land Acquisition Project	1084	Walter Ernest/Pelican Coast Conservancy	$2,000,000	This is a duplicate of Project No. 105.
Weeks Bay East Gateway Project	12838	Yael Girard/Weeks Bay Foundation	$3,000,000	This is a duplicate of Project No. 336.
Floodplain Conservation Easements	88	Ben Raines/Weeks Bay Foundation	$5,000,000	This is not a specific project.
Tracking the Ecological and Engineering Performance of Alabama's Early Coastal Restoration Projects: A Centralized, Comprehensive Monitoring Program	169	Bret Webb/University of South Alabama	$5,500,000	This project does not constitute active measures to meet Final PDARP/PEIS goals.
Coastal Alabama Habitat Restoration—Portersville Bay Islands	357	Paul Looney/Volkert	$8,000,000	This project is redundant with other initiatives that have already been funded or are included as components of other projects being advanced to the reasonable range of alternatives.
Restoration and Protection: Marsh Island, AL	807	Mel Landry	$7,000,000	Project already fully funded.
Oyster Reef Reestablishment in Portersville Bay and Mobile Bay, Alabama	11225	Barry A. Vittor	$5,000,000	Information is not adequate to evaluate project proposal. Elements of the project appear to be addressed by other project proposals.
Environmental Restoration of Cotton Bayou and Terry Cove Canals	84	Phillip West/City of Orange Beach	$500,000	Project not focused on wetlands, coastal, and nearshore habitats; does not meet the AL TIG's restoration goals for this plan.
Nearshore and Snorkeling Reef Project	396	Phillip West/City of Orange Beach	$500,000	This is a recreational use project, not a Wetlands, Coastal, and Nearshore Habitats project.
Environmental Restoration of Cotton Bayou and Adjacent Canals: Planning Assistance	12841	Phillip West/City of Orange Beach	$500,000	This project is a duplicate of Project No. 84.
Identification, Prioritization, and Quantitative Assessment of Ecosystem Benefits of Restoration Actions within the Perdido and Perdido Bay Watersheds	112	Joel Hayworth/ Marine Environmental Sciences Consortium (MESC) and Auburn University (MESC Institution)	$2,575,000	This project does not constitute active measures to meet Final PDARP/PEIS goals.
Grand Bay National Wildlife Refuge	10151	Ray Herndon/The Conservation Fund	NA	Project is fully funded.
100-1000: Restore Coastal Alabama	56	Judy Haner/The Nature Conservancy (TNC)	$150,000,000	No specific project proposed. Also, project budget far exceeds amounts available for this restoration plan.
Mobile Causeway Hydrologic Restoration Project	145	Casi Callaway/Mobile Baykeeper	$42,030,941	Project is not in high priority area for Wetlands, Coastal, and Nearshore Habitat restoration targeted by this plan.
Long-Term Recovery of Gulf Shorebirds and Waterbirds	11413	Jeff Trandahl/NFWF	$71,900,000	No specific project proposed. Also, project budget far exceeds amounts available for this restoration plan.

Wetlands, Coastal, and Nearshore Habitats Projects Not Carried Forward from Step 2 to Step 3 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Dock and Sea Wall Reef Ball® Habitat	11973	Larry Beggs	$1,000,000	No specific project proposed.
Mobile County Conservation Acquisition	164	Bill Melton/Mobile County Commission	$4,000,000	No specific project proposed.
Coastal Watershed Property Acquisition in Mobile County	677	Bill Melton/Mobile County Commission	$9,000,000	No specific project proposed.
Proposed Emergency Seagrass Restoration	842	Louis E. Shenman	$500,000	Project is complete.
Gulf of Mexico Community-based Restoration Partnership	635	Ryan Fikes	$1,500,000	No specific project proposed.
Alabama Harmful Algal Bloom Program Initiative	184	Alison Robertson/University of South Alabama, Marine Sciences Department	$7,075,937	This project does not constitute active measures to meet Final PDARP/PEIS goals.
Environmentally-friendly Alternatives to Bulkheads for Protecting Shorelines: Evaluation and Implementation of Two Living Shoreline Designs	347	Just Cebrian/University of South Alabama	$200,000	This project does not constitute active measures to meet Final PDARP/PEIS goals.
Reducing Runoff Pollution in Coastal Waters through Marsh Restoration: A Decision Support Tool for Stakeholders	350	Just Cebrian/University of South Alabama	$269,269	This project does not constitute active measures to meet Final PDARP/PEIS goals.
Reducing Runoff Pollution in Coastal Waters through Marsh Restoration: A Decision Support Tool for Stakeholders	12849	Just Cebrian/University of South Alabama	$269,269	This is a duplicate of Project No. 350 above.

Table 2-3: Wetlands, Coastal, and Nearshore Habitats Projects Not Carried Forward From Step 3 to Reasonable Range of Alternatives

Wetlands, Coastal, and Nearshore Habitats Projects Not Carried Forward From Step 3 to Reasonable Range of Alternatives	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Headwaters Coastal Forest Protection—Baldwin County, Alabama & Escambia/Santa Rosa Counties, Florida	10153	Ray Herndon/The Conservation Fund	NA	Actions not specified; public habitat benefits to the AL TIG priority watersheds not clear given lack of specificity in proposed working forest easements.
Perdido River Water Quality Protection, Habitat Restoration and Recreational Enhancement Project	318	Darryl Boudreau /TNC	$14,220,000	Replaced by new Perdido (Molpus) acquisition project deemed to be more cost-effective at this time and carried forward to reasonable range.
Grand Bay Coastal Resiliency and Habitat Restoration	892	Judy Haner/TNC	$7,500,000	Consideration of this project is deferred pending the outcome of other ongoing efforts in Mississippi Sound.
Fish River Watershed Restoration Project	73	Cal Markert/Baldwin Count Commission	$8,500,000	This is more appropriately categorized as a water quality project.
Shoreline Restoration near Skunk Bayou—Mobile Bay—Eastern Shore	419	Paul B. Looney/Volkert	$25,000,000	Consideration of this project is deferred pending ecological monitoring results from the Swift Tract living shoreline project funded under Early Restoration.
Alligator Bayou Bridge Project	11519	Daniel Dyas	NA	Site investigation reveals hydrologic restoration is not needed.
Benton Tract	105	Walter Ernest/Pelican Coast Conservancy	$2,500,000	This land acquisition does not have a willing seller.
Swift Tract Addition—A Resource Protection Project	646	Walter Ernest/Pelican Coast Conservancy	$309,200	This project has already been completed.
Meadows Addition—A Resource Protection Project	11164	Walter Ernest/Pelican Coast Conservancy	$750,000	This project has already been completed.
Improving Public Access to Alabama Coastal Waters—Viewpoint Park Public Access	11785	Walter Ernest/Pelican Coast Conservancy	$810,000	This project is primarily for recreation and not a habitat project.
BP Funded Coastal Restoration Project—Cat Island, Alabama	11582	Dr. John Dindo/DISL	NA	Project benefits uncertain pending more study.
Cotton Bayou–Perdido Islands Beneficial Use Restoration	86	Jody Thompson/ Alabama Cooperative Extension System (ACES)	$ 1,247,334	Project being evaluated as part of a broader Lower Perdido Islands Phase I E&D effort carried forward to the reasonable range of alternatives under Wetlands, Coastal, and Nearshore Habitats.
Town of Perdido Beach Shoreline Restoration Project	595	Patsy Parker	$6,000,000	Project involves dredging issues that may be an impediment to successful implementation.
Lillian Park Beach Habitat and Shoreline Protection Improvements	272	Cal Markert	$679,500	This project is primarily a recreation and not a habitat project.
City of Orange Beach Waterways Enhancement Program (Marine Debris Removal Program)	12868	Phillip West/City of Orange Beach	$220,000	No long-term restoration or habitat benefit.
Salt Aire Shoreline Restoration	339	Bill Melton/Mobile County Commission	$8,219,039	Project funded under the GEBF.
Fowl River Shore and Island Restoration and Stabilization	11771	Casi Callaway/Mobile Baykeeper	$6,500,000	Consideration of this project is deferred pending outcome of the National Estuary Program study and likelihood that project is challenging because of extensive private ownership issues.
Alabama Coastal Forest Restoration Project	5111	Keith Tassin/TNC	$3,000,000	Actions not specified; public habitat benefits to the AL TIG priority watersheds not clear given lack of specificity in proposed working forest easements.

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2.4.3 Screening Habitat Projects on Federally Managed Lands

Based on its review of the Final PDARP/PEIS goals, the AL TIG adopted the following restoration goals for Habitat Projects on Federally Managed Lands in coastal Alabama:

1. Restore federally managed habitats that were affected by the DWH oil spill and response actions through an integrated portfolio of restoration approaches across a variety of habitats;
2. Restore for injuries to federally managed lands by targeting restoration on federal lands where the injuries occurred, while considering approaches that provide resiliency and sustainability; and
3. Ensure consistency with land management plans for each designated federal land and its purpose by identifying actions that account for the ecological needs of these habitats.

The full set of screening criteria for Habitat Projects on Federally Managed Lands is included in Appendix B.

Step 1 of the screening process identified 10 potential Habitat Projects on Federally Managed Lands in the master database (Appendix A). In Step 2, the AL TIG determined that six of the projects did not meet the Step 2 criteria because they did not address the AL TIG's restoration goals, were duplicative, were already being proposed under other restoration programs, or were already funded (Table 2-4).

During the Step 3 evaluation (Table 2-5), the AL TIG's more detailed evaluation and refinement of projects eliminated two additional projects. One project was eliminated because the budget exceeded amounts available for restoration of federally managed lands in the Alabama Restoration Area. The other project was ultimately funded under the GEBF.

Based on the Step 3 evaluation and further refinement of project options, the AL TIG selected two Habitat Projects on Federally Managed Lands for inclusion in the reasonable range of alternatives:

1. Little Lagoon Living Shoreline
2. Restoring the Night Sky—Assessment, Outreach and Training (E&D)[19]

These projects would provide restoration benefits for natural resources injured by the DWH oil spill in and around BSNWR in Baldwin County.

[19] This project is discussed in the reasonable range of alternatives in this RP II/EA under both the Restoring Habitat Projects on Federally Managed Lands and the Sea Turtles Resource Types.

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Table 2-4: Habitat Projects on Federally Managed Lands Projects Not Carried Forward from Step 2 to Step 3 Analysis

Habitat Projects on Federally Managed Lands Projects Not Carried Forward from Step 2 to Step 3 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Little Point Clear Navy Cove Acquisition—BSNWR	67	Ray Herndon/The Conservation Fund	$6,000,000	This project is currently being implemented with NFWF funding and does not require additional AL TIG NRDA funding.
Little Point Clear East Acquisition—BSNWR	12585	Ray Herndon/The Conservation Fund	$11,000,000	Project is duplicative of Project Nos. 67 & 113.
Little Point Clear Unit—BSNWR—Three Rivers	113	Ray Herndon/The Conservation Fund	$4,750,000	Project is duplicative of Project Nos. 67 & 12585.
Seasonal Staff for Shorebird, Sea Turtle, and Beach Mouse Baseline Monitoring and Protection at BSNWR	DOI-001	Dianne Ingram/USDOI	$390,000–$585,000	Not a direct restoration activity.
No Name Road at end of Fort Morgan Peninsula	DOI-002	Dianne Ingram/USDOI	NA	This is a recreational use project, not a habitat project.
Boardwalk at Mobile Street	DOI-003	Dianne Ingram/USDOI	NA	This is a recreational use project, not a habitat project.

Table 2-5: Habitat Projects on Federally Managed Lands Projects Not Carried Forward from Step 3 to Reasonable Range of Alternatives Analysis

Habitat on Federally Managed Lands Projects Not Carried Forward from Step 3 to Reasonable Range of Alternatives Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
BLM Fort Morgan "Our Road" Acquisition	205	Bruce Dawson	$7,498,000	Costs exceed budget for this restoration plan.
Little Dauphin Island Erosion Restoration	DOI-004	Dianne Ingram/USDOI	NA	Project funded under GEBF.

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2.4.4 Screening Nutrient Reduction (Nonpoint Source) Restoration Projects

The screening of Nutrient Reduction (Nonpoint Source) projects involved additional complexity because of the difficulty in distinguishing projects aimed at improving water quality using various methods, including point source pollution reduction, from projects that focused primarily on nonpoint source nutrient reduction. As a result, the AL TIG implemented a four-step rather than three-step screening process (Appendix B). The Step 1 eligibility screen, which selected all proposed water quality initiatives in the master database (Appendix A), identified 68 potential projects. Step 2 further focused project selection on five nutrient reduction categories.

1. Agricultural conservation practices
2. Stormwater management practices
3. Forestry management practices
4. Creation and enhancement of wetlands
5. Hydrologic restoration

This step eliminated 52 projects that did not meet the AL TIG's Step 2 criteria for nutrient reduction (Table 2-6).

Steps 3 and 4 included screening and refinement to ensure projects advancing to the reasonable range of alternatives would generally meet the OPA criteria, did not exceed budget limitations for the RP II/EA, and are located in the watersheds targeted for nutrient reduction by the AL TIG. Targeted watersheds were identified through the application of USEPA's Recovery Potential Screening Tool, a systematic approach for comparing watersheds, their current condition, and how well they may respond to restoration or protection efforts.[20]

The AL TIG's decisions not to advance projects to the reasonable range of alternatives were generally a function of project cost, project location, and project readiness (Table 2-7). Many of the potential nutrient reduction projects exceeded the NRDA funds made available to the AL TIG by the DWH settlement for this Restoration Type. Five of the 12 projects included at Step 3, but not advanced to the reasonable range of alternatives, were eliminated because of these types of budgetary constraints. Four of the 12 that were not advanced to the reasonable range of alternatives were not located in the targeted watersheds. For the remaining three projects, the TIG determined that currently available information on project benefits was not sufficient to support decisions to proceed with the projects.

Based on the screening and further refinement of project options, four nutrient reduction restoration projects are included in the reasonable range of alternatives:

- Bayou La Batre Nutrient Reduction
- Toulmins Spring Branch E&D
- Fowl River Nutrient Reduction
- Weeks Bay Nutrient Reduction

[20] The targeted watersheds are listed in Appendix B.

These projects address nutrient reduction in watersheds in coastal Alabama that the AL TIG views as among the most at-risk and where reductions are most likely to benefit estuarine and coastal ecosystems injured by the oil spill. These projects were also included in or compatible with the recommendations of the Mobile Bay National Estuary Program's watershed management plans.

Table 2-6: Nutrient Reduction Projects Not Carried Forward from Step 2 to Steps 3/4 Analysis

Nutrient Reduction Projects Not Carried Forward from Step 2 to Steps 3/4 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Sanitary Sewer Construction Project	155	Dane Haygood/City of Daphne	$2,000,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Yancey Branch Watershed Restoration	165	Ashley Cambell/City of Daphne	$5,484,817	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Three Mile Creek Lower Watershed Land Acquisition and Planning	168	Dianne Irby/City of Mobile, AL	$12,150,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Effects of Disturbance and Habitat Degradation on Community Resilience, Food Web Dynamics, and Ecosystem Integrity in the Mobile-Tensaw Delta	181	Kelly Major/University of South Alabama	$ 544,476	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Assessment and Protection of the Mobile/Tensaw Delta and the Coastal Streams of Alabama	182	John McCreadie/University of South Alabama	$176,179	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Alabama Harmful Algal Bloom Program Initiative	184	Alison Robertson/University of South Alabama, Marine Sciences Department	$7,075,937	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Low Pressure Sewer System To Replace On-Site Systems in Sensitive Riverine Areas	185	Charles Hyland	$1,100,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Biopolymer Based Materials for the Removal of Harmful Metals from Mobile Bay Water	186	William Reichert	$563,003	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Southeast Mobile County Sanitary Sewer/Oyster Reefs Protection Project	201	Joe Summersgill	$6,148,750	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Drainage and Sewer Infrastructure Improvements of Facilities along West Turner Road and Dunlap Circle	211	Melanie Baldwin	$15,000,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
City of Chickasaw Sewer Rehabilitation Project	212	Byron Pittman	$1,300,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Reuse Water System for the City of Foley and Blue Collar Country Sports and Entertainment Complex	213	Richard Peterson	$3,500,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Dauphin Island Wastewater Treatment and Outfall Improvements	215	Vaile Feemster	$19,386,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Enhanced Nutrient Removal at the Saraland Wastewater Treatment Facility	221	Howard Rubenstein	$2,600,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
City of Saraland	222	Howard Rubenstein	$6,985,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Oyster Bay Restoration Feasibility Study	232	Ben Raines	$600,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
D'Olive Creek Property Purchase, Habitat Study, and Nutrient Removal Research/Educational Facility	233	Danny Lyndall	$975,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.

Nutrient Reduction Projects Not Carried Forward from Step 2 to Steps 3/4 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Wastewater Reuse Project for the City of Daphne and the Eastern Shore of Mobile Bay	236	Danny Lyndall	$950,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Aloe Bay/Mississippi Sound Water Quality Enhancement Project	247	Vaile Feemster	$7,992,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Extension of Effluent Force Main from Bayou La Batre Wastewater Treatment Facility	255	Annette Johnson	$12,000,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Bayou La Batre Wastewater Treatment Facility-Class A/EQ Sludge Treatment	262	Annette Johnson	$3,000,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Grand Bay Sewer Service Project	276	Buddy McGregor	$3,480,068	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Low Pressure Sanitary Sewer for Dauphin Island Parkway	277	Charles Hyland	$5,998,580	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Perch Creek Area Sanitary Sewer Trunk Line Cured in Place Pipe Project	278	Charles Hyland	$5,998,590	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Linking Water Quality, Marine Food Web Dynamics, and Ecosystem Health in Alabama: Improving Seafood Safety and Human Health	288	Alison Robertson	$2,986,322	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Rehabilitation of Sanitary Sewer Mains—Foley, Alabama	342	Richard Peterson	$1,250,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Dog River Watershed Water Quality Restoration	349	Christian Miller	$125,000,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
West Fowl River Pathogen Study	353	Christian Miller	$450,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Bayou La Batre Pathogen Study	354	Christian Miller	$450,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Presence, Potential Sources, Behavior, and Fate of Endocrine Disrupting Chemicals in Northern Gulf of Mexico Estuarine Systems	363	Joel Hayworth	$1,700,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Fly Creek Restoration	797	Jennifer Fidler	$19,000,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Three Mile Creek Repair/Maintenance	943	Nick Amberger	$1,500,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
D'Olive Creek Watershed Restoration	1212	Roberta Swann	$42,723,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Repair/Maintenance of Three Mile Creek	2138	Nick Amberger	$1,500,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.

Nutrient Reduction Projects Not Carried Forward from Step 2 to Steps 3/4 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Eco Restoration/Dredging of Langan Park Lake (Municipal Park)	2146	Nick Amberger	$8,000,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Eco Restoration/Dredging of Dog River and Tributaries	2147	Nick Amberger	$30,000,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Property Acquisitions for Protecting the Big Creek Lake/Converse Reservoir	4083	Dwight McGough	$4,500,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Renovation of Mobile, Alabama's Storm Water Treatment Methods to Meet Modern EPA Standards	5068	Nick Amberger	$1,000,000,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Alabama Port and Heron Bay Sewer Improvements	10054	Joe Summersgill	$3,500,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Perdido Watershed Water Quality Improvement	10105	Billy Middleton	$1,500,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
City of Chickasaw Wetland Restoration and Water Quality Improvement Project	10107	Byron Pittman	$7,500,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Wastewater Treatment Facility Rehabilitation	11710	Vaile Feemster	$6,800,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Sanitary Sewer Collection System Rehabilitation	11715	Vaile Feemster	$4,400,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
A Way to Clean Some of Oil Out of the Gulf	12462	Joseph Ferguson	Unknown	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Little Lagoon	12612	Stephen Kichler	Unknown	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Marine Debris and Shoreline Enhancement Program	12840	NA	$350,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
An Evaluation of the Eastern Oyster (*Crassostrea virginica*) as a Biological Surrogate for Aquatic Ecological Health of Alabama Estuaries: Relations to Hydrological, Chemical, and Physical Variables	12848	Billy Justus	$725,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Reducing Runoff Pollution in Coastal Waters through Marsh Restoration: A Decision Support Tool for Stakeholders	12849	Just Cebrian	$269,269	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Water Quality Dynamics and Flux in Hydrologically Complex Systems in Alabama	12870	Ana Maria Garcia	$750,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
The Renovation of Mobile, Alabama's Antiquated Storm Water Treatment Methods to Meet Modern EPA Standards	4072	Carol Adams-Davis	Unknown	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.
Comprehensive Monitoring to Quantify Ecosystem Benefits of Restoration Actions within the Perdido River and Bay Watersheds	12877	Joel S. Hayworth	$2,000,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.

Nutrient Reduction Projects Not Carried Forward from Step 2 to Steps 3/4 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Presence, Potential Sources, Behavior and Fate of Endocrine Disrupting Chemicals in Northern Gulf of Mexico Estuarine Systems	12881	Joel Hayworth	$2,000,000	Project is not an active measure designed primarily to reduce nutrient loadings to coastal ecosystems injured by the spill.

Table 2-7: Nutrient Reduction Projects Not Carried Forward From Steps 3/4 to Reasonable Range of Alternatives

Nutrient Reduction Projects Not Carried Forward From Steps 3/4 to Reasonable Range of Alternatives	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Fish River Watershed Restoration Project	73	Cal Markert/Baldwin Count Commission	$8,500,000	Project budget exceeds amounts available for this restoration plan.
Mobile Bay Preservation and Restoration; Lower Fly Creek Reach Project	106	Tim Kant/City of Fairhope, Alabama	$14,700,000	Project budget exceeds amounts available for this restoration plan.
Mobile Causeway Hydrologic Restoration Project	145	Casi Callaway/Mobile Baykeeper	$42,030,941	Project budget exceeds amounts available for this restoration plan.
Dog River Watershed Restoration	344	Christian Miller	$21,900,000	Project budget exceeds amounts available for this restoration plan.
Mobile Causeway Hydrologic Restoration Project, Mobile and Baldwin Counties, Alabama	5099	Judy Haner/TNC	$70,000,000	Project budget exceeds amounts available for this restoration plan.
Stormwater Quality Rehabilitation Project	98	Jeff Collier/Town of Dauphin Island	$500,000	Project is not located in watershed targeted by this restoration plan based on analysis using USEPA's Recovery Potential Screening Tool.
Stormwater Wetland Construction in Big Creek Lake Watershed	191	Charles Hyland	$1,200,000	Project is not located in watershed targeted by this restoration plan based on analysis using USEPA's Recovery Potential Screening Tool.
City of Fairhope—Public Beach's Water Quality Treatment (Project #1)	11505	Jennifer Fidler	$4,500,000	Project is not located in watershed targeted by this restoration plan based on analysis using USEPA's Recovery Potential Screening Tool.
Fairhope Public Beach's Water Quality Treatment	776	Jennifer Fidler	$4,500,000	Project is not located in watershed targeted by this restoration plan based on analysis using USEPA's Recovery Potential Screening Tool.
D'Olive Creek Watershed Land Acquisition	167	Ashley Cambell/City of Daphne	$900,000	Uncertainties regarding nutrient reduction benefits indicate project likely less beneficial than others carried through to the reasonable range.
Fowl River Watershed Headwaters Conservation and Restoration Program	351	Christian Miller	$7,416,000	It is unclear what portion of this project is for nutrient reduction. Defer consideration of this project to a future restoration plan when the ongoing watershed management plan is complete.
City of Foley Regional Stormwater Wetland	204	Chad Christian	$1,515,600	Nutrient reduction benefits could not be clearly documented.

2.4.5 Screening Sea Turtles Restoration Projects

Based on its review of the Final PDARP/PEIS goals and knowledge of location, restoration needs, and conditions, the AL TIG developed the following restoration goals for Sea Turtles projects. At a minimum, projects must:

1. Make direct contributions to reducing sea turtle bycatch and vessel collision mortality or injury in Alabama coastal waters; or
2. Enhance hatchling productivity or restore/conserve nesting habitat; or
3. Enhance enforcement of laws protecting sea turtles; or
4. Increase survival through actions to investigate and respond to threats and emergency incidents; or
5. Fill knowledge or data gaps specific to sea turtles and habitats in Alabama.

The full set of screening criteria for Sea Turtles projects is included in Appendix B.

Step 1 of the screening process identified 25 potential sea turtle restoration projects in the master database (Appendix A). In Step 2, the AL TIG determined that 13 of the 25 projects did not meet the TIG's restoration goals, were largely duplicative of other initiatives, had already received funding, or were considered outside the current geographic scope being considered by the AL TIG (e.g., potentially Region-wide or Open Ocean) or potentially part of a future, joint restoration plan (Table 2-8).

At Step 3 of the screening process, the AL TIG reviewed the remaining 12 Sea Turtles projects in more detail. Project proposals were evaluated and refined in the context of ongoing efforts such as the Alabama Share the Beach program. The AL TIG reviewed data collection initiatives to identify opportunities to combine efforts and increase the efficiency of proposed programs. Project reviews also involved careful consideration of potential cost-effectiveness and project budgets relative to the availability of funds for sea turtle restoration. In addition, the AL TIG considered a variety of compliance issues (e.g., whether there were any compliance issues if the project were to be implemented). Detailed results of the Step 3 review are summarized in Table 2-9.

Based on this review and further refinement of project options, five Sea Turtles projects are included in the reasonable range of alternatives. These include:

- Coastal Alabama Sea Turtle (CAST) Conservation Program
- CAST Triage
- CAST Habitat Usage and Population Dynamics
- CAST Protection: Enhancement and Education
- Restoring the Night Sky—Assessment, Outreach and Training (E&D)[21]

This set of projects directly addresses the restoration goals identified above, including the AL TIG's objective of filling important data gaps that would inform and enhance future sea turtle restoration efforts in Alabama waters.

[21] This project is discussed in the reasonable range of alternatives in this RP II/EA under both the Restoring Habitat Projects on Federally Managed Lands and the Sea Turtles Resource Type.

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Table 2-8: Sea Turtle Projects Not Carried Forward from Step 2 to Step 3 Analysis

Sea Turtle Projects Not Carried Forward from Step 2 to Step 3 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Research and Monitoring of Sea Turtles in Alabama Waters	342	Margaret Lamont/United States Geological Survey (USGS)	$2,300,000	Duplicate of Project No. 12862, which is advanced to Step 3.
Estimating Vital Rates of Loggerheads in the Northern Gulf of Mexico Using Traditional Mark-Recapture and Genetics	341	Margaret Lamont/USGS	$1,280,000	Project tasks are included in Project 12862, which is advanced to Step 3.
Research and Monitoring of Sea Turtles using Alabama Waters	12861	Margaret M. Lamont & Kristen Hart	$2,300,000	Project tasks are included in Project 12862, which is advanced to Step 3.
Sea Turtle Genetics: Refining Population Estimates and Assessing Stock Structure for Threatened Loggerheads	12865	Kristen Hart & Margaret M. Lamont	$201,150	Project tasks are included in Project 12862, which is advanced to Step 3.
Informing Barrier Island and Dune Habitat Restoration by Quantifying Dune Vegetation and Elevation Linkages and Evolution	12869	P. Soupy Dalyander/USGS	$1,716,000	Project has already received funding.
Expansion of the Orange Beach Wildlife Rehabilitation and Education Center	287	Wade Stevens/City of Orange Beach	$183,500	Further research indicates that this is a bird project that was incorrectly categorized as a sea turtle project in Step 1.
Development and Distribution of Gear Technology to Improve Fuel Economy and Reduce Bycatch in the Gulf Shrimp Fishery	11678	Judy Jamison	$1,500,000	Project is outside the current geographic scope being considered by the AL TIG.
Deployment of New Turtle Excluder Devices in Shrimp Fisheries	438	John Williams	$10,800,000	Project is outside the current geographic scope being considered by the AL TIG.
Coordinated Strategy for Sea Turtle Recovery in the Gulf	11222	Jeff Trandahl	$58,600,000	Project is outside the current geographic scope being considered by the AL TIG.
Conduct Tagging and Tracking of Large Marine Vertebrates in the Gulf of Mexico to Monitor Their Status, Distribution, and Changes in Habitat Use	12046	Chris Robbins	$500,000	Project is outside the current geographic scope being considered by the AL TIG.
5-Year Increase in Gulf of Mexico Fishery Observer Coverage for Monitoring Marine Mammals, Sea Turtles, and Bluefin Tuna	11523	Chris Robbins	$6,500,000	Project is outside the current geographic scope being considered by the AL TIG.
10-Year Enhancement for Improving Gulf of Mexico Sea Turtle Stranding Network Response and Science Capacity	11947	Chris Robbins	$1,000,000	Project is outside the current geographic scope being considered by the AL TIG.
Pelagic Longline Gear and Vessel Transition Program in the Gulf of Mexico	12837	Bobby Nguyen	NA	Project is outside the current geographic scope being considered by the AL TIG.

Table 2-9: Sea Turtle Projects Not Carried Forward From Step 3 to Reasonable Range of Alternatives

Sea Turtle Projects Not Carried Forward From Step 3 to Reasonable Range of Alternatives	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Our Road Tract Acquisition	170	Hendrik Snow /Alabama Coastal Heritage Trust	$7,498,000	Project exceeds available budget available for this restoration plan.
Alabama Habitat (Seagrasses) Mapping, Usage and Monitoring using GPS Tagged Manatees and UAS Technology	12857	Stephen Hartley/Cardigan Bay Marine Wildlife Center	$235,000	Additional research indicates this information is already available through the Alabama Marine Mammal Stranding Network.
Sea Turtle Conservation and Recovery in the Gulf of Mexico through Development of a Sea Turtle Health Surveillance Network	286	Scott Glaberman/University of South Alabama	$1,020,000	Discussions indicate this project can be most efficiently implemented by combining it with Project No. 12862, which is advanced to Step 3.
Sea Turtle Nesting Habitat Beach Equipment Replacement Program	300	Dan Bond/City of Gulf Shores & Phillip West/City of Orange Beach	$1,480,600	Project is determined not to be cost-effective and likely raises compliance issues.
City of Orange Beach Waterways Enhancement Program (Marine Debris Removal Program)	12868	Phillip West/City of Orange Beach	$220,000	Project determined to be more appropriately categorized under Wetlands, Coastal and Nearshore Habitats resource area.
Assessing the Vulnerability of Sea Turtle Nests to Inundation to Improve Management	12902	Matthew Ware	$40,021	Project is redundant with activities conducted by the Share the Beach program.
Eliminating Light Pollution on Sea Turtle Nesting Beaches in Alabama	12871	Nicole Woerner	$1,500,000	Project is premature—needs to await completion of E&D work for Restoring Night Sky—Assessment, Training, and Outreach (E&D) project, which is advanced to reasonable range of alternatives for this plan.

2.4.6 Screening Marine Mammals Restoration Projects

Based on its review of the Final PDARP/PEIS goals and knowledge of local restoration needs and conditions, the AL TIG developed the following restoration goals for Marine Mammals projects. At a minimum, projects must:

1. Make direct contributions to reducing mortality or morbidity of Alabama marine mammal populations caused by direct anthropogenic stressors or threats; or
2. Reduce natural stressors or take other actions that support the ecological needs of marine mammals that result in increased resilience of Alabama populations; or
3. Play a significant role in the collection and/or analysis of data that would improve the AL TIG's ability to restore marine mammal populations.

The full set of screening criteria for Marine Mammals projects is included in Appendix B.

The Step 1 screening process identified 18 potential marine mammal restoration projects in the master database (Appendix A). In Step 2, the AL TIG evaluated these projects against the TIG's marine mammal restoration goals and considered whether the projects may be more appropriate for implementation by a TIG addressing a geographic scope beyond that considered by the AL TIG (e.g., Region-wide or Open Ocean) or potentially part of a future, joint restoration plan. Based on the Step 2 evaluations, the AL TIG determined that 9 of the 18 projects did not meet the TIG's restoration goals, were outside the current geographic scope being considered by the AL TIG, were largely duplicative of other initiatives, had already received funding, or were not sufficiently specific (Table 2-10).

At Step 3 of the screening process, the AL TIG investigated the remaining nine marine mammal projects in more detail and worked closely with project proponents to develop a more detailed understanding descriptions of potential project tasks and budgets. Many of the proposed projects involved data collection initiatives and, based on further discussions, the AL TIG found significant opportunities to recombine project components to improve the efficiency and effectiveness of these efforts. The results of the Step 3 review are summarized in Table 2-11.

This reconfiguration of the data collection initiatives and further refinement of initiatives in Step 3 resulted in the AL TIG's decision to advance three marine mammals projects to the reasonable range of alternatives. These projects include:

- Enhancing Capacity for the Alabama Marine Mammal Stranding Network (ALMMSN)
- Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health
- Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education

The set of projects proposed for the reasonable range of alternatives would directly address all the Alabama TIG's marine mammal-specific restoration goals, including filling important data gaps that currently limit the scope and effectiveness of more effective marine mammal restoration in the Alabama Restoration Area.

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Table 2-10: Marine Mammal Projects Not Carried Forward from Step 2 to Step 3 Analysis

Marine Mammal Projects Not Carried Forward from Step 2 to Step 3 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Expansion of the Orange Beach Wildlife Rehabilitation and Education Center	287	Wade Stevens/City of Orange Beach	$183,500	Further research indicates that this is a bird project that was incorrectly categorized as a marine mammal project in Step 1.
City of Orange Beach Waterways Enhancement Program (Marine Debris Removal Program)	12868	Phillip West/City of Orange Beach	$220,000	Project determined to more appropriately address restoration of Wetland Coastal and Nearshore Habitats and considered as part of the screening process for that Restoration Type.
Active Surveillance for Stranded Marine Mammals to Improve Mortality Estimates	AL-3	NA	$65,000/year	Merged into AL1, which is carried forward for further evaluation.
Alabama Habitat (seagrasses) Mapping, Usage, and Monitoring Using GPS-tagged Manatees and UAS Technology	12857	Stephen Hartley/Cardigan Bay Marine Wildlife Center	$235,000	Additional research indicates this information is already available through the Alabama Marine Mammal Stranding Network.
Pelagic Longline Gear and Vessel Transition Program in the Gulf of Mexico	12837	Bobby Nguyen	NA	Project is outside the current geographic scope being considered by the AL TIG.
Grommet Island Style Beach Park for Physically Disabled Citizens	12084	The Jim Henkel Family	$3,500,000	No specific project proposed so information is not adequate to evaluate. Also, marine mammal benefits not clearly articulated.
5-Year Increase in Gulf of Mexico Fishery Observer Coverage for Monitoring Marine Mammals, Sea Turtles, and Bluefin Tuna	11523	Chris Robbins	$6,500,000	Project is outside the current geographic scope being considered by the AL TIG.
Conduct Tagging and Tracking of Large Marine Vertebrates in the Gulf of Mexico to Monitor Their Status, Distribution, and Changes in Habitat Use	12046	Chris Robbins	$500,000	Project is outside the current geographic scope being considered by the AL TIG.
Expand and Improve Gulf of Mexico Marine Mammal Stranding Response and Science Capacity	11966	Chris Robbins	$45,000,000	Project is outside the current geographic scope being considered by the AL TIG.

Table 2-11: Marine Mammal Projects Not Carried Forward From Step 3 to Reasonable Range of Alternatives

Marine Mammal Projects Not Carried Forward From Step 3 to Reasonable Range of Alternatives	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Assessment of Injury to Bay, Sound, and Estuary Dolphin Stocks in Alabama to Support Restoration and Recovery	248	Ruth Carmichael/USGS	$2,600,000	Direct health assessment on live animals is premature prior to completion of additional research of the type as is contemplated in projects proposed for the reasonable range of alternatives.
Reduce Injury and Mortality of Bottlenose Dolphins from Hook-and-Line Fishing Gear	AL-5	NOAA	$400,000	Key project components will be merged with No. AL-4, which is being carried forward to the reasonable range of alternatives.
Reduce Harmful and Lethal Impacts to Dolphins from Illegal Feeding Activities	AL-6	NOAA	$350,000–500,000	Key project components will be merged with No. AL-4, which is being carried forward to the reasonable range of alternatives.
Reduce Harmful and Lethal Impacts to Dolphins from Illegal Harassment Activities from Vessel-Based Ecotourism Activities	AL-7	NOAA	$300,000–$500,000	Key project components will be merged with No. AL-4, which is being carried forward to the reasonable range of alternatives.
Reduce Marine Mammal Takes By Enhancing State Enforcement of the MMPA	AL-8	NOAA	$200,000–$500,000	Key project components will be merged with No. AL-4, which is being carried forward to the reasonable range of alternatives.

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2.4.7 Screening Bird Restoration Projects

Based on its review of the Final PDARP/PEIS goals and knowledge of local restoration needs and conditions, the AL TIG developed the following Alabama-specific restoration goals for Birds restoration projects for this plan. At a minimum, projects must:

1. Increase reproduction or decrease mortality for DWH injured species where restoration is not largely complete (i.e., for wading birds and seabirds including brown pelicans and land birds); or
2. Fill important information/data gaps needed to inform future bird restoration efforts in the Alabama Restoration Area.

The full set of screening criteria for projects to restore birds in Alabama is included in Appendix B.

The Step 1 screening process identified 31 potential bird restoration projects in the master database (Appendix A). In Step 2, the AL TIG evaluated these projects against the TIG's restoration goals and considered whether the projects may be more appropriate for implementation by a TIG addressing a geographic scope beyond that considered by the AL TIG (e.g., Region-wide or Open Ocean) or potentially part of a future, joint restoration plan. Based on the Step 2 evaluations, the AL TIG determined that 18 of the 31 projects did not meet the Step 2 criteria (Table 2-12). The reasons why these projects were not advanced for Step 3 evaluation were varied. Many of the proposed projects addressed bird restoration across the Gulf and in some cases outside the Gulf and were determined to be outside the current geographic scope being considered by the AL TIG. Some projects were eliminated because they focused on species where some restoration has already begun or because they were not viewed as the most effective ways to meet the Trustees' goals for the Birds Restoration Type. A number of other projects were either duplicative with efforts that were advanced to Step 3 or were already funded. The AL TIG did not advance several projects to Step 3 because they were the subject of ongoing NFWF pre-proposals.

During the more detailed Step 3 evaluation and refinement of bird restoration projects, the AL TIG added two additional project alternatives—Colonial Nesting Wading Bird Tracking and Habitat Use Assessment, with both a Four Species and Two Species option. The purpose of these project alternatives is to fill an important data gap in information available for these species. With the addition of these projects, the AL TIG considered 14 bird projects at Step 3 and selected 3 to include in the reasonable range of alternatives (Table 2-13). Two of the 14 projects eliminated were determined to not be as beneficial for restoring injuries to birds as investments in projects focused on colonial wading birds. A number of projects proposed avian wildlife rehabilitation facilities, and the AL TIG concluded that none of these projects adequately targeted wading birds injured by the spill, and therefore lacked a clear nexus to the spill. Other projects were merged into initiatives included in the Wetlands, Coastal, and Nearshore Habitats Restoration Type or eliminated because they were redundant with ongoing restoration efforts.

Based on the Step 3 screening and refinement of the project options, three Birds restoration projects are included in the reasonable range of alternatives.

- Southwestern Coffee Island Habitat Restoration Project—Phase I[22]
- Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species
- Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species

These projects directly address the AL TIG's restoration goals for Birds restoration projects in this plan by facilitating creation and protection of the rookery at Coffee Island and filling important data gaps regarding wading bird habitat use that currently limit the scope and effectiveness of more effective bird restoration in Alabama.

[22] This project is discussed in the reasonable range of alternatives under both the Wetlands, Coastal, and Nearshore Habitats and Birds Restoration Types. It would be funded with monies from both Restoration Type allocations. If this project is ultimately selected in a final restoration plan, the Restoration Type (or combination of Restoration Types) funding source would be determined at that time.

Table 2-12: Bird Projects Not Carried Forward from Step 2 to Step 3 Analysis

Bird Projects Not Carried Forward from Step 2 to Step 3 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Little Point Clear Navy Cove Acquisition—BSNWR	67	Ray Herndon/The Conservation Fund	$6,000,000	This project is currently being implemented with NFWF funding and does not require additional AL TIG NRDA funding.
Little Point Clear East Acquisition—BSNWR	12585	Ray Herndon/The Conservation Fund	$11,000,000	The AL TIG reviewed this project for its potential to partially restore injuries to birds. It judged that other proposed initiatives included in the bird habitat restoration project category are more cost-effective. In addition, this project is the subject of a NFWF pre-proposal. The project also is duplicative with Project Nos. 67 & 113.
Our Road Tract Acquisition	170	Hendrik Snow/Alabama Coastal Heritage Trust	$7,498,000	Project primarily benefits shorebirds, where some restoration of injury occurred in Early Restoration and which are not the focus for restoration in this plan; therefore, does not meet the AL TIG objectives for this plan.
Bureau of Land Management Fort Morgan "Our Road" Acquisition	205	Bruce Dawson/BLM	$7,498,000	Project is a duplicate of Project No. 170.
Habitat Acquisition and Conservation of the Garrow's Bend Watershed-Radcliff—Goat Islands-Mobile Bay	306	Sandy Howard	$255,000	This project is currently being implemented by Mobile County with NFWF funding and does not require additional AL TIG NRDA funding.
A Coastal Wildlife Rescue and Research Center Project construct and maintain the first waterfowl and sea/shore birds implementing the Coast natural history/habitat	12463	Janet De La Oliva-Ripp	$1,500,000	Duplicative of other wildlife rescue and rehabilitation facilities in the area.
South Baldwin Wildlife Rescue and Rehabilitation Facility	399	Leslie Lassitter/Graham Creek Nature Preserve	$2,500,000	Other options are being considered by other Gulf restoration planning efforts that place rehab facility closer to injured coastal habitats and injured bird species.
Coastal Alabama Habitat Restoration—Mobile Bay Bird Islands	358	Paul Looney/Volkert	$10,000,000	This project is duplicative of efforts already underway in Mobile Bay.
BP Funded Coastal Restoration Project—Cat Island, Alabama	11582	Dr. John Dindo/DISL	Unknown	Project benefits uncertain pending more study.
Restoring One of the Most Important Sooty Tern Colonies of the Caribbean	12709	Yolanda Leon	$350,000	This project is outside the current geographic scope being considered by the AL TIG.
Restoration of Globally Important Seabird Colonies on Alto Velo Island, Dominican Republic	12719	Jose Luis Herrera-Giraldo	$2,000,000	This project is outside the current geographic scope being considered by the AL TIG.
Long-Term Recovery of Gulf Shorebirds and Waterbirds	11413	Jeff Trandahl/NFWF	$71,900,000	This project is outside the current geographic scope being considered by the AL TIG
Coastal Ecosystem Health: American Oystercatcher as an Indicator of Exposure and Effects of Pollutants on Breeding Birds on the Gulf Coast	12003	Felipe Chavez-Ramirez	$4,800,000	This project is outside the current geographic scope being considered by the AL TIG
Conservation and Evaluation of Limiting Factors for American Oystercatchers Along the Gulf Coast	12004	Felipe Chavez-Ramirez	$5,800,000	This project is outside the current geographic scope being considered by the AL TIG.
Conduct Tagging and Tracking of Large Marine Vertebrates in the Gulf of Mexico to Monitor Their Status, Distribution, and Changes in Habitat Use	12046	Chris Robbins	$500,000	This project is outside the current geographic scope being considered by the AL TIG.

Bird Projects Not Carried Forward from Step 2 to Step 3 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Benthic Invertebrate Community Response and Recovery Rates following Barrier Shoreline Restoration Projects and Potential Impacts to the Habitats of the Threatened Piping Plover and Other Wintering and Migratory Shorebirds	12851	Scott Mize	$750,000	A similar project is currently being conducted in Mississippi, the AL TIG may consider this project in future plans.
Bird Friendly City Initiative	5106	NA	Unknown	Information is inadequate to evaluate project proposal.
Replace Lights on Oil Rigs with Bird Friendly Lights	11850	Julia O'Neal	$1,000,000	This project is outside the current geographic scope being considered by the AL TIG.

Table 2-13: Bird Projects Not Carried Forward From Step 3 to Reasonable Range of Alternatives

Bird Projects Not Carried Forward From Step 3 to Reasonable Range of Alternatives	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Habitat Acquisition and Conservation for Neotropical Migratory Birds	104	Walter Ernest/Pelican Coast Conservancy	$891,217	This project does not address the AL TIG's priorities for increasing reproduction of bird species injured by the DWH spill as cost-effectively as proposed projects focused on colonial nesting birds.
Habitat Acquisition and Conservation for Neotropical Migratory Birds	11223	John F. Porter, Ph.D./Dauphin Island Bird Sanctuaries	$1,560,000	This project does not address the AL TIG's priorities for increasing reproduction of bird species injured by the DWH spill as cost-effectively as proposed projects focused on colonial nesting birds.
Dauphin Island West End Acquisition	348	Casi Callaway/Mobile Baykeeper	$10,050,000	An ongoing report is evaluating erosion threats to this part of Dauphin Island. The AL TIG is deferring NRDA restoration project decisions at that site until the report is complete.
South Baldwin Wildlife Rescue and Rehabilitation Facility	368	Phillip West/City of Orange Beach	$5,500,000	This project is primarily an interpretive center designed for public environmental education. This project does not address the AL TIG's current priorities for increasing reproduction of bird species injured by the DWH spill as cost-effectively as proposed projects focused on colonial nesting birds.
Gulf Coast Wildlife Recovery & Interpretive Center: Feasibility, Planning and Preliminary Design Phase (Phase I)	103	Phillip West/City of Orange Beach	$275,000	This project represents the E&D component of Project No. 368. This project does not address the AL TIG's current priorities for increasing reproduction of bird species injured by the DWH spill as cost-effectively as proposed projects focused on colonial nesting birds.
Expansion of the Orange Beach Wildlife Rehabilitation and Education Center	287	Wade Stevens/City of Orange Beach	$183,500	This project is designed to serve a wide array of bird species. The benefits to DWH injured species still requiring restoration are unclear at this time.
Coastal Avian Rescue & Rehabilitation Center	290	Leslie Gahagan/Graham Creek Nature Preserve	$850,000	Other options are being considered by other Gulf restoration planning efforts that place rehab facility closer to injured coastal habitats and injured bird species.
Cotton Bayou–Perdido Islands Beneficial Use Restoration	86	Jody Thompson/ACES	$1,247,334	Evaluation of this project is included as part of a broader E&D effort under Wetlands, Coastal, and Nearshore Habitats in this plan.

Bird Projects Not Carried Forward From Step 3 to Reasonable Range of Alternatives	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Robinson Island Restoration Project	370	Phillip West/City of Orange Beach	Unknown	Project being evaluated as part of Lower Perdido Islands E&D effort under Wetlands, Coastal, and Nearshore Habitats.
Island Wildlife Habitat Enhancement	5090	Phillip West/City of Orange Beach	$150,000	Project being evaluated as part of a broader E&D effort under Wetlands, Coastal, and Nearshore Habitats.
Coastal Alabama Habitat Restoration—Portersville Bay Islands	357	Paul Looney/Volkert	$8,000,000	This project is redundant with other initiatives that have already been funded or are included as components of other projects being advanced to the reasonable range of alternatives.

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2.4.8 Screening Oyster Restoration Projects

Based on its review of the Final PDARP/PEIS goals and knowledge of local restoration needs and conditions, the AL TIG developed the following restoration goals for Oysters projects for this plan. At a minimum, projects must:

1. Make direct contributions to solving long-term oyster survivorship problems in Alabama coastal waters, or
2. Play an important role in filling major scientific information or data gaps for oysters, or
3. Promote effective stewardship of oyster resources in the state.

The full set of screening criteria for projects to restore oysters in Alabama is included in Appendix B.

The Step 1 screening process identified 26 potential oyster restoration projects in the master database (Appendix A). In Step 2, the AL TIG evaluated these projects against the TIG's restoration goals while also considering whether the projects were duplicative, already funded, or may be more appropriate for implementation by a TIG addressing a geographic scope beyond that considered by the AL TIG (e.g., Region-wide or Open Ocean) or potentially part of a future, joint restoration plan. Based on the Step 2 evaluations, the AL TIG determined that 18 of the 26 projects did not meet the Step 2 criteria (Table 2-14). Four of the 18 projects were found to be either already funded or duplicative of other initiatives. One project was determined to be outside the current geographic scope being considered by the AL TIG. Further research indicated that two projects did not directly address oyster restoration. The remaining projects considered at Step 2 all met the TIG's goal of promoting effective stewardship of oyster resources. Therefore, further screening of these projects focused on their potential contributions to the AL TIG's other two oyster restoration goals: (1) making direct contributions to solving long-term oyster survivorship problems in Alabama coastal waters, or (2) playing an important role in filling major scientific data gaps for oysters. In the TIG's judgment, the results of the Step 2 screening suggest 11 of the original 26 projects did not best meet its goals of solving long term survivorship problems or filling major scientific data gaps.

During the more detailed Step 3 evaluation and refinement of oyster restoration projects, based on input from the ADCNR Marine Resources Division (AMRD), the AL TIG added one additional project to fill a critical data gap—a side-scan effort to map relic oyster reefs in Mobile Bay. The Step 3 project development and evaluation by the AL TIG determined that overlap existed across the remaining eight projects and that three projects could be considered duplicative (Table 2-15). In addition, one of the eight projects involved data collection activities that, upon further evaluation, were not essential to filling key data gaps.

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Table 2-14: Oyster Projects Not Carried Forward from Step 2 to Step 3 Analysis

Oyster Projects Not Carried Forward from Step 2 to Step 3 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Half-Shell High School: Oyster Restoration in the Mississippi Sound	77	Julian Stewart Alma Bryant High School/South Mobile County Education Foundation	$478,000	This project is largely duplicative and is being merged with Project No. 83, which is carried forward for further evaluation in Step 3.
Sustaining Alabama's Working Waterfront through Oyster Aquaculture	5105	Bill Walton	$12,500,000	This project is more directly supporting commercial oystering activities than ecological restoration and would not fill critical data gaps.
Sustainable Gulf Coast Oyster Restoration and Coastal Protection using Central Oyster Hatcheries and Gulf State Remote Setting Sites	154	LaDon Swann/Mississippi-Alabama Sea Grant Consortium	$132,000,000	This project is outside the current geographic scope being considered by the AL TIG.
100-1000: Restore Coastal Alabama	56	Judy Haner/TNC	$150,000,000	This project is not specific to oysters. In addition, it is duplicative as there are specific projects under this umbrella program that have already been implemented.
100:1000 Restore Coastal Alabama	888	Mark Spalding/TNC	Unknown	This project is not specific to oysters. In addition, it is duplicative as there are specific projects under this umbrella program that have already been implemented.
Eastern Mobile Bay and Bon Secour Bay Coastal Resiliency and Habitat Restoration	894	Judy Haner/TNC	$16,500,000	This is a living shoreline project and does not best meet the AL TIG's goals of directly enhancing survivorship or filling critical data gaps.
Western Mobile Bay and Portersville Bay Coastal Resiliency and Habitat Restoration	893	Judy Haner/TNC	$15,000,000	This is a living shoreline project and does not best meet the AL TIG's goals of directly enhancing survivorship or filling critical data gaps.
Grand Bay Coastal Resiliency and Habitat Restoration	892	Judy Haner/TNC	$7,500,000	This is a living shoreline project and does not best meet the AL TIG's goals of directly enhancing survivorship or filling critical data gaps.
Swift Tract Coastal Resiliency and Habitat Restoration	11744	Judy Haner/TNC	$5,250,000	This is a living shoreline project and does not best meet the AL TIG's goals of directly enhancing survivorship or filling critical data gaps.
Oyster Reef Rebuilding in Grand Bay—Priority 1	11486	Organized Seafood Association of Alabama	Unknown	This project does not best meet the AL TIG's goals of directly enhancing survivorship or filling critical data gaps.
Oyster Reef Rebuilding Off East and West of Cedar Point—Priority 5	11493	Organized Seafood Association of Alabama	Unknown	This project does not best meet the AL TIG's goals of directly enhancing survivorship or filling critical data gaps.
Oyster Reef Rebuilding in Bon Secour Bay (in the Eastern Part of Mobile Bay)—Priority 6	11492	Organized Seafood Association of Alabama	Unknown	This project does not best meet the AL TIG's goals of directly enhancing survivorship or filling critical data gaps.
Oyster Reef Rebuilding off North and South of the Mouth of East and West East Fowl River—Priority 4	11491	Organized Seafood Association of Alabama	Unknown	This project does not best meet the AL TIG's goals of directly enhancing survivorship or filling critical data gaps.
Oyster Reef Rebuilding in East and West Heron Bay—Priority 3	11490	Organized Seafood Association of Alabama	Unknown	This project does not best meet the AL TIG's goals of directly enhancing survivorship or filling critical data gaps.
Oyster Reef Rebuilding in Portersville Bay Outside the Mouth of West Fowl River—Priority 2	11488	Organized Seafood Association of Alabama	Unknown	This project does not best meet the AL TIG's goals of directly enhancing survivorship or filling critical data gaps.

Oyster Projects Not Carried Forward from Step 2 to Step 3 Analysis	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
South Shoreline of Dauphin Island	11500	Al Howes	Unknown	Further research indicates that this is a bird project that was incorrectly categorized as an oyster project in Step 1.
Alabama Oyster Shell Recycling Program	5098	Judy Haner/TNC	$6,400,000	This project has already received funding.
Upgrades to the Marine Science Hall	11484	George Crozier	$3,000,000	Further research indicates that this project was incorrectly categorized as an oyster project in Step 1.

Table 2-15: Oyster Projects Not Carried Forward From Step 3 to Reasonable Range of Alternatives

Oyster Projects Not Carried Forward From Step 3 to Reasonable Range of Alternatives	Project ID	Individual/Organization	Project Cost	Rationale for Not Carrying Forward
Using Off-Bottom Oyster Farming to Restore Alabama Oyster Reefs	203	Ernie Anderson/Organized Seafood Association of Alabama	$4,326,631	This project is more directly supporting commercial oystering activities than ecological restoration.
Enhancing Oyster Restoration Efforts in Coastal Alabama	144	Ernie Anderson/Organized Seafood Association of Alabama	$2,500,000	This project is more directly supporting commercial oystering activities than ecological restoration.
Enhancing Oyster Reef Restoration in Coastal Alabama: Oyster Farming as a Restoration Multiplier	5105	Bill Walton	$13,000,000	The hatchery component of this project supports the goals of the AL TIG but is duplicative of efforts in Project No. 108, a modification of which is carried forward to the reasonable range of alternatives.
An Evaluation of the Eastern oyster (Crassostrea virginica) as a Biological Surrogate for Aquatic Ecological Health of Alabama Estuaries: Relations to Hydrological, Chemical, and Physical Variables	12848	Billy Justus	$725,000	This research does not fill a critical knowledge gap for the AL TIG at this time.

Based on the Step 3 screening and further refinement of the project options, the AL TIG selected five Oysters restoration projects for inclusion in the reasonable range of alternatives.

- Oyster Cultch Relief and Reef Configuration
- Side-Scan Mapping of Mobile Bay Relic Oyster Reefs
- Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study Option
- Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study
- Oyster Grow-Out Restoration Reef Placement

Each of these projects would contribute to a functionally different aspect of an integrated solution to increase oyster survivorship in Alabama.

2.4.9 Screening Approach Summary

Implementation of the AL TIG's screening methodology provides a rigorous and comprehensive approach to identifying a reasonable range of alternatives for this RP II/EA. The process yielded 26 projects for more detailed OPA and NEPA analysis across 7 Restoration Types. The remainder of this chapter includes detailed descriptions of these projects organized by Restoration Type.

2.5 ALTERNATIVES NOT CONSIDERED FOR FURTHER EVALUATION IN THIS PLAN

Using the screening steps outlined above, the AL TIG identified a number of submitted projects that included activities that could benefit Wetlands, Coastal, and Nearshore Habitats; Habitat Projects on Federally Managed Lands; Nutrient Reduction (Nonpoint Source); Sea Turtles; Marine Mammals; Birds; and Oysters. Using these projects, the AL TIG developed project screening described in this chapter that resulted in the AL TIG developing the reasonable range of alternatives considered for this draft RP II/EA using these projects. The remaining projects that the AL TIG identified that have restoration potential, but are not selected for inclusion in the reasonable range of alternatives for this plan, may be evaluated and potentially selected in a future restoration plan. However, these projects are not considered for further evaluation under OPA or NEPA in this plan.

2.6 REASONABLE RANGE OF RESTORATION ALTERNATIVES CONSIDERED

Using the process described above, the AL TIG developed a reasonable range of alternatives for further consideration and evaluation under OPA and NEPA. The projects included in the reasonable range of alternatives for the Restoration Types selected for this plan are discussed in the following sections. The location of each of the projects considered in the reasonable range of alternatives in this draft RP II/EA is shown above in Figure 1-1.

As noted in Section 1.3.2, within the range of projects considered across Restoration Types, some projects only include preliminary planning or E&D activities. These projects are noted below and are evaluated in Chapter 3, OPA Evaluation of Restoration Alternatives; Chapter 5, NEPA Environmental Consequences—General Approach to Impact Analysis; and Chapter 6 NEPA Analysis—Engineering and Design Only. Environmental consequences related to E&D activities are evaluated in Section 6.4.14 of the Final PDARP/PEIS, from which this document is tiered. Therefore, the AL TIG's evaluation focuses on confirming that the environmental consequences of these projects fall within the scope of those evaluated in the Final PDARP/PEIS.

The remaining alternatives are evaluated in Chapters 3, 4, and 7–13 under both OPA (Chapter 3) and NEPA (Chapters 4 and 7–13). Detailed discussions of how the projects meet the Final PDARP/PEIS goals are included in Chapter 3. All projects evaluated in this draft RP II/EA have been designed with resiliency and sustainability in mind, in recognition of the dynamic coastal environment of Alabama. For those projects that include implementation activities, a MAM plan has been developed and is included in Appendix G.

2.6.1 Wetlands, Coastal, and Nearshore Habitats

Project screening in the Wetlands, Coastal, and Nearshore Habitats Restoration Type identified six Wetlands, Coastal, and Nearshore Habitats projects and a no action/natural recovery alternative for the reasonable range of alternatives. Table 2-16 presents the six projects and their estimated cost.

Table 2-16: Reasonable Range of Alternatives for the Wetlands, Coastal, and Nearshore Habitats Restoration Type

Reasonable Range of Alternatives	Project Cost
No Action/Natural Recovery	
Perdido River Land Acquisition (Molpus Tract)	$4,324,460
Magnolia River Land Acquisition (Holmes Tract)	$4,144,162
Weeks Bay Land Acquisition (East Gateway Tract)	$4,247,000
Weeks Bay Land Acquisition (Harrod Tract)	$3,606,900
Lower Perdido Islands Restoration Phase I (E&D)	$994,523
Southwestern Coffee Island Habitat Restoration Project—Phase I (E&D) (shared costs with Birds Restoration Type)	$825,225

2.6.1.1 No Action/Natural Recovery

As required by OPA regulations, the Final PDARP/PEIS considered a "… natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (15 CFR 990.53(b)(2)). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of injured natural resources or to compensate for lost services. The 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. Although injured resources could presumably recover to at or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, and tiering this draft RP II/EA from the Final PDARP/PEIS and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery for the Wetlands, Coastal, and Nearshore Habitats Restoration Type as a viable alternative under OPA, and natural recovery is not considered further in this draft RP II/EA. Because NEPA requires consideration of a no action alternative as a basis for comparison of potential environmental consequences of the action alternatives(s), a no action alternative is evaluated in that sense within this EA. This analysis presents the conditions that would result if the AL TIG did not select to undertake any additional restoration for injured natural resources or to compensate for lost services at this time. The environmental consequences of such an alternative are evaluated in Chapter 7 for comparison with the remaining action alternatives.

2.6.1.2 Perdido River Land Acquisition (Molpus Tract)

Project Summary/Background. The proposed Perdido River Land Acquisition (Molpus Tract) project would acquire 1,391 acres of coastal habitat on the Perdido River (Figure 2-1). Once acquired, ADCNR would own and manage the land as part of Perdido Wildlife Management Area. The Molpus Tract covers approximately 4 miles of riverfront on the Perdido River and is immediately south of and contiguous with the Perdido Wildlife Management Area. The tract is palustrine-forested wetlands containing cypress and Atlantic white cedar trees. The uplands are dominated by mixed slash and loblolly pine. Of the 1,391 acres proposed for purchase, approximately 686 acres are upland and 705 acres are wetland. ADCNR would be the implementing Trustee for this project.

Construction Methodology (or Implementation Methodology) and Timing. The property would be purchased at or below the Yellow Book appraised value. No construction is currently proposed, although future passive recreational opportunities and infrastructure may be considered in the development of the long-term management plan, particularly integration of the site into existing plans for a Perdido River “blueway trail” that would provide canoe and kayak camping opportunities along the river.

The acquisition of this property would include an appropriate land protection instrument (i.e., deed restriction or conservation easement) to ensure that the purpose of restoration, as described in this plan, is maintained in perpetuity. Clearing and prescribed burns would occur to facilitate hydrologic restoration, returning the appropriate acreage to long-leaf pine over time. Due diligence and land acquisition would take approximately 6 months to 1 year.

Maintenance Requirements. The property would be managed as part of the Perdido WMA. Periodic maintenance would occur in the form of infrastructure maintenance and trash collection, as needed. Future passive recreational opportunities and infrastructure may include canoe and kayak camping opportunities along the river. ADCNR would be responsible for maintenance.

Project Monitoring Summary. A MAM plan was not developed for this alternative because it was not selected as a preferred alternative in this draft RP II/EA.

Costs. Estimated project cost is $4,324,460 and would include funds for planning and design, construction, monitoring, operations and maintenance, and Trustee oversight.

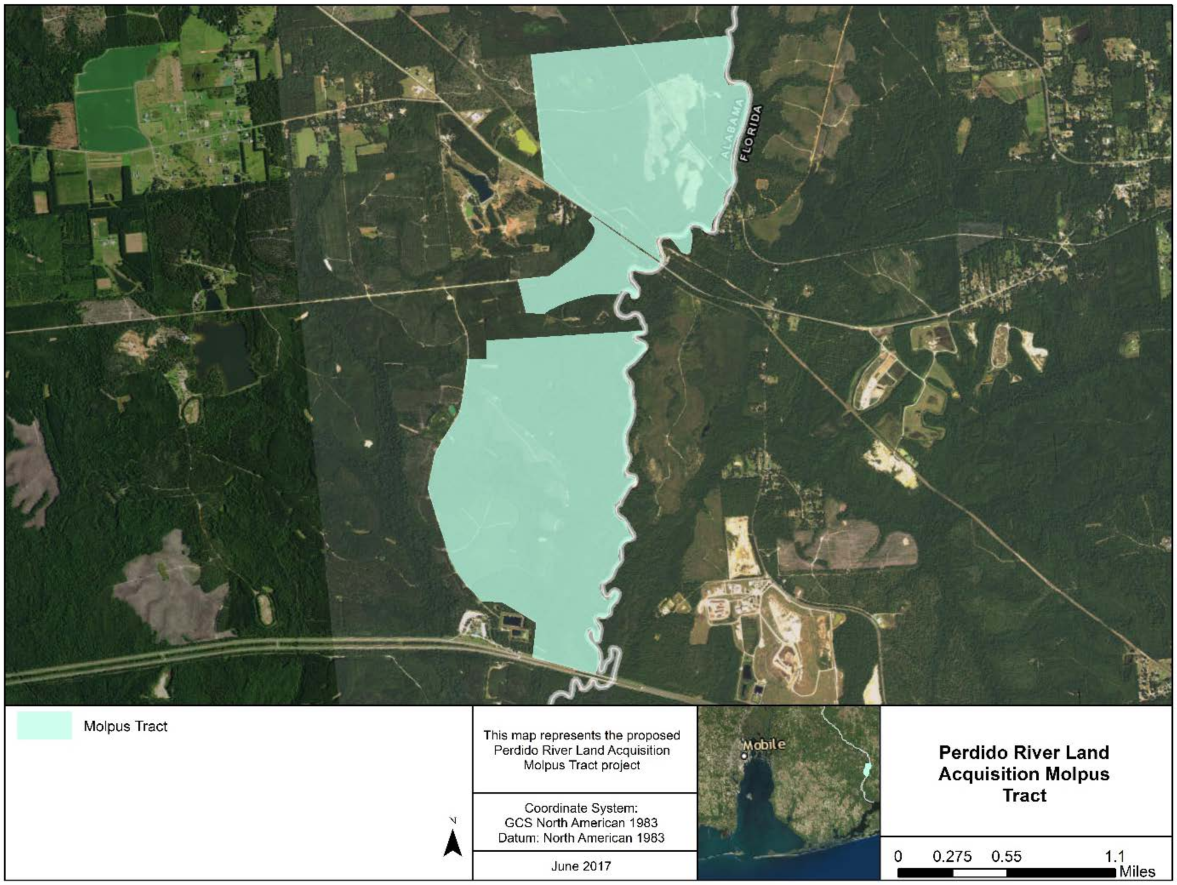


Figure 2-1: Location of the Perdido River Land Acquisition (Molpus Tract) Alternative

2.6.1.3 Magnolia River Land Acquisition (Holmes Tract)

Project Summary/Background. The proposed Magnolia River Land Acquisition project would fund the Weeks Bay Foundation (WBF) to acquire the 80-acre Holmes Tract through a fee simple purchase and transfer it into the permanent ownership of ADCNR with management by the Weeks Bay National Estuarine Research Reserve (Weeks Bay NERR). The Holmes Tract is located in Baldwin County off Keith Lane along the Magnolia River (PIN 287940, 65806, and portion of 20643) and includes about 80 acres (Figure 2-2). The property is one of the largest undeveloped tracts on Magnolia River that has not recently been timbered. It contains more than 1 mile of frontage on Magnolia River and Weeks Creek, including a perimeter of salt marsh and forested wetland fringe. WBF would protect the property in perpetuity using an appropriate land protection instrument (i.e., deed restriction or conservation easement) and address restoration needs to ensure that it provides the best habitat for native and endemic species. Restoration activities proposed for the Holmes Tract could include invasive species control (prescribed fire or other methods), native vegetation planting, and limited erosion control measures. This project would be accomplished with support from the town of Magnolia Springs and Weeks Bay NERR. ADCNR would be the implementing Trustee for this project.

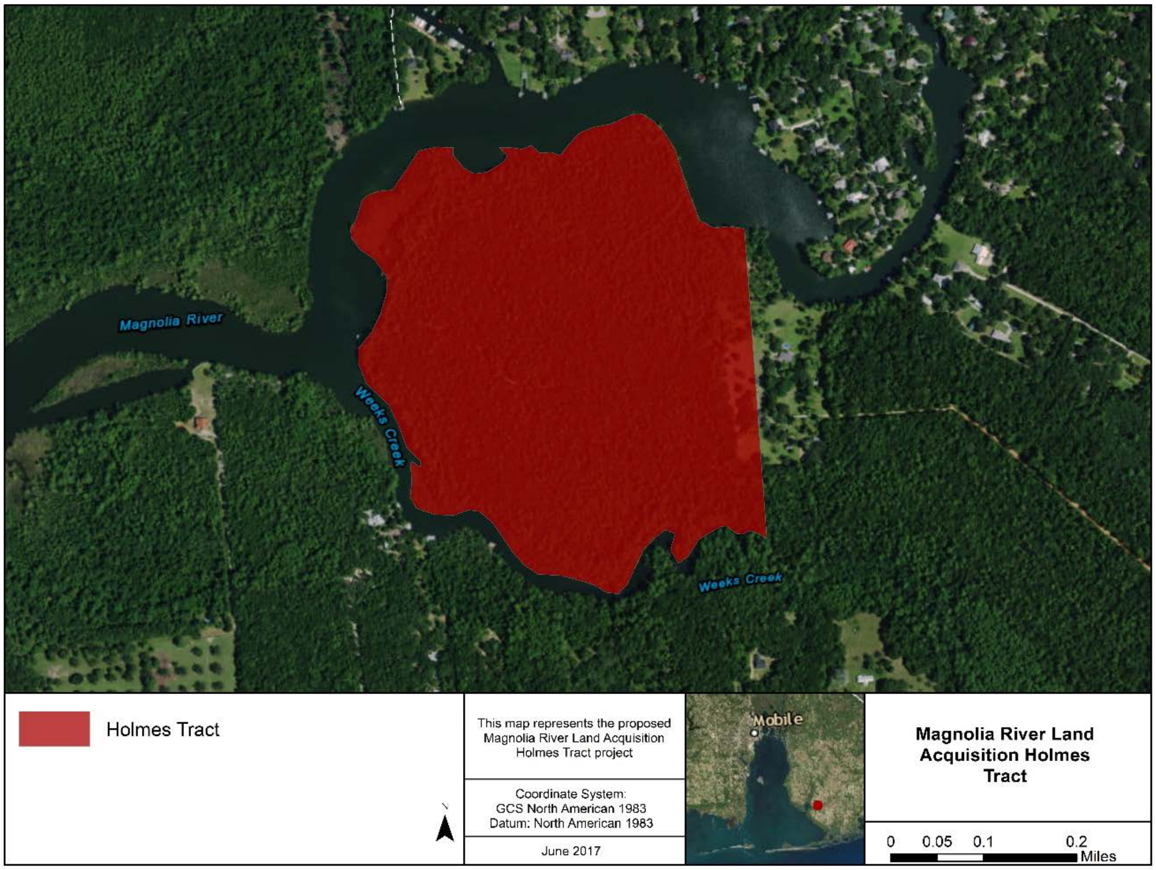


Figure 2-2: Project Location of the Magnolia River Land Acquisition (Holmes Tract) Alternative

Construction Methodology (or Implementation Methodology) and Timing. WBF would purchase the property through a willing seller at or below the Yellow Book appraised value and transfer it into the permanent ownership of ADCNR, with management by the Weeks Bay NERR. The acquisition of this property would include an appropriate land protection instrument (i.e., deed restriction or conservation easement placed on the property) to ensure that the purpose of restoration as described in this plan is maintained in perpetuity. In addition, WBF would work with Weeks Bay NERR to create a management plan and prioritize restoration needs, including re-creating longleaf pine savannas, pitcher plant bogs, and marsh and swamp habitat (where appropriate). Due diligence and acquisition would take approximately 6 months to 1 year to complete. Development of a restoration plan and associated restoration activities would be conducted over a 3-year period.

Maintenance Requirements. ADCNR would hold title to the property. Weeks Bay NERR would manage the restoration and future maintenance.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. Estimated project cost is $4,144,162 and would include funds for implementation, monitoring, and Trustee oversight.

2.6.1.4 Weeks Bay Land Acquisition (East Gateway Tract)

Project Summary/Background. The proposed Weeks Bay Land Acquisition (East Gateway Tract) project would fund the WBF to acquire the 175-acre East Gateway Tract through a fee simple purchase and transfer it into the permanent ownership of ADCNR with management by the Weeks Bay NERR. The East Gateway Tract is located in Baldwin County at the mouth of Weeks Bay and contains approximately 175 undeveloped acres (Figure 2-3). The project would protect the eastern shore of the mouth of Weeks Bay where a large salt marsh with an unnamed stream provides protected habitat and shelter for wading birds, duck species, and various indigenous marine life. This property contains more than 100 acres of wetlands, including estuarine intertidal marsh and freshwater forested wetlands. The bay front edge of the property is a popular place for anglers to anchor and fish for speckled trout and redfish. ADCNR would be the implementing Trustee for this project.

Construction Methodology (or Implementation Methodology) and Timing. The tract includes more than 100 acres of intertidal marsh and freshwater wetlands. WBF would purchase the property from a willing seller at or below the Yellow Book appraised value. The acquisition of this property would include an appropriate land protection instrument (i.e., deed restriction or conservation easement) to ensure that the purpose of restoration as described in this plan is maintained in perpetuity. WBF would work with Weeks Bay NERR to create a management plan and prioritize restoration needs, including re-creating longleaf pine savannas, pitcher plant bogs, and marsh and swamp habitat (where appropriate). This project would also include E&D for the removal of a bulkhead on the waterfront point of the property that splits Weeks Bay and Mobile Bay. The bulkhead is contributing to shoreline scouring and erosion. A shoreline restoration plan would be developed as part of the bulkhead removal E&D.

The total project time frame is 4 years. Due diligence and land acquisition would take approximately 6 months to complete. Development of a shoreline restoration plan would take approximately 1 year to complete. Design and engineering of the bulkhead removal on the point would take approximately 18 months to complete following completion of the plan.

Maintenance Requirements. ADCNR would hold title to the property. Weeks Bay NERR would manage the restoration and future maintenance.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. Estimated project cost is $4,247,000 and would include funds for implementation, monitoring, and Trustee oversight.

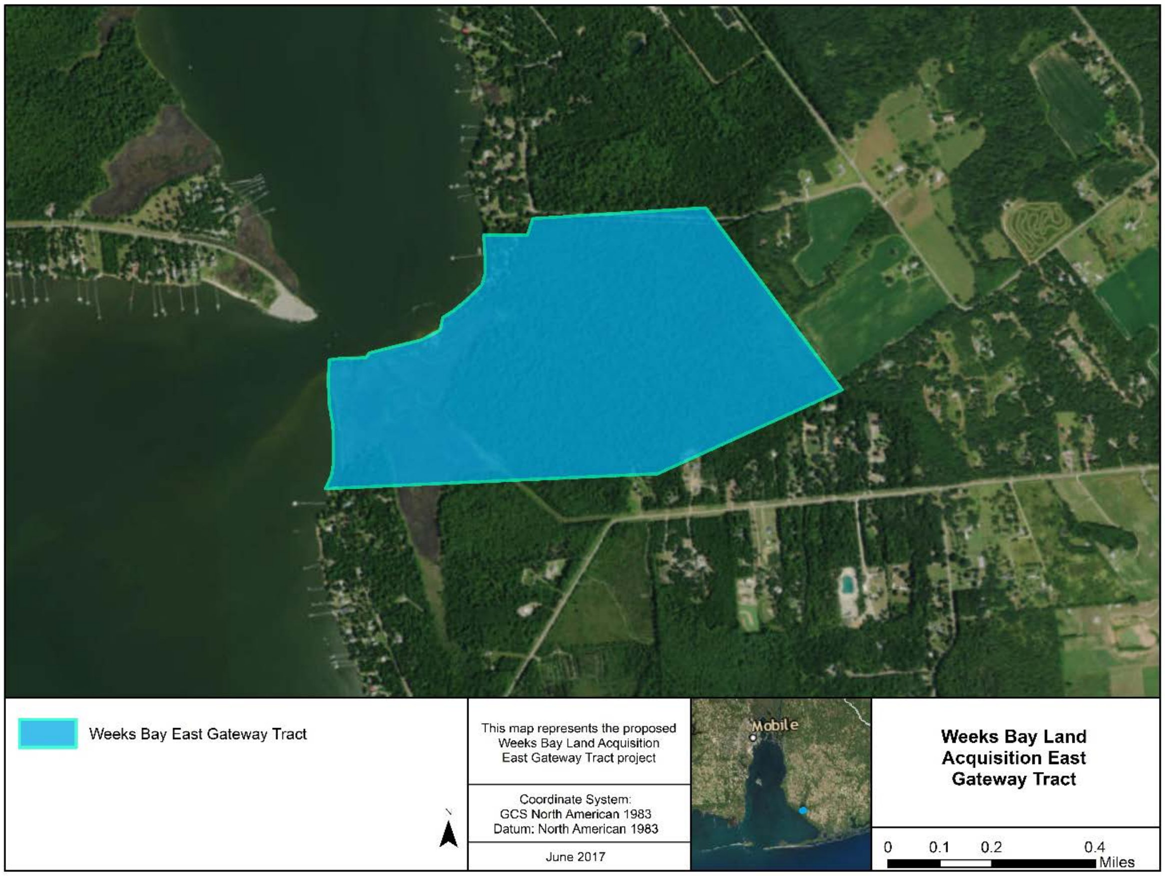


Figure 2-3: Project Location of the Weeks Bay Land Acquisition (East Gateway Tract) Alternative

2.6.1.5 Weeks Bay Land Acquisition (Harrod Tract)

Project Summary/Background. The proposed Weeks Bay Land Acquisition (Harrod Tract) project would fund WBF or the State of Alabama to acquire the 231-acre Harrod Tract through a fee simple purchase, and transfer it into the permanent ownership of ADCNR with management by the Weeks Bay NERR. The Weeks Bay Land Acquisition (Harrod Tract) project would protect approximately 231 acres in perpetuity to maintain its conservation value. The Harrod Tract is located in Baldwin County, Alabama, off Sherwood Highland Road (PIN 065600). The property is one of the largest remaining undeveloped parcels of cypress and gum swamp, marsh, and river shoreline in coastal Alabama and is the largest privately owned tract on the lower Fish River(Figure 2-4). Located adjacent to protected wetlands, it includes 7,600 feet of Fish River shoreline, as well as frontage along Turkey Branch and Waterhole Branch, two of Fish River's primary tributaries. Multiple smaller bayous (artificially constructed lakes) are also present on the property. The wetlands are composed of fringing salt marsh transitioning into hardwood cypress and gum swamp. The extensive marsh edge provides valuable nursery habitat for a host of estuarine organisms, including shrimp, crabs, and fish. Hundreds of species of migratory birds use the habitat, while more than a dozen resident species of shorebirds are found at the edges and within the property, along with a representative array of local wetland flora and fauna. The 231-acre property includes more than 100 acres of intact wetlands habitat. ADCNR would be the implementing Trustee for this project.

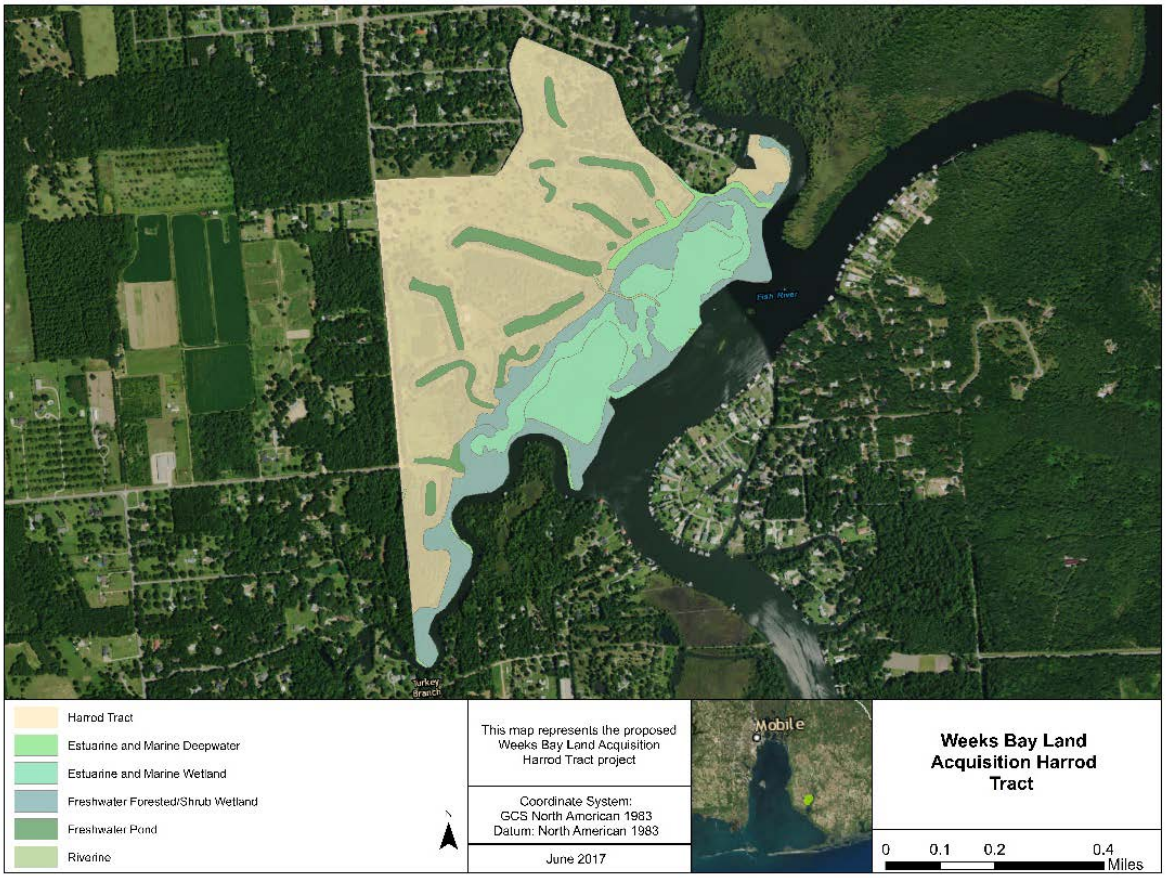


Figure 2-4: Project Location of the Weeks Bay Land Acquisition (Harrod Tract) Alternative

Construction Methodology (or Implementation Methodology) and Timing. A restoration plan would be developed, and associated restoration activities would be conducted on the purchased property, which could include invasive species control (prescribed burning or other methods), native vegetation planting, and limited erosion control measures. WBF would purchase the property through a willing seller at or below the Yellow Book appraised value; as an accredited land trust, WBF would maintain the conservation value of the property and prohibit any future development. The acquisition of this property would include an appropriate land protection instrument (i.e., deed restriction or conservation easement) to ensure that the purpose of restoration as described in this plan is maintained in perpetuity. Acquisition would take approximately 6 months to complete. Restoration activities would be conducted over a 3-year period following acquisition. A MAM plan would be developed and implemented as part of this project.

Maintenance Requirements. ADCNR would hold title to the property. Weeks Bay NERR would manage the restoration and future maintenance.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. Estimated project cost is $3,606,900 and would include funds for implementation, monitoring, and Trustee oversight.

2.6.1.6 Lower Perdido Islands Restoration Phase I (E&D)

Project Summary/Background. In recent decades, the valuable habitats on the Perdido Islands complex have experienced sustained erosion and other ecological injuries resulting from storms, intense boat traffic in nearshore waters, and shoreline and upland recreational use. The Lower Perdido Islands Restoration Phase I project would fund The Nature Conservancy (TNC) to develop a proactive and unified strategy for protecting the ecological functions of the Perdido Islands complex while allowing for passive public recreation. The project area includes several islands at the intersections of Bayou Saint John, Terry Cove, Cotton Bayou, and Perdido Pass, all in proximity to Orange Beach, Alabama, within the lower Perdido River and Bay watershed. The total project area encompasses approximately 420 acres and includes Robinson Island (11 acres), Bird Island (15 acres), Walker Island (7 acres), Gilchrest Island (2 acres), Boggy Point (7 acres), and the surrounding estuarine and marine environment (Figure 2-5). The remaining portion of the project area includes open water and a variety of wetland types. Robinson and Walker Islands are owned by the City of Orange Beach. Bird Island is owned by the State of Alabama, and Robinson, Walker and Bird islands are all managed and maintained by the City of Orange Beach. Boggy Point is owned and maintained by the City of Orange Beach. The uplands of Gilchrest Island are privately owned and are not included in this scope. ADCNR, USDOI, and NOAA would work collaboratively on this project; however, the implementing Trustee has not yet been identified.

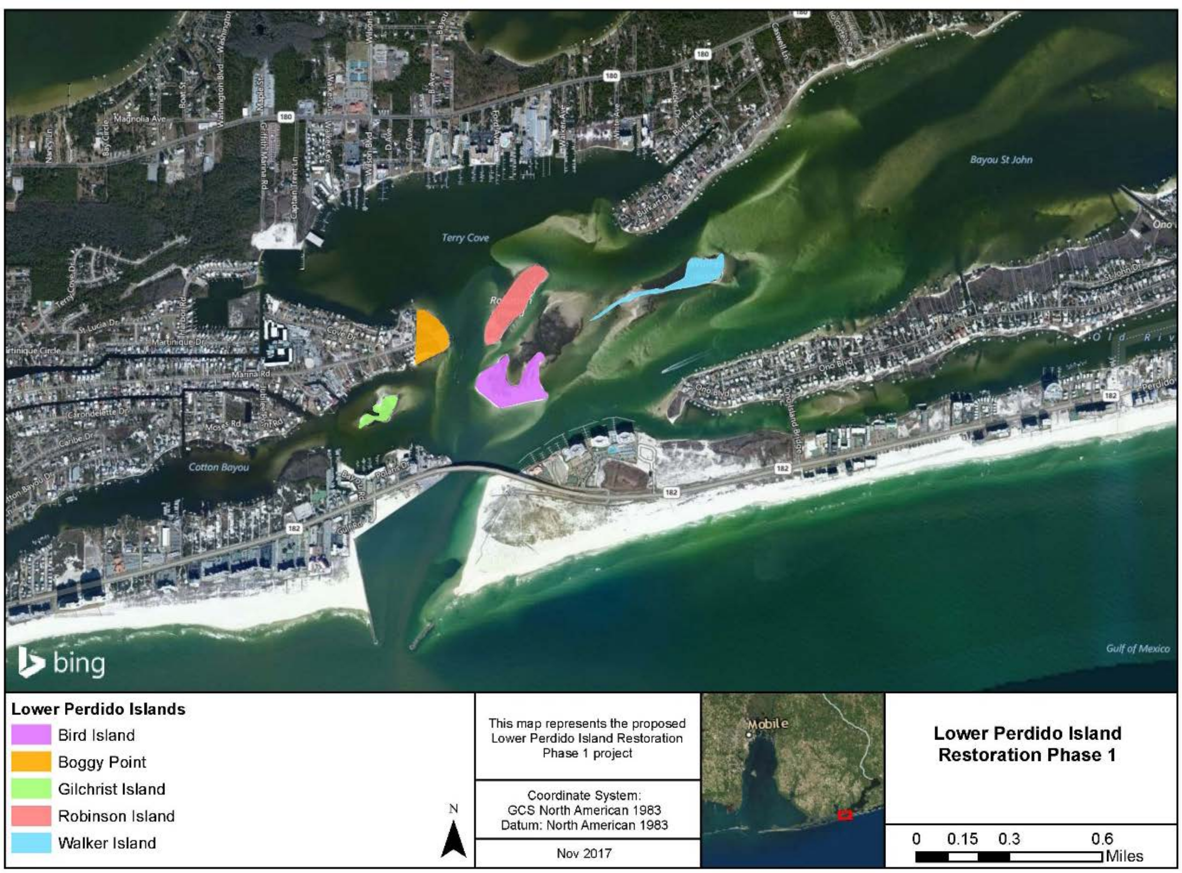


Figure 2-5: Project Location of the Lower Perdido Islands Restoration Phase I Alternative

Construction Methodology (or Implementation Methodology) and Timing. For this phase (Phase I) of the Lower Perdido Islands Restoration project, TNC would develop a conservation management plan to evaluate the most appropriate methods for minimizing adverse impacts on sensitive habitats and conduct a sediment modeling study to provide information on erosion that would inform future habitat restoration activities on the islands. Project elements would include identifying and describing the issues (such as erosion) and evaluating and recommending shoreline protection and restoration, SAV protection, and dune habitat protection strategies. Specific activities likely would include a habitat survey, baseline monitoring, recreational use monitoring/behavioral observations, preliminary permit and compliance investigations, stakeholder coordination, and identification of factors that may assist in restoration and improved conservation. Other interim habitat enhancement activities associated with the project would include the installation of signage on the islands alerting visitors to nesting bird habitat, tree plantings for bird nesting habitat, and marine debris monitoring. Aside from marine debris monitoring, which the City of Orange Beach would implement through its regular program, these activities would be implemented by TNC in close coordination with the City of Orange Beach.

This Phase I project is expected to take approximately 18 months to complete, including the development of a conservation management plan, sediment modeling study, and interim habitat enhancement activities. Baseline monitoring data would be collected as part of Phase I. Recommendations for future monitoring would be provided in Phase I; however, fully developed monitoring plans for specific projects would be developed during Phase II. Future activities as part of a Phase II or III may include one or more of the following: restoring eroded shoreline on Robinson Island or other islands, dredging materials from Terry Cove or other source areas as identified in the conservation management plan, restoring and/or enhancing emergent marsh, reestablishing native island upland vegetation on Robinson, Gilchrest, and Walker Islands for nesting wading birds; and installing a breakwater system.

Maintenance Requirements. The project includes mainly E&D; however, signage and tree plantings would be maintained by the City of Orange Beach.

Project Monitoring Summary. This project only addresses E&D, no MAM plan is required at this time.

Costs. The cost estimate for Phase I is $994,523, with feasibility Studies totaling $750,000, interim implementation activities (non-construction) accounting for $69,120 and oversight totaling $84,992, with contingency funds provided at a 10 percent rate.

2.6.1.7 Southwestern Coffee Island Habitat Restoration Project—Phase I (E&D)

Project Summary/Background. This project would support planning activities related to the restoration and creation of colonial nesting bird breeding habitat and tidal wetlands along the southwestern shoreline of Coffee Island, located in Mississippi Sound in south Mobile County, Alabama (Figure 2-6). Phase 1 proposes funding for two tasks—(1) a synthesis of colonial wading bird and shorebird nesting data in coastal Alabama, and (2) E&D and permitting for the restoration of habitat on Coffee Island to evaluate whether the project should be considered for further development in a later plan. The project site where E&D activities would occur is a state-owned island (managed by ADCNR) located in the Portersville Bay section of eastern Mississippi Sound. The island currently supports a small (approximately 1.0 acre) breeding colony of wading birds, including snowy egrets, tricolor herons, little blue herons, cattle egrets, white ibis, and similar colonial nesting wading bird species. Isle Aux Herbes is designated critical habitat for the federally threated wintering piping plover wherever primary constituent elements such as intertidal beaches, mudflats, and overwash habitat exist. Additionally, adjacent to the colony, a small shelly beach (approximately 0.50 acre) provides nesting habitat for shorebirds such as black skimmers and American oystercatchers. Funding would be supported by allocations from two Restoration Types: Wetlands, Coastal, and Nearshore Habitats and Birds. ADCNR would be the implementing Trustee for this project. While the project's overall goal is to benefit birds, not all design features would or must benefit birds. The appropriate allocation of financial resources from Restoration Type (Wetlands, Coastal, and Nearshore Habitats or Birds) would be mutually determined and approved by the Trustees for any future implementation of this project.

Figure 2.6: Southwestern Coffee Island Habitat Restoration Project-Phase I (E&D) Location

Construction Methodology (or Implementation Methodology) and Timing. This project includes E&D and analysis activities resulting from field studies, biological assessments, data synthesis, modeling, sediment source investigations, development of drawings and construction plans, and construction cost estimates as well as obtaining required permits. The project consists of two components. First, all colonial nesting bird habitat data in coastal Alabama would be compiled and analyzed, resulting in a Colonial Nesting Birds Data Synthesis and Assessment. Findings from this assessment are expected to determine whether nesting habitat is a limiting resource for colonial wading birds and if this project would be designed to restore wetlands and/or bird nesting habitat. The second component would include conducting engineering, design, and regulatory compliance for the proposed restoration of wetlands and bird nesting habitats along the southwestern shoreline of Coffee Island. Final conceptual plans for the project may be driven by the findings of the Colonial Nesting Birds Data Synthesis and Assessment described above.

ADCNR would be the implementing Trustee for this project. ADCNR and USDOI would work closely in the planning process for the project. Information from the Southwestern Coffee Island Habitat Restoration Project would assist the Trustees in identifying construction design features for future restoration that are expected to benefit target bird species.

Planning, site investigations, data synthesis, and E&D would take approximately 12 to 18 months. Permitting would take 6 to 9 months, running concurrently with E&D.

Maintenance Requirements. The project only includes E&D; therefore, there are no operation or maintenance requirements.

Project Monitoring Summary. This project only addresses E&D; no MAM plan is required at this time.

Costs. The cost estimate for Phase I is $1,650,449. This project would help restore both Wetlands, Coastal, and Nearshore Habitats and Birds. The AL TIG therefore proposes to allocate $825,225 from the Wetlands, Coastal, and Nearshore Habitats Restoration Type and the remainder ($825,225) from the Birds Restoration Type.

2.6.2 Habitat Projects on Federally Managed Lands

Project screening in the Habitat Projects on Federally Managed Lands Restoration Type identified two projects as well as a no action alternative for the reasonable range of alternatives. Table 2-17 presents the two projects and their anticipated costs.

Table 2-17: Reasonable Range of Alternatives for the Habitat Projects on Federally Managed Lands Restoration Type

Reasonable Range of Alternatives	Project Cost
No Action/Natural Recovery	
Little Lagoon Living Shoreline	$210,999
Restoring the Night Sky—Assessment, Training, and Outreach (E&D) (Shared costs with MAM)	$183,003

2.6.2.1 No Action/Natural Recovery

As required by OPA regulations, the Final PDARP/PEIS considered a "… natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (15 CFR 990.53(b)(2)). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of injured natural resources or to compensate for lost services. The 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. Although injured resources could presumably recover to at or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, and tiering this draft RP II/EA from the Final PDARP/PEIS and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery for the Habitat on Federally Managed Lands Restoration Type as a viable alternative under OPA, and natural recovery is not considered further in this draft RP II/EA. Because NEPA requires consideration of a no action alternative as a basis for comparison of potential environmental consequences of the action alternatives(s), a no action alternative is evaluated in that sense within this draft RP II/EA. This analysis presents the conditions that would result if the AL TIG did not select to undertake any additional restoration for injured natural resources or to compensate for lost services at this time. The environmental consequences of such an alternative are evaluated in Chapter 8 for comparison with the remaining action alternatives.

2.6.2.2 Little Lagoon Living Shoreline

Project Summary/Background. The Little Lagoon Living Shoreline project aims to restore a minimum of 2,200 feet of shoreline of Little Lagoon, on BSNWR, west of Gulf Shores, Alabama (Figure 2-7). Little Lagoon is a shallow body of brackish water, 10 miles long and 0.5 mile wide, and the targeted length of shoreline is actively eroding, threatening the adjacent Pine Beach Road. Construction of a living shoreline would protect habitat on adjacent federal land by buffering the shoreline against erosion. The project would include planning, implementation, and monitoring of a living shoreline project that uses natural materials rather than hardened structures or barriers, strategically placed to provide protective erosion control management to restore natural habitat, functions, and processes. USDOI would be the implementing Trustee for this project.

Figure 2-7: Project Location of the Little Lagoon Living Shoreline Alternative

Construction Methodology (and Implementation Methodology) and Timing. The Little Lagoon Preservation Society, Friends of BSNWR, and BSNWR would collaborate on implementation. USDOI would contract a qualified professional with living shoreline expertise to evaluate, plan, and implement the project. Depth surveys and measurements for project design such as wave energy would be provided in a desk top analysis. In general, one or two rows of biodegradable coconut fiber “coir” logs may then be placed along the eroding shoreline to stabilize vegetation and attenuate wave action, and grass plantings (e.g., *Spartan alterniflora* or *Juncus roemerianus*) may be placed between the logs and the eroded shoreline to jump start a vegetated buffer. Native mussels may also be seeded among the shoreline grasses. The specific restoration activities would be finalized during the evaluation and planning process.

Once the contract is awarded to a qualified professional, planning, permitting, and project implementation should occur within approximately 10 to 12 months. Following installation, the monitoring surveys would be performed quarterly for 3 years by BSNWR staff or other designated individuals to evaluate erosion and vegetation recovery.

Maintenance Requirements. Periodic maintenance may be necessary following severe weather events or other situations that would affect the project or cause further erosion. This would be provided by the Little Lagoon Preservation Society volunteers or others as delegated by the implementing Trustee.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. Estimated project cost is $210,999. Funds would support planning and design, implementation, monitoring, and Trustee oversight.

2.6.2.3 Restoring the Night Sky—Assessment, Training, and Outreach (E&D)

Project Summary/Background. Past lighting assessments and documented sea turtle disorientations along the Alabama coast suggest that anthropogenic light pollution negatively affects Alabama's natural resources. The long-term goal of the Restoring the Night Sky—Assessment, Training, and Outreach (E&D) project is to reduce the impacts of light pollution on federally managed lands that disorients nesting sea turtles and hatchlings, disrupting their reproductive activities and reducing their reproductive success. The project would produce an Alabama coast-wide analysis of the impacts of light pollution on federally managed lands and nearshore waters in Baldwin and Mobile counties in Alabama, helping to guide future work to mitigate this issue. Specifically, the project would help restore coastal habitats at BSNWR injured by the DWH oil spill by producing an inventory of artificial light sources that affect the refuge. This project has three primary objectives: (1) use remote sensing and NPS data products to identify locations that disproportionately contribute to light pollution on the Alabama coast; (2) produce a detailed strategy to mitigate the identified problematic lighting; and (3) work with local governments to improve their understanding and capacity to address lighting concerns in the future. The assessment would detail the most problematic locations across the Alabama coast with respect to impacts on coastal wildlife, evaluate the most cost-effective options to reduce light pollution in coastal Alabama, and describe the best options to elicit public participation in reducing light pollution. The project would also include pilot tests of alternative lighting systems to assess public and ecological responses to different lighting options. USDOI would be the implementing Trustee for this project. A second, future phase of the project (e.g., funded by a future AL TIG restoration plan or other funding stream) could use guidelines developed to fund upgrades to more energy-efficient and wildlife-friendly lighting techniques and materials, which would reduce the amount of light cast on natural habitats of the Alabama Gulf Coast.

Construction Methodology (and Implementation Methodology) and Timing. Funding provided by the Sea Turtles Restoration Type allocation (see Section 2.6.4.5) would help support lighting workshops and training for city code enforcement and staff, homeowners, and condominium and hotel owners in Alabama's coastal cities that wish to participate. These workshops would ensure that the technical nature of assessing and improving lighting for sea turtles is well understood by those in local government who are tasked with addressing problematic lighting. Further assistance may include developing meaningful ordinance language and reasonable solutions to any conflicts created by lighting. Once funded, USDOI would implement the project through the NPS's Natural Sounds and Night Skies

Division, which has experience working throughout the country on light pollution mitigation projects. Local assistance would be provided by USFWS. This project would be performed largely through face-to-face meetings and training, data collection in the field, and computer modeling. This project is also included under Section 2.6.4.5 as it relates to protection of sea turtles.

Maintenance Requirements. This project only includes E&D; therefore, there are no operation or maintenance requirements.

Project Monitoring Summary. This project only addressed E&D; no MAM plan is required at this time.

Costs. The overall cost of the project is $399,658. Objectives 1 and 2 ($183,003) would be funded by the Habitat Projects on Federally Managed Lands Restoration Type allocation; objective 3 ($216,655) would be funded by the MAM allocation. USDOI would implement the project through the NPS's Natural Sounds and Night Skies Division. Local assistance would be provided by USFWS.

2.6.3 Nutrient Reduction (Nonpoint Source)

Project screening in the Nutrient Reduction (Nonpoint Source) Restoration Type identified four nonpoint source nutrient reduction projects and a no action alternative for the reasonable range of alternatives. Table 2-18 presents the four projects and their anticipated costs.

Table 2-18: Reasonable Range of Alternatives for the Nutrient Reduction (Nonpoint Source) Restoration Type

Reasonable Range of Alternatives	Project Cost
No Action/Natural Recovery	
Toulmins Spring Branch E&D	$479,090
Bayou La Batre Nutrient Reduction	$1,000,000
Fowl River Nutrient Reduction	$1,000,000
Weeks Bay Nutrient Reduction	$2,000,000

Nutrient reduction would be achieved by these restoration alternatives through the implementation of conservation practices designed to help conserve soil, water, air, energy, and related plant and animal resources. Conservation practices would be implemented for the purpose of achieving nutrient and sediment reduction from agricultural and forested lands by effectively filtering nutrients and sediment from surface runoff as close to the source as possible. Site-specific planning would be conducted to determine which particular practice is appropriate to use given the site-specific conditions.

Because the projects under the Nutrient Reduction (Nonpoint Source) Restoration Type do not identify specific sites at this time, further site-specific environmental evaluation would be required prior to implementation. This site-specific evaluation is described further in Section 9.1.

2.6.3.1 No Action/Natural Recovery

As required by OPA regulations, the Final PDARP/PEIS considered a "… natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (15 CFR 990.53(b)(2)). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of injured natural resources or to compensate for lost services. The 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. Although injured resources could presumably recover to at or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, and tiering this draft RP II/EA from the Final PDARP/PEIS and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery for NR (Nonpoint Source) Restoration Type as a viable alternative under OPA, and natural recovery is not considered further in this draft RP II/EA. Because NEPA requires consideration of a no action alternative as a basis for comparison of potential environmental consequences of the action alternatives(s), a no action alternative is evaluated in that sense within this draft RP II/EA. This analysis presents the conditions that would result if the AL TIG did not select to undertake any additional restoration for injured natural resources or to compensate for lost services at this time. The environmental consequences of such an alternative are evaluated in Chapter 9 for comparison with the remaining action alternatives.

2.6.3.2 Toulmins Spring Branch Engineering and Design

Project Summary/Background. The Toulmins Spring Branch project would fund E&D for a variety of non-structural and structural best management practices (BMPs) that would reduce nutrients and pollutants into Toulmins Spring, a creek that is listed as having impaired water quality on Alabama's 303(d) list. The project location is at the headwaters of Toulmins Spring Branch, within the Three Mile Creek watershed and directly south of the Bessemer Hope VI multi-family and mixed use development in the City of Prichard, Alabama (Figure 2-8). Funding from USEPA's 319 nonpoint source grant program would likely be available to construct the project, but the grant funds could not be used for activities associated with the E&D work. Upon implementation, the appropriate agency would conduct the NEPA analysis. This E&D project is intended to fill a critical funding gap and clear the way for the actual project to be implemented. USDA would be the implementing Trustee for this project

Construction Methodology (and Implementation Methodology) and Timing. The project would include a watershed assessment and a conceptual plan for the entire length of Toulmins Spring Branch that details opportunities for erosion and sedimentation reduction, nutrient and pathogen reduction, and flooding and stormwater management. E&D would be performed for an approximately 6-acre park, a 1-acre created wetland, approximately 600 linear feet of bioswales, and riparian buffers on vacant, abandoned urban parcels in the headwaters of Toulmins Spring Branch. These structural BMPs would have the combined purpose of reducing the input of sediment, nutrients, and pollutants into the creek via stormwater runoff. Non-structural BMPs would include public outreach, community education and training, and litter cleanups, with the goal of reducing litter and other avoidable water pollutants. As a secondary benefit, additional features such as trails, footbridges, gazebos, and public gathering areas can be incorporated to create valuable public recreational and community amenities and increase public awareness for Toulmins Spring Branch and its restoration. The proposed E&D work is estimated to be completed in approximately 6 months.

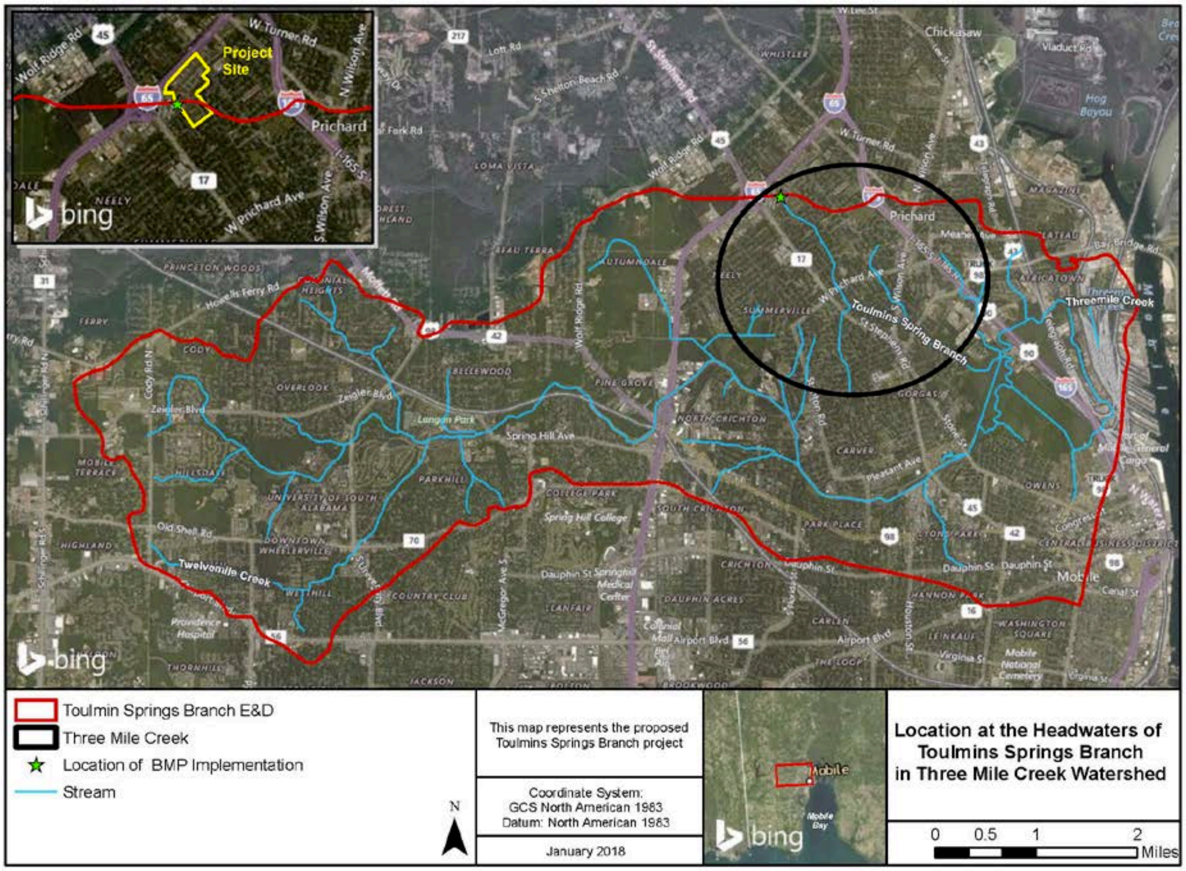


Figure 2-8: Location of Toulmins Spring Branch within the Three Mile Creek Watershed and the Specific Location of Proposed BMP Implementation

Maintenance Requirements. The project only includes E&D; therefore, there are no operation or maintenance requirements.

Project Monitoring Summary. This project only addresses E&D; no MAM plan is required at this time.

Costs. The estimated project cost is $479,090 for E&D activities.

2.6.3.3 Bayou La Batre Nutrient Reduction

Project Summary/Background. The Bayou La Batre Nutrient Reduction project seeks to improve water quality in the Bayou La Batre watershed through improved land management practices that reduce nutrient and sediment runoff. The watershed covers more than 19,500 acres in south Mobile County, flowing southwesterly into Portersville Bay and Mississippi Sound (Figure 2-9). Land uses in the watershed are 32 percent agricultural and 51 percent forested, where the majority of proposed activities would take place. Implementation of land management practices using existing USDA-Natural Resources Conservation Service (NRCS) conservation practice standards (CPS) and specifications would be the primary tool used to reduce erosion and nutrient inputs in the watershed. Examples of such measures include erosion and sediment control practices such as cover crops, conservation tillage, and field borders. Although cattle production is not the primary agricultural industry in the watershed, livestock exclusion from stream, wetlands, and drainage ways would be a priority conservation measure. The proposed conservation practices would reduce the loss of nitrogen, phosphorus, and sediment, which contribute to water quality impairments in streams and downstream receiving waters, from the landscape. Improved water quality in the Bayou La Batre watershed would ultimately benefit all estuarine and marine resources of coastal Alabama. USDA would be the implementing Trustee for this project.

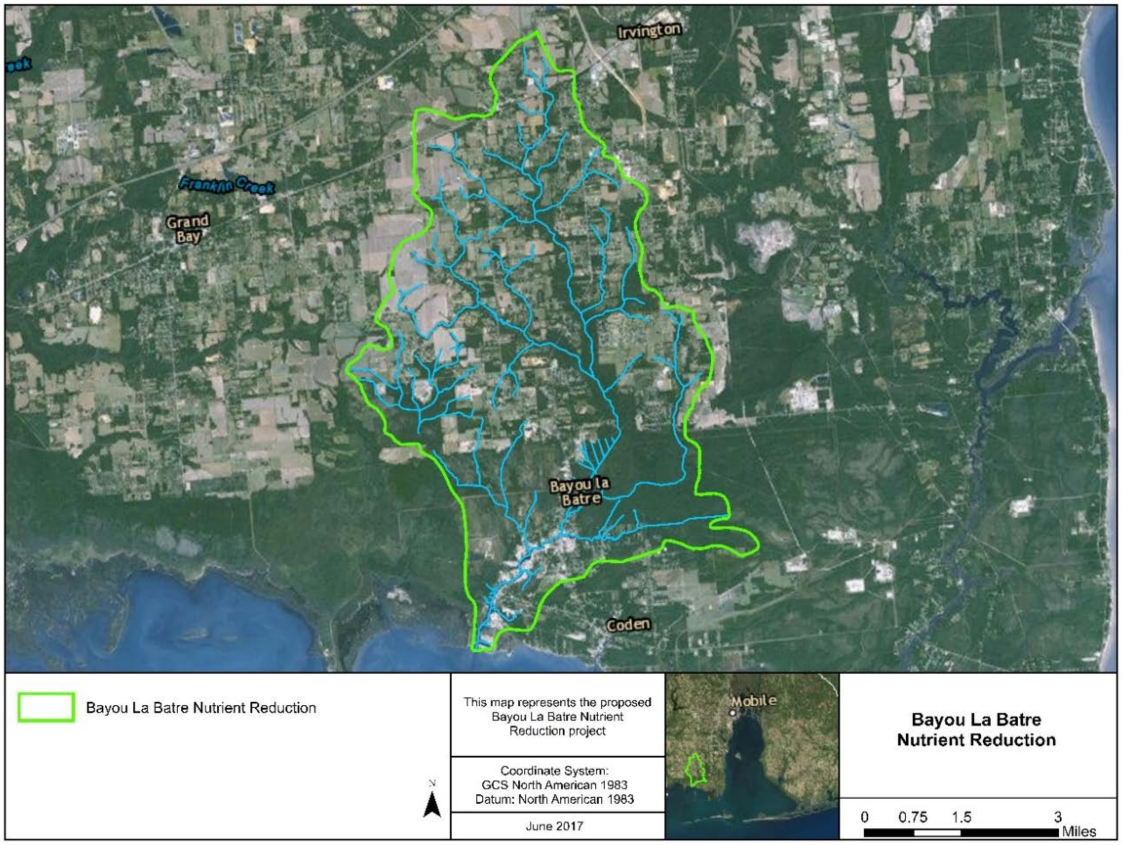


Figure 2-9: Project Location of the Bayou La Batre Nutrient Reduction Alternative

Construction Methodology (and Implementation Methodology) and Timing. The project is organized into four phases for implementation: (1) conservation planning (including landowner outreach and education) and environmental evaluation, (2) conservation practice E&D, (3) conservation practice implementation, and (4) water quality monitoring. USDA-NRCS would conduct outreach and provide technical assistance to voluntary participants (landowners), especially on the most vulnerable lands within prioritized subwatersheds. Technical assistance would be provided to landowners through the development of conservation plans for their lands, which would identify water quality resource concerns. Financial assistance could be provided to landowners to implement site-specific conservation practices to address the resource concerns on their property. Projects would be implemented in clusters within the highest priority subwatersheds addressed first to maximize impacts, with the goal of making a measurable difference in water quality within the entire watershed. Although this targeted and concentrated approach is desired, the project's proponents understand the voluntary nature of conservation implementation and would strive to address the major contributors of nutrient and sediment sources from agricultural and forested land in the watershed.

The project would be implemented over an approximately 4-year period, with the first year consisting primarily of landowner outreach and planning. Implementation of the conservation plans would begin in year 2 and continue through year 4. Baseline data collection through instream water quality monitoring would be initiated in the targeted watersheds in year 1. Water quality monitoring would be continued after most of the conservation practices are implemented. More than one of the four phase as described above can be conducted simultaneously.

Maintenance Requirements. Maintenance may include, but would not be limited to, addressing minor soil erosion or vegetation establishment issues because of weather-related events. Corrective actions that may be necessary include, but would not be limited to, regrading and leveling of soil around conservation practices, planting/replanting desirable vegetation, and/or removing nuisance vegetation. Any necessary corrective actions would occur after implementation, but within the 4-year time frame for this project. USDA-NRCS would identify corrective actions based on site evaluations and performance monitoring reports. USDA-NRCS would also evaluate costs for addressing the corrective action to determine feasibility.

Project Monitoring Summary. A MAM plan was not developed for this alternative because it was not selected as a preferred alternative in this draft RP II/EA.

Costs. The estimated cost for this project would be $1.0 million, which would include funds for conservation planning and design, implementation, monitoring, and Trustee oversight.

2.6.3.4 Fowl River Nutrient Reduction

Project Summary/Background. The Fowl River Nutrient Reduction project seeks to improve water quality in the Fowl River watershed through improved land management practices that reduce nutrient and sediment runoff. The watershed encompasses 52,782 acres, draining much of southern Mobile County, and is a significant contributor of freshwater flow into Mobile Bay (Figure 2-10). Land uses in the watershed are 21 percent urban, 15 percent agricultural, 63 percent forested, and 1 percent water/wetlands. Increasing development and continuing erosion and sedimentation threaten water and habitat quality. Improved land management practices, using existing USDA-NRCS CPS and specifications, would be the primary tool used to reduce erosion and nutrient inputs in the watershed. Examples of such measures would include erosion and sediment control practices such as cover crops, conservation tillage, and field borders. Although cattle production is not the primary agricultural industry in the watershed, livestock exclusion from stream, wetlands, and drainage ways would be a priority conservation measure. Ecosystem services that are provided by conservation practices include reducing nitrogen, phosphorus, and sediment runoff, which would improve water quality and mitigate chronic ecosystem threats (e.g., hypoxia, harmful algal blooms, and impaired recreational use). Improved water quality in the Fowl River watershed would ultimately benefit all estuarine and marine resources of coastal Alabama. USDA would be the implementing Trustee for this project.

Construction Methodology (or Implementation Methodology) and Timing. Project efforts and the phases of project implementation would be the same as described above for the Bayou La Batre Nutrient Reduction project. The project is organized into four phases for implementation: (1) conservation planning (including landowner outreach and education) and environmental evaluation, (2) conservation practice E&D, (3) conservation practice implementation, and (4) water quality monitoring. Technical assistance would be provided to landowners through the development of conservation plans for their lands, which would identify water quality resource concerns. Financial assistance could be provided to landowners to implement site-specific conservation practices to address the resource concerns on their property. USDA-NRCS would implement the project in the Fowl River watershed to improve water quality by implementing conservation practices to reduce nutrient and sediment runoff. USDA-NRCS and its conservation partners would help voluntarily participating landowners by developing conservation plans that identify natural resource concerns and conservation practices that landowners can implement to reduce nutrient and sediment runoff. The conservation planning and implementation would be completed for the purpose of addressing nutrient and sediment loading concerns, with the goal of making and observing a measurable impact. The project would be implemented over a 4-year period with the first year consisting primarily of landowner outreach and planning. Implementation of the conservation plans would begin in year 2 and continue through year 4. Baseline data collection through instream water quality monitoring would be initiated in the targeted watersheds in year 1. Water quality monitoring would be continued after most of the conservation practices are implemented. More than one of the four phase as described above can be conducted simultaneously.

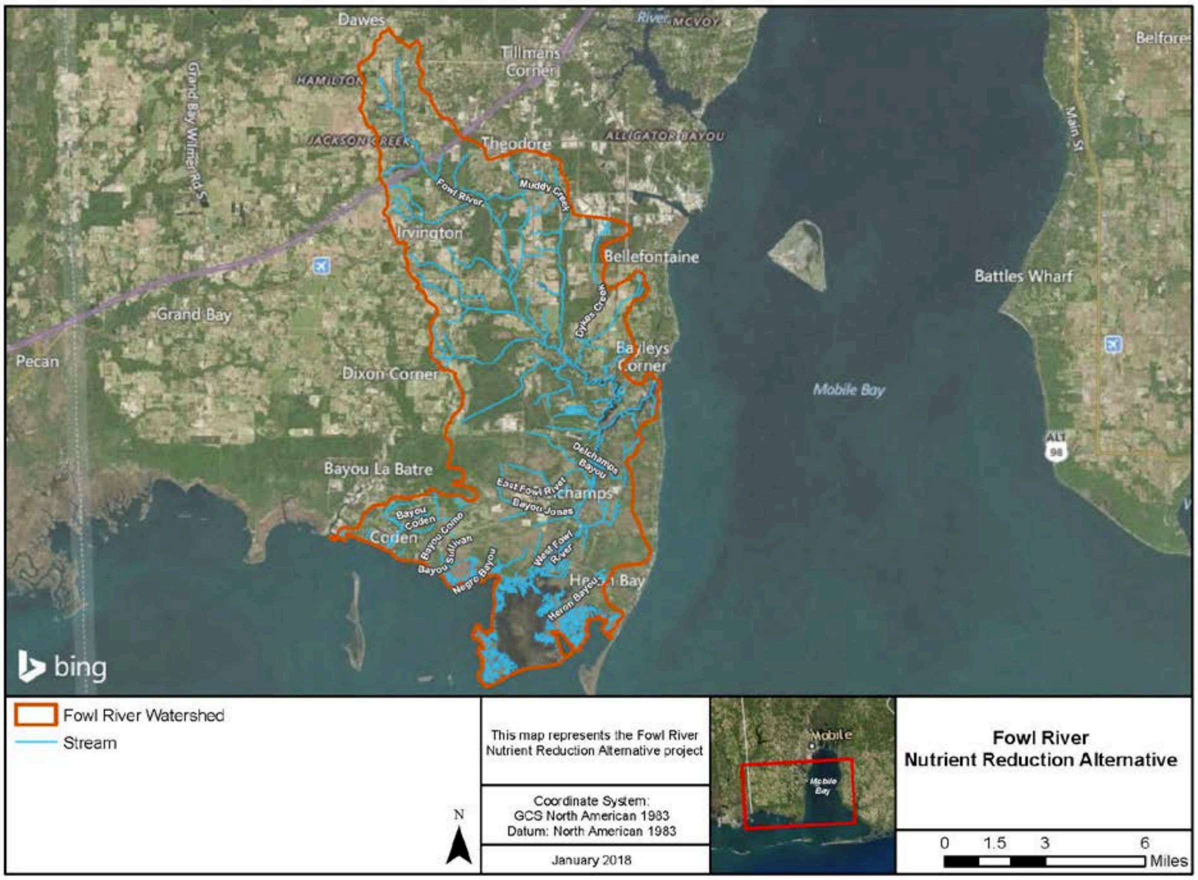


Figure 2-10: Project Location of the Fowl River Nutrient Reduction Alternative

Maintenance Requirements. Maintenance may include, but would not be limited to, addressing minor soil erosion or vegetation establishment issues because of weather-related events. Corrective actions that may be necessary include, but would not be limited to, regrading and leveling soil around conservation practices, planting/replanting desirable vegetation, and/or removing nuisance vegetation. Any necessary corrective actions would occur after implementation, but within the 4-year time frame for this project. USDA-NRCS would identify corrective actions based on site evaluations and performance monitoring reports. USDA-NRCS would also evaluate costs for addressing the corrective action to determine feasibility.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The estimated cost for this project would be $1.0 million, which would include funds for planning and design, implementation, monitoring, and Trustee oversight.

2.6.3.5 Weeks Bay Nutrient Reduction

Project Summary/Background. The Weeks Bay Nutrient Reduction project seeks to improve water quality in the Weeks Bay watershed through improved land management practices that reduce nutrient and sediment runoff. The watershed encompasses approximately 130,000 acres in southwest Baldwin County, which flows into Weeks Bay, a shallow sub-estuary of Mobile Bay (Figure 2-11). The implementation of land management practices using existing USDA-NRCS CPS and specifications would be the primary tool used to reduce erosion and nutrient inputs in the watershed. Examples of such measures would include erosion and sediment control measures such as cover crops, conservation tillage, and field borders. Ecosystem services that are provided by conservation practices include reducing nitrogen, phosphorus, and sediment runoff, which would improve water quality and mitigate chronic ecosystem threats (e.g., hypoxia, harmful algal blooms, and impaired recreational use). Improved water quality in Weeks Bay watershed would ultimately benefit all estuarine and marine resources of coastal Alabama. USDA would be the implementing Trustee for this project.

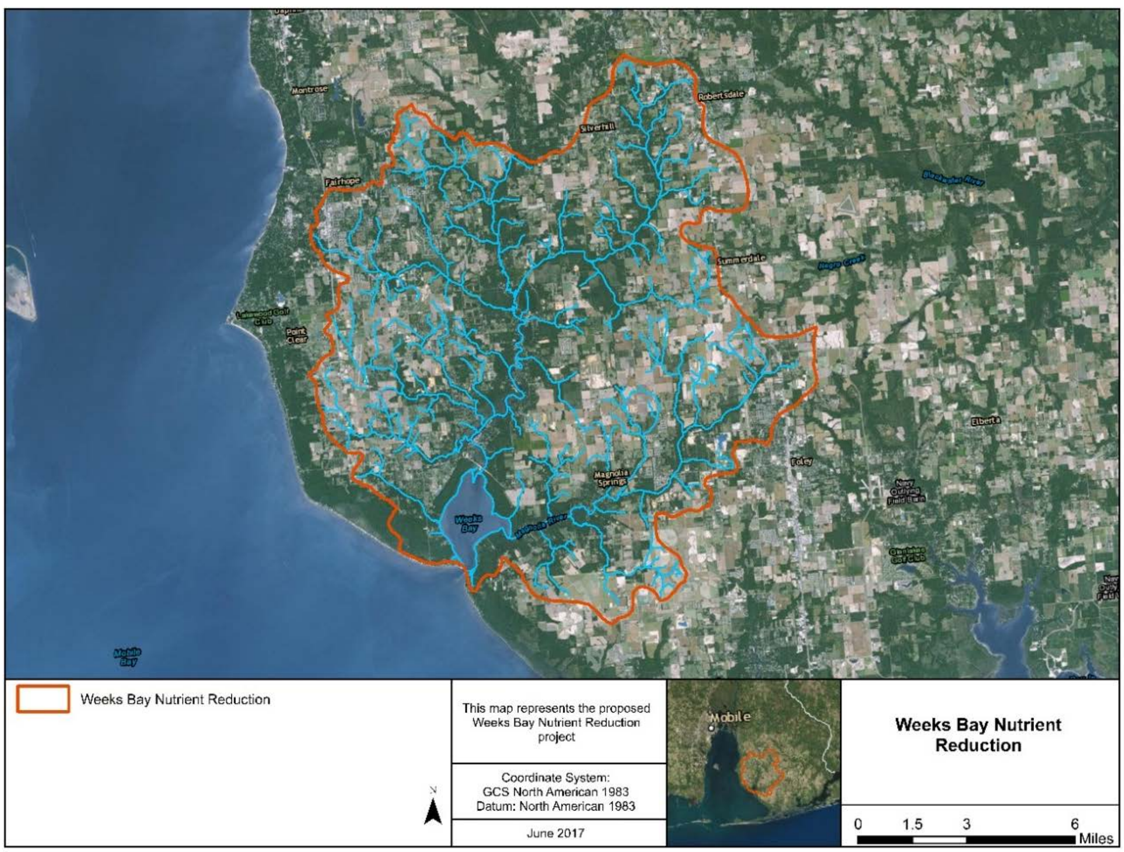


Figure 2-11: Project Location of the Weeks Bay Nutrient Reduction Alternative

Construction Methodology (or Implementation Methodology) and Timing. The Weeks Bay Nutrient Reduction project would focus on the middle Fish River, lower Fish River, and Magnolia River. Conservation planning would be conducted in all three of these watersheds; however, conservation implementation would only occur in two of the watersheds. The watersheds selected for implementation would be based on conservation opportunities on high-priority lands as ascertained from conservation planning efforts, and the phases of project implementation would be the same as described above for the Bayou La Batre Nutrient Reduction project. Technical assistance would be provided to landowners through the development of conservation plans for their lands, which would identify water quality resource concerns. Financial assistance could be provided to landowners to implement site-specific conservation practices to address the resource concerns on their property.

The project would be implemented over a 4-year period with the first year consisting primarily of landowner outreach and planning. Implementation of the conservation plans and identified land management practices would begin in year 2 and continue through year 4. Baseline data collection through instream water quality monitoring would be initiated in the targeted watersheds in year 1. Water quality monitoring would be continued after most of the conservation practices are implemented. More than one of the four phases as described above can be conducted simultaneously.

Maintenance Requirements. Maintenance may include, but would not be limited to, addressing minor soil erosion or vegetation establishment issues because of weather-related events. Corrective actions that may be necessary include, but would not be limited to, regrading and leveling soil around conservation practices, planting/replanting desirable vegetation, and/or removing nuisance vegetation. Any necessary corrective actions would occur after implementation, but within the 4-year time frame for this project. USDA-NRCS would identify corrective actions based on site evaluations and performance monitoring reports. USDA-NRCS would also evaluate costs for addressing the corrective action to determine feasibility.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The estimated cost for this project would be $2.0 million, which would include funds for planning and design, implementation, monitoring, and Trustee oversight.

2.6.4 Sea Turtles

Project screening in the Sea Turtles Restoration Type identified five Sea Turtles projects and a no action alternative for the reasonable range of alternatives. Table 2-19 presents the five projects and their anticipated costs.

Table 2-19: Reasonable Range of Alternatives for the Sea Turtles Restoration Type

Reasonable Range of Alternatives	Project Cost
No Action/Natural Recovery	
CAST Conservation Program	$935,061
CAST Triage	$622,915
CAST Habitat Usage and Population Dynamics	$1,631,696
CAST Protection: Enhancement and Education	$906,874

Reasonable Range of Alternatives	Project Cost
Restoring the Night Sky—Assessment, Training, and Outreach (E&D) (Shared costs with Habitat Projects on Federally Management Lands Restoration Type)[23]	$216,655

2.6.4.1 No Action/Natural Recovery

As required by OPA regulations, the Final PDARP/PEIS considered a "… natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (15 CFR 990.53(b)(2)). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of injured natural resources or to compensate for lost services. The 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. Although injured resources could presumably recover to at or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, and tiering this draft RP II/EA from the Final PDARP/PEIS and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery for the Sea Turtles Restoration Type as a viable alternative under OPA, and natural recovery is not considered further in this draft RP II/EA. Because NEPA requires consideration of a no action alternative as a basis for comparison of potential environmental consequences of the action alternatives(s), a no action alternative is evaluated in that sense within this draft RP II/EA. This analysis presents the conditions that would result if the AL TIG did not select to undertake any additional restoration for injured natural resources or to compensate for lost services at this time. The environmental consequences of such an alternative are evaluated in Chapter 10 for comparison with the remaining action alternatives.

2.6.4.2 Coastal Alabama Sea Turtle (CAST) Conservation Program

Project Summary/Background. The proposed CAST Conservation Program project is designed to support existing sea turtle programs in Alabama to strengthen efforts to protect nesting sea turtles and enhance the survival of sea turtle hatchlings in Alabama. The proposed project would provide funding for the continued operation, expansion, and enhancement of the existing Share the Beach Sea Turtle Nest Monitoring Program ("Share the Beach"), which as of January 2018 is proposed to be managed by the Alabama Coastal Foundation (ACF). ACF is an organization dedicated to environmental stewardship, with considerable experience in both program management; fundraising; and volunteer recruitment, training, and management. ACF's administration of the program would allow for better overall project expenditures to manage, analyze, and report data collected under the program. Previously this program had been managed by Friends of BSNWR.

The CAST Conservation Program would expand and enhance ACF's Share the Beach program by providing funds to guide the Share the Beach program in actions necessary to support sea turtle restoration in Alabama, such as maintaining and implementing protocols for sea turtle nest monitoring

[23] As noted in Section 2.7, Preferred Alternative, ultimately this project was considered appropriate for MAM funding and would be implemented using that funding, rather than from the Sea Turtles Restoration Type.

activities and reducing threats on nesting beaches. Under this project, additional staff experienced in sea turtle nest monitoring protocol would be hired to work with Share the Beach. This project would also help support a greater emphasis on public education, focused on minimizing anthropogenic threats to sea turtles outlined in the Northwest Atlantic Loggerhead Recovery Plan (NMFS, et al., 2008), such as artificial lighting and nesting obstacles. Using other non-AL TIG funds, the Share the Beach program has begun the process of transferring from BSNWR to ACF. This project would bring Alabama's sea turtle conservation program to a level of capacity similar to other states in the region by funding two full-time biologists, four seasonal team leaders annually, two summer interns annually, and an administrative position, as well as staff training, data collection and management, program equipment, and public education, among other activities. Locations of program operations are shown in Figure 2-12. ADCNR, in collaboration with USDOI, would be the implementing Trustee for this project.

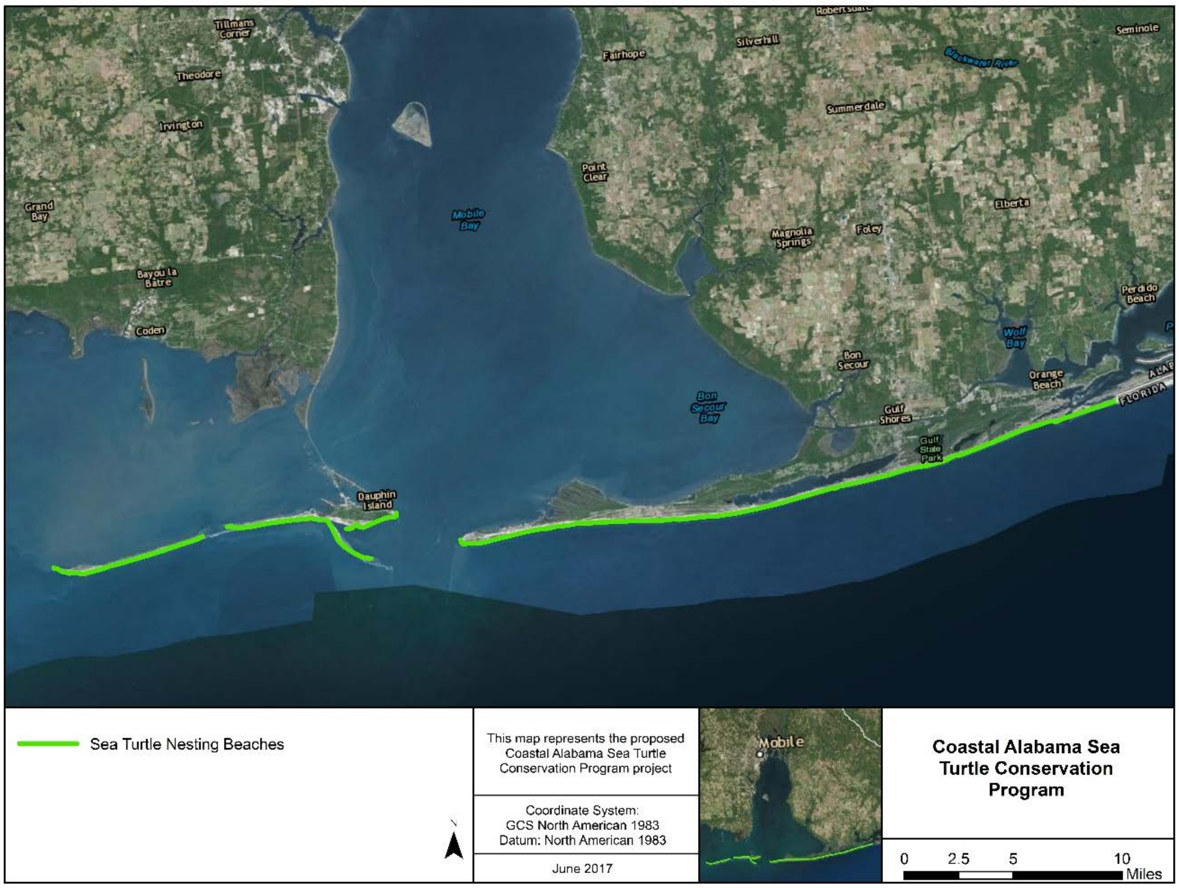


Figure 2-12: Project Location of the CAST Conservation Program Alternative

Construction Methodology (or Implementation Methodology) and Timing. Under this project, ACF would provide management of the Share the Beach program, and administrative activities would occur out of ACF's Mobile office. ACF would manage program administration; volunteer coordination; and all files, equipment, and materials necessary to successfully administer the Share the Beach program. This project would fund staff time, additional program equipment, education, and travel expenses. No infrastructure or other proposed improvements would be funded with these proposed project funds. As part of program management, all current permits would be maintained, and ACF employees and volunteers would be trained by personnel with sea turtle expertise in nesting survey protocols and data management, in collaboration with USDOI. ACF would work with USDOI on the permitting process to revise the existing Alabama sea turtle nest monitoring permit as needed and review existing permit holders as needed. Under the administration of ACF, the Share the Beach program would be reviewed annually to evaluate its effectiveness, including: (1) lessons learned from the previous year; (2) consulting on new scientific information about sea turtles to update educational and training materials; and (3) collaboration with USFWS to review sea turtle data collection, monitoring, and handling protocols. Additional activities that would be continued and expanded include ongoing recruitment and engagement of volunteers, volunteer training, nest monitoring and related data collection, outreach and education to residents and tourists, and data management.

Management of Share the Beach and expansion of the program would occur over a 3-year period. ACF would incur future costs to continue the program.

Maintenance Requirements. Operations are described above under Construction Methodology. No infrastructure would be built, and no maintenance would be required.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The cost estimate is $935,061, with implementation activities accounting for $875,061, oversight totaling $20,000, and contingency funds of $40,000.

2.6.4.3 CAST Triage

Project Summary/Background. The CAST Triage project would provide a new, appropriately equipped facility and program for the initial triage, treatment, release, and/or transfer of injured or ill sea turtles. Currently, Alabama has no facilities equipped for handling sea turtle strandings. The project would construct a new facility on property owned by the City of Orange Beach (Figure 2-13) and establish a program that would be supported by the City of Orange Beach in the future. Funding would not be provided for staff, who would be provided by the City of Orange Beach. This facility would complement and enhance the current Alabama Sea Turtle Stranding and Salvage Network (ALSTSSN). According to data from the NOAA STSSN database, the total numbers of live stranded sea turtles in Alabama per year for 2014, 2015, and 2016 were 14, 6, and 11, respectively. Of those, 9, 4, and 5 were incidentally caught on fishing piers. This facility and associated program would allow sea turtles injured in Alabama and proximity in adjacent states to be treated and released faster and with less stress on the animal from handling and transport. The expectation is that faster intervention, along with shorter periods of captivity and minimized handling, would improve the outcomes for injured or ill turtles by decreasing the time to receive treatment and providing a local resource to contact for citizens to report injured or distressed turtles. The program would also work to educate the public about (1) anthropogenic threats to sea turtles treated at the facility, (2) current science on how best to address the threats, and (3) conservation for sea turtles in the wild. Educational materials would be coordinated with USFWS's Alabama Ecological Services Field Office, the ALSTSSN coordinator, and the Alabama State Biologist (see CAST Protection: Enhancement and Education Project) to create a consistent and unified message. Project funding is expected to fully support the program for 5 years. The City of Orange Beach would incur operational costs into the future.

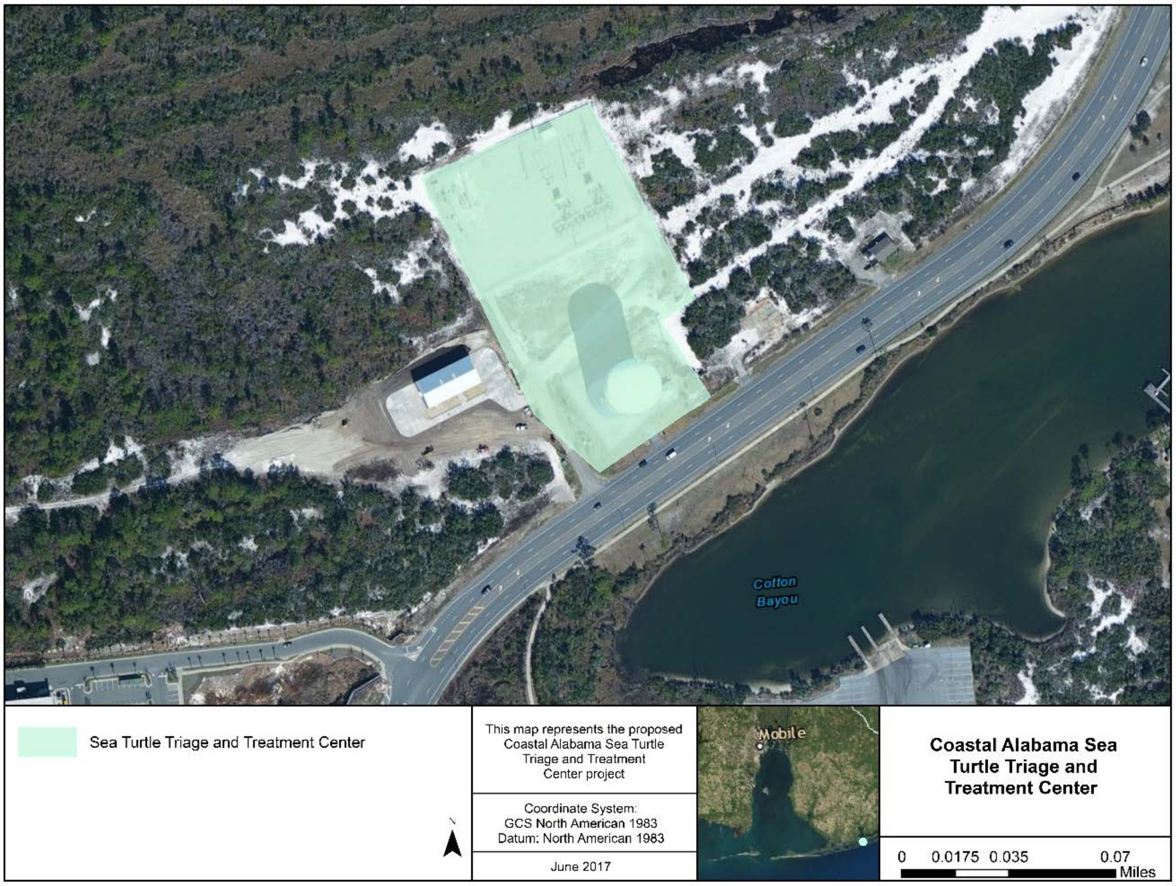


Figure 2-13: Project Location of the Facility Proposed by the CAST Triage Alternative

Stranding calls would continue to operate as they do now through the ALSTSSN coordinator, who acts much like a dispatcher. Volunteers and staff would continue to handle the response and transport to the new facility where the turtle would be immediately evaluated and provided any necessary basic supportive care via pre-designated protocols. Program veterinarians/staff (from existing receiving facilities) would be contacted much like they are now, but instead of limited information contributed by phone and a few text images, they would be able to converse via audio and video with trained staff as the animal is assessed. Initial care decisions would be made and diagnostics such as radiographs or even laboratory tests would be performed if needed. If the situation warrants, the animal could be supported until transport is arranged. If immediate transport is not warranted or possible, program veterinarians/staff would direct on-site staff to perform basic interventions and procedures that they have been trained in advance (working with the receiving facilities) to perform. The City of Orange Beach would provide on-site staffing. The animal may then be released immediately or after a brief recovery/monitoring period as per the vet's direction. Overall this facility and system would operate much like a first responder medic or a hospital-run urgent care clinic for humans. Immediate care would be provided via protocols, and the staff would act as field extensions of the definitive care facility.

In the event of a dead stranding suitable for collection or an animal that dies in care, the animal would be immediately placed in cold storage to allow sample collection or necropsy if desired. These tasks could also be performed on-site rather than allocating resources and time to transport the carcass to a distant facility when it may not be necessary. The ability to place multiple whole animals/samples in cold storage in a common location would be a significant improvement over the current situation and could be a necessity if die-offs/unusual mortality events occur in this region. ADCNR would be the implementing Trustee for this project.

Proposed Infrastructure (or Proposed Improvements). The site for this proposed facility is located in Orange Beach, Alabama, on city-owned property adjacent to Cotton Bayou. A large portion of the proposed site was previously a fire station. The building slab, some of the parking lot, and other features still exist. The remaining areas have all been disturbed/filled/excavated for the construction of the adjacent water tower, power substation, and roadway. The project would occupy 1 to 3 acres of land, upon which a 40-foot by 60-foot, wind-rated, light commercial metal structure on a concrete slab would be built. Construction would include the following elements: base building; site/utilities; water supply (bore); pumps/filtration; tanks (one large and two medium, miscellaneous small); HVAC (entire building); office/storage area; perimeter fence; concrete drives/apron; walk-in cooler/freezer; and enclosed triage/necropsy area. The building would be insulated, climate controlled, and equipped with a full bath, office/storage area, and walk-in cooler/freezer units. The budget includes funds for a variety of tank sizes to accommodate the different species/sizes of marine turtles and one large enough for pre-release assessment (this can be changed to any number of configurations). Each tank would be accessed by an overhead hoist or mobile gantry and would include an elevating floor platform as is appropriate in a rehabilitation tank. The primary water source would be achieved through an underground bore into Cotton Bayou. The proposed project would likely place a four pipes underneath the roadway between Cotton Bayou and the project site. Two pipes would be for intake and two for discharge (primary and secondary). The primary discharge pipe would be the first pipe used for discharge. The secondary discharge pipe would be in place as a backup. The pipes would likely be 3 to 4 inches in diameter depending on the terms of the permit, and they would be bored (horizontally drilled) in place. The final location of the pipe and its point of exchange with Cotton Bayou would be determined during the permitting process and informed by the regulatory process.

Construction Methodology (and Implementation Methodology) and Timing. Construction methods would include common construction practices consistent with the adopted International Building Codes for steel buildings and associated items such as electrical, mechanical, plumbing, and fire/life safety. The parking lot would be constructed of pervious material such as crushed concrete. Estimated parking for 10 to 12 vehicles is possible at the site. The facility would be connected to the public sewer system, and waste water would be discharged to the sanitary sewer via grinder pump. Associated infrastructure would require both a domestic and saltwater source (both are nearby, but the saltwater requires a bore); electrical service (nearby); sewer line tap and grinder pump (nearby and included); and broadband network access (achieved via point-to-point microwave shot to nearby service provider access point). Effluent from the tanks would be discharged into Cotton Bayou in accordance with all required permits. Required permits may include United States Army Corps of Engineers (USACE) Section 10 and Section 404 permits as well as water quality and coastal zone management consistency certifications from the Alabama Department of Environmental Management (ADEM). Any necessary building permits would be obtained in accordance with local, state, and federal laws. Other permits such as National Pollutant Discharge Elimination System permits would be obtained if required and necessary.

Planning could take from 60 to 120 days. Construction would require approximately 90 days and would include completion of the necessary regulatory and compliance process. Similar to current conditions, the ALSTSSN coordinator, would assign permitted ALSTSSN volunteers to respond to sea turtle strandings in the field. The triage facility would then, if approved, operate within the USFWS February 13, 2013, Standard Permit Conditions for Care and Maintenance of Captive Sea Turtles requirements to address short-term treatment needs (USFWS 2013). This facility permit is not in place but would be applied for at the appropriate time relative to the project because facilities and other program requirements must be in place at the time of application.

Maintenance Requirements. This facility would fold directly into the current ALSTSSN program and would complement, supplement, and enhance the program overall. Coordination with USFWS and NOAA would continue, using best practices and approved protocols for sea turtle stranding and a salvage and handling facilities program.

Through an implementation agreement, the City of Orange Beach would provide funds to care for the routine needs of the facility such as grounds care, utilities, trash service, and general upkeep. Unknowns include the inability to estimate to power costs for the recirculating pump system and the cost of any significant upgrades or repairs. The plan includes modification of a City vehicle for use in the program that the City would continue to maintain; there would be restrictions on approved vehicle operators because of insurance/policy requirements. Operational problems are not anticipated.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The cost estimate is $622,915, and would include funds for planning and design, construction, monitoring, operations and maintenance, and Trustee oversight.

2.6.4.4 CAST Habitat Usage and Population Dynamics

Project Summary/Background. The CAST Habitat Usage and Population Dynamics project would study migration patterns, habitat use, and distribution patterns of sea turtles along the Alabama Coast. The project proposes to sample in-water sea turtles to initiate a long-term monitoring program designed to determine distribution and habitat use, vital rates (including survival rates), connectivity, and potential impacts of anthropogenic activities for sea turtles in coastal and nearshore waters of Alabama. The project objective is to inform the AL TIG and other state and federal initiatives about the locations and types of activities that would provide the most cost-effective means of reducing threats to sea turtles and increasing their populations in coastal Alabama.

Using biological, genetic, and stable isotope analyses, researchers can explain links among and within populations and can identify human actions that disrupt important population connections and cause environmental threats. Genetic analysis allows researchers to identify the connectivity of turtles using Alabama waters to larger populations, such as determining from which nesting beaches juvenile turtles using Alabama waters originated. The project would also fund the collection of sea turtle movement data in and around the Alabama coast. Analyses of these data would be used to characterize where sea turtles forage, migration patterns, habitat use, and life history parameters for sea turtles using Alabama waters.

USDOI would be the implementing Trustee for this project, in collaboration with ADCNR. USDOI investigators (United States Geological Survey [USGS] biologists) would lead implementation. These investigators are currently collaborating with the Bureau of Ocean and Energy Management and NPS on complementary projects in the northern Gulf of Mexico. Leveraging funds from those projects would allow the AL TIG to do more with the limited funds available.

Construction Methodology (or Implementation Methodology) and Timing. The methods proposed for collecting these data include genetic analyses, stable isotope analyses, mark-recapture, and habitat modeling (including anthropogenic threats). The sea turtles would be captured by hand or using dip nets and tangle (set) nets at several sites along the Alabama coast, including inshore waters (i.e., Perdido Bay, Bon Secour Bay, Mobile Bay, and the Mississippi Sound) and the nearshore waters of the Gulf of Mexico. Gulf of Mexico Marine Assessment Program for Protected Species would serve as a pilot study for this project. Data from that work would help to locate prime capture locations in Alabama waters and identify the most effective capture methods. In addition, funds from these projects can be leveraged to provide a region-wide assessment of juvenile turtles using waters of the northern Gulf of Mexico. Data sharing would follow standard NRDA, Bureau of Ocean Energy Management, and USGS protocols. In addition to direct capture, researchers may obtain sea turtles for study that are legally captured during relocation trawling by the USACE hopper dredging operations.[24] Morphometric data, including size and weight, would be gathered from all sampled turtles, and a visual health assessment would be conducted. Biological samples, including blood, skin, and scute, would be gathered from each individual.

It is estimated that 100 turtles could be captured per year, with a minimum of 40 samples per species needed for genetic and vital rates analysis. Investigators currently hold a current, 5-year, renewable National Marine Fisheries Service (NMFS) permit (#17304-03) that allows these activities; therefore, capture, marking, and sampling for this project could be initiated immediately upon receipt of funds. The project is funded for 3 years.

Maintenance Requirements. No operation and maintenance is required for this study effort.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The proposed cost of the CAST Habitat Usage and Population Dynamics project is $1,631,696. These funds are solely directed at data collection activities, project oversight, supervision, and contingency.

2.6.4.5 CAST Protection: Enhancement and Education

Project Summary/Background. Enforcement of existing federal, state, and local regulations and ordinances is a crucial tool for reducing activities and behaviors that cause harm to sea turtles in state waters. The CAST Protection: Enhancement and Education project would enhance state enforcement of federal regulations and increase turtle protections in Alabama state waters by: (1) increasing awareness and understanding of the ESA and applicable regulations through education of state enforcement officers; (2) increasing resources for state enforcement agencies to more proactively dedicate efforts toward ESA-related activities (i.e., patrols, public education, enforcement hours); (3) taking steps to reduce fisheries bycatch (i.e., conduct social science surveys, which would likely involve focus groups, and through purchasing and distributing TEDs for the skimmer trawl fishery); and (4) taking steps to reduce impacts on nesting turtles, such as reducing nest vandalism and lighting harassment. ADCNR would be the implementing Trustee for this project.

Construction Methodology (or Implementation Methodology) and Timing. NMFS, USFWS, and ADCNR would work collaboratively with AMRD law enforcement and federal offices of law enforcement to determine law enforcement training needs, how best to conduct consistent training, and to identify specific training and educational needs/products. A full-time AMRD biologist would be hired to implement several elements in this project (i.e., enforcement training sessions, public education and

[24] These activities are addressed by existing Biological Opinions, including (1) the Gulf of Mexico Regional Biological Opinion on Hopper Dredge use for Maintenance Dredging of Channels and Sand Mining by the four USACE Gulf Of Mexico Districts (November 19, 2003); (2) Revision 1 to November 19, 2003 GRBO – Gulf of Mexico Regional Biological Opinion on Hopper Dredging (June 24, 2005); and (3) Revision 2 to November 19, 2000 GRBO – Gulf of Mexico Regional Biological Opinion on Hopper Dredging (January 9, 2007). These documents can be accessed at: http://sero.nmfs.noaa.gov/protected_resources/section_7/freq_biop/index.html.

outreach, stakeholder collaboration). The position would be funded 50 percent from this project budget and 50 percent from the Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education project (see Section 3.5.4). Training of AMRD enforcement officers would be conducted, and outreach products would be distributed to the public. NOAA NMFS protected resources staff, USFWS, and AMRD biologists would also work together to identify and prioritize hot spot areas for potential ESA violations and those areas that need increased and consistent enforcement efforts. Resources and equipment necessary to increase and sustain enforcement activities in identified hot spot areas would be identified, and state enforcement increased/enhanced in areas of need to reduce associated harm from illegal activities. A communication pathway between the state and federal agencies and law enforcement would also be established to continuously reevaluate needs to ensure consistency in enforcement enhancement efforts.

This project would begin as soon as funding becomes available and is proposed for 4 years. Increased state enforcement around sea turtle nesting beaches would occur throughout the duration of the project. Year 1 would be used to hire and train a biologist, develop initial partnerships with local and federal stakeholders, and coordinate with skimmer trawl owners for TED installation. Social science and fisheries surveys would be contracted by the end of year 2, and the results would be used to inform the targeting of public outreach materials. Training of AMRD law enforcement officers would likely occur in the winter of years 2, 3, and 4, with the bulk of training in year 2 and supplemental training of newly hired officers provided in years 3 and 4. In year 3, nest sites would be remotely monitored with game and/or surveillance cameras, and in years 3 and 4, outreach plans would be developed and targeted outreach and education would be implemented.

Maintenance Requirements. There would be no additional operation and maintenance requirements.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The project is estimated to cost $906,874, with implementation activities accounting for $843,690, oversight totaling $20,000, and contingency funds of $43,184.

2.6.4.6 Restoring the Night Sky—Assessment, Training, and Outreach (E&D)

The Restoring the Night Sky—Assessment, Training, and Outreach project is described in Section 2.6.2.3. It is included here because sea turtles are the primary group of species that are adversely affected by light pollution, and various components of the project could be funded by two Restoration Types (Habitat Projects on Federally Managed Lands and Sea Turtles). The project description in Section 2.6.2.3 notes which components of the project would be funded by which Restoration Type. USDOI would also be the implementing Trustee for this portion of the project.

2.6.5 Marine Mammals

Project screening in the Marine Mammals Restoration Type identified three marine mammal projects and a no action alternative for the reasonable range of alternatives. Table 2-20 presents the three projects and their anticipated costs.

Table 2-20: Reasonable Range of Alternatives for the Mammals Restoration Type

Reasonable Range of Alternatives	Project Cost
No Action/Natural Recovery	
Enhancing Capacity for ALMMSN	$2,432,389
Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health	$3,059,229
Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education	$686,374

2.6.5.1 No Action Alternative/Natural Recovery

As required by OPA regulations, the Final PDARP/PEIS considered a "… natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (15 CFR 990.53(b)(2)). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of injured natural resources or to compensate for lost services. The 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. Although injured resources could presumably recover to at or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, and tiering this draft RP II/EA from the Final PDARP/PEIS and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery for the Marine Mammals Restoration Type as a viable alternative under OPA, and natural recovery is not considered further in this draft RP II/EA. Because NEPA requires consideration of a no action alternative as a basis for comparison of potential environmental consequences of the action alternatives(s), a no action alternative is evaluated in that sense within this draft RP II/EA. This analysis presents the conditions that would result if the AL TIG did not select to undertake any additional restoration for injured natural resources or to compensate for lost services at this time. The environmental consequences of such an alternative are evaluated in Chapter 11 for comparison with the remaining action alternatives.

2.6.5.2 Enhancing Capacity for the Alabama Marine Mammal Stranding Network

Project Summary/Background. The Enhancing Capacity for the Alabama Marine Mammal Stranding Network project would enhance the capacity of the ALMMSN by providing funding for staff time, equipment and supplies, and sample analyses and would address the ending of the current funding source through NFWF-GEBF. ALMMSN is operated out of the Dauphin Island Sea Lab (DISL) on Dauphin Island, Alabama. This project would allow ALMMSN to use and expand on its existing infrastructure for cetacean stranding response and communications and data management to enhance the ALMMSN's operations. Information on dead or stranded cetaceans is obtained by collecting basic stranding data (Level A) and performing necropsies; however, ALMMSN has limited capacity for live cetacean stranding response. In addition, ALMMSN has limited resources to conduct in-depth analysis of causes of illness and mortality in stranded cetaceans. The project would allow ALMMSN to better respond to live or dead stranded cetaceans, to necropsy animals, and to analyze samples collected from cetaceans stranded in Alabama waters to better understand the causes of marine mammal illness and death. It would also support increased data consistency for information collected from stranded marine mammals by supporting ALMMSN to enter its data into a regional marine mammal health database (known as

GulfMAP, hosted by NOAA). The information collected by ALMMSN from stranded cetaceans should enable managers to mitigate impacts on marine mammals from natural and anthropogenic threats and to monitor population recovery post-DWH oil spill. Accordingly, this project is expected to provide a better understanding of the causes of illness/mortality through the early detection and intervention of anthropogenic and natural threats. Additionally the project is expected to increase the survival of rescued animals and recovery of populations affected by the DWH oil spill by improving marine mammal stranding response, data collection, data analyses, and reporting for Alabama waters. By enhancing mutual aid and collaboration to augment overall response capability of NOAA's Marine Mammal Health and Stranding Response Program, this project would also increase data consistency and the timeliness of data availability to managers of marine mammals to allow for rapid responses to emerging threats. ADCNR would be the implementing Trustee for this project.

Construction Methodology (or Implementation Methodology) and Timing. This project would continue ALMMSN's current data collection efforts and expand them by providing more in-depth data analysis provided by the ALMMSN staff in collaboration with the NMFS Southeast Regional Office and Southeast Fisheries Science Center. This increased collaboration would build capacity in the region to improve live stranding responses in the future. ALMMSN would also maintain its current reporting, databases, publications, and necropsy reports, and increase the number of metadata records relative to cetaceans responded to, necropsies conducted, and samples processed, as well as its number of publications.

This effort is currently funded by NFWF-GEBF through 2019. The proposed timing of this project is January 1, 2020, to January 1, 2023 which includes all activities under this program.

Maintenance Requirements. There would be no operation and maintenance requirements because this project does not include new infrastructure, maintenance of existing infrastructure including vehicles and/or boats, or other elements that would require maintenance.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The cost estimate is $2,432,389, with implementation activities accounting for $2,191,263, oversight totaling $20,000 and contingency funds of $221,126.

2.6.5.3 Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health

Project Summary/Background. This project is aimed at defining common bottlenose dolphin distribution, abundance, and population structure within Alabama state waters to assess the status of bottlenose dolphins using Alabama waters by collecting data on dolphin distribution, habitat use, mortality rates, and feeding habits. The project is a data collection effort to: (1) investigate stock structure across Mobile Bay, Perdido Bay, and nearshore Alabama waters and the seasonal (summer/winter) abundance, distribution, and habitat use of common bottlenose dolphins on the Alabama coast using capture-mark-recapture and photo-ID surveys; and (2) assess dolphin condition following the DWH oil spill using field observation and remote biopsy sampling, both of which would inform future restoration planning. This data collection effort would provide valuable resource-level monitoring for bottlenose dolphins, a largely unstudied top predator in Alabama waters, informing pre-restoration baselines and providing more effective restoration planning and implementation. ADCNR would be the implementing Trustee.

Scientists with DISL would lead the project and would collaborate with NOAA NMFS Southeast Fisheries Science Center. The project would involve capture-mark-recapture and photo-ID surveys, remote biopsy sampling, sample analyses, and data analyses. Reports and publications would be produced with assistance and guidance from NOAA NMFS Southeast Fisheries Science Center.

Construction Methodology (or Implementation Methodology) and Timing. With additional training and support from NOAA NMFS Southeast Fisheries Science Center, DISL has in place the infrastructure and staff necessary to manage the project, including coordinating fieldwork with collaborators, performing sample processing and analyses, and submitting annual reports to ADCNR. Data would be comparable to and transferable to inform Gulf-wide conservation efforts. Four remote biopsy surveys of bottlenose dolphins would be conducted in Mobile Bay (Figure 2-14), Perdido Bay (Figure 2-15), and adjacent coastal waters defined as more than 2 kilometers from the shoreline to the 20 meter contour line (Figure 2-16) to obtain adequate seasonal sample sizes for genetic analysis. Each season, the goal would be to collect 40 samples within both Mobile Bay and Perdido Bay and 25 samples in the adjacent coastal waters (i.e., a total of 260 samples). Each seasonal remote biopsy survey would be conducted during a 42-day window using one boat staffed with four scientists. This survey window includes an average of 2 days for each full survey day required. Dolphin tissue samples would be stored at DISL, and analyses would include: (1) genetic analysis for stock structure, sex determination, species confirmation, and morphotype determination; (2) stable isotope and fatty acid analyses for diet assessment; (3) contaminant and harmful algal bloom toxin detection; and (4) mtDNA integrity and bioenergetics efficiency analysis. All samples (~260) would be analyzed for genetic structure, ~200 samples would be analyzed for diet assessment, and ~50 percent of samples would be randomly selected for contaminant analyses, depending on the quantity of sample available to accommodate the multiple analyses proposed and selected to represent each sampling location and time relative to sex and age class of the sampled population. Twelve seasonal (two per site per year) photo-ID mark-recapture surveys of dolphins would also be conducted at sites in Perdido Bay and Mobile Bay following established protocols outlined in Rosel et al. (2011). Abundance estimates for Mobile Bay and Perdido Bay would follow established methods for photo-ID mark-recapture surveys. Mobile Bay surveys would require two boats staffed with three scientists each. Photos would be collected using high-resolution digital photography of dorsal fin and flanks of each animal.

This project has a 4-year timeline. As proposed, identifying survey routes and selection and staff training would occur during spring 2019. Photo-ID surveys would begin during summer 2019 and repeated during summers 2020 and 2021, as well as winters 2019–2020 and 2021–2022. Remote biopsy surveys would be performed during winter 2019–2020 and summer 2020 and 2021. Tissue and data analysis would begin after the first surveys are completed and continue through the duration of the study. Final reporting is expected by winter 2022. Data would be stored in compliance with Trustee Council SOP.

Maintenance Requirements. There would be no operation and maintenance requirements specific to these actions. Maintenance of infrastructure (e.g., boats/vessels, freezers) is already occurring, and additional needs would not be created as a result of this project.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The project is estimated to cost $3,059,229, with implementation activities accounting for $2,761,117, oversight totaling $20,000, and contingency funds of $278,112.

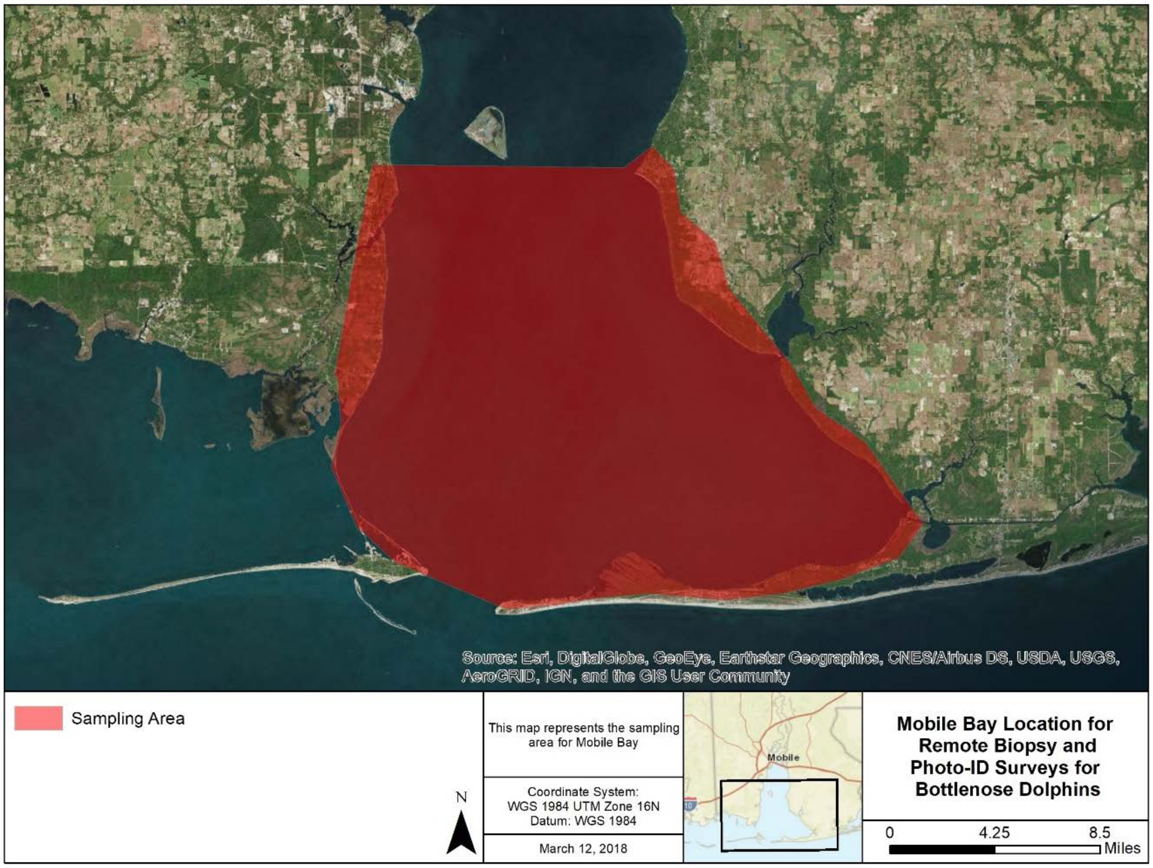


Figure 2-14: Mobile Bay Location for Remote Biopsy and Photo-ID Surveys for Bottlenose Dolphins

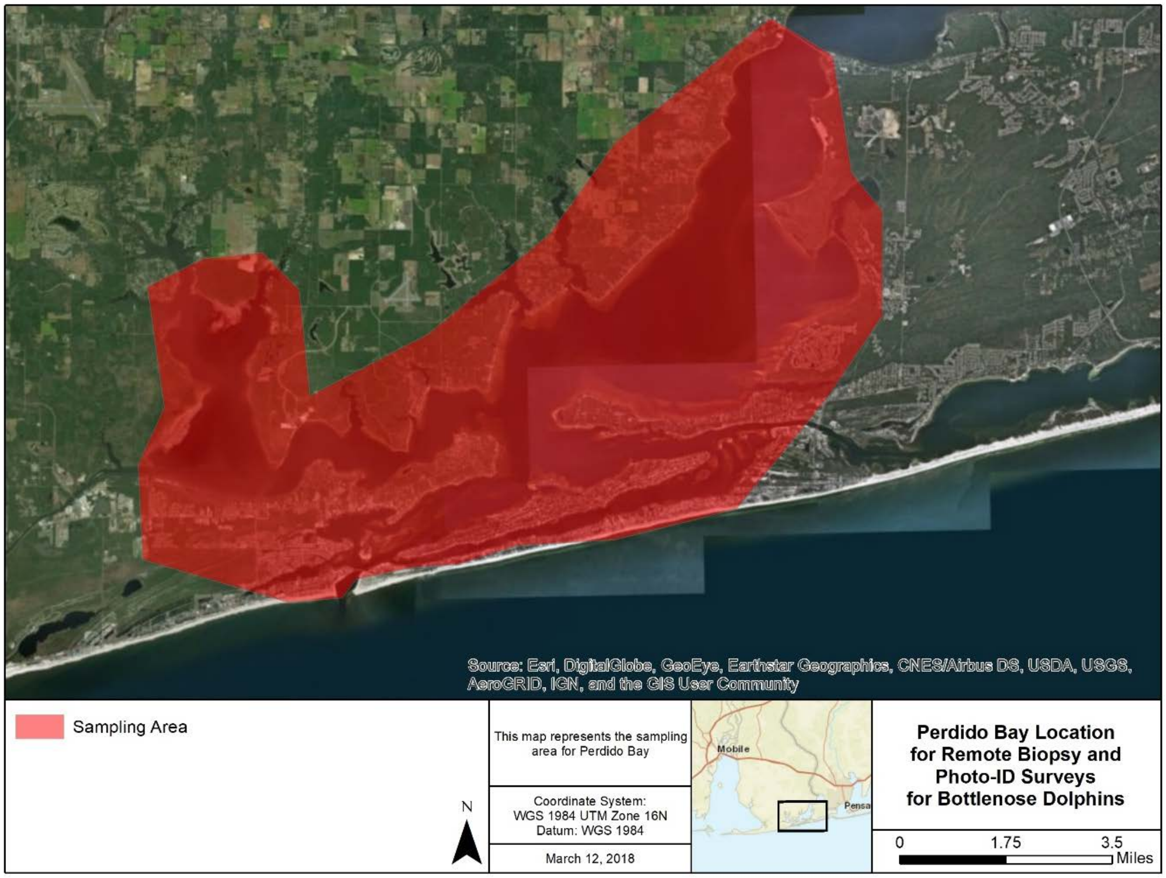


Figure 2-15: Perdido Bay Location for Remote Biopsy and Photo-ID Surveys for Bottlenose Dolphins

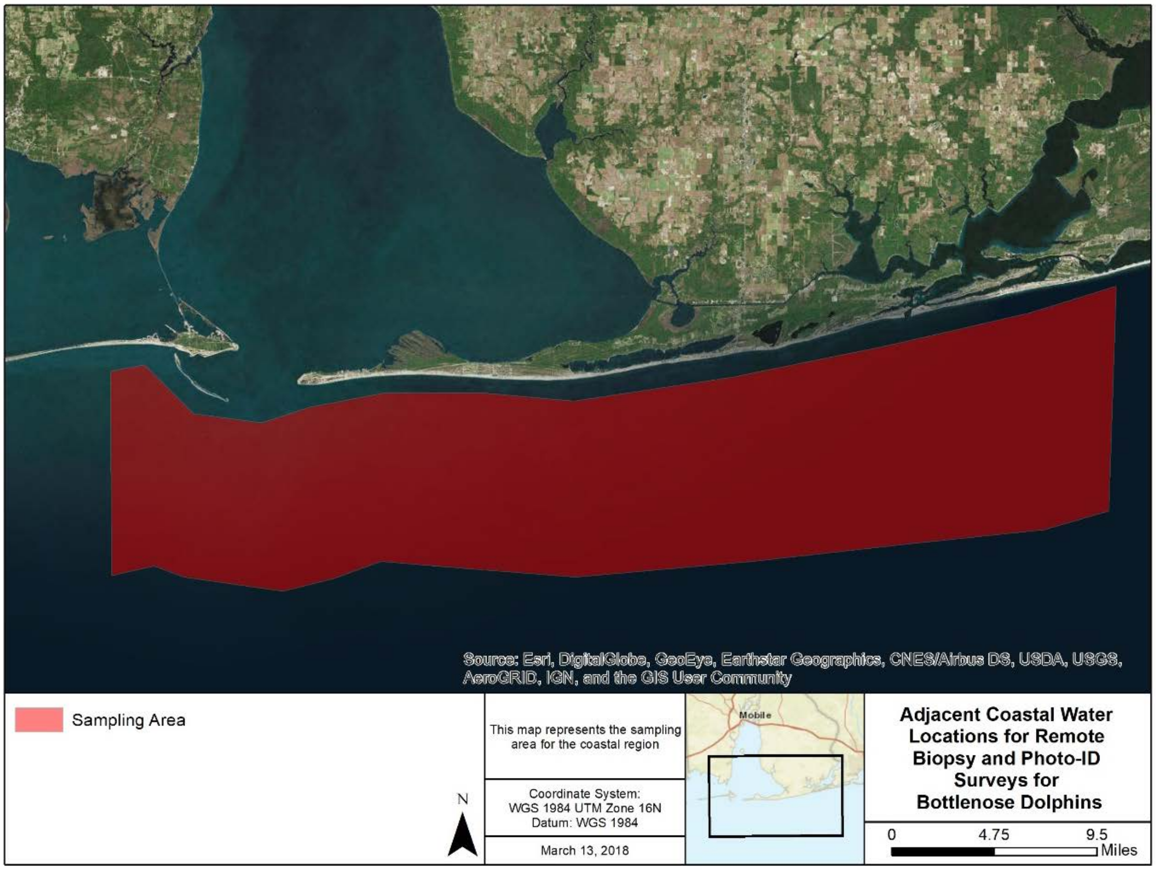


Figure 2-16: Adjacent Coastal Water Locations for Remote Biopsy and Photo-ID Surveys for Bottlenose Dolphins

2.6.5.4 Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education

Project Summary/Background. This project would reduce injury and mortality in Alabama estuarine bottlenose dolphins. This would be accomplished by: (1) increasing resources for ADCNR AMRD to dedicate toward MMPA-related activities and increasing patrol hours; (2) increasing awareness and understanding of the MMPA through education to assist state enforcement efforts; (3) conducting social science studies (e.g., interviews, focus groups) to help (a) characterize the nature and extent of the illegal feeding of dolphins, vessel-based harassment, and interactions of dolphins with hook and line fishing gear in Alabama, and (b) understand attitudes and perceptions of these user groups; (4) conducting systematic fishery surveys to help characterize the nature and extent of dolphin interactions with commercial fishing vessels and hook-and-line gear in Alabama; and (5) developing and implementing a comprehensive and targeted outreach plan based on the results of these social science studies and systematic fishery surveys. Enforcement of the MMPA is a crucial tool for reducing activities known to cause harm to marine mammals in state waters, and enhancing state enforcement would provide a key component to aid in reducing injury and mortality in Alabama estuarine bottlenose dolphins. NMFS and ADCNR would work collaboratively with AMRD law enforcement and NOAA Office of Law Enforcement to determine law enforcement training needs and how best to conduct consistent training and to identify specific training and educational needs/products. AMRD would hire a biologist to implement training of enforcement officers on the MMPA and public outreach topics related to marine mammals. The biologist would coordinate with the NMFS Office of Protected Resources to receive and stay up-to-date on issues and information related to marine mammal protection. ADCNR would be the implementing Trustee.

Resources and equipment necessary to increase and sustain state enforcement activities in hotspot areas would be identified, and state enforcement would be increased/enhanced in areas of need to reduce harm from illegal activities. A communication pathway between the state and federal agencies and law enforcement would be established to reevaluate needs on an ongoing basis to ensure consistency in enforcement enhancement efforts.

This project would also enhance public knowledge of marine mammal protection and the MMPA by contracting with a company who would conduct a social science survey, which would inform the creation of a well-informed, targeted education and outreach program for the Alabama coast. This program would inform the public and vessel operators about the harmful effects of illegal feeding and harassment of marine mammals in the Gulf of Mexico. Additionally, this project would contract with a company to conduct a fisheries survey to characterize dolphin interactions with commercial and recreational fisheries, which would also inform the education and outreach program. Educational components could include how commercial and recreational fisheries could help prevent these impacts within Alabama state waters. The biologist would oversee the contracting for the surveys and the implementation of the education and outreach program for coastal Alabama.

Construction Methodology (or Implementation Methodology) and Timing. AMRD would hire a full-time biologist to implement the elements in this project (i.e., enforcement training sessions, targeted public education and outreach, stakeholder collaboration) and to work on the CAST Protection: Enhancement and Education project (i.e., the position would be funded 50 percent from this project budget. See Section 2.6.4.5). This biologist would specifically focus on (1) characterizing dolphin interactions with commercial and recreational fishing vessels; (2) developing practices to reduce harmful and/or lethal impacts on dolphins from hook-and-line fishing related injuries, illegal feeding activities, and vessel-based ecotourism activities; (3) implementing a public outreach and education program based on the results of the social science and fisheries surveys; and (4) training AMRD enforcement personnel.

To develop the outreach and education program, the AMRD biologist, in coordination with NMFS, would specifically focus on contracting with a company(ies): (1) to conduct a systematic fisheries science survey to characterize dolphin interactions with commercial and recreational fisheries; and (2) to conduct social science studies (e.g., interviews, focus groups) to characterize the nature and extent of illegal feeding and harassment activities in Alabama state waters by user group. Conducting the fishery surveys and social science studies would help inform the identification, development, and implementation of ways to reduce harmful interactions with dolphins, including outreach and education.

This project is proposed to support 4 years of implementation. Year 1 would be used to (1) hire and train a biologist, (2) develop initial partnerships with local and federal stakeholders, and (3) develop and print enforcement training materials. Training AMRD law enforcement officers on the MMPA and safe marine mammal viewing practices would likely occur in the winter of years 2, 3, and 4, with the bulk of training in year 2 and supplemental training provided in years 3 and 4, as updates to viewing practices are added, and as potentially new harmful fisheries and viewing interactions are discovered. The biologist would contract with a company (or companies) to conduct social science and systematic fisheries surveys in years 2-3. These surveys would inform the development of a targeted outreach program, which would be developed and implemented by the biologist in years 3 and 4. Additional MMPA-related state law enforcement patrols would be conducted throughout the project life.

Maintenance Requirements. There would be no additional operation and maintenance requirements.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The project is estimated to cost $686,374, with implementation activities accounting for $633,690, oversight totaling $20,000, and contingency funds of $32,684.

2.6.6 Birds

Project screening in the Birds Restoration Type identified three bird projects and a no action alternative for the reasonable range of alternatives. Table 2-21 presents the three projects and their anticipated costs.

Table 2-21: Reasonable Range of Alternatives for the Birds Restoration Type

Reasonable Range of Alternatives	Project Cost
No Action/Natural Recovery	
Southwestern Coffee Island Habitat Restoration project—Phase I (E&D) (Costs shared with Wetlands, Coastal, and Nearshore Habitat)	$825,225
Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species	$2,322,144
Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species	$1,547,500

2.6.6.1 No Action Alternative/Natural Recovery

As required by OPA regulations, the Final PDARP/PEIS considered a "… natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (15 CFR 990.53(b)(2)). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of injured natural resources or to compensate for lost services. The 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. Although injured resources could presumably recover to at or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, and tiering this draft RP II/EA from the Final PDARP/PEIS and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery for the Birds Restoration Type as a viable alternative under OPA, and natural recovery is not considered further in this draft RP II/EA. Because NEPA requires consideration of a no action alternative as a basis for comparison of potential environmental consequences of the action alternatives(s), a no action alternative is evaluated in that sense within this draft RP II/EA. This analysis presents the conditions that would result if the AL TIG did not select to undertake any additional restoration for injured natural resources or to compensate for lost services at this time. The environmental consequences of such an alternative are evaluated in Chapter 12 for comparison with the remaining action alternatives.

2.6.6.2 Southwestern Coffee Island Habitat Restoration Project—Phase I (E&D)

This project would be the same as the one described in Section 2.6.1.7. The cost estimate for Phase I is $1,650,450. This project would help restore both Wetlands, Coastal, and Nearshore Habitats and Birds. Funding for this effort would therefore come from both Restoration Types: $825,225 from Birds and the remainder ($825,225) from the Wetlands, Coastal, and Nearshore Habitats Restoration Types.

2.6.6.3 Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species

Project Summary/Background. Additional information is needed to address information gaps for the metapopulation of tricolored heron (*Egretta tricolor*), little blue heron (*Egretta caerulea*), cattle egret (*Bubulcus ibis*), and white ibis (*Eudocimus albus*) breeding along the Alabama coast in the northern Gulf of Mexico to inform restoration planning. Specifically, the AL TIG has an interest in better understanding the contributions of individual nesting colonies in coastal Alabama to the metapopulation of Ardieds (herons, egrets, and bitterns) and daily and seasonal movements and habitat use (i.e., foraging sites versus roosting/loafing sites versus nesting sites) of individual birds to guide restoration of these DWH-injured resources within the coastal areas of Alabama. The four species targeted in this study are identified in the Southwestern Coffee Island Habitat Restoration Project—Phase I proposal and were injured by the DWH oil spill.

The Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species project would collect additional monitoring data needed to address critical information gaps that currently act as impediments to restoration planning for these species in Alabama. The proposed 4-year study would equip wading birds from target breeding colonies with a combination of satellite and very high frequency (VHF) transmitters and color leg-bands. Tracking these birds would generate monitoring data to help elucidate limiting habitat components for these species.

A number of potentially competing hypotheses have been posed for declines of coastal wading birds, nesting shorebirds, and seabirds in the Gulf of Mexico both pre- and post-DWH oil spill. The interaction of habitat loss and fragmentation, reductions in habitat quality, human disturbance at nesting colonies, and apparently increasing diversity and abundance of predators continue to negatively affect breeding populations of these species (Hunter et al., 2006; Rodgers and Smith, 2012). These habitats are extremely vulnerable to anthropogenic habitat loss and degradation (Withers, 2002; LeDee et al., 2008). Availability of nesting habitat can limit local bird populations (Newton, 1998). Results from this effort should allow simultaneous evaluation of this issue and other potentially competing hypotheses (e.g., predator access to nesting habitat and lack of foraging habitat) (Lebreton et al., 1992). The data collected from this project are expected to provide useful insights into these questions and would assist the AL TIG in planning more effective restoration of bird species injured by the DWH oil spill.

This project would take advantage of synergies with other important initiatives being implemented in the same area. The study area falls within the Mobile Bay Initiative Area of the Gulf Coast Joint Venture (Manlove et al., 2002), and the little blue heron is identified as a priority species for the Gulf Coast Joint Venture (Vermillion, 2016). The Gulf of Mexico Avian Monitoring Network identifies little blue heron and tri-colored heron in their list of Birds of Conservation Concern for the northern Gulf of Mexico (Gulf of Mexico Avian Monitoring Network, 2017). Both cattle egrets and white ibis are typically found in good numbers along the Alabama coast and may serve as reasonable indicators for other colonial nesting waders (Ogden et al., 2014a, 2014b). Presently, habitat protection (including reducing human disturbance) at known nesting areas in conjunction with habitat restoration or creation of high quality nesting sites (e.g., deposited dredge material; Erwin et al., 1995; Erwin, 1996; Mallach and Leberg, 1999) remain conservation priorities. USDOI would be the implementing Trustee for this project.

Construction Methodology (or Implementation Methodology) and Timing. This project proposes a telemetry tracking study of the movements of four bird species breeding along the Alabama coast—tricolored heron, little blue heron, cattle egret, and white ibis. The goals of the study are to better understand the extent to which declines in colonial nesting wader populations result from habitat limitations versus other potential causes such as increased prevalence of predators or human disturbance. The proposed study would (1) determine daily and seasonal movements among nesting colonies at three important breeding areas—Mississippi Sound, Gaillard Island, and Perdido Bay (Figure 2-17); (2) determine seasonal and annual home ranges for birds marked at sites identified above and document fidelity to specific nesting colonies, dispersal timing, and regional dispersal among colonies; (3) document average foraging distances, time away from nests, and important foraging areas within the study area; and (4) determine weekly and seasonal habitat use within the study area.

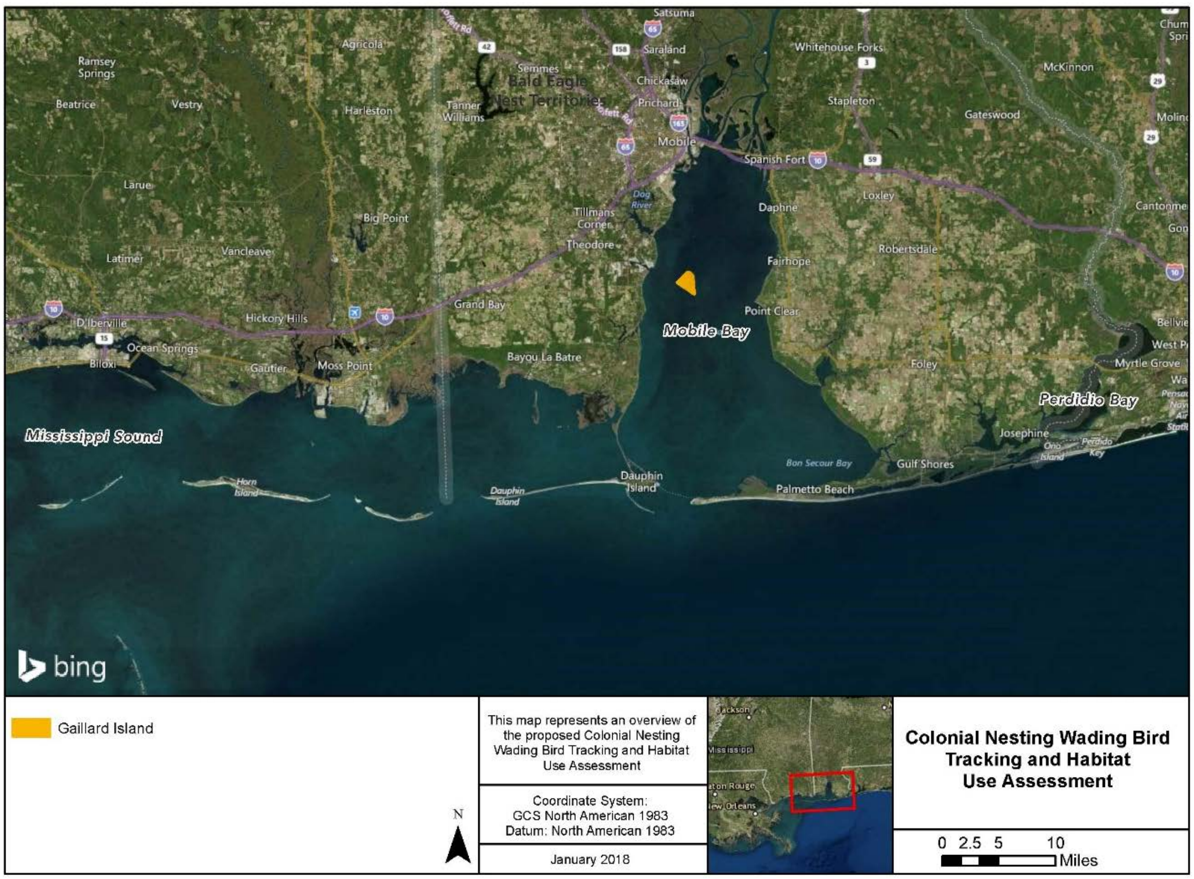


Figure 2-17: Colonial Nesting Wading Bird Tracking and Habitat Use Assessment Study Area

Using a combination of satellite transmitters and color leg-banding, all four species (tricolored heron, little blue heron, cattle egret, and white ibis) would be marked and monitored if available in sufficient numbers and within the constraints of the project budget. Researchers would work with project leads and the other Trustees to determine primary target species of study if necessary to modify the project. Researchers would capture adult female or fledgling birds of each of the four species, with the goal of equipping 30 birds/species with satellite GPS transmitters (120 total) and 50 per species with VHF transmitters (200 total) in nesting colonies within each of the three general areas identified above. Females of all four species would be captured either during the pre-incubation stage or during incubation using modified noose mats near nests. Satellite transmitters (Microwave Telemetry, Inc.

PTT-100 5 gram or 9.5 gram w/ harness) would be placed on individual birds weighing more than 300 grams for either the 8 or 9.5 gram packages to adhere to a desired 3 percent transmitter/body weight threshold (Phillips et al., 2003; but see Barron et al., 2010; Vandenabeele et al., 2011). In addition, if practicable, researchers would also equip birds and nestling siblings with color-leg bands and USFWS aluminum bands. Both birds with transmitters and color leg-banded individuals (when resighted) would provide information on important foraging areas, inter- and intra-annual movements, home range size, nest site fidelity, and dispersal. This project would potentially involve the USFWS, USGS, ADCNR, ADEM, DISL, and target universities as collaborators.

Banding permits and state/federal scientific permits are required to capture, handle, and mark birds. Researchers would be required to supply applicable Institutional Animal Care and Use Committee permits before work begins. Satellite tags are custom built and would take approximately 3 months upon receipt of funds for tags to be acquired for deployment. Bird captures would begin the first breeding season after project funding and mobilization.

Maintenance Requirements. This project does not include construction or any maintenance of infrastructure; therefore, there are no maintenance requirements.

Project Monitoring Summary. A MAM plan was not developed for this alternative because it was not selected as a preferred alternative in this draft RP II/EA.

Costs. The proposed cost for the Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species project is $2,322,144. These funds are solely directed at the telemetry tracking study and project oversight, supervision, and contingency.

2.6.6.4 Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species

Project Summary/Background. This project would initiate monitoring studies expected to inform and enhance future restoration planning for key colonial nesting wading bird species along the Alabama coast that were injured by the DWH oil spill and would occur in the same manner as Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species, as described in Section 2.6.6.3. The goals of the study are to better understand the extent to which declines in colonial nesting wading bird populations result from habitat limitations versus other potential causes such as increased prevalence of predators or human disturbance. The project would address the same four objectives described for the four species alternative: (1) determine daily and seasonal movements among nesting colonies at three important breeding areas—Mississippi Sound, Gaillard Island, and Perdido Bay (Figure 2-17); (2) determine seasonal and annual home ranges for birds marked at sites identified above and document fidelity to specific nesting colonies, dispersal timing, and regional dispersal among known breeding colonies within the study area; (3) document average foraging distances, time away from nests, and important foraging areas within the study area; and (4) determine weekly and seasonal habitat use within the study area. This project alternative would sample only two of the target species to provide information that is of comparable value in characterizing colonial wading bird movements and habitat use. The project would include 30 satellite tags per species (60 total) and 50 VHF per species (100 total). This combination of tagging would allow for more precise estimates of seasonal and annual survival of post-fledgling juveniles or adult females, respectively. Site-specific survival estimates for either age-class would provide invaluable information as to potential spatial variation in this important demographic parameter. USDOI would be the implementing Trustee for this project.

Construction Methodology (or Implementation Methodology) and Timing. This project proposes a telemetry tracking study of the movements of two wading bird species breeding along the Alabama coast. Target species include tricolored heron and either little blue heron or white ibis, based on additional recommendations from Trustee bird experts. The proposed 4-year study would employ a combination of satellite and VHF transmitters in conjunction with color leg-banding to generate the monitoring data to help elucidate limiting habitat components for these species in a fashion described by the Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species project (Section 2.6.6.3). Banding permits and state/federal scientific permits are required to capture, handle, and mark birds. Researchers would be required to supply applicable Institutional Animal Care and Use Committee permits before work begins. Satellite tags are custom built and would take approximately 3 months upon receipt of funds for tags to be acquired for deployment. Bird captures would begin the first breeding season after project funding and mobilization.

Maintenance Requirements. This project does not include construction or any maintenance of infrastructure; therefore, there are no maintenance requirements.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The proposed cost for the Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species project is $1,547,500. These funds are solely directed at the telemetry tracking study and project oversight, supervision, and contingency.

2.6.7 Oysters

Project screening in the Oysters Restoration Type identified five oyster projects and a no action alternative for the reasonable range of alternatives. Table 2-22 presents the four projects and their anticipated costs.

Table 2-22: Reasonable Range of Alternatives for the Oysters Restoration Type

Reasonable Range of Alternatives	Project Cost
No Action/Natural Recovery	
Oyster Cultch Relief and Reef Configuration	$480,262
Side-scan Mapping of Mobile Bay Relic Oyster Reefs	$104,229
Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study	$2,949,472
Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study	$2,018,109
Oyster Grow-Out and Restoration Reef Placement	$962,370

2.6.7.1 No Action Alternative/Natural Recovery

As required by OPA regulations, the Final PDARP/PEIS considered a "… natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (15 CFR 990.53(b)(2)). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of injured natural resources or to compensate for lost services. The 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. Although injured resources could presumably recover to at or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, and tiering this draft RP II/EA from the Final PDARP/PEIS and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery for the Oysters Restoration Type as a viable alternative under OPA, and natural recovery is not considered further in this draft RP II/EA. Because NEPA requires consideration of a no action alternative as a basis for comparison of potential environmental consequences of the action alternatives(s), a no action alternative is evaluated in that sense within this draft RP II/EA. This analysis presents the conditions that would result if the AL TIG did not select to undertake any additional restoration for injured natural resources or to compensate for lost services at this time. The environmental consequences of such an alternative are evaluated in Chapter 13 for comparison with the remaining action alternatives.

2.6.7.2 Oyster Cultch Relief and Reef Configuration

Project Summary/Background. Since 2005, the oyster density on publicly harvested reefs in Alabama has been in decline as a result of damage and silting associated with hurricanes Ivan and Katrina and drought conditions that have made conditions conducive to the proliferation of the predatory oyster drill *Thais haemastoma* on historically productive reefs.

The ADCNR AMRD is proposing to investigate the merits of deploying different types of cultch material in various configurations to facilitate positive settlement and growth of oysters on selected reef areas in Mobile Bay, Alabama, building on work they previously conducted with DISL. This project has three primary objectives: (1) determine if there are differences in oyster settlement, growth, and survival on reefs of differing levels of relief and/or orientation relative to currents, (2) determine optimum reef material relief needed to restore oyster density on specific reefs within historical reef areas in which hydrology parameters such as oxygen and salinity and oyster recruitment and survival are highly variable, and (3) estimate the cost/benefits of deploying cultch in certain configurations as opposed to traditional cultch broadcast methods. AMRD experts expect this alternative would provide useful insights into improving methods for locating cultch sites in coastal Alabama similar to other studies that have been conducted (Gregalis et al., 2008), selecting appropriate cultch materials, and constructing reefs with the most effective degree of relief. ADCNR would be the implementing Trustee for this project.

Construction Methodology (and Implementation Methodology) and Timing. The construction phase of the project would include the deployment of oyster shell, limestone rock, and fossilized oyster shell in three experimental configurations including mounding, elongated furrows, and control plots using typical cultch broadcasting methods. Within the designated area(s), nine mounds, six furrows, and six control plots would be created. Control plots would be created using traditional cultch broadcast methods at 100 percent 1-inch bottom coverage in the vicinity of experimental plots. Control plots would cover approximately the same area as the experimental plots. Final project site selection, cultch height, and reef area would be determined by the results of pre-monitoring surveys. For the purposes of this project, two sites have been tentatively selected, including a 36-acre reef approximately 1 mile north-northeast of the mouth of East Fowl River (2014 Reef Planting Area), and Denton Reef (70 acres), located approximately 3 miles southeast of the mouth of East Fowl River, designated as Area VI by AMRD (Figure 2-18). Physical conditions would determine which type of plot would be used in each project site. For example, previous physical data indicate dissolved oxygen at the benthic (bottom) interface at Denton Reef is consistently hypoxic (low oxygen) or anoxic (no oxygen) and not conducive to oyster growth (Figure 2-19). Therefore, using mounds at Denton Reef could place spat in areas of more suitable dissolved oxygen by elevating the oysters in the water column where dissolved oxygen is higher.

Using this proposed design, nine mounds (three cultch treatments at three different depths and with three different cultch types) would be created at Denton Reef. Three control plots would be established at this site. The control plots would use traditional oyster shell cultch and broadcast methods.

On the proposed site near the mouth of Fowl River, six furrow sites would be created to evaluate the effects of relief, reef material, and orientation relative to currents on settlement, growth, and survivorship. Three control plots using traditional cultch shell deployed in traditional 1-inch bottom coverage would be established at this site.

Following the construction phase, these mounds and furrows and control plots would be monitored for oyster settlement and growth annually for 3 years. Individual mound construction including total area and maximum height would depend on the depth of the bottom in which it is placed to ensure compliance with the USACE authorized minimum clearance requirement depth. The area of the base of each mound would be calculated to support reef material to attain the desired relief. Length, height, and orientation of each furrow would also depend on depth and direction of currents at study site. It is anticipated that the width of each furrow would be approximately 2 feet wide, although the actual width would depend on the cascading effect of material deployed to a specific maximum height. Furrows would be planted a minimum of 2 feet apart.

Planning, pre-monitoring, and site selection are anticipated to take 3 months (January–March of project year). The invitation to bid and bid process is anticipated to take 1 month (March of project year). Construction is anticipated to take 1 month and conclude by May of the first year. Construction would include acquiring, transporting, and deploying cultch material on areas and in configurations as determined by AMRD staff. It is anticipated that those selected to do the work would transport cultch by push boat and barge to the site and deploy the material off the deck using skid steers, excavator shovels, or high pressure water hoses. High pressure water hoses may only be used to distribute shell onto control plots.

Maintenance Requirements. Maintenance of the cultch mounds and furrows including the deployment of additional cultch may be needed in the event of a disaster such as a hurricane or tropical storm. A contingency for maintenance is included in the project budget.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The proposed cost for the project is $480,262. These funds are solely directed at project implementation, monitoring and project oversight, supervision, and contingency.

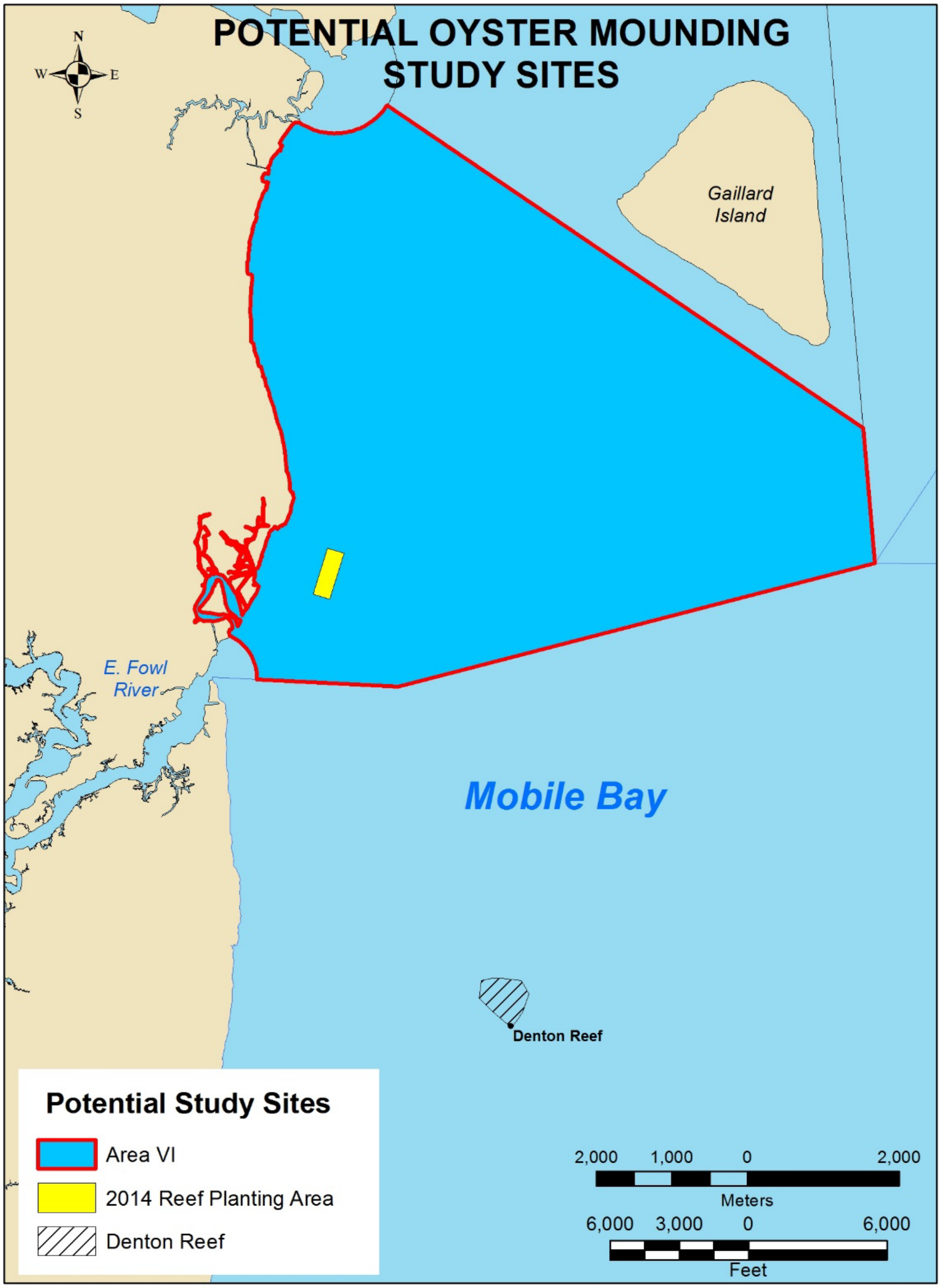


Figure 2-18: Potential Oyster Mounding Study Sites

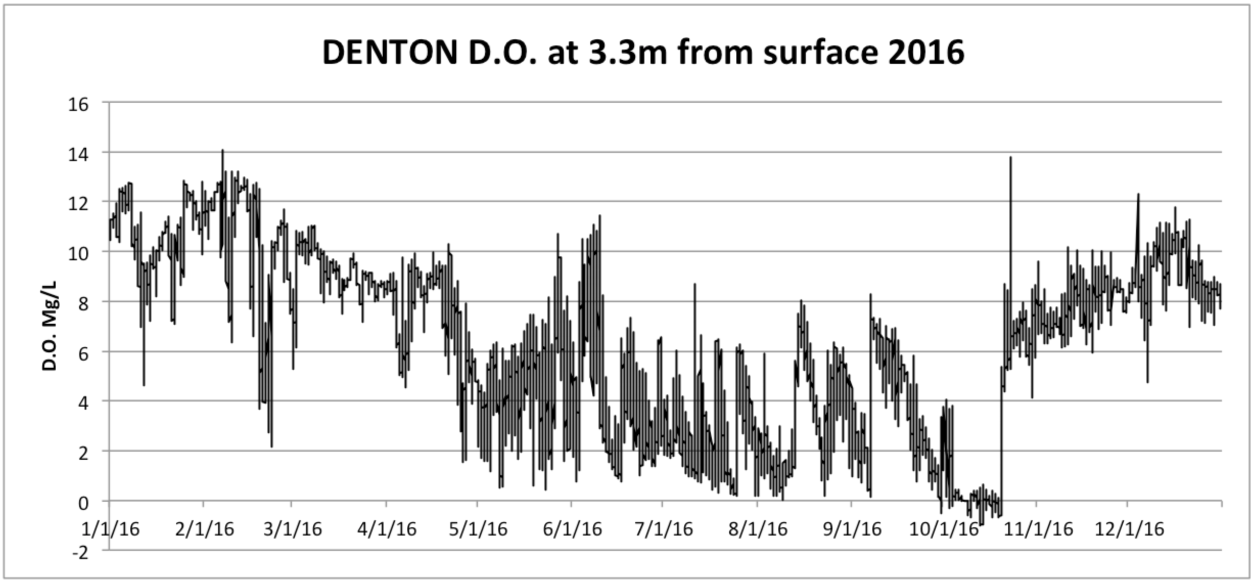


Figure 2-19: Dissolved Oxygen at the Benthic Interface at Denton Reef

2.6.7.3 Side-scan Mapping of Mobile Bay Relic Oyster Reefs (E&D)

Project Summary/Background. Recent larval flow modeling and recruitment studies have indicated that flow patterns and larval transport occur in a southerly direction down the western shore of Mobile Bay from oyster populations in northern Mobile Bay to oyster reefs in lower Mobile Bay and then in a westerly direction towards Mississippi Sound (Choong-Ki, Park, and Powers, 2013; Powers et al., 2009; Choong-ki et al., 2010; Gregalia, Johnson and Powers, 2009). Oyster larvae transported from upper Mobile Bay contribute to a significant portion of recruitment on Alabama's public reefs in lower Mobile Bay and Mississippi Sound and help populate Cedar Point and Heron Bay Reefs. Historically, Hollinger's Island and Whitehouse Reefs, located in middle Mobile Bay, were productive oyster reefs and bridged the large gap between oyster populations in upper Mobile Bay and the public reefs of lower Mobile Bay. Currently Hollinger's Island Reef is moderately productive, and Whitehouse Reef is non-productive as a result of recent hydrological conditions, including persistent low dissolved oxygen on the water bottom.

This project would use sonar technology to identify benthic areas of mid- to lower-Mobile Bay that are suitable to support cultch material for oyster reef restoration (Figure 2-20). Depending on the side-scan results, these areas could be used to reestablish oyster populations through initial efforts to seed reef areas with hatchery-raised, high-density oyster spat setting. The project would survey the current extent and conditions of the relic oyster reefs identified in the 1968 reef surveys contracted by AMRD and other water bottoms not surveyed. Approximately 8,847 acres of non-contiguous, state-owned water bottoms have been identified for side-scan mapping in mid- to lower Mobile Bay based on a survey of living and relic oyster reefs conducted in 1968. An additional 5,153 acres of oyster bottoms have been identified in upper Mobile Bay to quantify the location and extent of existing oyster resources that contribute to larval production and recruitment to lower Mobile Bay oyster reefs. ADCNR would be the implementing Trustee for this project.

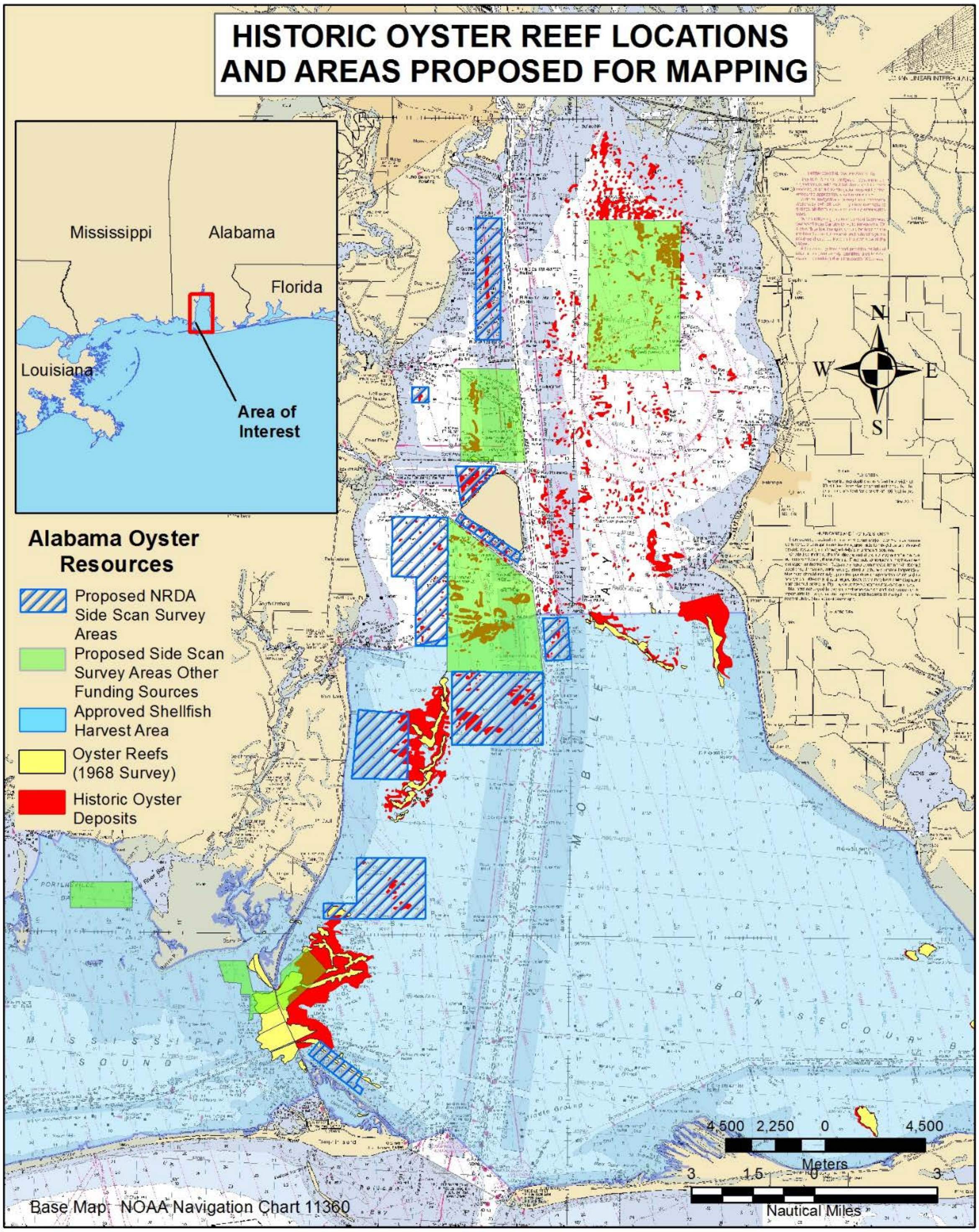


Figure 2-20: Historic Oyster Reefs and Shell Deposits Based on 1968 Survey and Areas Proposed for Side-scan Mapping in Upper and Lower Mobile Bay

Construction Methodology (or Implementation Methodology) and Timing. Side-scanning activities may be performed by an entity with side-scan sonar capabilities, in addition to AMRD staff. To identify priority areas for side scanning and for contract specifications, grids comprising 2 kilometers by 2 kilometers would be superimposed on a map of historical oyster surveys within Mobile Bay. Side scanning and image processing would occur during the following 4 months. Once completed, AMRD staff would verify the data from random areas in mapped areas with high reflectance via hand dredge and pole to confirm the extent of bottom hardness and sediment burden. The gathered information would be used to prioritize areas for future oyster reef restoration.

The surveys are expected to be completed within 1 year. Afterward, the next 4 months of the project would entail project planning and identification of target areas for side-scan mapping and contract development. Side scanning and image processing would occur during the next 4 months. The final 4 months would consist of ground-truthing mapped areas. The overall project would last approximately 2 years.

Maintenance Requirements. Operation and maintenance requirements are only related to side scanning and field sampling to confirm side-scan images. Data would be stored on AMRD computers.

Project Monitoring Summary. This project only addresses E&D; no MAM plan is required at this time.

Costs. The cost estimate is $104,229 with implementation activities accounting for $55,725, oversight totaling $39,029, and contingency funds of $9,475. The budget would be used to fund the side-scan activities and AMRD staff including two biologists and four biologist aides to develop side-scanning areas to target, contract development and to conduct side scanning of the remaining areas and field sampling to verify image information. Indirect costs are also included in the budget.

2.6.7.4 Oyster Hatchery at Claude Peteet Mariculture High Spat Production with Study

Project Summary/Background. The proposed project would construct an oyster hatchery at the existing Claude Peteet Mariculture Center in Gulf Shores and would provide operation and maintenance funding for the facility for a 4-year project period (Figure 2-21). Project components would also include remote setting and deployment from the AMRD facility at Dauphin Island. Additionally, the project would result in the deployment of cultch material, including spat on shell, to areas identified as suitable for oyster growth. The 45-acre Claude Peteet Mariculture Center complex is located on the north side of the Gulf Intracoastal Waterway (GIWW). The oyster spat produced from this project would be used for oyster restoration projects in Mobile Bay, which has experienced reduced oyster production compared to the early 20th century. This project would use information gained from mapping relic oyster reefs identified in the late 1960s as described in the Side-scan Mapping of Mobile Bay Relic Oyster Reefs Project, above, as part of reef restoration. Information from areas mapped with side-scan technology in previous efforts and as part of another proposed project in this restoration plan would be assessed to determine suitability (i.e., hardness of bottom, sediment burden) for spat deployment. Side-scan images would be used to identify water bottoms suitable for cultch and spat placement in areas recognized as conditionally approved for oyster harvest, while other areas would be identified in conditionally restricted or restricted waters. Spat produced in the proposed hatchery would be deployed to both areas as conditions allow. Cultch material could also be deployed as needed.

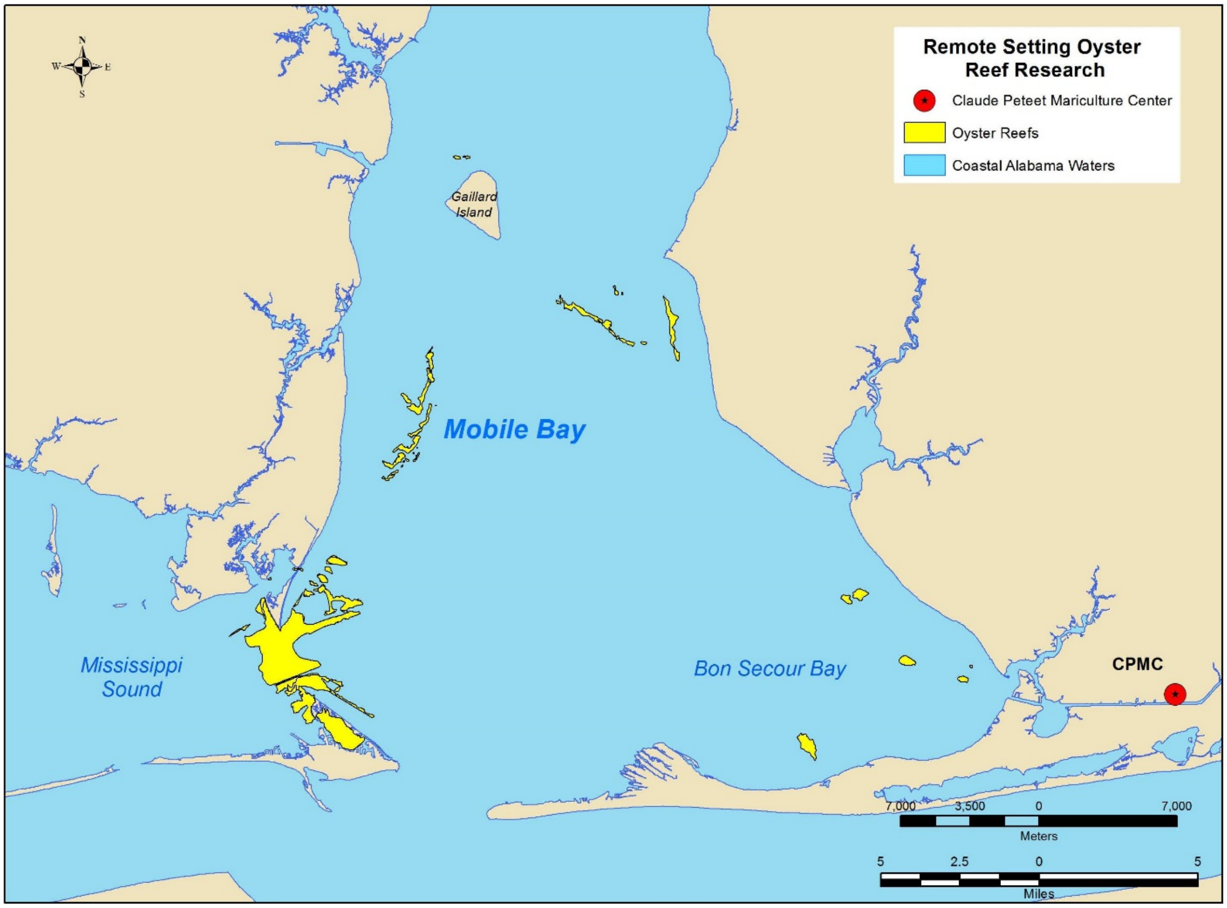


Figure 2-21: Location of Claude Peteet Mariculture Center and Historical Oyster Reefs in Mobile Bay

Additionally, a comprehensive oyster restoration plan would be developed for coastal Alabama and funded through this restoration plan. The purpose of the comprehensive oyster restoration plan is to develop a long-term strategy to develop and sustain stable and resilient oyster populations in coastal Alabama. The plan would characterize local oyster populations, including an understanding of larval transport and recruitment trends, as well as environmental factors that affect them. The plan would aim to restore oyster abundance and spawning stock to support a regional oyster larvae pool sufficient for healthy recruitment levels to subtidal and nearshore oyster reefs. The plan would analyze existing literature, pull together data from previous and ongoing projects (including side-scan sonar, larval transport studies, and habitat suitability index), develop overall restoration goals and priorities, and provide specific recommendations to meet overall restoration goals and objectives.

ADCNR would be the implementing Trustee of this project. ADCNR would also lead the development of the comprehensive oyster restoration plan in collaboration with the AL TIG, ADCNR resource managers, NOAA, and other oyster restoration experts. The plan would take approximately 12 months to complete and guide utilization of remaining Oysters Restoration Type funds in the AL TIG.

Proposed Infrastructure (or Proposed Improvements). The proposed project would create an oyster hatchery at the existing Claude Peteet Mariculture Center. Four settlement tanks would also be installed at Dauphin Island. The project would provide operation and maintenance funding for the facility for a 4-year project period. A new greenhouse building is proposed for protecting the oyster hatchery tanks and equipment. The greenhouse would be approximately 60 by 96 feet (5,750 cubic feet) and constructed with sidewalls, ventilation, and mechanical devices to maintain temperature within the structure (Figure 2-22). The proposed greenhouse structure would have two bays (adjoining rooms) and would replace two of four existing greenhouses of the same dimensions. The proposed greenhouse would be on the footprint of the existing structure (Figure 2-23). As part of this proposed hatchery project, broodstock holding and spawning tanks and larvae settlement tanks, water chillers/heaters, pumps, air blowers, and filtration systems would be purchased and installed within or adjacent to the new greenhouse.

Additionally, an existing concrete pad at the AMRD office on Dauphin Island, which serves as a remote setting facility, would be expanded to approximately 70 by 25 feet, and a roof structure would be constructed over the pad. The covered pad would contain four settlement tanks (three existing, one new), to which water would be supplied from Little Dauphin Island Bay. The concrete pad is approximately 60 feet from the water source.

Construction Methodology (or Implementation Methodology) and Timing.

Oyster Culture: The project would entail acquisition of wild oyster broodstock from local waters and maintaining that broodstock in existing ponds at the Claude Peteet Mariculture Center. Before spring spawning, oyster broodstock would be gathered from the ponds and held in tank systems (within the newly constructed hatchery which is described below) where the temperatures would be held at levels to prevent spawning but maintain adult oysters in pre-spawning ripe condition. As needed, small batches of oysters would be retrieved from the holding tanks and induced to spawn in smaller temperature-controlled systems. Released eggs and sperm would be combined to produce fertilized larvae, which would be moved into culture systems and fed daily rations of paste algae. These larvae would remain in the culture system for approximately 14 to 20 days until they develop into pediveligers (footed larvae). Once the larvae have reached the pediveliger state, they would be transferred to setting tanks where they would be given approximately 10 to 14 days to set on the provided substrate. During the setting period, spat would be fed live algae sourced naturally from brackish water sources. After the setting period, the cultch material and spat would be removed from the tanks and placed on a contracted barge for transport to suitable areas in Mobile Bay and Mississippi Sound identified by AMRD staff (see Figure 2-21).

Hatchery Infrastructure: The proposed hatchery would install a static water culture system. This static water culture system consists of broodstock holding and spawning tanks, larvae settlement tanks, water chillers/heaters, pumps, air blowers, and filtration systems. Once the static water culture system is installed, the proposed oyster hatchery is anticipated to produce up to approximately 65 million, 10-day-old spat (24-day-old oysters) each year.

Contracts would be developed during the first 3 months of the project for the greenhouse structure at the Claude Peteet Mariculture Center and barge transport of spat. The greenhouse is anticipated to be installed within 6 months (June assuming a January start date) and barge contracting would be completed within 8 months (August) of the start of the project. The tanks, heater chillers, and filtration would be purchased during the first 6 months and installed 3 months after the installation of the greenhouse. Oyster broodstock would be acquired in months 9 to 12 (September–December), and the first spawning cycle would begin around the fourth month (April) of years 2 through 4. The barge would be contracted for deployment to occur 4 days per month or 20 days per season during years 2 through 4.

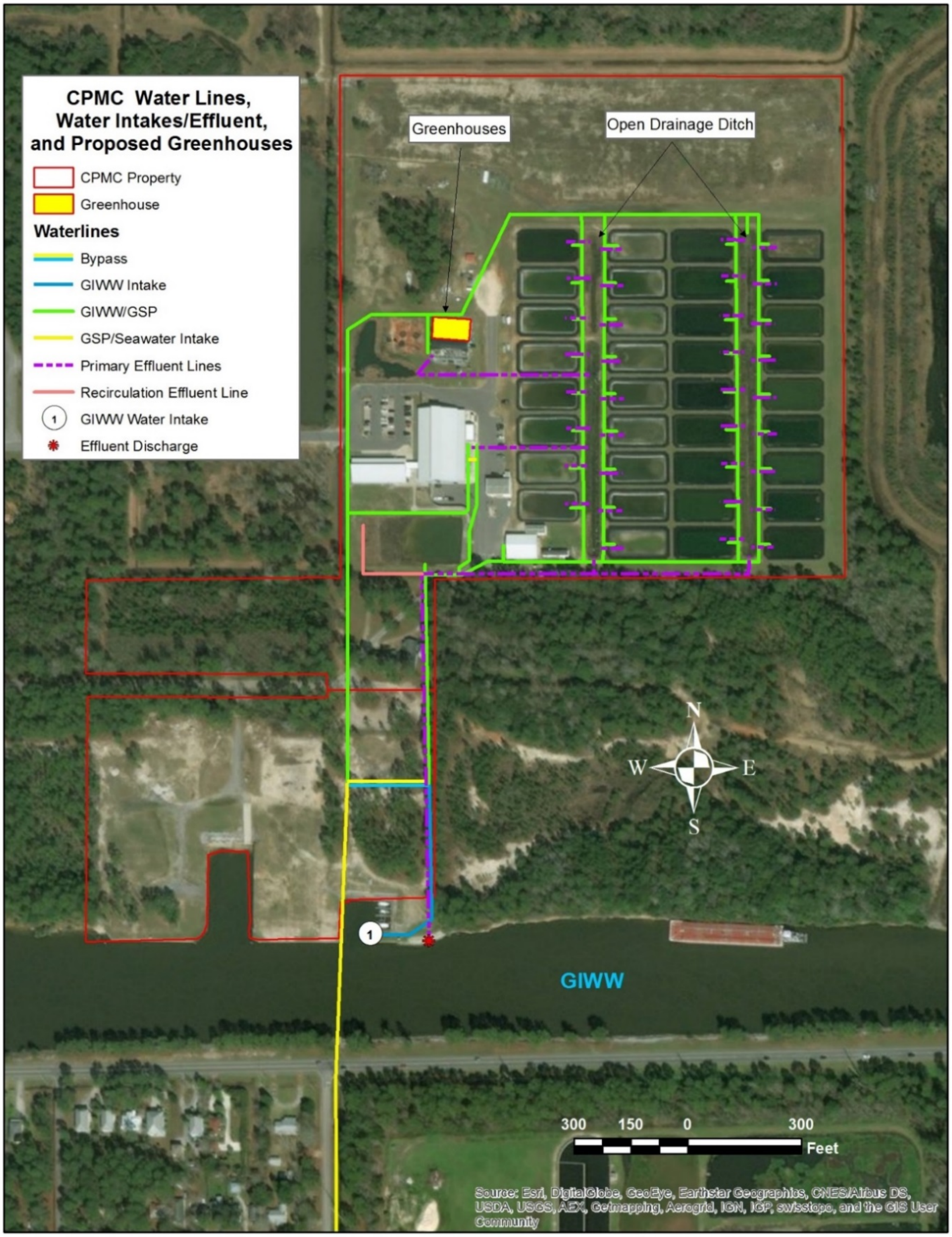


Figure 2-22: Location of Greenhouse and Existing Infrastructure, Claude Peteet Mariculture Center

Figure 2-23: Location of Proposed Pad Extension and Existing Water Intakes, Claude Peteet Mariculture Center

In addition to the oyster culture facility at the Claude Peteet Mariculture Center, an additional settlement tank and a simple structure to cover existing and proposed additional settlement tanks, are proposed at the AMRD office on Dauphin Island. The current 50 by 20-foot concrete pad would be expanded to 70 by 25 feet, and a simple roof structure would be constructed to cover the 70 by 25-foot structure and protect the settlement tanks. Currently, three settlement tanks are in place at the existing concrete pad. The dimensions of each tank are 30 feet long by4 feet high by 3 feet wide. The volume is approximately 2,693 gallons. Each settlement tank holds 20 cultch cages. Each cultch cage holds 0.38 cubic yard of cultch. The existing water intake and effluent pipes would likely be reconfigured to accommodate the additional tank. Design and construction of the proposed addition would likely take 6 months and occur during the first winter (non-spawning season) the project is funded.

Comprehensive Oyster Plan: The comprehensive oyster restoration plan would be developed within the first year after project funding. No construction activities are associated with the development of this plan development. Upon finalization, the AL TIG would make the Comprehensive Oyster Plan publicly available on the Trustee Council website.

Maintenance Requirements. Within the first few months of the project the AMRD would hire one full-time biologist to oversee purchasing of equipment and installation of tanks, pumps, and the heater/chiller installation. Three biologist aides would be hired within 6 months of the project start to assist with hatchery infrastructure installation and spawning, larvae, and spat production. During years 2 through 4, a biologist aide within existing AMRD biological staff would be used during the summer to assist with oyster spat care and deployment. In addition, a portion of the operating budget would be set aside to pay for electricity, maintenance, replacement of equipment, and algae paste for larval culture.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The project is estimated to cost $2,949,472, with implementation activities accounting for $2,516,574, oversight totaling $252,303, and contingency funds of $180,595. The budget would be used to fund annual salaries and benefits for one new biologist for 4 years and three biologist aides for 32 weeks during year 1 and 52 weeks per year for years 2 through 4. The equivalent of 3 weeks of one biologist aide from existing AMRD staff at Claude Peteet Mariculture Center would be used during spat deployment activities during years 2 through 4. The equivalent of 8 weeks of one biologist aide from existing AMRD staff at Claude Peteet Mariculture Center would be used during spat settlement tank pad construction and tank set up, spat culture and deployment activities during years 1 through 4.

2.6.7.5 Oyster Hatchery at Claude Peteet Mariculture Center–Low Spat Production without Study

Project Summary/Background. This project would occur in the same manner as Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study, described in Section 2.6.7.4. However, this project would differ in that it would be smaller in scope, using smaller setting tanks, which would produce approximately half the number of 10-day-old spat. Given the smaller settlement tanks, the other parts of the project reduce proportionally. The broodstock holding and spawning tanks, water chillers/heaters, pumps, air blowers, and filtration systems are all smaller or less powerful than in the full scale version. Staff time would also be reduced. Operations and maintenance costs for electricity, maintenance, replacement of equipment, and algae paste for larval culture would be reduced in this project. This alternative does not include funding the development of a comprehensive oyster restoration plan, as described in Section 2.6.7.4.

Maintenance Requirements. Within the first few months of the project the AMRD would hire one full-time biologist to oversee purchasing of equipment and installation of tanks, pumps, and the heater/chiller installation. Three biologist aides would be hired within 6 months of the project start to assist with hatchery infrastructure installation and spawning, larvae, and spat production. During years 2 through 4, a biologist aide within existing AMRD biological staff would be used during the summer to assist with oyster spat care and deployment. In addition, a portion of the operating budget would be set aside to pay for electricity, maintenance, replacement of equipment, and algae paste for larval culture.

Project Monitoring Summary. A MAM plan was not developed for this project because it was not selected as a preferred alternative in this draft RP II/EA.

Costs. The reduced scope project is estimated to cost $2,018,108. This includes a total of $1,735,333 for implementation activities, oversight totaling $161,463, and a contingency of $121,312.

2.6.7.6 Oyster Grow-Out and Restoration Reef Placement

Project Summary/Background. This project would establish up to three protected oyster gardening grow-out areas located in Grand Bay, Portersville Bay, and Bon Secour Bay (Figure 2-24) and use these adult sized oysters for restoration reef placement. The project, to be conducted and managed by the Alabama Cooperative Extension System in coordination with its other oyster gardening activities, would grow out oysters to at least 1 year old, place these oysters on existing reef sites, including existing complementary living shoreline sites in Mobile Bay and Mississippi Sound as well as cultched sites, and identify and prioritize future restoration reef locations (including nearshore living shorelines and intertidal reefs). Additionally, the project would include monitoring the success in terms of oyster survival and reproduction of both the grow-out areas and restoration sites to determine effective techniques to increase the sustainability of oyster populations in Alabama. This project would build on other efforts such as ACF's Oyster Shell Recycling Program and the Mobile Bay Oyster Gardening effort, which recently received approval to expand into Little Lagoon. It would also build on a recently completed NFWF-funded project that demonstrated successful plantings and subsequent spawning of advanced stock-sized oysters in Mobile Bay and Mississippi Sound can potentially reduce aggressive predation by oyster drills. ADCNR would be the implementing Trustee for this project.

Construction Methodology (or Implementation Methodology) and Timing. Once the necessary permits are obtained within the first year, 12 to 20 pilings (12-inches diameter) would be installed with a vibratory hammer. A wire or rope would connect the pilings, to which oyster baskets (cages) would be attached at regular intervals and hang, suspended in the water column. A single layer of oysters would be placed on the bottom of each oyster basket. Each site would occupy approximately 0.5 acre. The targeted volume of each grow-out site is 20,000–25,000 oysters using the Oyster Gardening program only, or 48,000–50,000 oysters per site when supplemented from the Auburn University Shellfish Lab hatchery. Planning and permitting is expected to take approximately 8 to 12 months. Installation and setup of the grow-out sites is expected to take approximately 6 months. Monitoring would be conducted for the duration of the project (approximately 5 years). Periodic maintenance may be necessary following severe weather events or other situations that would disturb the grow-out sites. If the structures were disturbed, they would need to be repaired and/or reinstalled. Further, the grow-out sites would be adaptively managed over time to retrofit the structures with the most effective predator controls.

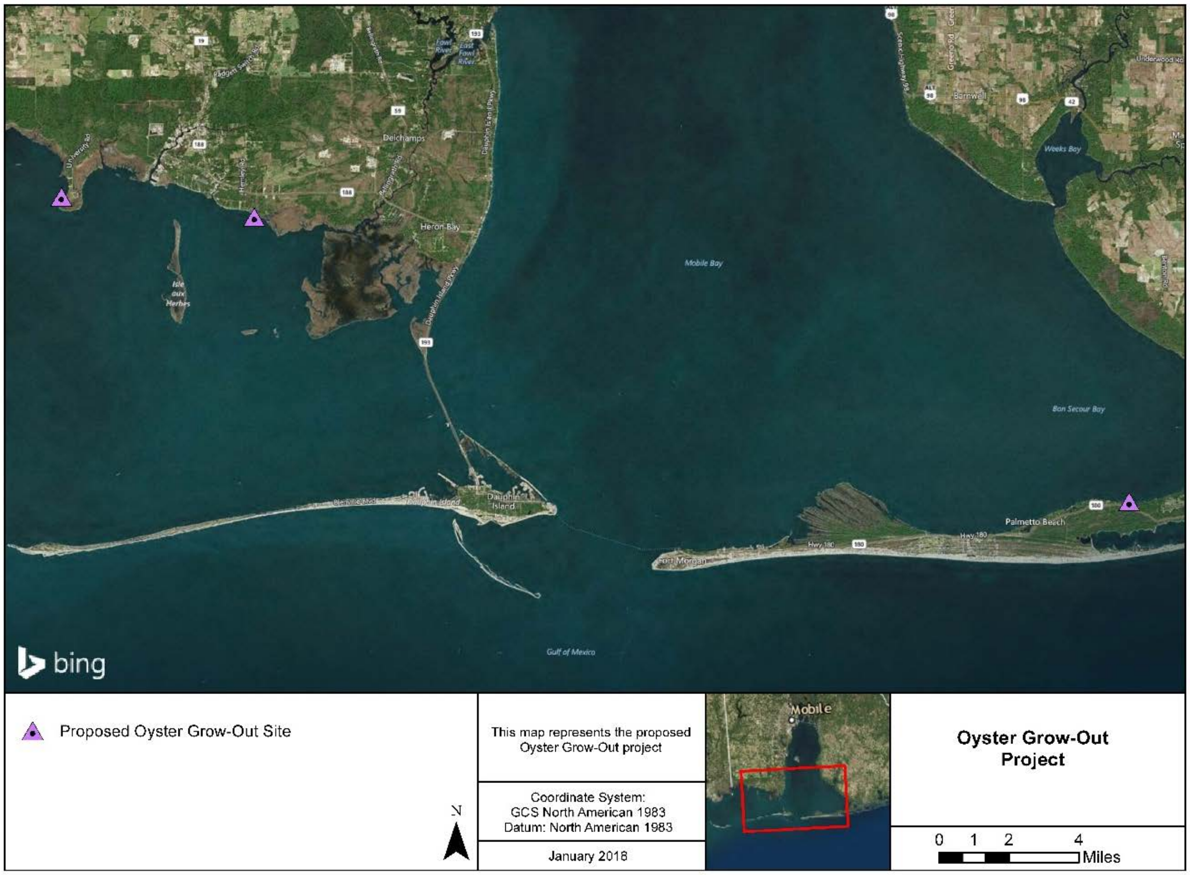


Figure 2-24: Oyster Grow-Out Mariculture Center in Mobile Bay

Oysters would be grown at the selected grow-out sites for 1 year within suspended oyster baskets that would be installed on pilings. Each of the grow-out sites are on privately leased riparian areas and would be managed by the Auburn University Marine Extension and Research Center. Then, the cultch, live oysters, and spat on shell, would be transferred via boat from the grow-out sites to reefs, living shorelines, and intertidal areas that are located in waters classified as Conditionally Approved for oyster harvesting by the Alabama Department of Public Health: Seafood Division. The Alabama Cooperative Extension System would work with the AL TIG, AMRD, and other restoration practitioners to determine the need for additional locations for other oyster gardening program grow-out sites. If additional sites were needed, they would be identified in Mobile Bay, Bon Secour Bay, Mississippi Sound, and Perdido Bay.

Maintenance Requirements. Periodic maintenance may be necessary following severe weather events or other situations that would disturb the grow-out sites. In the event that the structures were disturbed, they would need to be re-installed. Further, the grow-out sites would be adaptively managed over time in order to retrofit the structures with the most effective predator controls.

Project Monitoring Summary. A MAM plan would be developed and implemented as part of this project; a draft MAM plan is included in Appendix G.

Costs. The project is estimated to cost $962,370, with planning and design accounting for $60,000.00, implementation activities accounting for $190,200, monitoring accounting for $80,000, oversight totaling $554,170, and contingency funds of $78,000.

2.7 PREFERRED ALTERNATIVE

In Table 2-23, the AL TIG identifies its preferred restoration alternatives, i.e., those alternatives that are proposed to be selected for Restoration Type funding, in whole or in part, in this draft RP II/EA. Table 2-23 also identifies AL TIG's non-preferred alternatives. Table 2-24 identifies those alternatives ultimately proposed to be selected for MAM funding, in whole or in part. Table 2-25 then provides a summary of the total funds ($35,051,153) that the AL TIG proposes to distribute under this RP II/EA to fund both the preferred Restoration Type alternatives and the proposed MAM activities.[25]

The alternatives preferred for Restoration Type funding in this draft RP II/EA include projects for implementation and E&D only. All restoration alternatives evaluated in this draft RP II/EA (the preferred and non-preferred, and those proposed for MAM funding) underwent a thorough review under OPA and NEPA. This included an evaluation of a No Action/Natural Recovery Alternative for each Restoration Type. The OPA and NEPA analyses demonstrated that some of the alternatives not selected as preferred in this draft plan may provide benefits to the physical and biological environments and to human use and socioeconomics resources, without causing major adverse environmental impacts. Accordingly, restoration projects not proposed as preferred in this draft RP II/EA could be identified as preferred in a future restoration plan.

Finally, given the unprecedented temporal, spatial, and funding scales associated with the DWH oil spill restoration effort, the DWH Trustees, including those represented on the AL TIG, recognize the need for robust MAM to support the overall DWH restoration planning and implementation effort. As a result, one of the programmatic goals established in the Final PDARP/PEIS is to "Provide for Monitoring, Adaptive Management, and Administrative Oversight to Support Restoration Implementation." The Final PDARP/PEIS also discusses the appropriateness of funding scientific activities associated with implementing restoration for each Restoration Type, which would help resolve key uncertainties that currently limit restoration planning and implementation. To this end, in addition to the preferred Restoration Type alternatives, the AL TIG proposes to fund two restoration projects with MAM funds, in whole or in part, in this draft RP II/EA. These MAM projects aim to inform and enhance future restoration, consistent with the Final PDRAP/PEIS (Section 5.5.15)

[25] This information is also summarized in Table 1-2.

Table 2-23: Range of Alternatives and Identification of Preferred Alternatives

Alternative	Preferred/Not Preferred/MAM Funded	Rationale, if not Preferred	Project Costs, if Preferred
Wetlands, Coastal, and Nearshore Habitats			
Perdido River Land Acquisition (Molpus Tract)	Not Preferred	Project would restore a different type of wetlands from the injured wetlands and, therefore, has less of a nexus to injured natural resources than the other projects for this Restoration Type. The project may be evaluated in a future restoration plan.	
Magnolia River Land Acquisition (Holmes Tract)	Preferred	--	$4,144,162
Weeks Bay Land Acquisition (East Gateway Tract)	Preferred	--	$4,247,000
Weeks Bay Land Acquisition (Harrod Tract)	Preferred	--	$3,606,900
Lower Perdido Islands Restoration Phase I (E&D)	Preferred	--	$994,523
Southwestern Coffee Island Habitat Restoration Project—Phase I (also evaluated under the Wetlands, Coastal, and Nearshore Habitats Restoration Type) (E&D)	Preferred	--	$825,225
Habitat Projects on Federally Managed Lands			
Little Lagoon Living Shoreline	Preferred	--	$210,999
Restoring the Night Sky: Assessment, Training, and Outreach (also evaluated under the Sea Turtles Restoration Type)	Preferred	--	$183,003

Alternative	Preferred/Not Preferred/MAM Funded	Rationale, if not Preferred	Project Costs, if Preferred
Nutrient Reduction (Nonpoint Source)			
Bayou La Batre Nutrient Reduction	Not Preferred	Due to its smaller amount of agricultural production, the Bayou La Batre watershed, although having the potential to benefit from implementation of the types of agricultural conservation practices proposed in this project, would not generate benefits to the same extent as other nutrient reduction projects included in this draft RP II/EA due to there being fewer opportunities for implementing nutrient reduction measures.	
Toulmins Spring Branch (E&D)	Preferred	--	$479,090
Fowl River Nutrient Reduction	Preferred	--	$1,000,000
Weeks Bay Nutrient Reduction	Preferred	--	$2,000,000
Sea Turtles			
CAST Conservation Program	Preferred	--	$935,061
CAST Triage	Preferred	--	$622,915
CAST Habitat Usage and Population Dynamics	Preferred	--	$1,631,696
CAST Protection: Enhancement and Education	Preferred	--	$906,874
Restoring the Night Sky: Assessment, Training, and Outreach (also evaluated under the Habitat Projects on Federally Managed Lands Habitat Restoration Type)	Not Preferred/MAM Funded	Preferred for Habitat Projects on Federally Managed Lands funding, and identified as an AL TIG MAM priority proposed for MAM funding in this plan.	

Alternative	Preferred/Not Preferred/MAM Funded	Rationale, if not Preferred	Project Costs, if Preferred
Marine Mammals			
Enhancing Capacity for the Alabama Marine Mammal Stranding Network	Preferred	--	$2,432,389
Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health	Not Preferred/MAM Funded	Identified as an AL TIG MAM priority proposed for MAM funding in this plan.	
Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education	Preferred	--	$686,374
Birds			
Southwestern Coffee Island Habitat Restoration Project—Phase I (also evaluated under the Wetlands, Coastal, and Nearshore Habitats Restoration Type)	Preferred	--	$825,225
Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species	Not Preferred	Data collected under the Two Species option would provide sufficient information to inform restoration at a lower cost than this Four Species option.	
Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species	Preferred	--	$1,547,500
Oysters			
Oyster Cultch Relief and Reef Configuration	Preferred	--	$480,262
Side-scan Mapping of Mobile Bay Relic Oyster Reef (E&D)	Preferred	--	$104,229
Oyster Hatchery at Claude Peteet Mariculture Center—High Spat With Study	Preferred	--	$2,949,472

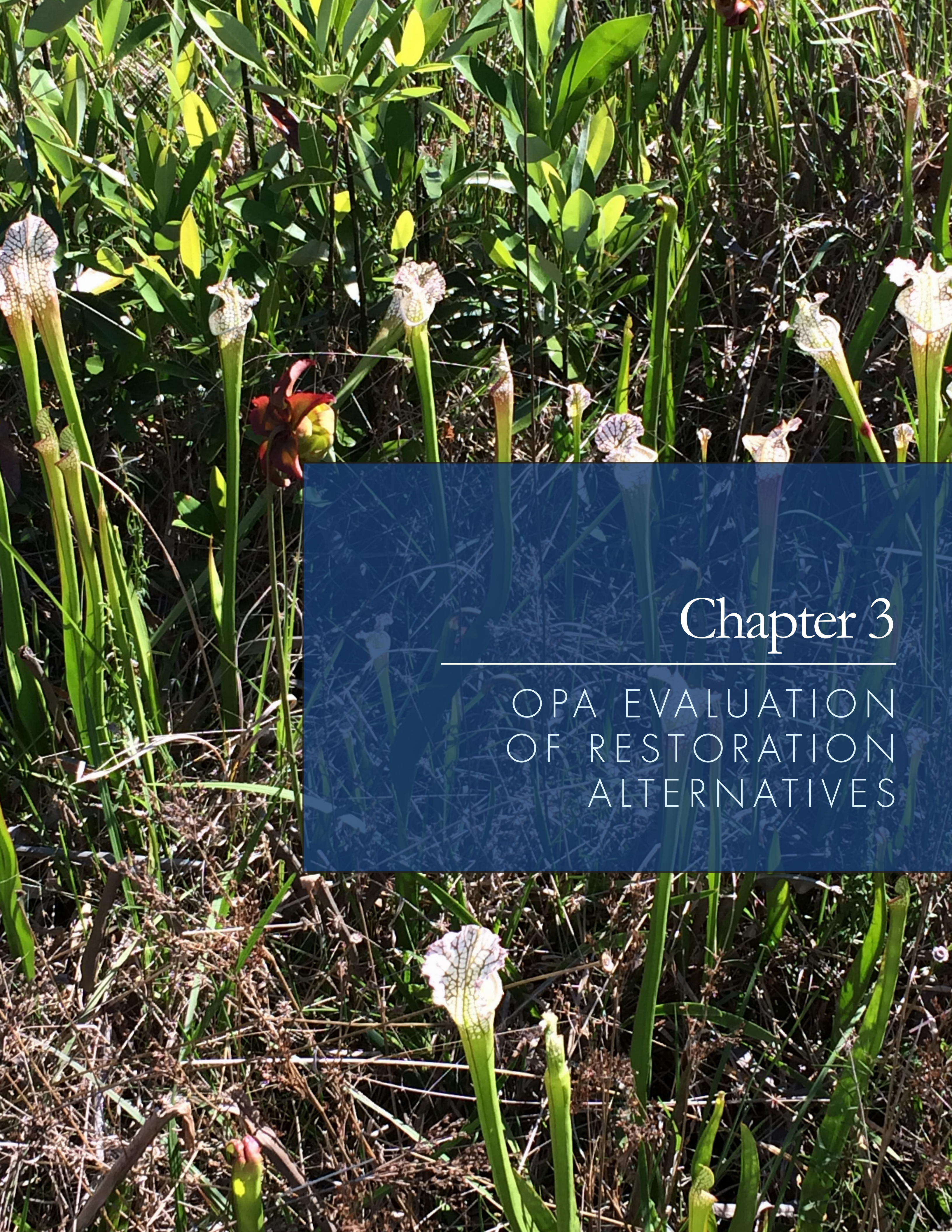
Alternative	Preferred/Not Preferred/MAM Funded	Rationale, if not Preferred	Project Costs, if Preferred
Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Without Study	Not Preferred	Determined to be less cost-effective than the High Spat alternative, and production level would not sufficiently address oyster restoration needs. Absence of planning study would make the alternative less effective.	
Oyster Grow-Out and Restoration Reef Placement	Preferred	--	$962,370
Total Funding for Preferred Restoration Type Alternatives			**$31,775,269**

Table 2-24: Identification of Projects Proposed for MAM Funding

Alternative	Costs (MAM)
Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health	$3,059,229
Restoring the Night Sky: Assessment, Training, and Outreach (also proposed for funding under the Habitat Projects on Federally Managed Lands Habitat Restoration Type)	$216,655
MAM Total	**$3,275,884**

Table 2-25: Summary of Preferred Restoration Type Alternatives and Proposed MAM Projects

	Costs
Total Preferred Restoration Type Alternatives	$31,775,269
Total MAM Proposed MAM Funding	$3,275,884
Grand Total	$35,051,153



Chapter 3

OPA EVALUATION OF RESTORATION ALTERNATIVES

3.0 OPA EVALUATION OF RESTORATION ALTERNATIVES

According to the NRDA regulations, Trustees are responsible for identifying a reasonable range of restoration alternatives (15 CFR 990.53(a)(2)) that are to be evaluated according to the OPA standards (15 CFR 990.54). Chapter 2 described the screening and identification of the proposed reasonable range of alternatives for evaluation under OPA. This chapter discusses the considerations the AL TIG applied when performing the OPA evaluation of these alternatives. This evaluation process is informed by the OPA criteria found in 15 CFR 990.54(a), as well as by additional deliberations on restoration goals and objectives conducted by the AL TIG.

For each alternative, the OPA criteria are evaluated independently and a determination is made as to how well the alternative meets each individual criterion. In applying the OPA criteria, the AL TIG took into account the following considerations.

1. **Trustee goals and objectives.**[26] The OPA analysis addresses the extent to which each alternative is expected to meet the Trustees' goals and objectives in returning the injured natural resources and services to baseline and/or compensating for interim losses. This encompasses the Final PDARP/PEIS goals and approaches for each resource type considered in this restoration plan as well as restoration goals tailored to the Alabama Restoration Area by the AL TIG and, where available, information provided by the Strategic Frameworks developed by the Trustees. Under this criterion, the focus is on each restoration alternative's nexus to the relevant injuries as described in the Final PDARP/PEIS, and the nature, magnitude, and impact of the ecological and other natural resource benefits that the alternative is expected to provide the public.
2. **Cost to carry out the alternative**. The Trustees consider whether the full costs of the alternative over the life of the project (including land acquisition, restoration, training, associated studies, staffing, E&D, construction, management, monitoring, maintenance, and contingency) are clearly specified and described. In addition, the analysis determines whether the costs of the alternative are reasonable, appropriate, and comparable to other equivalent restoration alternatives.
3. **Likelihood of success**. The Trustees consider factors bearing on a project's likelihood of success as part of their decision about whether to recommend a project for implementation. Examples of important questions for evaluating likelihood of success include: Does an alternative propose approaches or techniques that the Trustees have previously executed successfully? Is the restoration approach or technique routinely used? Are there significant permitting or other impediments to implementation or successful realization of project benefits at this time in Alabama?
4. **Prevents future injury and avoids collateral injury.** OPA requires evaluating the extent to which each alternative would prevent future injury as a result of the incident and/or avoid collateral injury as a result of implementing the alternative. None of the alternatives considered in this draft RP II/EA prevent future injuries from the incident. For the OPA analysis, the AL TIG's analysis focuses on whether the restoration alternative has the potential to cause direct or indirect collateral environmental injuries. For non-E&D projects, these considerations are

[26] Throughout this chapter, "Trustee goals and objectives" refers to the aggregate set Trustee restoration objectives. This terminology is intended to encompass the Final PDARP/PEIS goals, considerations derived from the Strategic Frameworks, and goals specifically tailored to the Alabama Restoration Area by the AL TIG.

covered in greater detail in the "Environmental Consequences" sections of this RP II/EA (Chapters 7–13).

5. **Benefits more than one natural resource/service.** Although the projects considered in RP II/EA generally are funded from only a single Resource Type allocation, the AL TIG considers the importance of multiple resource benefits by evaluating whether alternatives convey multiple ecosystem service benefits that make them more valuable to the public. Examples might include Wetlands, Coastal, and Nearshore Habitats projects that potentially benefit birds, turtles, or marine mammals.
6. **Effects on public health and safety.** The AL TIG considers whether any aspects of the alternative could affect public health and safety. These include both positive benefits to public health as well as adverse impacts that cannot be effectively mitigated when the project is implemented.

3.1 WETLANDS, COASTAL, AND NEARSHORE HABITATS PROJECTS

3.1.1 Overview of Restoration Goals and Approaches

For Wetlands, Coastal, and Nearshore Habitats restoration projects, the AL TIG developed a reasonable range of alternatives based on the following goals and objectives derived from the Final PDARP/PEIS (Section 5.5.2) and state-specific considerations. For Wetlands, Coastal, and Nearshore Habitats, the Final PDARP/PEIS goals are to:

- Restore a variety of interspersed and ecologically connected coastal habitats in each of the five Gulf states to maintain ecosystem diversity, with particular focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities.
- Restore for injuries to habitats in the geographic areas where the injuries occurred, while considering approaches that provide resiliency and sustainability.
- While acknowledging the existing distribution of habitats throughout the Gulf of Mexico, restore habitats in appropriate combinations for any given geographic area. Consider design factors, such as connectivity, size, and distance between projects, to address injuries to the associated living coastal and marine resources and restore the ecological functions provided by those habitats.

For screening purposes, the AL TIG required locating Wetlands, Coastal, and Nearshore Habitats restoration projects for this plan in a geographically defined set of high priority coastal locations (see Section 2.3.1) that the TIG identified as having the greatest potential for generating the types of ecological benefits identified in the Final PDARP/PEIS and where synergies with the activities of other TIGs (e.g., Mississippi and Florida) might be realized.

The projects selected for inclusion in the Wetlands, Coastal, and Nearshore Habitats reasonable range of alternatives employ the following restoration approaches identified in the Final PDARP/PEIS.

1. Create, restore, and enhance coastal wetlands.
2. Restore oyster reef habitat.
3. Create, restore, and enhance barrier and coastal islands and headlands.
4. Restore and enhance dunes and beaches.
5. Restore and enhance SAV.

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

The remainder of this section provides OPA analysis for the six individual Wetlands, Coastal, and Nearshore Habitats projects advanced to the reasonable range of alternatives, with specific reference to each OPA criterion.

3.1.2 Perdido River Land Acquisition (Molpus Tract)

3.1.2.1 Project Summary

For the Perdido River Land Acquisition (Molpus Tract) project, ADCNR would acquire and permanently conserve 1,391 acres of coastal habitat located on the Perdido River. The acquisition of this property would include an appropriate land protection instrument (i.e., deed restriction or conservation easement) to ensure that the purpose of restoration, as described in this plan, is maintained in perpetuity. The Molpus Tract borders approximately four miles of undeveloped riverfront and is immediately south of and contiguous with ADCNR’s Perdido Wildlife Management Area. Of the 1,391 acres proposed for purchase, approximately 686 acres are uplands and 705 acres are wetlands. The uplands are dominated by mixed slash and loblolly pine. The palustrine-forested wetlands contain cypress and Atlantic white cedar growth. Upon acquisition of the land, ADCNR would develop a long-term plan for managing and restoring the property as part of Perdido Wildlife Management Area. The project proposal includes funds for restoration of the tract, which would involve clearing and prescribed burns to facilitate hydrologic restoration of the property, returning the acreage to longleaf pine over time. No construction is proposed as part of the restoration plan for this site, although future passive recreational opportunities and infrastructure may be considered in the development of the long-term management plan, particularly integration of the site into existing plans for a Perdido River “blueway trail” that would provide canoe and kayak camping opportunities along the river.

3.1.2.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore a variety of interspersed and ecologically connected coastal habitats with particular focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities.*

This project has the potential to indirectly address the Trustees’ goal of restoring ecologically connected coastal habitat with a focus on maximizing ecological functions for a range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities. Protecting 1,391 acres of habitat, including adjacent upland habitat, ensures the extensive on-site wetlands system continues to provide a wide array of ecological functions and services in perpetuity. The PDARP/PEIS approach utilized is to protect and conserve marine, coastal, estuarine, and riparian habitats. These include valuable habitat for fish and wildlife species, including land bird species injured by the spill. The project would potentially meet the AL TIG Wetlands, Coastal, and Nearshore Habitats restoration goals (Section 2.4.2) through permanent protection and active restoration of the site. Through the food web and other ecological connections (e.g., maintenance of water quality) provided by the Perdido River, protection of the site has a nexus to Alabama coastal areas injured by the spill. However, the on-site palustrine wetlands differ from wetlands directly oiled by the spill, and in that regard, this project’s nexus to the spill is not as direct as it is for Wetlands, Coastal, and Nearshore Habitats projects that are closer to the coast. This project also makes a contribution to the Trustees’ goal of implementing initiatives that restore habitats in appropriate combinations for a given geographic area through consideration of connectivity, size, and distance between projects. In this case, the project would become part of a broader interstate effort involving DWH restoration activities in both Alabama and Florida that are designed to restore and conserve the lower Perdido River watershed. This broader effort supports the development of a model for the use of DWH funds to foster interstate cooperation on integrated ecosystem planning and restoration.

3.1.2.3 Cost to Carry Out the Alternative

The proposed cost for the Perdido River Land Acquisition (Molpus Tract) project is $4,324,460. These funds are solely directed to acquiring the land and conducting appropriate planning and restoration activities on the property. The budget for the alternative includes funds for land acquisition, planning, ecological restoration, maintenance, monitoring, project oversight and supervision, and contingency. The land acquisition costs included in the budget are based on an estimate and are consistent with previous conservation purchases in the area. A Yellow Book appraisal would be completed prior to land acquisition. The AL TIG reviewed the estimated restoration, monitoring, project oversight and supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.1.2.4 Likelihood of Success

The alternative's goal of protecting, conserving, and restoring the Perdido River property has a high likelihood of success. The land proposed for acquisition has a willing seller, and it is anticipated that negotiations would lead to its acquisition at a reasonable price. Land acquisitions of this type are a proven approach for achieving the types of conservation goals identified by the AL TIG for this property. The proposed restoration techniques have been widely and successfully implemented for recreating longleaf pine habitat capable of supporting a more diverse range of native flora and fauna. Finally, ADCNR, which would hold title to the property and manage the restoration and future maintenance, already successfully manages numerous other properties similar to the one proposed for acquisition, including Perdido Wildlife Management Area into which this tract is proposed to be merged.

3.1.2.5 Avoids Collateral Injury

The Perdido River Land Acquisition (Molpus Tract) project would preserve a healthy on-site ecosystem, which in turn could play an indirect role in maintaining a healthier and more resilient downstream estuarine ecosystem in Perdido Bay. Positive impacts would not be expected to be accompanied by any direct or indirect collateral natural resource injuries because acquisition and restoration are the only planned activities. This is discussed more fully in Chapter 7 of this draft RP II/EA.

3.1.2.6 Benefits More Than One Natural Resource or Service

This project has the potential to benefit other downstream natural resources—such as oysters, fish, marine mammals, and sea grasses—that rely on maintenance of existing water quality levels. However, the extent of these benefits has not been evaluated or enumerated by the AL TIG. The project would enhance the ecological health and resilience of the connected food web and other ecological resources of the Perdido Bay estuarine system, furthering the restoration goals of the Trustees. In addition, although infrastructure has not been proposed as part of this restoration plan, the site has added potential to provide passive recreational benefits through connections to the proposed Perdido River "blueway" canoe and kayak trail. However, the project would restore a different type of wetland from those injured by the DWH oil spill, and therefore has less of a nexus to injured natural resources than the other projects proposed for this Restoration Type.

3.1.2.7 Effects on Public Health and Safety

The Perdido River Land Acquisition (Molpus Tract) project would not affect public health and safety. Preservation of the property and restoration of longleaf pine savannahs are not expected to have impacts on public health or safety. Any passive uses associated with increased recreational activity on the property are not expected to cause any impacts on public health and safety.

3.1.2.8 Summary OPA Evaluation: Perdido River Land Acquisition (Molpus Tract)

The OPA evaluation indicates that implementation of this alternative has the potential to contribute to the Trustees' Wetlands, Coastal, and Nearshore Habitats goals by permanently protecting valuable wetland habitat from future development and providing for the effective restoration and management of the site for many years. The property is ecologically connected by the Perdido River to areas injured by the spill, although the nexus is weaker than for other proposed Wetlands, Coastal, and Nearshore Habitats project sites located closer to the coast where wetland habitats and adjacent habitat continuums are the same type as those injured by the spill. The land acquisition and restoration costs of the alternative are well documented and reasonable. The project has a high probability of success and has the potential to indirectly benefit other downstream natural resources in Perdido Bay, although the magnitude of these benefits has not been evaluated. No collateral injuries to natural resources are anticipated. Although infrastructure has not been proposed, the site has the potential to provide future passive recreational benefits through connections to the proposed Perdido River "blueway" canoe and kayak trail. Public health and safety issues are not expected to be a concern.

3.1.3 Magnolia River Land Acquisition (Holmes Tract)

3.1.3.1 Project Summary

Under the proposed Magnolia River Land Acquisition, WBF would acquire the 80-acre Holmes Tract through a fee simple purchase, place an appropriate permanent land protection instrument on the property (i.e., deed restriction, conservation easement), and transfer it into the permanent ownership of ADCNR with management by the Weeks Bay NERR. The Holmes property is one of the largest undeveloped tracts on Magnolia River, accounting for more than 1 mile of water frontage along the Magnolia River and Weeks Creek. Habitats include a small freshwater emergent marsh, bottomland hardwood wetlands fronting the rivers, and upland habitat. WBF and the Weeks Bay NERR would address restoration needs to ensure that the site provides the best habitat for native and endemic species, including migrant land birds and estuarine-dependent fish. Restoration activities to be conducted on the property could include invasive species control (prescribed burning or other methods), native vegetation planting, and limited erosion control measures. In addition, WBF would work with Weeks Bay NERR to create a long-term management plan and prioritize additional restoration needs, including possible re-creation of longleaf pine savannas, pitcher plant bogs, and marsh and swamp habitat.

3.1.3.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore a variety of interspersed and ecologically connected coastal habitats with particular focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities.*

This project addresses the Trustees' goal of restoring ecologically connected coastal habitats with a focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities. By protecting 80 acres of marsh and wetland habitat, including adjacent upland habitat, the project would ensure the extensive on-site wetlands system continues to provide a wide array of ecological functions and services in perpetuity. The Final PDARP/PEIS approach utilized is to protect and conserve marine, coastal, estuarine, and riparian habitats. Wetland habitat types on the property include estuarine and marine wetlands, freshwater emergent wetlands, and freshwater forested/shrub wetlands, which are representative of the types of connected habitat injured by the spill. Adjacent upland habitats on the property support migratory land birds injured by the spill. The specific restoration technique is to acquire lands for conservation. Conserving and protecting the Holmes Tract via acquisition and implementation of permanent protection provides a wide array of benefits identified by the Final PDARP/PEIS for this restoration technique. The project will permanently protect wetlands and other significant coastal, estuarine, and riparian habitats; remove direct threats of development; create opportunities for protected species management; provide nesting and foraging habitat for birds; protect critical freshwater inflows to estuaries; and improve coastal water quality. The property is located within the Weeks Bay watershed, an area the TIG has identified as a high priority coastal location (see Section 2.3.1) with major potential to generate the types of ecological benefits identified in the Final PDARP/PEIS. Additionally the project includes minor restoration activities such as removal of invasive species, planting of native vegetation, and minor erosion control activities which also contribute to the above Final PDARP/PEIS and AL TIG goals. The project has a strong nexus to the spill given the permanent protection of on-site habitat types injured by the spill and the ability of these on-site habitats to support species injured by the spill, including estuarine-dependent fish and migrant land birds.

3.1.3.3 Cost to Carry Out the Alternative

The proposed cost of the Magnolia River Land Acquisition Project is $4,144,162. These funds are solely directed to acquiring the land and conducting minor restoration activities at the site. The budget for the alternative includes funds for land acquisition, ecological restoration, monitoring, project oversight and supervision, and contingency. The land acquisition costs included in the budget are based on an estimate and are consistent with previous conservation purchases in the area. A Yellow Book appraisal will be completed prior to land acquisition. The AL TIG reviewed the estimated restoration, monitoring, project oversight and supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.1.3.4 Likelihood of Success

The alternative's goal of protecting, conserving, and restoring the Magnolia River property has a high likelihood of success. The land proposed for acquisition has a willing seller, and it is anticipated that negotiations would lead to its acquisition at a reasonable price. Land acquisitions of this type are a proven approach for achieving conservation goals. The proposed restoration techniques are widely and successfully implemented. WBF, which would conduct the transaction for the property, is a well-established non-governmental organization that has managed similar transactions in the past. ADCNR, which would hold title to the property, already owns numerous other properties similar to the one proposed for acquisition under this alternative. The ultimate transfer of the property to ADCNR would include a permanent land protection instrument to ensure conservation and maintenance of the property in perpetuity.

3.1.3.5 Avoids Collateral Injury

The Magnolia River Land Acquisition Project would create a healthier and more resilient on-site and downstream estuarine ecosystem in Weeks and Mobile Bays by eliminating the risk of development on the Holmes property. These positive impacts are not expected to be accompanied by any direct or indirect collateral natural resource injuries because acquisition and restoration are the only planned activities. The reasons for this are discussed more fully in Chapter 7 of this draft RP II/EA.

3.1.3.6 Benefits More Than One Natural Resource or Service

The project would directly protect coastal estuarine wetland habitat, which in turn would benefit estuarine-dependent fish and invertebrates, birds, and marine mammals in the area. Land acquisition provides habitat for these species in perpetuity. By ensuring the property remains undeveloped, this project also has the potential to benefit the water quality of Magnolia River and downstream areas. As such, the project would enhance the ecological health and resilience of the connected food web and other ecological resources of the Weeks and Mobile Bay estuaries, furthering the Wetlands, Coastal, and Nearshore Habitats goals of the Trustees.

3.1.3.7 Effects on Public Health and Safety

The Magnolia River Land Acquisition Project would not affect public health and safety. Preservation of the property in its current natural state is not expected to have any impacts on public health or safety. Passive uses that might result from increased recreational activity on the property are not expected to pose risks to public health and safety.

3.1.3.8 Summary OPA Evaluation: Magnolia River Acquisition Project

The OPA evaluation indicates that implementation of this alternative would meet the Trustee’s Wetlands, Coastal, and Nearshore Habitats goals by permanently protecting coastal estuarine habitat and connected upland habitat and providing for the effective restoration and management of the site for many years. The alternative has a strong nexus to the ecological injury caused by the DWH oil spill because it protects the types of wetland habitats injured by the spill. The land acquisition and restoration costs of the alternative are well documented and appropriate. The project has a high probability of success and is expected to benefit other natural resources in the Weeks and Mobile Bay estuaries. No collateral injuries to natural resources are anticipated. Public health and safety issues are not expected to be a concern.

3.1.4 Weeks Bay Land Acquisition (East Gateway Tract)

3.1.4.1 Project Summary

Under the proposed Weeks Bay Land Acquisition (East Gateway Tract), WBF would acquire the 175-acre East Gateway Tract through a fee simple purchase, place an appropriate permanent land protection instrument on the property (i.e., deed restriction, conservation easement), and transfer it into the permanent ownership of ADCNR with management by the Weeks Bay NERR. The proposed acquisition, which includes more than 100 acres of intertidal marsh and freshwater wetlands, would protect the eastern shore of the mouth of Weeks Bay. The property features a large salt marsh with a stream providing protected habitat and shelter for wading birds, duck species, and various species of indigenous marine life. Diamondback Terrapin, an Alabama species of concern, have been documented in upland areas of the property. The shoreline of the property has been ecologically degraded by the construction of approximately a 0.25-mile bulkhead. The acquisition and proposed permanent protection would conserve the site in perpetuity and begin the process of addressing restoration at the site by providing funds (1) for E&D to remove the bulkhead, which is contributing to shoreline scouring and erosion; and (2) for the development of a comprehensive shoreline restoration plan. In addition, the project includes funds for the Weeks Bay NERR to work with WBF on a long-term management plan setting priorities for additional restoration at the site, including possible re-creation of longleaf pine savannas, pitcher plant bogs, and marsh and swamp habitat.

3.1.4.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore a variety of interspersed and ecologically connected coastal habitats with particular focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities.*

This project addresses the Trustees' goal of restoring ecologically connected coastal habitats with a focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities. By protecting 175 acres of beach, marsh and wetlands habitat, including adjacent uplands, the project would ensure the extensive on-site intertidal wetlands system continues to provide a wide array of ecological functions and services in perpetuity. The Final PDARP/PEIS approach utilized is to protect and conserve marine, coastal, estuarine, and riparian habitats. Wetland habitat types on the property include intertidal and freshwater wetlands, which are representative of the types of connected habitat injured by the spill. The specific restoration technique is to acquire lands for conservation. Conserving and protecting the East Gateway tract via acquisition and implementation of a permanent land protection instrument provides a wide array of benefits identified by the Final PDARP/PEIS for this restoration technique. The project will permanently conserve wetlands and other significant coastal, estuarine, and riparian habitats; remove direct threats of development; create opportunities for protected species management; and provide nesting and foraging habitat for birds. The property is located in the Weeks Bay watershed, an area the AL TIG has identified as a high priority coastal location (Chapter 2, Section 2.3.1) with major potential to generate the types of ecological benefits identified in the Final PDARP/PEIS. The project has a strong nexus to the spill through the permanent protection of on-site habitat types like those directly injured by the spill as well as habitats supporting species injured by the spill, including estuarine-dependent fish. The provision of funding for E&D to support removal of the bulkhead and reduce erosion at the site, as well as funding for longer term shoreline restoration planning, also contributes the Trustees' goal of restoring coastal wetland and marine habitats and nearshore oyster reefs.

3.1.4.3 Cost to Carry Out the Alternative

The proposed cost of the Weeks Bay Land Acquisition (East Gateway Tract) project is $4,247,000. These funds would be solely directed to acquiring the land and conducting appropriate planning and restoration activities at the site. The budget for the alternative includes funds for land acquisition, shoreline restoration planning and E&D, monitoring, project oversight and supervision, and contingency. The land acquisition costs included in the budget are based on an estimate and are consistent with previous conservation purchases in the area. A Yellow Book appraisal would be completed prior to land acquisition. The AL TIG reviewed the estimated restoration, monitoring, project oversight and supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.1.4.4 Likelihood of Success

The alternative's goal of protecting, conserving, and restoring the East Gateway Tract has a high likelihood of success. The land proposed for acquisition has a willing seller, and it is anticipated that negotiations would lead to its acquisition at a reasonable price. Land acquisitions of this type are a proven approach for achieving conservation goals and have been widely and successfully implemented.

WBF, which would conduct the transaction for the property, is a well-established NGO that has managed similar transactions in the past. ADCNR, which would hold title to the property, already owns numerous other properties similar to the one proposed for acquisition under this alternative. The ultimate transfer of the property to ADCNR would include a permanent land protection instrument to ensure conservation and maintenance of the property in perpetuity.

3.1.4.5 Avoids Collateral Injury

The Weeks Bay Land Acquisition (East Gateway Tract) has the potential to create a healthier and more resilient ecosystem in Weeks and Mobile Bays than would be the case if the property were not protected, and restoration could not occur. These positive impacts are not expected to be accompanied by any direct or indirect collateral natural resource injuries because acquisition and E&D are the only planned activities proposed by this draft RP II/EA. The reasons for this are discussed more fully in Chapter 7 of this draft RP II/EA.

3.1.4.6 Benefits More Than One Natural Resource or Service

The project would directly protect coastal estuarine wetland habitat, which in turn would benefit estuarine-dependent fish and invertebrates, birds, and marine mammals in the area. Of particular note, the bay front edge of the property is a popular location for recreational angling for redfish and speckled trout. Acquisition of the East Gateway tract would help protect habitats for these species in perpetuity. By ensuring the property remains undeveloped, the project also has the potential to benefit the water quality of Weeks Bay. As such, the project would enhance the ecological health and resilience of the connected food web and other ecological resources of the Weeks and Mobile Bay estuaries, furthering the restoration goals of the Trustees. Acquisition would also increase the property’s potential use for passive recreation.

3.1.4.7 Effects on Public Health and Safety

The Weeks Bay Land Acquisition (East Gateway Tract) project would not affect public health and safety. Acquisition of the property and E&D work to plan future restoration are not anticipated to alter public uses. Any changes in public use resulting from removal of the bulkhead would be the subject of a future restoration plan.

3.1.4.8 Summary OPA Evaluation: Weeks Bay Land Acquisition (East Gateway Tract)

The OPA evaluation indicates that implementation of this alternative would meet the Trustee’s Wetlands, Coastal, and Nearshore Habitats goals by permanently preserving valuable coastal shoreline, wetlands, and connected upland habitat, and by initiating restoration planning for the property. The alternative has a strong nexus to ecological injuries caused by the DWH oil spill. The estimated land acquisition costs are reasonable for currently available conservation properties in the Weeks Bay watershed. The proposed E&D costs are reasonable for the proposed removal of a 0.25-mile-long bulkhead. The project has a high probability of success and is expected to benefit other natural resources in the Weeks and Mobile Bay estuaries. No collateral injuries to natural resources are anticipated. Public health and safety issues are not expected to be a concern.

3.1.5 Weeks Bay Land Acquisition (Harrod Tract)

3.1.5.1 Project Summary

Under the proposed Weeks Bay Land Acquisition (Harrod Tract), WBF would acquire the 231-acre Harrod Tract through a fee simple purchase, place an appropriate permanent land protection instrument on the property (i.e., deed restriction, conservation easement), and transfer it into the permanent ownership of ADCNR with management by the Weeks Bay NERR. The property is one of the largest remaining undeveloped parcels of cypress and gum swamp, marsh, and river shoreline in coastal Alabama and is the largest privately owned tract on the lower Fish River. Located adjacent to protected wetlands, it includes 7,600 feet of Fish River shoreline, as well as frontage along Turkey Branch and Waterhole Branch, two of Fish River's primary tributaries. Multiple smaller bayous (artificially constructed lakes) are also present on the property. The wetlands are composed of fringing salt marsh transitioning into hardwood cypress and gum swamp. The extensive marsh edge provides valuable nursery habitat for a host of estuarine organisms including shrimp, crabs, and fish. Hundreds of species of migratory birds use the habitat, while more than a dozen resident species of shorebirds are found at the edges and within the property, along with a representative array of local wetland flora and fauna. WBF would work with the Weeks Bay NERR to develop a restoration plan for the site. Associated restoration activities--invasive species control (prescribed burns or other methods), native vegetation planting, and erosion control--would be implemented, primarily on the disturbed upland areas of the property.

3.1.5.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore a variety of interspersed and ecologically connected coastal habitats with particular focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities.*

This project addresses the Trustees' goal of restoring ecologically connected coastal habitats with a focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities. By protecting 231 acres of marsh and wetlands habitat, including adjacent upland habitat, the project would ensure the extensive on-site wetlands system continues to provide a wide array of ecological functions and services in perpetuity. The Final PDARP/PEIS approach utilized is to protect and conserve marine, coastal, estuarine, and riparian habitats. Wetland habitat types on the property include estuarine wetlands, freshwater emergent wetlands, and freshwater forested/shrub wetlands, which are representative of the types of connected habitat injured by the spill. Adjacent upland habitats on the property support migratory land birds injured by the spill. The specific restoration technique is to acquire lands for conservation. Conserving and protecting the Harrod tract via acquisition and permanent protection provides a wide array of benefits identified by the Final PDARP/PEIS for this restoration technique. The project would permanently protect wetlands and other significant estuarine and riparian habitats; remove direct threats of development; provide nesting and foraging habitat for birds; protect critical freshwater inflows to estuaries; and improve coastal water quality. The property is located within the Weeks Bay watershed, an area the TIG has identified as a high priority coastal location (see Chapter 2, Section 2.3.1) with major potential to generate the types of ecological benefits identified in the Final PDARP/PEIS. Additionally, the project includes minor restoration activities such as removal of invasive species, planting of native vegetation, and minor erosion control activities, which also contribute to the above Final PDARP/PEIS and TIG specific goals. This project has a strong nexus to the spill given the permanent protection of on-site habitat types injured by the spill and the ability of these on-site habitats to support species injured by the spill, including estuarine-dependent fish.

3.1.5.3 Cost to Carry Out the Alternative

The proposed cost of the Weeks Bay Land Acquisition (Harrod Tract) project is $3,606,900. These funds are solely directed to acquiring the land and conducting appropriate restoration planning and restoration activities at the site. The budget for the alternative includes funds for land acquisition, restoration, monitoring, project oversight and supervision, and contingency. The land acquisition costs included in the budget are based on an estimate and are consistent with previous conservation purchases in the area. A Yellow Book appraisal would be completed prior to land acquisition. The AL TIG reviewed the estimated restoration, monitoring, project oversight and supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.1.5.4 Likelihood of Success

The alternative's goal of protecting, conserving, and restoring the Harrod Tract has a high likelihood of success. The land proposed for acquisition has a willing seller, and it is anticipated that negotiations would lead to its acquisition at a reasonable price. Land acquisitions of this type are a proven approach for achieving conservation goals. The proposed restoration techniques have been widely and successfully implemented. WBF, which would conduct the transaction for the property, is a well-established non-governmental organization that has managed similar transactions in the past. ADCNR, which would hold title to the property, already owns numerous other properties similar to the one proposed for acquisition under this alternative. The ultimate transfer of the property to ADCNR would include a permanent land protection instrument to ensure conservation and maintenance of the property in perpetuity.

3.1.5.5 Avoids Collateral Injury

The Weeks Bay Land Acquisition (Harrod Tract) has the potential to create a healthier and more resilient ecosystem in Weeks and Mobile Bays than would be the case if the property were not protected, and restoration could not occur. These positive impacts are not expected to be accompanied by any direct or indirect collateral natural resource injuries because acquisition and restoration are the only planned activities proposed by this RP II/EA. The reasons for this are discussed more fully in Chapter 7 of this draft RP II/EA.

3.1.5.6 Benefits More Than One Natural Resource or Service

The project would directly protect coastal estuarine wetland habitat, which in turn would benefit estuarine-dependent fish and invertebrates, birds, and marine mammals in the area. Land acquisition would provide habitat for these species in perpetuity. By ensuring the property remains undeveloped, the project also has the potential to benefit the water quality of lower Fish River and downstream areas. As such, the project would enhance the ecological health and resilience of the connected food web and other ecological resources of the Weeks and Mobile Bay estuaries, furthering the goals of the Trustees.

3.1.5.7 Effects on Public Health and Safety

The Weeks Bay Land Acquisition (Harrod Tract) alternative would not affect public health and safety. Preservation of the property in its current natural state is not expected to have any impacts on public health or safety. Passive uses that might result from increased recreational activity on the property are not expected to pose risks to public health and safety.

3.1.5.8 Summary OPA Evaluation: Weeks Bay Land Acquisition (Harrod Tract)

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' Wetlands, Coastal, and Nearshore Habitats goals by permanently protecting valuable wetland, riverine, and connected upland habitat from future development, while providing for the effective restoration and management of the site for many years. The alternative has a strong nexus to the downstream ecological injury caused by the DWH oil spill. The land acquisition and restoration planning costs of the alternative are well documented and reasonable. The project has a high probability of success and is expected to benefit other natural resources in the Weeks and Mobile Bay estuaries. No collateral injuries to natural resources are anticipated. Public health and safety issues are not expected to be a concern.

3.1.6 Lower Perdido Islands Restoration Phase I

3.1.6.1 Project Summary

The Lower Perdido Islands Restoration Phase I project proposes a feasibility study, including E&D, to support the development and implementation of a proactive and unified strategy for protecting the natural resources of the Perdido Islands complex while allowing for sustainable public recreation. The project area, approximately 420 acres, includes Robinson Island, Bird Island, Walker Island, Gilchrest Island, Boggy Point, and the surrounding estuarine and marine environment. This area exhibits a strong continuum of habitat types including emergent marsh, unconsolidated shore (sandy beaches, dunes, sand bars), SAV beds, freshwater forested/shrub wetland, and mixed pine uplands. These habitats support a variety of valuable marine and bird species.

In recent decades, these habitats have experienced erosion and other degradation resulting from storms, recreational activities, and other factors. Under this project, the AL TIG would fund development of a conservation management plan, in partnership with TNC and the City of Orange Beach, to identify strategies for protecting and restoring the natural resources of the Perdido Islands. The feasibility work would include planning and design of a long-term protection and restoration strategy, as well as limited interim habitat enhancement activities. Feasibility study elements would include identification and description of issues (e.g., erosion), and evaluation and recommendations for shoreline protection and restoration, SAV protection, and dune habitat protection. Specific feasibility study activities likely would include a habitat survey, baseline monitoring, recreational use monitoring, preliminary permit and compliance investigations, stakeholder coordination, and identification of other factors that could assist in restoration and improved conservation. Interim habitat enhancement activities would include addition of signage to protect nesting birds, planting of trees to restore nesting bird habitat, and data synthesis from the Orange Beach marine debris program.

3.1.6.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore a variety of interspersed and ecologically connected coastal habitats with particular focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities.*

This project begins the process of addressing the Trustees’ goal of restoring ecologically connected coastal habitats with a focus on maximizing ecological functions for the range of resources injured by the spill, such as SAV, oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities. This project contributes to this goal over the longer-term by initiating feasibility and planning work designed to result in the protection and restoration of currently degraded but critical coastal beach, dune, upland and marine habitat in high priority areas directly affected by the DWH spill. The sensitive habitats of the Perdido Islands support many important species including shoal grass, shrimp, blue crab, speckled trout, red drum, southern flounder, sea oats, and West Indian Manatee. Robinson Island is an important nesting area for wading herons and terns, including the Great Blue Heron. Robinson and Bird Islands are used by neotropical bird species migrating across the Gulf of Mexico. Because of these characteristics, Robinson Island was purchased by the City of Orange Beach and designated as a bird sanctuary (City of Orange Beach Parks & Recreation Department, 2017).

The interim implementation activities support Trustee goals for initiating active restoration actions as soon as possible. Although longer term planning is needed to ensure an appropriate, sustainable and cost-effective strategy for the islands, the proposed interim activities have been identified as short-term measures that would likely be part of any longer term initiative and therefore could be implemented at this time consistent with Trustee goals.

The Lower Perdido Islands Restoration (Phase I) project would complement and build on other restoration efforts focused on the Florida portion of the Perdido River watershed. These include a NFWF GEBF Fund project to update the Perdido River and Bay Surface Water Improvement and Management Plan, a NFWF GEBF funded Seagrass Assessment study, and a RESTORE funded effort for installation of passive recreational improvements along the Perdido River (in the middle/upper watershed).

3.1.6.3 Cost to Carry Out the Alternative

The proposed cost of the Perdido Islands Restoration (Phase I) project is $994,523. These funds are solely directed to feasibility studies and interim habitat enhancement work. The budget for the alternative includes funds for a contracted feasibility study, interim habitat enhancement measures, project oversight and supervision, and contingency. The feasibility study cost estimates reflect the best estimates of the AL TIG. If selected for implementation, this work would go through the State of Alabama's competitive bidding process to ensure the reasonableness of the costs. The AL TIG also reviewed the estimated interim habitat enhancement, project oversight and supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.1.6.4 Likelihood of Success

This alternative's goal of conducting a feasibility analysis that would create an effective strategy for preserving and restoring the habitats and ecological services provided by the Perdido Islands has a high likelihood of success. The project design clearly addresses the baseline condition of the habitat, current use levels, the nature of ongoing threats to the habitats, and the potential design of measures to restore habitat injuries and sustain the productivity of these habitats into the future. Both natural and anthropogenic threats would be considered. These types of studies have been conducted by the Trustee agencies in the past. Involvement of TNC and the City of Orange Beach in this process is expected to bring added practical expertise to the effort, increasing the likelihood of a successful outcome.

3.1.6.5 Avoids Collateral Injury

For the proposed feasibility study and the interim implementation measures, no direct or indirect collateral natural resource injuries are anticipated. The proposed actions do not involve on the ground activities with any potential to cause environmental injury.

3.1.6.6 Benefits More Than One Natural Resource or Service

Future implementation of the recommendations from the Perdido Islands Restoration (Phase I) alternative would have the potential to benefit multiple natural resources around the Perdido Islands, including sea turtles, oysters, fish, marine mammals, sea grasses, wading birds, shorebirds, and neotropical migratory bird species. The intent of the feasibility and planning activities is also to increase the sustainability of recreational activities. As such, the project ultimately would enhance the ecological health and resilience of the connected food web and would broadly promote sustainable ecological services of the Perdido Bay nearshore and estuarine system, furthering multiple goals of the Trustees.

3.1.6.7 Effects on Public Health and Safety

The Lower Perdido Islands Restoration (Phase I) alternative would not affect public health and safety. The feasibility study itself has no direct impacts on public uses of the islands or nearshore waters. The interim implementation activities involve measures such as signage and tree planting that are not expected to result in changes to public behavior that cause in any increases in risks to public health and safety.

3.1.6.8 Summary OPA Evaluation: Lower Perdido Islands Restoration (Phase I)

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' Wetlands, Coastal, and Nearshore Habitats goals by initiating planning to ensure the long-term restoration and sustainability of critical marine, nearshore, beach, dune, and upland ecological and recreational services from the Perdido Islands. The alternative has a strong nexus to ecological and recreational injuries caused by the DWH oil spill. The planning approaches proposed are well documented and technically appropriate for addressing the ecological and recreational issues in and around the islands. The project has a high probability of success and, when the recommendations from the feasibility work are implemented, it is expected to benefit multiple natural resources in the area. No collateral injuries to natural resources are anticipated. Public health and safety issues are not expected to be a concern.

3.1.7 Southwestern Coffee Island Habitat Restoration Project—Phase I

3.1.7.1 Project Summary

The Southwestern Coffee Island Habitat Restoration Project—Phase I would support planning activities related to the restoration and creation of tidal wetlands and other colonial nesting bird breeding and foraging habitat along the southwest shoreline of Coffee Island, located in Mississippi Sound in Mobile County. Phase 1 proposes funding for two tasks: (1) a synthesis of colonial wading bird and shorebird nesting data in coastal Alabama, and (2) E&D and permitting for restoration of habitat on Coffee Island. The synthesis of nesting data would be conducted to determine existing nesting habitat types and acreages in coastal Alabama, including the location of past restoration projects that may benefit birds injured by the DWH oil spill. These include little blue herons, tri-colored herons, white ibis, cattle egrets, black skimmers, and American oystercatchers. Additional analysis would be conducted (pending data availability) to determine the number and types of birds using the identified habitats. The proposed E&D work for Coffee Island restoration would include field studies, biological assessments, data synthesis, modeling, sediment source investigations, development of drawings and construction plans, preparation of construction cost estimates, and acquisition of required permits. Phase I project funding would be shared equally between the Wetlands, Coastal, and Nearshore Habitats and Birds Restoration Types.

3.1.7.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore a variety of interspersed and ecologically connected coastal habitats with particular focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities.*

This project begins the process of addressing the Trustees' goal of restoring ecologically connected coastal habitats with a focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities. This project initiates investigations and E&D work designed to restore, protect, and conserve coastal habitat in areas of Mississippi Sound injured by the spill. Future implementation of restoration work at Coffee Island has the potential to yield a wide array of Wetlands, Coastal, and Nearshore Habitats benefits in coastal Alabama. The project E&D phase would develop plans for protecting Coffee Island from further losses to erosion. In addition, it would develop options for building new wetland and shell beach habitats along the southwestern shoreline of the island, creating new nesting and foraging habitat for both shorebirds and colonial wading birds. This new habitat opens up the possibility that threatened nesting colonies from other coastal Alabama locations, such as nearby Cat Island where existing nesting sites are increasingly subject to inundation by sea level rise, could migrate to Coffee Island. The restoration of Coffee Island further addresses the Trustees' goal of creating more resilient shorelines because it would provide additional storm protection for mainland communities bordering Mississippi Sound.

3.1.7.3 Cost to Carry Out the Alternative

The total proposed cost of the Southwestern Coffee Island Habitat Restoration Project—Phase I is $825,225.[27] The estimates include direct and indirect costs for the habitat synthesis and E&D phases of the project, plus project oversight, supervision, and contingency. The habitat synthesis and E&D study cost projections reflect the best estimates of the AL TIG. The AL TIG reviewed the direct and indirect project costs and find these to be reasonable. If selected for implementation, the habitat synthesis and E&D work would go through the State of Alabama's competitive bidding process to ensure the reasonableness of the costs. The AL TIG also reviewed the estimated project oversight, supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.1.7.4 Likelihood of Success

This alternative's goal of conducting the habitat synthesis and the E&D work for Southwestern Coffee Island Habitat Restoration Project—Phase I has a high likelihood of success. The project has been designed in phases to ensure that key threshold questions about the need for additional nesting and foraging habitat at Coffee Island would be answered prior to beginning the E&D phase. The initial habitat synthesis work, and related telemetry work associated with the proposed Colonial Nesting Wading Bird Tracking and Habitat Use Assessment projects (Two and Four Species alternatives), have the potential to help inform any resulting E&D work for the Coffee Island restoration planning effort, further increasing the probability of successful occupation of the island by the target bird species. The data and methods needed to perform the proposed habitat synthesis are available and widely accepted.

3.1.7.5 Avoids Collateral Injury

For the proposed habitat synthesis and E&D work, no direct or indirect collateral natural resource injuries are anticipated. The proposed actions do not involve on the ground activities with any potential to cause environmental injury.

3.1.7.6 Benefits More Than One Natural Resource or Service

Future implementation of the restoration plans developed under this alternative is expected to benefit multiple natural resources. Restoration would create wetland, coastal, and nearshore habitats and coastal resiliency benefits and potentially restore bird species injured by the spill.

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[27] This represents the 50 percent share of the project costs funded from the Wetlands, Coastal and Nearshore Habitats Resource Type allocation. The remaining 50 percent would be funded from the Birds Restoration Type allocation.

3.1.7.7 Effects on Public Health and Safety

The Southwestern Coffee Island Habitat Restoration Project—Phase I is not expected to affect public health and safety. The project consists of data analysis activities and E&D work that would not involve the public.

3.1.7.8 Summary OPA Evaluation: Southwestern Coffee Island Habitat Restoration Project—Phase I

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' goals by initiating investigations and E&D work designed to protect, conserve, and restore wetlands, coastal, and nearshore habitats; restore and conserve bird nesting and foraging habitat; and/or reestablish breeding colonies in areas of coastal Alabama injured by the spill. The costs of the project are reasonable. The proposed approaches are well-designed and ensure a high probability of success. The work would not cause any collateral injury to natural resources. Restoration of Coffee Island has the potential to benefit multiple natural resources and services (i.e., wetlands, coastal, and nearshore habitats, birds, and coastal resilience). Finally, public health and safety issues are not expected to be a concern.

3.1.8 Natural Recovery—Wetlands, Coastal, and Nearshore Habitats

Pursuant to the OPA regulations, the Final PDARP/PEIS considered a "natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (40 CFR 990.53[b][2]). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of wetlands, coastal, and nearshore habitats in the Alabama Restoration Area using DWH NRDA funding at this time. The 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. Although injured resources could presumably recover to or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for and restore natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, tiering this RP II/EA from the Final PDARP/PEIS, and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery as a viable alternative under OPA. Natural recovery is not considered further in this RP II/EA.[28]

3.2 HABITAT PROJECTS ON FEDERALLY MANAGED LANDS

3.2.1 Overview of Restoration Goals and Approaches

For Habitat Projects on Federally Managed Lands, the AL TIG developed a reasonable range of alternatives based on the following goals and objectives from the Final PDARP/PEIS (Section 5.5.3):

- Restore federally managed habitats that were affected by the oil spill and response actions through an integrated portfolio of restoration approaches across a variety of habitats.
- Restore for injuries to federally managed lands by targeting restoration on federal lands where the injuries occurred, while considering approaches that provide resiliency and sustainability.

[28] NEPA requires evaluation of a "no action" alternative. This differs from the natural recovery alternative under OPA. The environmental consequences of the NEPA no action alternative are considered separately in Chapter 5.

- Ensure consistency with land management plans for each designated federal land and its purpose by identifying actions that account for the ecological needs of these habitats.

The projects selected for inclusion in the Habitat Projects on Federally Managed Lands reasonable range of alternatives employ the following restoration approaches identified in the Final PDARP/PEIS:

1. Create, restore, and enhance coastal wetlands.
2. Restore and enhance dunes and beaches.

The remainder of this section provides OPA analysis for the individual habitat projects on federally managed lands, with specific reference to each of the OPA criteria.

3.2.2 Little Lagoon Living Shoreline

3.2.2.1 Project Summary

This alternative would apply living shoreline techniques to restore, at a minimum, 2,200 feet of heavily eroded area along the southwestern corner and southern shore of Little Lagoon in the BSNWR. Restoration would include a combination of evaluation, planning, and implementation of a living shoreline project. One to two rows of biodegradable coconut fiber logs would be placed along the eroding shoreline, and appropriate species of grass plantings would be placed between the logs and the existing eroded shoreline to encourage development of a vegetated buffer. Shoreline grass planting (*Spartina alterniflora* and *Juncus roemerianus*), placement of wave attenuation structures, and, if available, native mussel seeding in the shoreline grasses would be used to further promote restoration of the shoreline.

3.2.2.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore federally managed habitats that were affected by the oil spill and response actions through an integrated portfolio of restoration approaches across a variety of habitats.*

Construction of the living shoreline would meet the Trustees' goal of restoring federally managed habitats that were injured by the oil spill and response actions. The project, by improving water quality in Little Lagoon at the BSNWR, has a strong nexus to the spill. It would return an eroding shoreline to a natural state and showcase methods to improve the health of the lagoon and remediate environmental problems. The stabilization of the shoreline would also reduce erosion of adjacent habitat supporting endangered Alabama beach mouse and address Trustee goals to create more storm-resilient and biologically productive shoreline habitats.

3.2.2.3 Cost to Carry Out the Alternative

The proposed cost of the Little Lagoon Living Shoreline project is $210,999. The budget includes costs for permitting, construction, monitoring, and project oversight, supervision, and contingency. The construction cost estimates, developed by USFWS experts, are reasonable and comparable to those for similar projects.[29] Adherence to USDOI contracting procedures is expected to further ensure the reasonableness of the costs. The AL TIG also reviewed the estimated permitting, monitoring, and other project oversight, supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

[29] See http://www.nj.gov/dep/cmp/docs/20170227-ls-summit/bhaskar-nj-workshop.pdf

3.2.2.4 Likelihood of Success

This project has a high likelihood of successfully providing shoreline protection in Little Lagoon. The effectiveness of the proposed techniques have been demonstrated in other locations.[30] The functional life of the project, however, is difficult to estimate. Over time, the project's effectiveness would likely be reduced by sea level rise and the impacts of storms. Nonetheless, the AL TIG concludes this investment in shoreline protection and improved coastal resiliency is a worthwhile initiative that is likely to restore shoreline ecosystem functions for a reasonable period of time given its costs.

3.2.2.5 Avoids Collateral Injury

The project focuses on shoreline restoration and is not expected to cause any collateral injuries to natural resources. The reasons for this are discussed more fully in Chapter 8 of this draft RP II/EA.

3.2.2.6 Benefits More Than One Natural Resource or Service

By preventing erosion of adjacent Alabama beach mouse habitat, the project is expected to provide ESA benefits. In addition, native emergent wetland vegetation is expected to provide habitat for fish and shellfish. The restored habitat would also be expected to benefit shorebirds and wading bird species.

3.2.2.7 Effects on Public Health and Safety

The Little Lagoon Living Shoreline alternative is not expected to affect public health and safety. The project would restore coastal wetland and nearshore habitat and is not expected to alter in any substantial way the public uses the lagoon shoreline.

3.2.2.8 Summary OPA Evaluation: Little Lagoon Living Shoreline

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' goal of restoring and enhancing coastal wetlands and nearshore habitat on federal lands that were injured by the DWH spill. The project costs are reasonable. The project techniques have been demonstrated in other locations. Although the expected life of the project is uncertain, the AL TIG concludes that the project would be a worthwhile restoration investment given its relatively low cost and likely ability to provide shoreline protection for a reasonable period of time. The project would provide for a healthier Little Lagoon ecosystem while posing no risk of collateral injuries to other natural resources. It is expected to benefit other natural resources in the area (e.g., the endangered Alabama beach mouse). Public health and safety issues are not anticipated to be a concern.

3.2.3 Restoring the Night Sky—Assessment, Training, and Outreach (E&D)

3.2.3.1 Project Summary

The Restoring the Night Sky—Assessment, Training, and Outreach (E&D) project is an E&D initiative with the long-term goal of reducing the impacts on federally managed lands of off-site light pollution that disorients nesting sea turtles and hatchlings, disrupting their reproductive activities and reducing their reproductive success. The proposed E&D project has three primary objectives: (1) assessing artificial lighting that affects federally managed lands along the Baldwin and Mobile County coasts; (2) developing a detailed strategy to mitigate the impacts of the identified problematic lighting; and (3) working with local governments to improve their understanding and capacity to address lighting concerns.[31] Future implementation of the strategies recommended by the project would be designed to

[30] ibid.

[31] Objective 3 is the focus of the work proposed under the Sea Turtles Restoration Type.

eliminate the worst sources of light pollution affecting sea turtle reproductive success on federally managed lands in coastal Alabama. The E&D work proposed would include local tests of human responses to sea turtle friendly alternative lighting fixtures; identification of off-site locations that contribute disproportionately to light pollution on federal lands, and developing a detailed strategy to mitigate the identified problematic lighting. The study would evaluate potential economic and environmental benefits of advanced lighting options and include pilot tests of alternative systems to assess public and ecological responses to different options. The project would sponsor lighting workshops and training for city code enforcement staff and local property owners. This project is also included in the reasonable range of alternatives for restoration of Sea Turtles (Section 2.6.4).

3.2.3.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore federally managed habitats that were affected by the oil spill and response actions through an integrated portfolio of restoration approaches across a variety of habitats.*

Completion of the Restoring the Night Sky—Assessment, Training, and Outreach (E&D) project would make an important contribution towards the Trustees' goal of restoring federally managed habitats that were affected by the oil spill and response actions. The restoration approach helps to address injured beach and dune areas at BNSWR and other federally managed lands in coastal Alabama. These areas, which were directly damaged by oiling and/or response activities associated with the DWH oil spill, are currently degraded by off-site sources of light pollution that reduce the ability of sea turtles to reproduce successfully. Consistent with Module 4 of the Strategic Framework for Sea Turtle Restoration Activities, the project would develop data and analyses for implementing actions to eliminate the most damaging sources of light pollution on these beaches by replacing them with alternative lighting solutions. The specific objectives under these elements of the project would be to fund the analysis of lighting impacts and the development of the strategy for mitigating impacts.

3.2.3.3 Cost to Carry Out the Alternative

The proposed cost of the Restoring the Night Sky—Assessment, Training, and Outreach (E&D) project is $183,003.[32] The budget for the alternative includes funds for assessment and strategy development, E&D work, outreach and training, and project oversight, supervision, and contingency. The AL TIG worked with experts at USDOI to develop the cost estimates for the assessment, strategy, and outreach activities. The costs are representative of similar studies previously carried out by USDOI and are therefore found to be reasonable. The AL TIG also reviewed the estimated project oversight costs and contingency. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.2.3.4 Likelihood of Success

This alternative's objective of developing a strategy for controlling light pollution on federally managed lands in coastal Alabama has a high likelihood of success. The project design is clearly documented. The study would be conducted by NPS's Natural Sounds and Night Skies Division, which has successfully conducted these types of studies in the past. Local assistance would be provided by USFWS, further ensuring success. Implementation of recommendations for reduced levels of light pollution would ultimately be expected to benefit sea turtles because studies have clearly demonstrated the harmful effects of light pollution on nesting sea turtles (Witherington and Martin, 2014).

[32] This represents the share of the total project budget ($399,658) coming from the Habitat Projects on Federally Managed Lands Restoration Type allocation.

3.2.3.5 Avoids Collateral Injury

The project is not expected to cause any collateral injuries to natural resources because it focuses on studies of lighting impacts and outreach to local officials, activities that pose no direct or indirect risk of injury to the environment.

3.2.3.6 Benefits More Than One Natural Resource or Service

Future implementation of the E&D study's recommendations for reducing light pollution has the potential to benefit other species on federally managed lands in coastal Alabama. In addition to sea turtles, studies have demonstrated potential benefits of reduced light pollution to beach mice (Bird et al., 2004), sea birds (Montevecchi, 2006), and a diverse range of other marine and terrestrial species (Longcore and Rich, 2004; Gaston et al., 2013).

3.2.3.7 Effects on Public Health and Safety

The Restoring the Night Sky—Assessment, Training, and Outreach (E&D) project proposes studies and outreach, activities that would not affect public health or safety.

3.2.3.8 **Summary OPA Evaluation:** Restoring the Night Sky—Assessment, Training, and Outreach (E&D)

The OPA evaluation indicates that implementation of this alternative would make an important contribution towards the Trustees' goal of restoring injured beach and dune areas on federally managed lands in coastal Alabama. It would accomplish this by initiating E&D work to develop a strategy for reducing light pollution on federally managed lands, with the ultimate objective of restoring beach and dune habitat for use by sea turtles. The alternative has a strong nexus to ecological injuries caused by the DWH spill and response activities, particularly at the BSNWR. The proposed study approaches are well documented and technically appropriate for addressing light pollution issues. NPS is well qualified to perform the work. The costs are reasonable. The project has a high probability of success and is expected to benefit multiple natural resources. It would pose no risk of collateral injuries to other natural resources. Public health and safety issues are not expected to be a concern.

3.2.4 Natural Recovery—Habitat Projects on Federally Managed Lands

Pursuant to the OPA regulations, the Final PDARP/PEIS considered a "natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (40 CFR 990.53[b][2]). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of habitat on federally managed lands in the Alabama Restoration Area using DWH NRDA funding at this time. The 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. Although injured resources could presumably recover to or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, tiering this RP II/EA from the Final PDARP/PEIS, and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery as a viable alternative under OPA. Natural recovery is not considered further in this RP II/EA.[33]

3.3 NUTRIENT REDUCTION (NONPOINT SOURCE)

3.3.1 Overview of Restoration Goals and Approaches

For Nutrient Reduction projects, the AL TIG developed a reasonable range of alternatives based on the following goals and objectives derived from the Final PDARP/PEIS (Section 5.5.4) and state-specific considerations.

- Reduce nutrient loadings to Gulf Coast estuaries, habitats, and resources that are threatened by chronic eutrophication, hypoxia, or harmful algal blooms or that suffer habitat losses associated with water quality degradation.
- Where appropriate, co-locate nutrient load reduction projects with other restoration projects to enhance ecological services provided by other restoration approaches.
- Enhance ecosystem services of existing and restored Gulf Coast habitats.

The projects selected for inclusion in Nutrient Reduction reasonable range of alternatives are located in targeted watersheds identified by the AL TIG and employ following restoration approaches identified in the Final PDARP/PEIS.

1. Reduce nutrient loads to coastal watersheds.
2. Reduce pollution and hydrologic degradation to coastal watersheds.
3. Create, restore, and enhance coastal wetlands.
4. Protect and conserve marine, coastal, estuarine, and riparian habitats.

The remainder of this section provides OPA analysis for the individual Nutrient Reduction projects, with specific reference to each of the OPA criteria.

3.3.2 Bayou La Batre Nutrient Reduction

3.3.2.1 Project Summary

The Bayou La Batre Nutrient Reduction project would restore water quality through implementation of improved land management practices that reduce nutrient and sediment loadings to Portersville Bay and Mississippi Sound. The implementation of land management practices using existing USDA-NRCS CPS and specifications would be the primary tool for reducing erosion and nutrient inputs in the watershed. Examples of such measures would include erosion and sediment control practices such as cover crops, conservation tillage, and field borders. Although cattle production is not the primary agricultural industry in the watershed, livestock exclusion from stream, wetlands, and drainage ways would be a priority conservation measure. The proposed conservation practices would reduce the loss of nitrogen, phosphorus, and sediment from the landscape, which contributes to water quality impairment in streams and downstream receiving waters. Improved water quality in the Bayou La Batre

[33] NEPA requires evaluation of a “no action” alternative. This differs from the natural recovery alternative under OPA. The environmental consequences of the NEPA no action alternative are considered separately in Chapter 5.

watershed would broadly benefit the ecological health of the estuarine and marine resources of coastal Alabama.

3.3.2.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Reduce nutrient loadings to Gulf Coast estuaries, habitats, and resources that are threatened by chronic eutrophication, hypoxia, or harmful algal blooms or that suffer habitat losses associated with water quality degradation.*

This project directly addresses the Trustees' goal of reducing nutrient loadings to Gulf Coast estuaries, habitats, and resources that are threatened by chronic eutrophication, hypoxia, or harmful algal blooms or that suffer habitat losses associated with water quality degradation. The AL TIG conducted its analysis using USEPA's Recovery Potential Screening Tool, which generated rankings of watersheds flowing into areas injured by the spill, based on their nutrient loadings and the potential for reductions in nutrient-driven ecological stressors. Due to its amount of land in agriculture, the Bayou La Batre watershed showed potential to benefit from implementation of the types of agricultural conservation practices proposed for this project, although not to the extent of other nutrient reduction projects included in this draft RP II/EA. Nutrient reductions would improve overall water quality in the affected streams and in the coastal waters of Portersville Bay and Mississippi Sound. Implementation of this project would likely increase overall marine and estuarine ecological health, benefiting nearshore habitats and species and generally increasing the resiliency of these coastal ecosystems.

3.3.2.3 Cost to Carry Out the Alternative

The proposed cost of Bayou La Batre Nutrient Reduction project is $1,000,000. The restoration approaches proposed by USDA-NRCS to reduce nutrient loads from agricultural lands in the Bayou La Batre watershed have been applied extensively across the country, and the costs are well documented and reasonable. Previous studies demonstrate that these approaches provide cost-effective reductions in nutrient loadings for the type of agricultural operations occurring in the Bayou La Batre watershed.[34] The conservation planning, practice implementation, and monitoring costs represent best estimates from USDA and are consistent with previously implemented initiatives/programs. Based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.3.2.4 Likelihood of Success

This alternative's goal of reducing nutrient loadings from agricultural lands in the Bayou La Batre watershed has a reasonable likelihood of success. The proposed BMPs are well demonstrated for reducing nutrient loadings and appropriate for agricultural lands in the watershed. Although participation in the project is voluntary, USDA-NRCS does not anticipate any difficulties implementing an outreach strategy that will result in high demand for technical and financial assistance offered in this project. Further contributing to the likelihood of success, a monitoring program would be implemented to document changes to water quality and identify whether any adaptive management actions are needed to achieve nutrient reduction goals. However, this watershed has lower agricultural production for agricultural nutrient reduction than the other two proposed alternatives in this draft RP II/EA. Therefore, while yielding positive impacts, the Bayou La Batre alternative is expected to be less

[34] USDA, 2014, Assessment of the Effects of Conservation Practices on the Cultivated Cropland in the South Atlantic Gulf Basin, Natural Resources Conservation Service, Conservation Effects Assessment Project, Washington, D.C.

beneficial than these other two alternatives because it would offer fewer opportunities for implementing nutrient reduction measures.

3.3.2.5 Avoids Collateral Injury

The Bayou La Batre Nutrient Reduction project would contribute to healthier and more resilient downstream coastal ecosystems in habitats that were injured by the spill. No direct or indirect collateral injuries to natural resources are anticipated from implementation of the nutrient reduction measures in the watershed. The reasons for this are discussed more fully in Chapter 9 of this RP II/EA.

3.3.2.6 Benefits More Than One Natural Resource or Service

By improving water quality in Portersville Bay and Mississippi Sound, implementation of the Bayou La Batre Nutrient Reduction project has the potential to benefit the entire range of coastal and estuarine habitats, species, and natural resource services that experience improved health in the presence of lower sediment levels, higher oxygen concentrations, and reductions in the frequency and intensity of toxic algal blooms.

3.3.2.7 Effects on Public Health and Safety

The Bayou La Batre Nutrient Reduction project is not likely to have adverse impacts on public health and safety. The implementation of nutrient reduction measures, such as construction of sediment control structures or changes in cover crop or tillage practices, would not create any new risks for agricultural workers or pose any threats to air or water quality. To the extent that the project reduces bacterial contaminants in surface waters, there may be a public health benefit.

3.3.2.8 Summary OPA Evaluation: Bayou La Batre Nutrient Reduction Project

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' goal of reducing nutrient loadings to coastal habitats and waters injured by the DWH spill. The project costs are reasonable. The project has a reasonable likelihood of success because the proposed techniques have been fully demonstrated in other locations for the types of agricultural operations in the Bayou La Batre watershed. The project is expected to benefit multiple natural resources in coastal Alabama and would pose no risks of collateral injuries to other natural resources. The measures taken to reduce nutrients and sediments may have a beneficial impact on public health because of their potential to reduce bacterial contamination in surface waters. However, because the watershed has lower agricultural production than the other two proposed alternatives for agricultural nutrient reduction in this draft RP II/EA, it is expected to be less beneficial, there being fewer opportunities to implement nutrient reduction measures.

3.3.3 Toulmins Spring Branch Engineering and Design

3.3.3.1 Project Summary

The Toulmins Spring Branch E&D project would fund E&D for a variety of non-structural and structural BMPs that reduce nutrients and pollutants flowing into Toulmins Spring—a creek that is listed on Alabama's 303(d) list as having impaired water quality. The project location is at the headwaters of Toulmins Spring Branch, in the Three Mile Creek watershed in the City of Prichard, Alabama. The Mobile Bay National Estuary Program, ADEM, and TNC would all be partners on this project. Funding from USEPA's 319 nonpoint source grant program will likely be available to construct the project, but the grant funds cannot be used for activities associated with E&D work. This E&D project is intended to fill this critical funding gap and clear the way for the construction work to be implemented. The E&D project would include a watershed assessment and a conceptual plan for the entire length of Toulmins

Spring Branch, which would detail opportunities for erosion and sedimentation reduction, nutrient and pathogen reduction, and flooding and stormwater management.

3.3.3.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Reduce nutrient loadings to Gulf Coast estuaries, habitats, and resources that are threatened by chronic eutrophication, hypoxia, or harmful algal blooms or that suffer habitat losses associated with water quality degradation.*

This project addresses Trustees' goal of reducing nutrient loadings to Gulf Coast estuaries, habitats, and resources that are threatened by chronic eutrophication, hypoxia, or harmful algal blooms or that suffer habitat losses associated with water quality degradation. Proposed efforts to reduce nutrient loadings in the Toulmins Spring Branch have been identified as a priority in the recently completed Three Mile Creek Watershed Plan.[35] Completion of the E&D work targeting reductions in nutrient loads, as proposed in this project, is expected to facilitate implementation of measures to improve water quality in Mobile Bay, resulting in healthier wetlands, coastal and nearshore habitats of the types injured by the spill, reducing chronic eutrophication, hypoxia, and harmful algal blooms in Mobile Bay.

3.3.3.3 Cost to Carry Out the Alternative

The proposed cost of the Toulmins Spring Branch E&D project is $479,090. The cost represents the contracts for the development of engineering plans and designs and permit applications, as well as project oversight and monitoring, and contingency. Funding E&D work allows the Trustees to leverage implementation of the much larger Toulmins Spring construction project that would result in the reduction in sediment, nutrient, and pollutant loadings to the watershed. Until now, the project proponents have been unable to secure a source of funds for E&D. Without the proposed E&D project, it is not clear whether funds can be found to complete the work necessary to support further project development. The AL TIG reviewed the estimated E&D and permitting costs and found them to be reasonable. If selected for implementation, the E&D and permitting work would go through USEPA's competitive bidding process to further ensure the reasonableness of the costs. The AL TIG also reviewed the estimated costs for project oversight and monitoring, and contingency. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.3.3.4 Likelihood of Success

This alternative's goal of conducting the E&D work for the Toulmins Spring project would provide the necessary plans needed to implement an effective strategy for reducing nutrient loadings from the Three Mile Creek watershed into Mobile Bay. Project proponents indicate strong local support for the initiative and consequently, there is a reasonable possibility that grant funds under USEPA's 319 nonpoint source program would be available to complete the construction work. The proposed nutrient reduction strategies have already been identified, are well documented, and have been widely and successfully implemented in similar situations. Consequently, upon completion of the E&D work needed to receive funding for construction of the nonpoint controls, the likelihood of successfully reducing nutrient loadings through other programs is high.

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[35] See http://www.mobilebaynep.com/the_watersheds/three_mile_creek_watershed/

3.3.3.5 Avoids Collateral Injury

For the E&D work proposed under this project, no direct or indirect collateral injuries to natural resources are anticipated. The proposed actions do not involve on the ground activities with any potential to cause environmental injury.

3.3.3.6 Benefits More Than One Natural Resource or Service

Future implementation of the plans developed in the Toulmins Spring E&D project likely would benefit multiple natural resources and habitats in Mobile Bay. The project would enhance water quality and thus broadly promote the ecological health of the estuary and its food web, increasing the resilience of the system and its ability to provide a diverse set of ecosystem services. More directly, it also would provide riparian habitat in the form of stream buffers in areas where BMPs are implemented. In addition, the proposed park improvements would enhance public recreation.

3.3.3.7 Effects on Public Health and Safety

The Toulmins Spring E&D alternative is not expected to affect public health and safety directly. The E&D study itself has no direct impacts on public uses in the Three Mile Creek watershed or Mobile Bay. However, future implementation of the E&D plans would improve water quality, and, in addition to removing sediments and nutrients, may reduce bacteria levels, with a potentially beneficial effect on quality of life for traditionally underserved residents in the area.

3.3.3.8 **Summary OPA Evaluation:** Toulmins Spring Engineering and Design

The OPA evaluation indicates that this alternative would meet the Trustees' goal of reducing nutrient loadings to coastal habitats and waters injured by the DWH spill by filling a critical funding gap and clearing the way for future implementation of a critical restoration project that would reduce nutrient and sediment loadings to Mobile Bay. This would benefit estuarine habitats and natural resources directly connected through the food web to areas injured by the DWH oil spill. The proposed E&D work is clearly documented and uses well-established and technically appropriate nutrient reduction techniques. The cost of the E&D work is reasonable, and the project provides the Trustees with a unique opportunity to leverage restoration funding that would not otherwise be available. The project has a high probability of success and is expected to benefit multiple natural resources and resource services in the area. No direct public health and safety issues are associated with the E&D work. Future measures taken to reduce nutrients and sediments may have a beneficial impact on public health because of their potential to reduce bacterial contamination in surface waters.

3.3.4 Fowl River Nutrient Reduction

3.3.4.1 Project Summary

The Fowl River Nutrient Reduction project would restore water quality through implementation of improved land management practices that reduce nutrient and sediment loadings to Mobile Bay. The implementation of land management practices using existing USDA-NRCS CPS and specifications would be the primary tool for reducing erosion and nutrient inputs in the watershed. Examples of such measures would include erosion and sediment control practices such as cover crops, conservation tillage, and field borders. Although cattle production is not the primary agricultural industry in the watershed, livestock exclusion from stream, wetlands, and drainage ways would be a priority conservation measure. The proposed conservation practices would reduce the loss of nitrogen, phosphorus, and sediment from the landscape, which contributes to water quality impairment in streams and downstream receiving waters. Improved water quality in the Fowl River watershed would broadly benefit the ecological health of the estuarine and marine resources of coastal Alabama.

3.3.4.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Reduce nutrient loadings to Gulf Coast estuaries, habitats, and resources that are threatened by chronic eutrophication, hypoxia, or harmful algal blooms or that suffer habitat losses associated with water quality degradation.*

This project directly addresses the Trustees' goal of reducing nutrient loadings to Gulf Coast estuaries, habitats, and resources that are threatened by chronic eutrophication, hypoxia, or harmful algal blooms or that suffer habitat losses associated with water quality degradation. The AL TIG conducted its analysis using USEPA's Recovery Potential Screening Tool, which generated rankings of watersheds flowing into areas injured by the spill, based on their nutrient loadings and potential for reductions in nutrient-driven ecological stressors. Because of its relatively high prevalence of agricultural land, the Fowl River watershed showed a high potential to benefit from implementation of the types of agricultural conservation practices proposed for this project. Nutrient reductions would improve overall water quality in the affected streams and in the waters of Mobile Bay. Implementation of this project is expected to increase overall marine and estuarine ecological health, benefiting nearshore habitats and species and generally increasing the resiliency of these coastal ecosystems.

3.3.4.3 Cost to Carry Out the Alternative

The proposed cost of the Fowl River Nutrient Reduction project is $1,000,000. The restoration approaches proposed by USDA-NRCS to reduce nutrient loads from agricultural lands in the Fowl River watershed have been applied extensively across the country, and the costs are well documented and reasonable.[36] The conservation planning, practice implementation, and monitoring costs represent best estimates from USDA and are consistent with previously implemented initiatives/programs. Based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.3.4.4 Likelihood of Success

This alternative's goal of reducing nutrient loadings from agricultural lands in the Fowl River watershed has a high likelihood of success. The proposed BMPs are well demonstrated for reducing nutrient loadings and are appropriate for agricultural lands in the watershed. Although participation in the project is voluntary, USDA-NRCS does not anticipate any difficulties implementing an outreach strategy that will result in high demand for technical and financial assistance offered in this project. Further contributing to the high likelihood of success, a monitoring program would be implemented to document changes to water quality and identify whether any adaptive management actions are needed to achieve nutrient reduction goals.

3.3.4.5 Avoids Collateral Injury

The Fowl River Nutrient Reduction project would contribute to healthier and more resilient downstream coastal ecosystems in habitats that were injured by the spill. No direct or indirect collateral injuries to natural resourcesare are anticipated from implementation of the nutrient reduction measures in the watershed. The reasons for this are discussed more fully in Chapter 9 of this draft RP II/EA.

[36] USDA, 2014, Assessment of the Effects of Conservation Practices on the Cultivated Cropland in the South Atlantic Gulf Basin, Natural Resources Conservation Service, Conservation Effects Assessment Project, Washington, D.C.

3.3.4.6 Benefits More Than One Natural Resource or Service

By improving water quality in Mobile Bay, implementation of the Fowl River Nutrient Reduction project has the potential to benefit the entire range of coastal and estuarine habitats, species and natural resource services that experience improved health in the presence of lower sediment levels, higher oxygen concentrations, and reductions in the frequency and intensity of toxic algal blooms.

3.3.4.7 Effects on Public Health and Safety

The Fowl River Nutrient Reduction project is not likely to have adverse impacts on public health and safety. The implementation of nutrient reduction measures, such as construction of sediment control structures or changes in cover crop or tillage practices, would not create any new risks for agricultural workers or pose any threats to air or water quality. To the extent that the project also reduces bacterial contaminants in surface waters, there may be a public health benefit.

3.3.4.8 Summary OPA Evaluation: Fowl River Nutrient Reduction Project

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' goal of reducing nutrient loadings to coastal habitats and waters injured by the DWH spill. The project costs are reasonable. The project has a high likelihood of success because the proposed techniques have been fully demonstrated in other locations for the types of agricultural operations in the Fowl River watershed. The project is expected to benefit multiple natural resources in Mobile Bay. The project would pose no risks of collateral injuries to other natural resources. The measures taken to reduce nutrients and sediments may have a beneficial impact on public health because of their potential to reduce bacterial contamination in surface waters.

3.3.5 Weeks Bay Nutrient Reduction

3.3.5.1 Project Summary

The Weeks Bay Nutrient Reduction project would restore water quality through implementation of improved land management practices that reduce nutrient and sediment loadings to Weeks and Mobile Bays. The implementation of land management practices using existing USDA-NRCS CPS and specifications would be the primary tool for reducing erosion and nutrient inputs in the watershed. Examples of such measures would include erosion and sediment control practices such as cover crops, conservation tillage, and field borders. Although cattle production is not the primary agricultural industry in the watershed, livestock exclusion from stream, wetlands, and drainage ways would be a priority conservation measure. The proposed conservation practices would reduce the loss of nitrogen, phosphorus, and sediment from the landscape, which contributes to water quality impairment in streams and downstream receiving waters. Improved water quality in the Weeks Bay watershed would broadly benefit the ecological health of the estuarine and marine resources of coastal Alabama.

3.3.5.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Reduce nutrient loadings to Gulf Coast estuaries, habitats, and resources that are threatened by chronic eutrophication, hypoxia, or harmful algal blooms or that suffer habitat losses associated with water quality degradation.*

This project directly addresses the Trustees' goal of reducing nutrient loadings to Gulf Coast estuaries, habitats, and resources that are threatened by chronic eutrophication, hypoxia, or harmful algal blooms or that suffer habitat losses associated with water quality degradation. The AL TIG conducted its analysis using USEPA's Recovery Potential Screening Tool, which generated rankings of watersheds flowing into areas injured by the spill, based on their nutrient loadings and potential for reductions in nutrient-driven ecological stressors. Because of its relatively high prevalence of agricultural land, the Weeks Bay watershed showed a high potential to benefit from implementation of the types of agricultural conservation practices proposed for this project. Nutrient reductions would improve overall water quality in the affected streams and in the coastal waters of Weeks and Mobile Bays. Implementation of this project is expected to increase overall marine and estuarine ecological health, benefiting nearshore habitats and species and generally increasing the resiliency of these coastal ecosystems.

3.3.5.3 Cost to Carry Out the Alternative

The proposed cost of the Weeks Bay Nutrient Reduction project is $2,000,000. The restoration approaches proposed by USDA-NRCS to reduce nutrient loads from agricultural lands in the Weeks Bay watershed have been applied extensively across the country, and the costs are well documented and reasonable.[37] The conservation planning, practice implementation, and monitoring costs represent best estimates from USDA and are consistent with previously implemented initiatives/programs. Based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.3.5.4 Likelihood of Success

This alternative's goal of reducing nutrient loadings from agricultural lands in the Weeks Bay watershed has a high likelihood of success. The proposed BMPs are well demonstrated for reducing nutrient loadings and are appropriate for agricultural lands in the watershed. Although participation in the project is voluntary, USDA-NRCS does not anticipate any difficulties implementing an outreach strategy that will result in high demand for technical and financial assistance offered in this project. Further contributing to the high likelihood of success, a monitoring program would be implemented to document changes to water quality and identify whether any adaptive management actions are needed to achieve nutrient reduction goals.

3.3.5.5 Avoids Collateral Injury

The Weeks Bay Nutrient Reduction project would contribute to healthier and more resilient downstream coastal ecosystems in habitats that were injured by the spill. No direct or indirect collateral injuries to natural resources are anticipated from implementation of the nutrient reduction measures in the watershed. The reasons for this are discussed more fully in Chapter 9 of this draft RP II/EA.

3.3.5.6 Benefits More Than One Natural Resource or Service

By improving water quality in Mobile Bay, implementation of the Weeks Bay Nutrient Reduction project has the potential to benefit the entire range of coastal and estuarine habitats, species and natural resource services that experience improved health in the presence of lower sediment levels, higher oxygen concentrations, and reductions in the frequency and intensity of toxic algal blooms. This project may also have synergistic benefits with the multiple land acquisition and restoration projects proposed for this high priority watershed under the Wetlands, Coastal, and Nearshore Habitats Restoration Type in this plan.

3.3.5.7 Effects on Public Health and Safety

The Weeks Bay Nutrient Reduction project is not likely to have adverse impacts on public health and safety. The implementation of nutrient reduction measures, such as construction of sediment control

[37] USDA, 2014, Assessment of the Effects of Conservation Practices on the Cultivated Cropland in the South Atlantic Gulf Basin, Natural Resources Conservation Service, Conservation Effects Assessment Project, Washington, D.C.

structures or changes in cover crop or tillage practices, would not create any new risks for agricultural workers or pose any threats to air or water quality. To the extent that projects also reduce bacterial contaminants in surface waters, there may be a public health benefit.

3.3.5.8 Summary OPA Evaluation: Weeks Bay Nutrient Reduction Project

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' goal of reducing nutrient loadings to coastal habitats and waters injured by the DWH spill. The project costs are reasonable. The project has a high likelihood of success because the proposed techniques have been fully demonstrated in other locations for the types of agricultural operations in the Weeks Bay watershed. The project is expected to benefit multiple natural resources in the area. There would be no risks of collateral injuries to other natural resources. The measures taken to reduce nutrients and sediments may have a beneficial impact on public health because of their potential to reduce bacterial contamination in surface waters.

3.3.6 Natural Recovery—Nutrient Reduction (Nonpoint Source)

Pursuant to OPA regulations, the Final PDARP/PEIS considered a "natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (40 CFR 990.53[b][2]). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of areas that would benefit from nutrient reduction projects in the Alabama Restoration Area using DWH NRDA funding at this time. The 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. Although injured resources could presumably recover to or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, tiering this draft RP II/EA from the Final PDARP/PEIS, and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery as a viable alternative under OPA. Natural recovery is not considered further in this draft RP II/EA.[38]

3.4 SEA TURTLES

3.4.1 Overview of Restoration Goals and Approaches

The Final PDARP/PEIS (Section 5.5.10) established Gulf-wide goals for restoration of Sea Turtles, which the AL TIG refined to a set of five specific goals for nearshore habitats in Alabama and coastal Alabama waters.

- Make direct contributions to reducing sea turtle bycatch and vessel collision mortality or injury in Alabama coastal waters.
- Enhance hatchling productivity or restore/conserve nesting habitat.
- Enhance enforcement.

[38] NEPA requires evaluation of a "no action" alternative. This differs from the natural recovery alternative under OPA. The environmental consequences of the NEPA no action alternative are considered separately in Chapter 5.

- Increase survival through actions to investigate and respond to threats and emergency incident.
- Fill knowledge or data gaps specific to sea turtles and habitats in Alabama.[39]

The projects selected for inclusion in the Sea Turtles reasonable range of alternatives employ the following restoration approaches identified in the Final PDARP/PEIS.

1. Identifying and implementing measures to reduce bycatch in commercial and recreational fisheries.
2. Enhancing sea turtle hatchling productivity and restoring and conserving nesting beach habitat.
3. Enhancing state enforcement to improve compliance with existing requirements to reduce bycatch in commercial fisheries.
4. Increasing sea turtle survival through enhanced mortality investigations and early detection of and response to anthropogenic threats and emergency events.
5. Reducing injury and mortality of sea turtles from vessel strikes.

The remainder of this section provides OPA analysis for the individual Sea Turtles projects, with specific reference to each of the OPA criteria.

3.4.2 CAST Conservation Program

3.4.2.1 Project Summary

The CAST Conservation Program is designed to support existing sea turtle programs in Alabama to strengthen efforts to protect nesting sea turtles and enhance the survival of sea turtle hatchlings. The proposed project would allow the continued operation, expansion, and enhancement of Alabama's Share the Beach program under the management of the ACF. The project would educate the public about the conservation of sea turtles in the wild, and identify and help minimize anthropogenic threats, while at the same time promoting the region's potential for sea turtle-based eco-tourism. In addition, the project would support focused education and training of ACF program employees and volunteers, with the goal of improving the effectiveness and efficiency of sea turtle nesting data collection. These data would be provided to local governments, the state, and USFWS to support their work in actively reducing threats to nesting sea turtles, nests, and hatchlings. These enhancements would ensure the Alabama program operates on a similar level with other programs throughout the southeastern United States and would increase Alabama's contribution to overall efforts to support sea turtle restoration in the Gulf of Mexico. Properly trained ACF staff would organize and direct the expansion of the state's important sea turtle conservation initiatives using established policies and protocols.

3.4.2.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore injuries by addressing primary threats to sea turtles in the marine and terrestrial environment such as bycatch in commercial and recreational fisheries, acute environmental changes (e.g., cold water temperatures), loss or degradation of nesting beach habitat (e.g., coastal armoring and artificial lighting), and other anthropogenic threats.*

This project meets the Trustees' goals of addressing primary threats to sea turtles in the terrestrial environment and conserving nesting beach habitat, as outlined in the Final PDARP/PEIS, and is consistent with approaches specified in the Strategic Framework for Sea Turtle Restoration Activities (Module 4, page 16). ACF staff would provide nest monitoring protocol training oversight of Share the

[39] Alabama Sea Turtle Screening Criteria, Appendix B.

Beach for the during the nesting season. In addition, ACF would actively grow the volunteer network. These activities would be accompanied by ACF volunteer training and enhanced public education and outreach programs to improve public awareness and understanding of anthropogenic threats to turtles in both the beach and offshore environments. Systematic data collection on nests and nesting success and annual evaluation of lessons learned would further support the AL TIG goals of filling key knowledge gaps.

3.4.2.3 Cost to Carry Out the Alternative

The proposed cost of the CAST Conservation Program is $935,061. These costs are based on actual operation of Alabama's Share the Beach program in recent years and were refined to reflect the expansion and enhancement of the program under ACF's management. The estimates include ACF's proposed program costs (e.g., personnel, equipment, data management, and education and outreach costs). The AL TIG reviewed these costs and found them to be reasonable and comparable to costs incurred in the non-profit sector for similar types of programs. The AL TIG also reviewed the estimated project oversight, supervision, and contingency costs. Based on similar past projects, the TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.4.2.4 Likelihood of Success

This alternative has a high likelihood of successfully enhancing turtle hatchling productivity and filling related data gaps. Management of the program by ACF would enhance active volunteer recruitment and oversight and also ensure the continued existence of the program, which otherwise cannot be guaranteed. The proposed expansion and enhancement of the program under ACF is expected to be successful. ACF staff have the expertise and experience to fully implement the activities proposed under the program since they actively run other volunteer efforts in the region including training activities, oversight of public volunteers, and education and outreach. These include the Alabama oyster shell recycling program, the Mobile Bay Estuary Corps, and the "Eco-Team." Also contributing to the alternative's high likelihood of success is ACF's proposal to hire a project biologist with experience collecting and managing sea turtle nesting data. Overall, the ACF program is expected to increase hatchling survival in Alabama, which over time is expected to have positive impact on sea turtle populations in the Gulf.

3.4.2.5 Avoids Collateral Injury

The project is not be expected to cause any direct or collateral injury to other natural resources because it would primarily be a data collection and public education initiative. Any interactions by program staff or volunteers with sea turtles (e.g., turtles injured through vessel collisions or entanglements with hook-and-line fishing gear) would be governed by the Alabama Share the Beach program's existing ESA Permit No. TE100012 or a follow-on permit with similar conditions. The reasons why this project avoids collateral injury are discussed more fully in Chapter 10 of this draft RP II/EA.

3.4.2.6 Benefits More Than One Natural Resource or Services

This alternative is expected to primarily benefit sea turtles. Some secondary ecotourism benefits may occur as a result of ACF's public outreach and education activities.

3.4.2.7 Effects on Public Health and Safety

The CAST Conservation Program is not expected to affect public health and safety. The project would primarily involve data collection by ACF staff and public volunteers, and public education and outreach activities. None of these activities is expected to result in any health or safety issues for the public because ACF will follow appropriate safety protocols (e.g., waivers, protective equipment).

3.4.2.8 Summary OPA Evaluation: CAST Conservation Program

The OPA evaluation indicates that implementation of this alternative addresses the Trustees' goal of enhancing sea turtle hatchling productivity and restoring and conserving nesting beach habitat. The proposed approach has already been successfully implemented through the Alabama's Share the Beach program, and this proposal to allow its continued operation, including well-designed expansion and enhancements, is clearly described and appropriate. The costs are based on historical experience and are well documented and reasonable. The project would primarily benefit sea turtles. It is not expected to cause any collateral damage to natural resources. Public health and safety issues also are not expected to be a concern.

3.4.3 CAST Triage

3.4.3.1 Project Summary

The CAST Triage project would provide funds to develop an appropriately equipped triage center and partial program support for the initial triage, treatment, release, and/or transfer of injured or ill sea turtles. The facility would be merged into the ALSTSSN. The City of Orange Beach would provide the remaining operating costs. The project would allow more animals to be treated and released more quickly and with less stress on the animal from handling and long transports than is currently possible under existing ALSTSSN procedures. The site for this proposed facility is located on land owned by the City of Orange Beach adjacent to Cotton Bayou and within 2,000 feet of the beach. The proposed building would be a basic 40-foot by 60-foot, light, wind-rated, commercial metal structure. The building would be climate controlled and equipped with a full bath, office/storage area, and walk-in cooler/freezer units. As a major feature of the project, staff would work to educate the public about (1) anthropogenic threats to sea turtles treated at the facility, (2) current science on how best to address these threats, and (3) best conservation practices for sea turtles in the wild. Educational materials would be coordinated with USFWS's Alabama Ecological Services Field Office, the ALSTSSN coordinator, and the Alabama State Biologist (see CAST Protection: Enhancement and Education Project) to create a consistent and unified message.

3.4.3.2 Trustee Goals and Objectives

PDARP Restoration Goal*: Restore injuries by addressing primary threats to sea turtles in the marine and terrestrial environment such as bycatch in commercial and recreational fisheries, acute environmental changes (e.g., cold water temperatures), loss or degradation of nesting beach habitat (e.g., coastal armoring and artificial lighting), and other anthropogenic threats.*

This project meets the Trustees' goals by increasing sea turtle survival through actions to investigate and respond to threats and emergency incidents, including strandings and turtles injured through bycatch and vessel collision incidents. The project is consistent with recommendations in the Trustees' Strategic Framework for Sea Turtle Restoration Activities by enhancing turtle rehabilitation facilities (Module 4, page 17). The facility would reduce response time for emergency incidents and increase the likelihood of survival for stranded or injured turtles through the assembly of a local network of on-call veterinarians to assist with turtle rehabilitation. The facility would also provide important new opportunities for educating the public about the anthropogenic threats to sea turtles along the Alabama coast.

3.4.3.3 Cost to Carry Out the Alternative

The proposed cost of the CAST Triage project is $622,915. The estimated budget includes the costs of permitting, constructing, and equipping the facility; staff coordination and training; and project oversight, supervision, and contingency. The AL TIG reviewed these costs and found them to be reasonable, particularly in light of the willingness of the City of Orange Beach to make valuable coastal land available at no cost and to provide funding for operational costs after construction. If the project is selected for implementation, the construction of the building would go through the State of Alabama's competitive bidding process, further ensuring the reasonableness of the costs. The AL TIG also reviewed the estimated project oversight, supervision, and contingency costs. Based on similar past projects, the TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project reasonable and appropriate.

3.4.3.4 Likelihood of Success

This alternative has a high likelihood of successfully improving the ALSTSSN's ability to respond quickly and effectively to sea turtle strandings and other emergency incidents. The facility would provide a central location on the Alabama coast that would reduce the average response time for live turtle strandings and turtles injured through bycatch and vessel collision incidents. More rapid intervention coupled with shorter periods of captivity and minimized handling generally improves the outcomes for these incidents. Other facilities similar to the one proposed by this project exist in the Gulf of Mexico and have been very successful both in rehabilitating sea turtles and as effective centers for public education and outreach.[40]

3.4.3.5 Avoids Collateral Injury

The project is not expected to cause any collateral injury to other natural resources because the goal would be to support ALSTSSN's activities, which are focused only on turtles. The reasons why this project avoids collateral injury are discussed more fully in Chapter 10 of this draft RP II/EA.

3.4.3.6 Benefits More Than One Natural Resource or Services

This alternative is only expected to benefit sea turtles.

3.4.3.7 Effects on Public Health and Safety

The CAST Triage Center is not expected to affect public health and safety. The project would primarily involve ALSTSSN staff and volunteers, and public education and outreach activities. These activities are not expected to result in any health or safety issues for the public.

3.4.3.8 Summary OPA Evaluation: CAST Triage

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' goals of increasing sea turtle survival through actions to investigate and respond to threats and emergency incidents, including strandings of turtles injured through bycatch and vessel collision incidents and those stranded as a result of other causes. The proposed approach has already been successfully implemented at other locations around the Gulf of Mexico. The costs are well documented and very reasonable because of the donation of valuable coastal land for the facility by the City of Orange Beach. The project only benefits sea turtles. It is not expected to cause any collateral injury to natural resources. Public health and safety issues are not expected to be a concern.

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[40] http://www.seaturtleinc.org/ and https://www.imms.org/

3.4.4 CAST Habitat Usage and Population Dynamics

3.4.4.1 Project Summary

The CAST Habitat Usage and Population Dynamics project would collect data on migration patterns, habitat usage, and distribution patterns of sea turtles along the Alabama Coast. The project proposes in-water sampling of sea turtles to initiate a long-term monitoring program designed to determine distribution and habitat use, vital rates (including survival rates), connectivity, and potential impacts of anthropogenic activities for sea turtles in coastal and nearshore waters of Alabama. Methods proposed for collecting these data include genetic analyses, stable isotope analyses, mark-recapture, and habitat modeling (including anthropogenic threats). The objective is to inform and enhance future sea turtle restoration by the AL TIG and other state and federal initiatives about the locations and types of activities that would reduce threats to sea turtles and increase their populations in coastal Alabama by providing information on the locations and types of activities that may be most cost-effective.

3.4.4.2 Trustee Goals and Objectives

PDARP MAM Objectives: *The Trustees may also perform targeted resource level monitoring and scientific support activities for those Restoration Types with substantial gaps in scientific understanding, which limit restoration planning, implementation, evaluation, and/or understanding of resource recovery status (PDARP/PEIS, page 5-88).*

This project furthers the Trustees' Sea Turtle restoration goals by filling critical knowledge gaps about the population dynamics of and habitat usage by sea turtles in Alabama. The project is consistent with the Final PDARP/PEIS implementation considerations for sea turtles, which notes (page 5-62) that restoration may require a phased approach that would "include data collection to inform the best methods and to ensure restoration success, followed by larger-scale implementation of those preferred methods." The Final PDARP/PEIS states that sea turtle restoration encompasses "monitoring and scientific support to address critical information gaps and help inform the temporal and spatial implementation of future restoration projects" (page 5-63). The project's information collection strategy is also well-aligned with the types of potentially useful information gathering efforts outlined in the Strategic Framework for Sea Turtle Restoration Activities (page 21):

> "Population surveys and/or research directed at sea turtles at sea during their oceanic and neritic life stages to address temporal and spatial gaps in our understanding of sea turtle population trends, population structure, spatio-temporal distribution, life history parameters (e.g., survival rates, sex ratios, growth rates), migration patterns, and habitat use. This type of information will help inform future restoration actions as well as help evaluate the effects of the portfolio of sea turtle restoration projects."

Lack of knowledge about sea turtle population parameters, migration patterns, and habitat use currently constrains the effectiveness of the AL TIG's restoration planning and implementation in nearshore and coastal Alabama. Although nest counts and limited stranding data exist for turtles in the state, little else is known about turtle populations and their in-water activities in comparison with neighboring Gulf of Mexico states. Through this project, the AL TIG would develop a more complete understanding of current numbers of sea turtles by species using Alabama waters and their connection to other sea turtle populations in the Gulf of Mexico. This would provide more concrete reference points against which to measure the recovery of turtle populations over time. In addition, improved understanding of the distribution of sea turtle populations and their habitat use and dietary preferences, through the project's stable isotope analyses and mark-and-recapture components, is expected to help the AL TIG develop future initiatives that improve the geographic and temporal targeting of restoration and recovery activities, for example marine enforcement and compliance programs designed to reduce bycatch mortality. Also, better knowledge of habitat use by turtles potentially could allow greater targeting of programs such as the CAST Conservation Program and the Restoring the Night Sky—Assessment, Training, and Outreach (E&D) programs, which are designed to minimize human interference with nesting turtles and their hatchlings. Overall, collection of the data proposed in this project is expected to enhance the AL TIG's ability to successfully implement all five of its substantive sea turtle restoration goals.

3.4.4.3 Cost to Carry Out the Alternative

The proposed cost of the CAST Habitat Usage and Population Dynamics project is $1,631,696. These funds are solely directed at data collection activities, project oversight, supervision, and contingency. The proposed data collection would be completed by the USGS Wetland and Aquatic Research Center. The AL TIG reviewed the qualifications of the data collection team and the proposed costs of the work. Based on this review, the TIG finds the team to be well qualified and the proposed costs comparable to previous grants for similar activities, and therefore reasonable.[41] The AL TIG also reviewed the estimated project oversight, supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project reasonable and appropriate.

3.4.4.4 Likelihood of Success

This alternative has a strong likelihood of improving the AL TIG's understanding of habitat use and population dynamics of sea turtles in Alabama nearshore and coastal waters, and thus informing and enhancing future sea turtle restoration efforts. The proposed data collection methods are well tested and accepted in the peer-reviewed scientific literature. The sample sizes are expected to be large enough to yield statistically significant results.

3.4.4.5 Avoids Collateral Injury

This alternative is primarily a data gathering activity and therefore is not expected to cause any collateral injury to other natural resources. Sea turtle sampling would occur, but it would be conducted under NMFS permits and is not anticipated to result in any additional harm to sea turtles outside the harm currently authorized.[42] The reasons why this project avoids collateral injury are discussed more fully in Chapter 10 of this draft RP II/EA.

3.4.4.6 Benefits More Than One Natural Resource or Services

This alternative is only expected to benefit sea turtles.

3.4.4.7 Effects on Public Health and Safety

The CAST Habitat Usage and Population Dynamics project is not expected to affect public health and safety. The project would involve data gathering and analysis activities that include sampling and laboratory work, with no direct involvement of the public.[43]

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[41] See https://www.boem.gov/GoMMAPPS-Sea-Turtles/

[42] The existing permit (NMFS Permit No. 17304-02) for current research would need to be renewed or replaced with a new permit if this project is selected for implementation.

[43] The current permit (NMFS Permit No. 17304-02) requires the investigators to notify NMFS of all estimated dates for field work.

3.4.4.8 Summary OPA Evaluation: CAST Habitat Usage and Population Dynamics

The OPA evaluation indicates that implementation of this alternative would help further the Trustees' goals for sea turtle restoration by filling critical knowledge gaps that currently constrain the AL TIG's ability to optimize sea turtle restoration policies in Alabama. The costs of the proposed data collection activities are well documented and reasonable, and the project has a high likelihood of success. The project benefits only a single resource--sea turtles. It poses no threat of collateral injury to other natural resources. Public health and safety issues are not a concern.

3.4.5 CAST Protection: Enhancement and Education

3.4.5.1 Project Summary

The CAST Protection: Enhancement and Education project would support state enforcement of the ESA and increase turtle protection in Alabama state waters through a variety of activities. First, it would increase public awareness and understanding of ESA regulations that work to conserve and protect sea turtles through education initiatives designed to assist state enforcement efforts. Second, it would increase state enforcement resources dedicated to sea turtle ESA-related activities. Third, it would identify and initiate steps to reduce sea turtle bycatch in state fisheries, through social science surveys and by purchasing and distributing TEDs to skimmer trawl boats. Fourth, it would take steps to reduce anthropogenic impacts on nesting turtles, such as nest vandalism and lighting harassment, through increased beach enforcement and outreach.

AMRD law enforcement would work collaboratively with other federal and state agencies to determine training needs for its enforcement officers. Additionally, an AMRD biologist, hired as a full-time employee whose time is proposed to be split between this project and the marine mammal restoration project "Alabama Estuarine Bottlenose Dolphin Protection: Education and Enhancement" will work to better understand community outreach needs and implement new programs. The biologist's proposed tasks include: (1) overseeing the implementation of social science surveys to characterize attitudes and perceptions of vessel-based ecotourism businesses and their patrons regarding harmful interactions with sea turtles; (2) determining the scale and frequency of sea turtle and hook-and-line gear interactions in Alabama coastal waters; (3) developing a public outreach plan to inform the public of ways to reduce interactions with sea turtles and to provide guidance on what to do if an interaction occurs; and (4) working with federal agencies to identify and prioritize hotspot areas that need increased and consistent enforcement efforts. Once temporal and spatial hotspots are identified, necessary resources and equipment, and increased patrol hours would be provided established to reduce associated harm from illegal activities. This project requires close communication and coordination between the state and federal agencies to ensure the project goal, to reduce sea turtle interactions, is met.

3.4.5.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore injuries by addressing primary threats to sea turtles in the marine and terrestrial environment such as bycatch in commercial and recreational fisheries, acute environmental changes (e.g., cold water temperatures), loss or degradation of nesting beach habitat (e.g., coastal armoring and artificial lighting), and other anthropogenic threats.*

This project meets the Trustees' sea turtle restoration goals of reducing bycatch and vessel collision mortality/morbidity, and enhancing enforcement of sea turtle regulations in Alabama waters. The project adopts a variety of the restoration approaches suggested in Module 4 of the Strategic Framework for Sea Turtle Restoration Activities addressing bycatch and vessel collision incidents, including the following activities. The distribution of TEDs to 60 vessels in the skimmer trawl fishery is anticipated to result in substantial reductions in turtle bycatch. Outreach and education on sea turtle hook-and-line interactions in recreational fisheries, including incidents occurring around for-hire boats and recreational fishing piers, is also expected to yield positive bycatch reduction benefits. Finally, the increase in resources available for state enforcement training and patrols, as well as greater targeting of hotspots where sea turtle incidents occur, is anticipated to lead to more effective implementation of ESA regulations, including reductions in harassment of turtles by vessels in Alabama's coastal waters. In sum, the various efforts conducted under this project are expected to reduce overall sea turtle mortality and morbidity in Alabama.

3.4.5.3 Cost to Carry Out the Alternative

The proposed cost of the CAST Protection: Enhancement and Education project is $906,874. The budget for the alternative includes funds for AMRD staff, project oversight, supervision, and contingency. The staffing estimates for the program were developed by AMRD using current AMRD personnel costs. The AL TIG reviewed these costs and found the estimates to be well documented and reasonable for the proposed level of effort. The AL TIG also reviewed the estimated project oversight and contingency costs. Based on similar past projects, the TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project reasonable and appropriate.

3.4.5.4 Likelihood of Success

This alternative has a reasonable likelihood of successfully reducing mortality or morbidity of Alabama sea turtle populations caused by direct anthropogenic stressors and threats. The combined impact of increased enforcement of the ESA coupled with expanded education and outreach on harmful human interactions with sea turtles is expected to reduce the incidence of turtle deaths and injuries. Although data are not available to indicate the magnitude of such reductions, the AL TIG concludes that this project would be a cost-effective expenditure of Sea Turtles Restoration Type monies.

3.4.5.5 Avoids Collateral Injury

The project is not expected to cause collateral injury to other natural resources because it would primarily focus on enforcing the ESA and on providing outreach and education on sea turtle protection issues, activities that do not result in actions with any potential to cause injury to other natural resources. The reasons why this project avoids collateral injury are discussed more fully in Chapter 10 of this draft RP II/EA.

3.4.5.6 Benefits More Than One Natural Resource or Services

Some project staffing costs are shared between this alternative and the Alabama Estuarine Bottlenose Dolphin Protection: Education and Enhancement alternative, which provides benefits to marine mammals.

3.4.5.7 Effects on Public Health and Safety

The CAST Protection: Enhancement and Education project is not expected to affect public health and safety. The proposed enforcement, education and outreach activities would pose no health and safety risks to the public.

3.4.5.8 Summary OPA Evaluation: Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education

The OPA evaluation indicates that implementation of this alternative meets the Trustees' restoration goals of reducing sea turtle mortality and morbidity caused by direct anthropogenic stressors or threats, and enhancing enforcement of the ESA and other sea turtle regulations in Alabama. The costs are based on current agency experience, and are well documented and reasonable. The project has a reasonable expectation of success. The project primarily benefits sea turtles, although some staff costs would be shared with a similar effort for marine mammals. It is not expected to cause any collateral damage to natural resources. Public health and safety issues also are not expected to be a concern.

3.4.6 Restoring the Night Sky—Assessment, Training, and Outreach

3.4.6.1 Project Summary

The Restoring the Night Sky—Assessment, Training, and Outreach project is an E&D initiative with the long-term goal of reducing the impacts on federally managed lands of off-site light pollution that disorients nesting sea turtles and hatchlings, disrupting their reproductive activities and reducing their reproductive success. The E&D project has three primary objectives: (1) assessing artificial lighting that impacts federally managed lands along the Baldwin and Mobile County coasts; (2) developing a detailed strategy to mitigate the impacts of the identified problematic lighting; and (3) working with local governments to improve their understanding and capacity to address lighting concerns in the future.[44] Future implementation of the strategies recommended by the E&D project would eliminate the worst sources of light pollution affecting sea turtle reproductive success on federally managed lands in coastal Alabama. The E&D work proposed by this project would include local tests of human responses to sea turtle friendly alternative lighting fixtures; development of an inventory of municipal lighting; and identification of off-site locations that contribute disproportionately to light pollution on federal lands. The study would evaluate potential economic and environmental benefits of advanced lighting options and include pilot tests of alternative systems to assess public and ecological responses to different options. The project would sponsor lighting workshops and training for city code enforcement staff and local property owners. This project is also included in the reasonable range of alternatives for Habitat Projects on Federally Managed Lands (Section 3.2.3).

3.4.6.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore injuries by addressing primary threats to sea turtles in the marine and terrestrial environment such as bycatch in commercial and recreational fisheries, acute environmental changes (e.g., cold water temperatures), loss or degradation of nesting beach habitat (e.g., coastal armoring and artificial lighting), and other anthropogenic threats.*

This project would make an important contribution towards the Trustees' Sea Turtle restoration goal of addressing primary threats to sea turtles in terrestrial environments and restoring and conserving nesting beach habitat in coastal Alabama. These areas, which were directly damaged by oiling and/or response activities associated with the spill, are currently degraded by off-site sources of light pollution that reduce the ability of sea turtles to reproduce successfully, particularly along the beaches at the BSNWR. Consistent with the Strategic Framework for Sea Turtle Restoration Activities (page 12), the project would develop the necessary data to support implementation of actions to eliminate the most damaging sources of light pollution on these beaches by replacing them with alternative lighting solutions. The specific objective under this element of the project would be to fund outreach and training with local officials and property owners in order to build understanding and support for these lighting replacement programs.

[44] Objectives 1 and 2 are the focus of the work proposed under the Restoring Habitat Projects on Federally Managed Lands Restoration Type.

3.4.6.3 Cost to Carry Out the Alternative

The proposed cost of The Restoring the Night Sky—Assessment, Training, and Outreach project is $216,655.[45] The budget for the alternative includes funds for the assessment and strategy development, E&D work, outreach and training, and project oversight, supervision, and contingency. The AL TIG worked with experts at USDOI to develop the cost estimates for the assessment, strategy and outreach activities. The costs are representative of similar studies previously carried out by USDOI and are therefore found to be reasonable. The AL TIG also reviewed the estimated project oversight costs and contingency. Based on similar past projects, the TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project reasonable and appropriate.

3.4.6.4 Likelihood of Success

This alternative's objective of developing a strategy for controlling light pollution on federally managed lands in coastal Alabama has a high likelihood of success. The project design is clearly documented. The study would be conducted by NPS's Natural Sounds and Night Skies Division, which has successfully conducted these types of studies in the past. Local assistance with outreach and training would be provided by USDOI, further ensuring success. Implementation of recommendations for reduced levels of light pollution would ultimately be expected to benefit sea turtles because studies have clearly demonstrated the harmful effects of light pollution on nesting sea turtles (Witherington and Martin, 2014).

3.4.6.5 Avoids Collateral Injury

The project is not expected to cause any collateral injuries to natural resources because it focuses on studies of lighting impacts and outreach to local officials, activities that pose no direct or indirect risk of injury to the environment.

3.4.6.6 Benefits More Than One Natural Resource or Service

Future implementation of the E&D study's recommendations for reducing light pollution has the potential to benefit other species on federally managed lands in coastal Alabama. In addition to sea turtles, studies have demonstrated potential benefits of reduced light pollution to beach mice (Bird et al., 2004), sea birds (Montevecchi, 2006), and a diverse range of other marine and terrestrial species (Longcore and Rich, 2004; Gaston et al., 2013).

3.4.6.7 Effects on Public Health and Safety

The Restoring the Night Sky—Assessment, Training, and Outreach project proposes studies and outreach, activities are not expected to have impacts on public health or safety.

3.4.6.8 Summary OPA Evaluation: Restoring the Night Sky—Assessment, Training, and Outreach

The OPA evaluation indicates that implementation of this alternative meets the Trustees' goals of enhancing sea turtle hatchling productivity and restoring and conserving nesting beach, particularly on federally managed lands in coastal Alabama. The alternative has a strong nexus to ecological injuries caused by DWH spill and response activities, particularly at the BSNWR. The proposed outreach and collaboration approaches are well documented and technically appropriate for addressing light pollution issues. USDOI is well qualified to direct the outreach and training work. The costs are reasonable. The project has a high probability of success and is expected to benefit multiple natural resources. The

[45] This represents the Sea Turtles Restoration Type's proposed share of the total project budget ($399,658).

project would pose no risks of collateral injuries to other natural resources. Public health and safety issues are not expected to be a concern.

3.4.7 Natural Recovery—Sea Turtles

Pursuant to the OPA regulations, the Final PDARP/PEIS considered a "natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (40 CFR 990.53[b][2]). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of Sea Turtles in the Alabama Restoration Area using DWH NRDA funding at this time. The 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. Although injured resources could presumably recover to or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, tiering this RP II/EA from the Final PDARP/PEIS, and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery as a viable alternative under OPA. Natural recovery is not considered further in this draft RP II/EA.[46]

3.5 MARINE MAMMALS

3.5.1 Overview of Restoration Goals and Approaches

The Final PDARP/PEIS (Section 5.5.11) established Gulf-wide goals for marine mammal restoration, which the AL TIG refined to a set of three specific goals for marine mammals in coastal Alabama waters. Projects should:

- Make direct contributions to reducing mortality or morbidity of Alabama marine mammal populations caused by direct anthropogenic stressors or threats; or
- Reduce natural stressors or take other actions that support the ecological needs of marine mammals resulting in increased resilience of Alabama populations; or
- Play a significant role in the collection and/or analysis of data that improves the ability of the AL TIG to restore marine mammal populations in Alabama.[47]

The projects selected for inclusion in the Marine Mammal reasonable range of alternatives employ the following restoration approaches identified in the Final PDARP/PEIS:

1. Reduce commercial fishery bycatch through collaborative partnerships.
2. Reduce injury and mortality of bottlenose dolphins from hook-and-line fishing gear.
3. Increase marine mammal survival through better understanding of the causes of illness and death as well as early detection and intervention for anthropogenic and natural threats.

[46] NEPA requires evaluation of a "no action" alternative. This differs from the natural recovery alternative under OPA. The environmental consequences of the NEPA no action alternative are considered separately in Chapter 5.

[47] Alabama Marine Mammal Screening Criteria, Appendix B.

4. Reduce injury, harm and mortality to bottlenose dolphins by reducing illegal feeding and harassment activities.
5. Reduce marine mammal takes through enhanced state enforcement related to the MMPA.
6. Reduce injury and mortality of marine mammals from vessel collisions.

The remainder of this section provides OPA analysis for the individual Marine Mammal projects, with specific reference to each of the OPA criteria.

3.5.2 Enhancing Capacity for the Alabama Marine Mammal Stranding Network

3.5.2.1 Project Summary

The Enhancing Capacity for the ALMMSN project would allow ALMMSN, managed and operated out of the DISL, to continue responding to strandings, performing necropsies, and analyzing samples from stranded marine mammals in Alabama waters from 2020 to 2023. This work allows researchers to understand causes of marine mammal illness and death. The program would increase data consistency for information collected from stranded marine mammals by providing additional support for ALMMSN to enter its data into the regional marine mammal health database (Gulf MAP). ALMMSN would use and expand the existing infrastructure for communications and data management established by DISL/Mammal Stranding Network and ALMMSN. Additional personnel expected to be hired to support the operation of the ALMMSN include a principal investigator, stranding coordinator, technician, and graduate student. The Alabama data collected by the project would enable marine resource managers to mitigate impacts on marine mammals from natural and anthropogenic threats and to monitor population recovery post-DWH oil spill.

3.5.2.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Identify and implement restoration activities that mitigate key stressors in order to support resilient populations. Collect and use monitoring information, such as population and health assessments and spatio-temporal distribution information.*

This project meets the Trustees' Marine Mammal restoration goals by increasing marine mammal survival through better understanding of the causes of illness and death, as well as by facilitating early detection and intervention for anthropogenic and natural threats. Consistent with both the Final PDARP/PEIS and the Strategic Framework for Marine Mammal Restoration Activities (Module 4, section 2.4, page 11), it does this by reducing stranding response time; improving the quantity, quality, and consistency of reporting data for marine mammals; increasing the number of personnel trained for stranding response in the region; increasing the number of biological samples analyzed to determine causes of death and population status; expanding community awareness; and providing long-term data sharing, storage, and retrieval capacity. These efforts would directly enhance the number of reports and quality of information available to management authorities. Relationships among regional network responders would also be strengthened by the increased capacity for trained response, and veterinarian participation would ease workloads. These efforts would reduce marine mammal mortality in Alabama waters, better define the specific causes of serious injury and death among stranded marine mammals, and establish baseline conditions or shifts from previous conditions for comparison to immediate and longer-term threats to marine mammals.

In the long term, these efforts would increase the abundance and stability of marine mammal populations in the region, identify larger patterns in stranding data that would allow managers and policy makers to define and focus management and conservation efforts, improve knowledge of and response to future environmental emergencies like the DWH oil spill or longer term effects such as climate change and habitat loss, and potentially reduce the likelihood of future unusual or mass mortality events.

3.5.2.3 Cost to Carry Out the Alternative

The proposed cost of the Enhancing Capacity for ALMMSN project is $2,432,389. These costs are based on actual operation of the existing ALMMSN program, refined to reflect the proposed expansion and enhancement of the program. The AL TIG reviewed these costs and found them to be reasonable estimates of the levels of effort required for the proposed activities. The program costs are representative of direct and indirect costs incurred by other similar stranding networks in the Gulf of Mexico and are reasonable. The AL TIG also reviewed the estimated project oversight, supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project reasonable and appropriate.

3.5.2.4 Likelihood of Success

This alternative has a high likelihood of successfully strengthening and growing Alabama's marine mammal populations. The program is already operating successfully and funding of this effort would ensure not only its continued operation, which otherwise cannot be guaranteed, but its enhancement and expansion. The proposed expansion and enhancement of the program under its existing manager, DISL, is expected to be a success. DISL staff have the expertise and experience to implement the activities proposed under the program—including sample collection, necropsies, sample analysis, and data management.

3.5.2.5 Avoids Collateral Injury

The proposed project is not expected to cause any collateral damage to other natural resources because it would primarily be a data collection and analysis initiative. Any interactions with marine mammals (e.g., bottlenose dolphins injured through human interactions) would be governed by existing agreement for the stranding program between DISL and NOAA's Southeast Region (valid through 9/30/19) or by a renewal of the agreement after expiration of the current one. The reasons why this project avoids collateral injury are discussed more fully in Chapter 11 of this draft RP II/EA.

3.5.2.6 Benefits More Than One Natural Resource or Services

This alternative is only expected to benefit marine mammals.

3.5.2.7 Effects on Public Health and Safety

The Enhancing Capacity for ALMMSN project is not expected to affect public health and safety. The project would primarily involve data collection by ALMMSN staff. These activities are not expected to result in any health or safety issues for the public, who would not be involved in the project.

3.5.2.8 Summary OPA Evaluation: Enhancing Capacity for the Alabama Marine Mammal Stranding Network

The OPA evaluation indicates that implementation of this alternative directly addresses the Trustees' marine mammal restoration goals by continuing efforts to strengthen and grow the AL TIG's understanding of the threats to marine mammal populations. The proposed approach has already been successfully implemented and the proposal to allow continued operation, including well-designed expansion and enhancements, is well documented. The costs are based on historical experience, and are well documented and reasonable. The project only benefits marine mammals. It is not expected to cause any collateral damage to natural resources. Public health and safety issues are not expected to be a concern.

3.5.3 Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health

3.5.3.1 Project Summary

The Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health project would measure seasonal (summer/winter) dolphin abundance, distribution, and habitat use, providing baseline assessment information for dolphin stocks within Alabama state waters. The project would also assess dolphin condition, based on observation and biopsy sampling post-DWH oil spill. Four remote biopsy surveys would be conducted in Mobile Bay and Perdido Bay to obtain statistically valid seasonal sample sizes for analysis of genetic stock structure, body condition, diet, and toxicology assessments. Winter 2019–2020 and summer 2020 remote biopsy surveys would be conducted across Perdido Bay and adjacent coastal waters. Remote biopsy sampling in Mobile Bay and adjacent coastal waters would be conducted during the winter 2020–2021 and summer 2021 sampling season. Twelve seasonal photo-ID surveys would be conducted at sites in Perdido Bay and Mobile Bay. Abundance estimates for Perdido Bay and Mobile Bay would follow established methods (i.e., mark-recapture). Additional methods would include genetic analyses, stable isotope analyses, mark-recapture, and habitat modeling (including anthropogenic threats). The objective of the project is to inform AL TIG and other agency restoration initiatives about baseline population characteristics as reference points for evaluating restoration progress, as well as providing information on marine mammal habitat use that might suggest effective approaches for increasing populations in Alabama. The project would be implemented by the DISL in collaboration with NOAA NMFS Southeast Fisheries Science Center.

3.5.3.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Identify and implement restoration activities that mitigate key stressors in order to support resilient populations. Collect and use monitoring information, such as population and health assessments and spatio-temporal distribution information.*

This project meets the Trustees' Marine Mammal restoration goals through the collection and analysis of data that improves the ability of the AL TIG to restore marine mammal populations in Alabama. It does this through established scientific data collection activities that fill important gaps in the AL TIG's understanding of the stock status of bottlenose dolphin populations that reside all or part of the year in Mobile and Perdido Bays. This work is consistent with the identification in the Final PDARP/PEIS of the need for acquisition of additional resource-level monitoring data characterizing marine mammal populations and their spatial distribution and health through use of photo-ID surveys and cataloguing, capture-mark-recapture surveys and analyses, and remote biopsy sampling. The project tasks implement activities outlined in greater detail in the Strategic Framework for Marine Mammal Restoration Activities (Module 4, Table 2, page 23). The project would provide direct stock assessment based on genetics and photo-identification targeted at defining distribution, abundance, and population structure in the years since the DWH spill. These analyses would allow direct comparison of genetic stock structure, seasonal density, and survival patterns in Alabama with data from sites in Louisiana, Mississippi, and Florida that have already been collected. As new Alabama data become available, the TIG would be able to make better-informed decisions about marine mammal restoration in Alabama because of its improved understanding of the baseline size, location, inshore habitat utilization, and ongoing health status of these populations. This would enhance the AL TIG's ability to increase marine mammal survival through better understanding of the causes of illness and death, as well as early detection and intervention in response to anthropogenic and natural threats—and identify and help prioritize future restoration approaches for implementation to further benefit marine mammals in Alabama.

3.5.3.3 Cost to Carry Out the Alternative

The proposed cost of the Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health project is $3,059,229. These funds are solely directed at scientific data collection and project oversight, supervision, and contingency. The proposed investigations would be completed by researchers at DISL and the NOAA NMFS Southeast Fisheries Science Center. The AL TIG reviewed the qualifications of data collection team and the proposed costs of the work. Based on this review, the TIG finds the team to be well qualified and the proposed costs comparable to previous efforts for similar data collection activities, and therefore reasonable. The AL TIG also reviewed the estimated costs of project oversight, supervision, and contingency. Based on similar past projects, the TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project reasonable and appropriate.

3.5.3.4 Likelihood of Success

This alternative has a high likelihood of successfully characterizing the proposed population attributes of bottlenose dolphins in Alabama coastal waters. The proposed data collection methods are well-tested, accepted in the peer-reviewed scientific literature, and consistent with approaches proposed in the Strategic Framework for Marine Mammal Restoration Activities. The sample sizes are expected to be large enough to yield statistically meaningful results. The proposed data collection plan is well documented and clear. The proposed staff are well qualified and experienced.

3.5.3.5 Avoids Collateral Injury

This proposed alternative is a data collection activity that would not cause any collateral injury to natural resources. Marine mammal sampling would occur, but it would be conducted under NMFS permits. The reasons why this project avoids collateral injury are discussed more fully in Chapter 11 of this draft RP II/EA.

3.5.3.6 Benefits More Than One Natural Resource or Services

This alternative is only expected to benefit marine mammals, and only as the results of the scientific investigations begin to inform future restoration activities.

3.5.3.7 Effects on Public Health and Safety

The Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health project is not expected to affect public health and safety. The project would involve scientific investigations that include sampling and laboratory work by trained scientists, with no involvement by the public.

3.5.3.8 Summary OPA Evaluation: Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' goals for mitigating key marine mammal stressors in order to support resilient populations. The project does this by collecting monitoring information on populations regarding their health and spatial and temporal distributions. This information expected to contribute to a better understanding of baseline population characteristics, the causes of marine mammal illness and death, and early detection and intervention related to anthropogenic and natural threats. It would also help to identify future restoration opportunities. The costs of the proposed activities are well documented and reasonable, and the project has a high likelihood of success. The project is expected to benefit only bottlenose dolphins. It poses no threat of collateral injury to other natural resources. Public health and safety issues are not a concern.

3.5.4 Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education

3.5.4.1 Project Summary

The Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education project would provide increased resources for state enforcement and education around a variety of bottlenose dolphin protection issues in Alabama. First, the project would increase resources dedicated to state law enforcement of the MMPA. Second, it would foster awareness and understanding of the MMPA through education, training, and outreach. NMFS and ADCNR would work collaboratively with AMRD law enforcement and NOAA's Office of Law Enforcement to determine state enforcement personnel training needs, design consistent training methods, and develop appropriate training and educational materials and products. Resources and equipment necessary to increase and sustain state enforcement activities in hotspot areas would be identified, and state enforcement would be increased/enhanced in areas of need to reduce harm from illegal activities. A communication pathway between the state and federal agencies and law enforcement would be established to reevaluate needs on an ongoing basis to ensure consistency in enforcement enhancement efforts. Additional education and outreach activities would specifically address bottlenose dolphin injuries related to commercial and recreational fishing, vessel-based harassment, and illegal feeding. To develop the outreach and education program, the AMRD biologist, in coordination with NMFS, would specifically focus on characterizing dolphin interactions with commercial fishing vessels, and identifying and developing practices to reduce lethal impacts on dolphins from hook-and-line fishing related injuries, as well as illegal feeding and vessel-based ecotourism activities. This would require retaining expert assistance to: (1) conduct a systematic fisheries science survey for characterizing dolphin interactions with commercial and recreational fisheries; and (2) conduct social science studies (e.g., interviews, focus groups) examining the nature and extent of illegal feeding and harassment activities in Alabama state waters by user group. These fishery and social science studies are intended to inform the identification, development, and implementation of ways to reduce harmful interactions with dolphins, including outreach and education.

3.5.4.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Identify and implement restoration activities that mitigate key stressors in order to support resilient populations. Collect and use monitoring information, such as population and health assessments and spatiotemporal distribution information.*

Consistent with the Final PDARP/PEIS and the Strategic Framework for Marine Mammal Restoration Activities (e.g., Module 4, Sections 2.6-2.8), this project meets the Trustees' marine mammal restoration goal of reducing mortality or morbidity of Alabama marine mammal populations caused by direct anthropogenic stressors or threats by playing a significant role in the collection and analysis of data that improves the ability of the AL TIG to restore marine mammal populations in Alabama. Increased and more targeted state enforcement of the MMPA is expected to directly reduce bottlenose dolphin mortality in Alabama related to violations of the MMPA. The increase in resources would allow state enforcement officers to devote greater attention to harm and mortality related to violations of the MMPA, including from vessel-based harassment of dolphins, and illegal feeding. These activities are reported as presently occurring at levels that pose unacceptable threats to bottlenose dolphins. The TIG's goals would be further addressed through the outreach and education activities of the AMRD biologist to reduce direct threats caused by both fishery interactions and human interactions (i.e., illegal harassment and feeding activities). By increasing public awareness of the potential injuries and harm caused by these anthropogenic stressors, the TIG anticipates that the project would result in larger and healthier bottlenose dolphin populations in Alabama's coastal waters.

3.5.4.3 Cost to Carry Out the Alternative

The proposed cost of the Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education project is $686,374. The cost is based on staffing estimates for the program by AMRD using current AMRD personnel costs, as well as indirect costs for materials, project oversight, supervision, and contingency. The AL TIG reviewed the direct and indirect project costs and found them reasonable for the proposed level of effort. The AL TIG also reviewed the estimated project oversight, supervision, and contingency costs. Based on similar past projects, the TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.5.4.4 Likelihood of Success

This alternative has a reasonable likelihood of successfully reducing mortality of Alabama marine mammal populations caused by direct anthropogenic stressors or threats. The combined impact of increased state enforcement of the MMPA coupled with expanded education and outreach on harmful human interactions with bottlenose dolphins is expected to reduce the incidence of dolphin deaths and injuries. Although data are not available to indicate the magnitude of such reductions, the AL TIG concludes that this project would be a cost-effective expenditure of restoration monies.

3.5.4.5 Avoids Collateral Injury

The project is not expected to cause any collateral injury to other natural resources as it is primarily focused on enforcing the MMPA and on providing outreach and education on MMPA issues, activities that do not result in actions with any potential to cause injury to other natural resources. The reasons why this project avoids collateral injury are discussed more fully in Chapter 11 of this draft RP II/EA.

3.5.4.6 Benefits More Than One Natural Resource or Services

Project costs are shared between this alternative and the CAST Protection: Enhancement and Education alternative, which provides benefits to sea turtles.

3.5.4.7 Effects on Public Health and Safety

The Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education project is not expected to affect public health and safety. The proposed enforcement, education and outreach activities would pose no health and safety risks to the public.

3.5.4.8 Summary OPA Evaluation: Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education

The OPA evaluation indicates that implementation of this alternative would successfully meet the Trustees' restoration goal of reducing mortality of Alabama marine mammal populations caused by direct anthropogenic stressors or threats. The costs are based on current agency experience, and are well documented and reasonable. The project has a reasonable expectation of success. The project primarily benefits marine mammals, although some staff costs would be shared with a similar effort for sea turtles. It is not expected to cause any collateral damage to natural resources. Public health and safety issues also are not expected to be a concern.

3.5.4.9 Natural Recovery—Marine Mammals

Pursuant to the OPA regulations, the Final PDARP/PEIS considered a "natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (40 CFR 990.53[b][2]). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of Marine Mammals in the Alabama Restoration Area using DWH NRDA funding at this time. The 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. Although injured resources could presumably recover to or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, tiering this RP II/EA from the Final PDARP/PEIS, and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery as a viable alternative under OPA. Natural recovery is not considered further in this RP II/EA.[48]

3.6 BIRDS

3.6.1 Overview of Restoration Goals and Approaches

The Final PDARP/PEIS (Section 5.5.12) established Gulf-wide goals for bird restoration, which the AL TIG refined to a set of two specific goals for bird projects in coastal Alabama. Projects should:

- Increase reproduction or decrease mortality for DWH injured species where restoration is not largely complete (colonial nesting wading birds and seabirds including brown pelicans); or
- Fill important information/data gaps for birds in Alabama.[49]

The projects selected for inclusion in Birds reasonable range of alternatives employ the following restoration approaches identified in the Final PDARP/PEIS:

1. Restore and conserve bird nesting and foraging habitat.
2. Establish or reestablish breeding colonies.
3. Protect and conserve marine, coastal, estuarine and riparian habitats.

The remainder of this section provides OPA analysis for the individual Birds restoration projects, with specific reference to each of the OPA criteria.

3.6.2 Southwestern Coffee Island Habitat Restoration Project—Phase I (E&D)

3.6.2.1 Project Summary

The Southwestern Coffee Island Habitat Restoration Project—Phase I would support planning activities related to the restoration and creation of tidal wetlands and other colonial nesting bird breeding and foraging habitat along the southwest shoreline of Coffee Island, located in Mississippi Sound in Mobile County. Phase I proposes funding for two tasks: (1) a synthesis of colonial wading bird and shorebird nesting data in coastal Alabama and (2) E&D and permitting for the restoration of habitat on Coffee Island to evaluate whether the project should be considered for further development in a later plan. The synthesis of nesting data would be conducted to determine existing nesting habitat types and acreages in coastal Alabama, including the location of past restoration projects that may benefit birds injured by

[48] NEPA requires evaluation of a "no action" alternative. This differs from the natural recovery alternative under OPA. The environmental consequences of the NEPA no action alternative are considered separately in Chapter 5.

[49] Alabama Bird Screening Criteria, Appendix B.

the spill. These include little blue herons, tri-colored herons, white ibis, cattle egrets, black skimmers, and American oystercatchers. Additional analysis would be conducted (pending data availability) to determine the number and types of birds using the identified habitats. The proposed E&D work for Coffee Island restoration would include field studies, biological assessments, data synthesis, modeling, sediment source investigations, development of drawings and construction plans, preparation of construction cost estimates, and acquisition of required permits. E&D funding would be shared equally between the Wetlands, Coastal, and Nearshore Habitats and Birds Restoration Types.

3.6.2.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore or protect habitats on which injured birds rely.*

This project begins the process of meeting the Trustees' Birds restoration goals by initiating investigations and E&D work designed to restore and conserve bird nesting and foraging habitat and protect and conserve coastal habitat in areas injured by the spill. Future restoration of Coffee Island has the potential to yield a wide array of benefits to birds in coastal Alabama. The proposed E&D project would consider opportunities to protect Coffee Island from further losses to erosion. In addition, consistent with the Strategic Framework for Bird Restoration Activities, it would consider options for adding new wetland and shell beach habitats along the southwestern shoreline of the island, creating new nesting and foraging habitat for both shorebirds and colonial wading birds. This creates potential opportunities for transfer of threatened nesting colonies from other coastal Alabama locations such Cat Island, where existing nesting sites are expected to be increasingly subject to inundation by sea level rise in the relatively near future.

3.6.2.3 Cost to Carry Out the Alternative

The proposed cost of the Southwestern Coffee Island Habitat Restoration Project—Phase I is $825,225.[50] The estimate includes direct and indirect costs for the habitat synthesis and E&D phases of the project, plus project oversight, supervision, and contingency. The habitat synthesis and E&D study cost projections reflect the best estimates of the AL TIG. The AL TIG reviewed the direct and indirect project costs and find these to be reasonable. If selected for implementation, this work would go through the State of Alabama's competitive bidding process to ensure the reasonableness of the costs. The AL TIG also reviewed the estimated project oversight and supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.6.2.4 Likelihood of Success

This alternative's goal of conducting the habitat synthesis and the E&D work for the Coffee Island restoration project has a high likelihood of success. The project has been designed in phases to ensure that key threshold questions about the need for additional nesting and foraging habitat at Coffee Island would be answered prior to beginning the E&D phase. The initial habitat synthesis work, and related telemetry work associated with the proposed Colonial Nesting Wading Bird Tracking and Habitat Use Assessment projects (Two and Four Species alternatives), have the potential to help inform any resulting E&D work for the Coffee Island restoration planning effort, increasing the probability of successful occupation of the island by the target bird species. The data and methods needed to perform the proposed habitat synthesis are available and widely accepted.

[50] This represents the 50 percent share of the project costs funded from the Bird Restoration Resource Type allocation. The remaining 50 percent would be funded from the Wetlands, Coastal, and Nearshore Habitats Restoration Type allocation.

3.6.2.5 Avoids Collateral Injury

For the proposed habitat synthesis and E&D work, no direct or indirect collateral natural resource injuries are anticipated. The proposed actions do not involve on the ground activities with any potential to cause environmental injury.

3.6.2.6 Benefits More Than One Natural Resource or Service

Future implementation of the restoration plans developed under this alternative is expected to benefit multiple natural resources. It would restore bird species injured by the spill, while creating wetlands, coastal, and nearshore habitat and coastal resiliency benefits. However, project benefits only accrue in the future if restoration actions are implemented at Coffee Island.

3.6.2.7 Effects on Public Health and Safety

The Southwestern Coffee Island Habitat Restoration Project—Phase I is not expected to affect public health and safety. The project consists of data analysis activities and E&D work that would not involve the public.

3.6.2.8 Summary OPA Evaluation: Southwestern Coffee Island Habitat Restoration Project—Phase I

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' goals by initiating investigations and E&D work designed to restore and conserve bird nesting and foraging habitat and protect, conserve and restore wetlands, coastal, and nearshore habitat in areas of coastal Alabama injured by the spill. The costs of the project are reasonable. The project is not expected to cause any collateral injury to natural resources. Restoration of Coffee Island would benefit multiple natural resources and services (i.e., wetlands, coastal, and nearshore habitats, birds, and coastal resilience). Public health and safety issues are not expected to be a concern.

3.6.3 Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species

3.6.3.1 Project Summary

The Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species project would collect monitoring data needed to address critical information gaps that currently act as impediments to restoration planning for these species in Alabama. The study proposes a telemetry tracking study of the movements of four species breeding along the Alabama coast—tricolored heron, little blue heron, cattle egret and white ibis. The goals of the monitoring are to better understand the extent to which declines in colonial nesting wader populations result from habitat limitations versus other potential causes such as increased prevalence of predators or human disturbance. The proposed study would (1) determine daily and seasonal movements among nesting colonies at three important breeding areas—Mississippi Sound, Gaillard Island, and Perdido Bay; (2) determine seasonal and annual home ranges for birds marked at sites identified above and document fidelity to specific nesting colonies, as well as dispersal timing and regional dispersal among known breeding colonies within the study area; (3) document average foraging distances, time away from nests, and identification of important foraging areas within the study area; and (4) determine weekly and seasonal habitat use within the study area. The proposed study would employ a combination of satellite and VHF transmitters in conjunction with color leg-banding to generate the monitoring data to elucidate limiting habitat components for these species.

3.6.3.2 Trustee Goals and Objectives

PDARP MAM Objectives: *The Trustees may also perform targeted resource level monitoring and scientific support activities for those restoration types with substantial gaps in scientific understanding,* *which limit restoration planning, implementation, evaluation, and/or understanding of resource recovery status (Final PDARP/PEIS page 5-88).*

This project furthers the Trustees' Bird restoration goals by initiating monitoring studies expected to inform and enhance future restoration planning for key colonial nesting wading bird species along the Alabama coast that were injured by the DWH spill. The project is consistent with Final PDARP/PEIS monitoring considerations which note (page 5-76) that "data collection activities would include additional monitoring and scientific support to address several critical information gaps regarding the effects of restoration activities, including regional metapopulation conditions, movement, and interactions; behaviors of target species given chronic and acute threats; site- and regional-specific recruitment survival rates and drivers; effects of patterns of dispersal on recruitment; and the potential for species to shift to alternate nesting habitats in response to habitat loss and/or creation. In addition to providing information needed to adaptively manage restoration actions for birds and their habitats, targeted data collection efforts will provide resource managers with improved technical input for management decisions, which could provide further benefit to the species targeted for restoration." The project's information collection strategy also aligns with monitoring guidance in the Strategic Framework for Bird Restoration Activities, which identifies the need for resource-level monitoring (page 29), stating that "[m]any species that will be targets for restoration activities have broad distributions that extend beyond potential project boundaries. These broad distributions require coordinated monitoring across sites…."

Currently, the AL TIG is unable to effectively weigh the relative merits of creating or restoring new nesting habitat relative to other potential restoration measures for these species (e.g., greater emphasis on predator controls or actions to increase the availability of forage resources). The data collected from the study are expected to provide useful insights into these questions and would allow the TIG to target future active restoration measures more effectively.

3.6.3.3 Cost to Carry Out the Alternative

The proposed cost for the Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species project is $2,322,144. These funds are solely directed at the telemetry tracking study and project oversight, supervision, and contingency. The proposed work would be completed by USFWS staff and researchers under contract to them. The AL TIG reviewed the direct and indirect project costs and found them reasonable for the proposed level of effort. The AL TIG also reviewed the estimated project oversight, supervision, and contingency costs. Based on similar past projects, the TIG found these costs to be reasonable. The AL TIG notes, however, that while the costs are reasonable for the proposed work, the extent of the investigations (i.e., the number of species monitored) may be more than is required to adequately characterize the movements of colonial wading birds in coastal Alabama.

3.6.3.4 Likelihood of Success

This alternative has a high likelihood of successfully characterizing the movements of the four species that would be fitted with tracking devices. The proposed data collection plan is well documented and clear. The telemetry and tagging approaches are well-tested in the field and accepted in the peer-reviewed scientific literature. The sample sizes are expected to be large enough to yield statistically significant results. However, it may not be necessary to track four species in order to develop an adequate understanding of the movements of colonial wading birds in coastal Alabama. Studying a smaller set of representative species may be provide sufficient information to inform future restoration.

3.6.3.5 Avoids Collateral Injury

This project is primarily a data collection activity and therefore would not cause any collateral damage to natural resources. The tagging itself is not anticipated to result in any harm to the affected birds. The reasons why this project avoids collateral injury are discussed more fully in Chapter 12 of this draft RP II/EA.

3.6.3.6 Benefits More Than One Natural Resource or Services

This alternative is only expected to benefit birds, and only in the future when the monitoring results begin to inform restoration activities.

3.6.3.7 Effects on Public Health and Safety

The Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species project is not expected to affect public health and safety. The project would involve data collection and analysis activities that include field monitoring by trained scientists, with no involvement of the public.

3.6.3.8 Summary OPA Evaluation: Colonial Nesting Wading Bird Tracking and Habitat Use Assessment

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' bird restoration goals by initiating monitoring work to fill critical information gaps that currently act as impediments to restoration planning for these colonial wading bird species in Alabama. The costs of the project are reasonable for the proposed scope of work. The proposed approach is well-designed and would successfully meet the Trustees' goal of informing and enhancing the restoration decision-making process. The project would not cause any collateral injury to natural resources. The project only benefits birds. Public health and safety issues are not expected to be a concern. Overall, however, the project is a less cost-effective approach than the Two Species alternative which analysis suggests would provide information sufficient for characterizing colonial wading bird movements and habitat use.

3.6.4 Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species

3.6.4.1 Project Summary

The Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species project would collect monitoring data needed to address critical information gaps that currently act as impediments to restoration planning for these species in Alabama. The study proposes a telemetry tracking study of the movements of two species breeding along the Alabama coast. Monitored species would be selected from the group that includes tricolored heron and either the little blue heron or the white ibis, based on additional recommendations from Trustee bird experts. The goals of the monitoring are to better understand the extent to which declines in colonial nesting wader populations result from habitat limitations versus other potential causes such as increased prevalence of predators or human disturbance. The proposed study would (1) determine daily and seasonal movements among nesting colonies at three important breeding areas (Mississippi Sound, Gaillard Island, and Perdido Bay); (2) determine seasonal and annual home ranges for birds marked at sites identified above and document fidelity to specific nesting colonies, as well as dispersal timing and regional dispersal among known breeding colonies within the study area; (3) document average foraging distances, time away from nests, and identification of important foraging areas within the study area; and (4) determine weekly and seasonal habitat use within the study area. The proposed study would employ a combination of satellite and VHF transmitters in conjunction with color leg-banding to generate the monitoring data to help elucidate limiting habitat components for these species.

3.6.4.2 Trustee Goals and Objectives

PDARP MAM Objectives: *The Trustees may also perform targeted resource level monitoring and scientific support activities for those restoration types with substantial gaps in scientific understanding, which limit restoration planning, implementation, evaluation, and/or understanding of resource recovery status (Final PDARP/PEIS, page 5-88).*

This project furthers the Trustees' Bird restoration goals by initiating monitoring studies expected to inform and enhance future restoration planning for key colonial nesting wading bird species along the Alabama coast that were injured by the DWH spill. The project is consistent with Final PDARP/PEIS monitoring considerations which note (page 5-76) that "data collection activities would include additional monitoring and scientific support to address several critical information gaps regarding the effects of restoration activities, including regional metapopulation conditions, movement, and interactions; behaviors of target species given chronic and acute threats; site- and regional-specific recruitment survival rates and drivers; effects of patterns of dispersal on recruitment; and the potential for species to shift to alternate nesting habitats in response to habitat loss and/or creation. In addition to providing information needed to adaptively manage restoration actions for birds and their habitats, targeted data collection efforts will provide resource managers with improved technical input for management decisions, which could provide further benefit to the species targeted for restoration." The project's information collection strategy also aligns with monitoring guidance in the Strategic Framework for Bird Restoration Activities, which identifies the need for resource-level monitoring (page 29), stating that "[m]any species that will be targets for restoration activities have broad distributions that extend beyond potential project boundaries. These broad distributions require coordinated monitoring across sites…."

Currently, the AL TIG is unable to effectively weigh the relative merits of creating or restoring new nesting habitat relative to other potential restoration measures for these species (e.g., greater emphasis on predator controls or actions to increase the availability of forage resources). The data collected from the study are expected to provide useful insights into these questions and would allow the TIG to target future active restoration measures more effectively.

3.6.4.3 Cost to Carry Out the Alternative

The proposed cost for the Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species project is $1,547,500. These funds are solely directed at the telemetry tracking study and project oversight, supervision, and contingency. The proposed work would be completed by USFWS staff and researchers under contract to them. The AL TIG reviewed the direct and indirect project costs and found them reasonable for the proposed level of effort. The AL TIG also reviewed the estimated project oversight, supervision, and contingency costs. Based on similar past projects, the TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate. Overall, the project is expected to be more cost-effective than the similar alternative (Four Species) that collects tracking information on two additional species.

3.6.4.4 Likelihood of Success

This alternative has a high likelihood of successfully characterizing the movements of the two species that would be fitted with tracking devices. The proposed data collection plan is well documented and clear. The approaches are well-tested in the field and accepted in the peer-reviewed literature. The sample sizes are expected to be large enough to yield statistically significant results. Overall, the project is a more cost-effective approach than the Four Species alternative because it is expected to provide information that is of comparable value in characterizing colonial wading bird movements and habitat use but at a lesser cost. Two carefully selected representative species are expected to be sufficient to characterize colonial wading bird movements and habitat use.

3.6.4.5 Avoids Collateral Injury

Because it is primarily a data collection activity, the alternative would not cause any collateral damage to natural resources. The tagging itself is not anticipated to result in any harm to the affected birds. The reasons why this project avoids collateral injury are discussed more fully in Chapter 12 of this draft RP II/EA.

3.6.4.6 Benefits More Than One Natural Resource or Services

This alternative is only expected to benefit birds, and only in the future as the monitoring results begin to inform restoration activities.

3.6.4.7 Effects on Public Health and Safety

The Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species project is not expected to affect public health and safety. The project would involve data collection and analysis activities that include field monitoring by trained scientists, with no involvement by the public.

3.6.4.8 Summary OPA Evaluation: Colonial Nesting Wading Bird Tracking and Habitat Use Assessment

The OPA evaluation indicates that implementation of this alternative would begin to address the Trustees' bird restoration goals by initiating monitoring work designed to fill critical information gaps that currently act as impediments to restoration planning for colonial wading bird species in Alabama. The costs of the project are reasonable for the proposed scope of work. The proposed approach is well-designed. Collection of data on two species has a good likelihood of providing data that would support the Trustees' goal of better informing its bird restoration decision-making process. The work would not cause any collateral injury to natural resources. The project only benefits birds. Public health and safety issues are not expected to be a concern. Overall, the project likely provides a more cost-effective approach than the Four Species alternative because it is expected to provide information that is of comparable value to that from the larger, more expensive study. Two representative species are expected to be sufficient to characterize colonial wading bird movements and habitat use.

3.6.5 Natural Recovery—Birds

Pursuant to the OPA regulations, the Final PDARP/PEIS considered a "natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (40 CFR 990.53[b][2]). Under a natural recovery alternative, no additional restoration would be done by Trustees to accelerate the recovery of Birds in the Alabama Restoration Area using DWH NRDA funding at this time. The 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. Although injured resources could presumably recover to or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, tiering this RP II/EA from the Final PDARP/PEIS, and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery as a viable alternative under OPA. Natural recovery is not considered further in this RP II/EA.[51]

3.7 OYSTERS

3.7.1 Overview of Restoration Goals and Approaches

The Final PDARP/PEIS (Section 5.5.9) established Gulf-wide goals for oyster restoration, which the AL TIG refined to a set of three specific goals for oyster projects in coastal Alabama. Projects should:

- Make direct contributions to solving long-term oyster survivorship problems in Alabama coastal waters, or
- Play an important role in filling major scientific information or data gaps for oysters or
- Promote effective stewardship of oyster resources in the state.[52]

The Final PDARP/PEIS notes that oyster "restoration would be accomplished by directly restoring reef habitat, enhancing oyster reef productivity, and restoring regional oyster recruitment by increasing oyster spawning stock populations and, subsequently, the regional larval supply."

The remainder of this section provides OPA analysis for the individual Oyster projects, with specific reference to each of the OPA criteria.

3.7.2 Oyster Cultch Relief and Reef Configuration

3.7.2.1 Project Summary

The Oyster Cultch Relief and Reef Configuration project would deploy different types of cultch material in various configurations to facilitate positive settlement and growth of oysters on selected reef areas in Mobile Bay, Alabama. Since 2005, the oyster density on publicly harvested reefs has been in decline as a result of damage and silting associated with hurricanes Ivan and Katrina and drought conditions. This has caused the proliferation of the predatory oyster drill on historically productive reefs. AMRD is proposing to investigate the merit of deploying different types of cultch material in various configurations to enhance settlement and growth of oysters on selected reef areas in Mobile Bay. In addition to the direct goal of restoring the reefs selected for project implementation, the project has three additional study objectives: (1) determine whether there are differences in oyster settlement, growth, and survival on reefs of differing levels of relief and/or orientation relative to currents; (2) determine optimum reef material relief needed to restore oyster density on specific reefs within historical reef areas in which hydrology parameters such as oxygen and salinity and oyster recruitment and survival are highly variable; and (3) estimate the cost/benefits of deploying cultch in configurations differing from traditional cultch broadcast methods. The broader goal is to inform and increase the success of future oyster reef restoration activities. For project implementation, two sites have been tentatively selected for pre-monitoring surveys--a 36-acre reef approximately 1 mile north-northeast of the mouth of East Fowl River and Denton Reef (70 acres) located approximately 3 miles southeast of the mouth of East Fowl River.

[51] NEPA requires evaluation of a "no action" alternative. This differs from the natural recovery alternative under OPA. The environmental consequences of the NEPA no action alternative are considered separately in Chapter 5.

[52] Alabama Oyster Screening Criteria, Appendix B.

3.7.2.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore resilience to oyster populations that are supported by productive larval source reefs and sufficient substrate in larval sink areas to sustain reefs over time.*

This project meets the Trustees' oyster restoration goals through direct restoration of oyster reefs and through the collection and analysis of data that fills major scientific information or data gaps for oysters and contributes to solving long-term oyster survivorship problems in Alabama coastal waters. Predatory oyster drills have had a major adverse effects on the survivorship of oysters in Alabama in recent years. The Strategic Framework for Oyster Restoration Activities stresses the contributions of cultch placement and attributes to the success of restoration (Module 4, Section 3.2.1). This project proposes to test various cultch material using various placement approaches believed to have the potential to counteract the impacts of oyster drills and other survivorship issues such as low dissolved oxygen. If more effective cultching approaches can be identified that improve oyster survivorship, this could make a substantial contribution to successfully re-populating the oyster larval source reefs in areas of Mobile Bay and Mississippi Sound that were injured by the DWH spill.

3.7.2.3 Cost to Carry Out the Alternative

The proposed cost for the Oyster Cultch Relief and Reef Configuration project is $480,262. These funds are solely devoted to direct and indirect project costs, and project oversight, supervision, and contingency. The estimated costs were developed by AMRD experts based on experience. The AL TIG reviewed these cost estimates and found them reasonable. If selected for implementation, this work would go through the State of Alabama's competitive bidding process to ensure the reasonableness of the costs. The AL TIG also reviewed the estimated project oversight and supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.7.2.4 Likelihood of Success

AMRD experts expect this alternative would provide useful insights into improved methods for locating cultch sites in coastal Alabama similar to other studies that have been conducted (Gregalis et al., 2008), selecting appropriate cultch materials, and constructing reefs with the most effective degree of relief. The project design takes into account the key factors that are known to affect the success of settlement and growth of oysters. Through systematic variation of these factors, it is expected that improved cultch materials and placement methods can be identified. Where these methods prove successful, the project would also result in productive restored oyster reef.

3.7.2.5 Avoids Collateral Injury

Placement of cultch is a common activity in the areas proposed for the project and the testing of proposed alternative cultch materials and configurations is not expected to result in any collateral injuries to natural resources. The reasons why this project avoids collateral injury are discussed more fully in Chapter 13 of this draft RP II/EA.

3.7.2.6 Benefits More Than One Natural Resource or Services

Over the long-term, if this alternative is successful, it has the broad potential to benefit the health of Alabama's coastal and estuarine ecosystems. Oysters are an ecological keystone species and successful restoration of oyster reefs through improved survivorship would provide habitat for a diversity of marine organisms, provide structural integrity to reduce shoreline erosion, and improve water quality.

3.7.2.7 Effects on Public Health and Safety

The Oyster Cultch Relief and Reef Configuration project is not expected to affect public health and safety. The project would involve offshore activities that are similar to ongoing oyster production cultch placement activities. Any potential impacts on public safety (e.g., to recreational boating) would be fully mitigated during project implementation through observance of oyster reef work safety practices.

3.7.2.8 Summary OPA Evaluation: Oyster Cultch Relief and Reef Configuration

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' goals through the enhancement of degraded reefs in areas injured by the spill and through collection and analysis of data that make direct contributions to solving long-term oyster survivorship problems in Alabama coastal waters. The costs of the project are reasonable. The proposed approach is well-designed and has a reasonable probability of success. The work would not cause any collateral injury to natural resources. The project has the potential for a broad range of ecological benefits in the marine and estuarine environment. Public health and safety issues are not expected to be a concern.

3.7.3 Side-scan Mapping of Mobile Bay Relic Oyster Reefs

3.7.3.1 Project Summary

The Side-scan Mapping of Mobile Bay Relic Oyster Reefs project would identify water bottoms in areas of mid- to lower Mobile Bay capable of supporting oyster cultch. The longer-term objective would be to reestablish oysters in these areas through cultching and initial high density seeding with hatchery raised oyster spat. Historically reefs in these areas were highly productive and an important linkage ensuring the transfer of spat from upper to lower Mobile Bay and Mississippi Sound. Under the direction of AMRD, this project would survey the current extent and condition of the relic oyster reefs identified in previous reef surveys and other water bottoms not surveyed at that time. Approximately 8,847 acres of non-contiguous, state-owned water bottoms have been identified for side-scan mapping in mid- to lower Mobile Bay based on a survey of living and relic oyster reefs conducted in 1968. An additional 5,153 acres of oyster bottoms have been identified in upper Mobile Bay to quantify the location and extent of existing oyster resources that contribute to larval production and recruitment to lower Mobile Bay reefs. The project would inform and enhance future restoration because the side-scan data could be used to target priority areas for future oyster reef restoration, in conjunction with other ongoing oyster restoration efforts under consideration by the AL TIG.

3.7.3.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore resilience to oyster populations that are supported by productive larval source reefs and sufficient substrate in larval sink areas to sustain reefs over time.*

This project plays an important role in addressing the Final PDARP/PEIS concern that oyster restoration take into account habitat suitability and ensure that restoration occurs in locations that facilitate larval transport between reefs to promote recruitment of new oysters (Final PDARP/PEIS, page 5-16) into areas injured by the spill. The Strategic Framework for Oyster Restoration Activities (page 6) also emphasizes the importance of initial planning to identify suitable habitat in "up-estuary position(s) within a suitable salinity zone to take advantage of larval transport to downstream reefs." This project would inform the AL TIG's future oyster restoration planning through the provision of information on water bottoms in areas of mid- to lower Mobile Bay capable of supporting oyster cultch. This would allow the TIG to mitigate oyster survivorship problems through the selection of optimal locations for re-establishing oyster beds in mid- and lower Mobile Bay that would foster larval transport from upper

Mobile Bay down to Mississippi Sound, thereby leading to broad regional increases in oyster recruitment and survival in Alabama waters.

3.7.3.3 Cost to Carry Out the Alternative

The proposed cost of the Side-scan Mapping of Mobile Bay Relic Oyster Reefs project is $104,229. These funds are solely devoted to direct and indirect project costs, and project oversight, supervision, and contingency. The estimated costs were developed by AMRD experts based on experience. AL TIG reviewed these cost estimates and found them reasonable. If selected for implementation, the portion of the mapping work not conducted by ADCNR-MRD would go through the State of Alabama's competitive bidding process to ensure the reasonableness of the costs. The AL TIG also reviewed the estimated project oversight and supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.7.3.4 Likelihood of Success

This alternative has a high likelihood of successfully identifying the historic locations of relic oyster reefs in Mobile Bay, which in turn will lead to targeting priority locations for reef restoration. The proposed approach is well documented and clear. Side-scanning technology has been used by AMRD in the past and is a demonstrated method for identifying relic reefs. The proposal includes a plan for ground-truthing the side-scan results, which would further ensure the accuracy of the results.

3.7.3.5 Avoids Collateral Injury

Side-scan radar is a non-invasive technology that would not cause any collateral natural resource injury.

3.7.3.6 Benefits More Than One Natural Resource or Services

Over the long-term, if this alternative is successful, it has the broad potential to benefit the health of Alabama's coastal and estuarine ecosystems by identifying areas where restoration can most feasibly and successfully re-establish oyster reefs in Mobile Bay and Mississippi Sound. Oysters are an ecological keystone species and successful restoration of oyster reefs would provide habitat for a diversity of marine organisms, provide structural integrity to reduce shoreline erosion, and improve water quality.

3.7.3.7 Effects on Public Health and Safety

The Side-scan Mapping of Mobile Bay Relic Oyster Reefs project is not expected to affect public health and safety. The project would involve offshore mapping activities with no involvement by or interaction with the public.

3.7.3.8 Summary OPA Evaluation: Side-scan Mapping of Mobile Bay Relic Oyster Reefs

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' goals through identification of water bottoms in mid- to lower Mobile Bay--areas where oyster recruitment was injured by the spill--capable of supporting oyster cultch and where future restoration has the potential to help the AL TIG mitigate oyster survivorship problems in Alabama coastal waters. The costs of the project are reasonable. The proposed approach is well-designed and has a high probability of success. The work would not cause any collateral injury to natural resources. The project has the potential to support the restoration of a broad range of ecological benefits in the marine and estuarine environment. Public health and safety issues are not expected to be a concern.

3.7.4 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

3.7.4.1 Project Summary

AMRD is proposing to construct an oyster hatchery within a newly constructed greenhouse building at its Claude Peteet Mariculture Center and operate the facility over a 4-year period. The oyster spat produced by the project would be used to encourage oyster recruitment in portions of Mobile Bay that have experienced reduced oyster production compared to the early 20th century. Under the High Spat Production with Study option, the proposed oyster hatchery is anticipated to produce up to approximately 65 million, 10-day-old spat each year. Spat would be deployed based on identification of favorable locations, potentially in coordination with the cultch relief and configuration, side-scan radar and oyster 'grow-out' projects also under consideration as part of this RP II/EA. Areas conditionally approved for oyster harvest, as well as conditionally restricted or restricted waters, would all potentially be candidates for spat deployment. After spat deployment, reefs available for harvest would be monitored to determine when significant quantities of harvestable oysters (> 3 inch) were present, at which time the reefs would be opened to harvest. Beyond the 4-year project life, long-term funding may be derived from sack fees collected by AMRD from commercial oyster harvesters using public reefs. The small fee, however, may not be sufficient to operate the hatchery as described in this project. Therefore, a scaled down version of the hatchery, in terms of operating costs and production, is anticipated long-term. Additionally, a long term comprehensive oyster restoration plan will be developed for the Mobile estuary as part of this project.

3.7.4.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore a diversity of oyster reef habitats that provide ecological functions for estuarine- dependent fish species, vegetated shoreline and marsh habitat, and nearshore benthic communities.*

This project meets the Trustees' oyster restoration goals through the production and deployment of oyster spat on existing and restored reef sites that would help the AL TIG mitigate long-term oyster recruitment and survivorship problems in Alabama coastal waters where recruitment was injured by the spill. For a variety of complex reasons, related both to the DWH spill (see Final PDARP/PEIS, Section 4.6.5) and other factors, oyster recruitment and subsequent survivorship in Alabama waters has been in decline in recent years. By (1) funding construction of a hatchery capable of producing 65 million spat per year and (2) employing the juvenile oysters to populate restoration reefs, the project will allow the state authorities to populate new reefs in mid- and lower Mobile Bay and in Mississippi Sound. The deployment of spat will in turn contribute to the Final PDARP/PEIS goal of restoring larval source reefs in coastal Alabama. Further, the development of a long term comprehensive oyster restoration plan will contribute to defining a long-term, science-based strategy for future oyster restoration in Alabama waters. The plan would characterize local oyster populations, including improved understanding of larval transport and recruitment trends, as well as environmental factors that affect them. The plan would aim to restore oyster abundance and spawning stock to support a regional oyster larvae pool sufficient for healthy recruitment levels to subtidal and nearshore oyster reefs. It would also provide an analysis of existing literature, assemble data from previous and ongoing projects (including side-scan sonar, larval transport studies, and habitat suitability index), develop overall restoration goals and priorities, and provide specific recommendations for meeting the restoration goals and objectives.

3.7.4.3 Cost to Carry Out the Alternative

The proposed cost of the Oyster Hatchery at Claude Peteet Mariculture Center (High Spat Production with Study) project is $2,949,472. These funds are solely devoted to facility construction costs, costs to develop a comprehensive oyster restoration plan, vessel transport for cultch and spat deployment, operation and maintenance over the 4-year project duration, monitoring, and project oversight, supervision, and contingency. The estimated costs were developed by AMRD experts based on experience. The AL TIG reviewed these cost estimates and found them reasonable given that long term operation and maintenance will be funded by ADCNR. If selected for implementation, contracts for construction and cultch and spat deployment would go through the State of Alabama's competitive bidding process to ensure the reasonableness of the costs. The AL TIG also reviewed the estimated project O&M, oversight and supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate over the 4-year implementation time frame.

3.7.4.4 Likelihood of Success

This alternative has a high likelihood of successfully producing the projected quantity of spat, which in turn will contribute to the restoration of harvestable reefs and also more sustainable larval source reefs in coastal Alabama. The proposed approach is well documented and has been successfully implemented previously.[53] In conjunction with the other potential initiatives under consideration by the TIG that would identify optimal locations and methods for ensuring recruitment, the project has a strong likelihood of contributing towards the AL TIG's broad goal of increasing survivorship of oysters in Mobile Bay and Mississippi Sound. ADCNR's commitment to fund continuing operation and maintenance at the facility after the funding for this project ends will further enhance the long term benefits of the project.

3.7.4.5 Avoids Collateral Injury

The project is not expected to cause any collateral injury to natural resources as it simply enhances a naturally occurring process—deployment of oyster spat. The reasons why this project avoids collateral injury are discussed more fully in Chapter 13 of this draft RP II/EA.

3.7.4.6 Benefits More Than One Natural Resource or Services

Over the long-term, if this alternative is successfully implemented, it has the broad potential to benefit the health of Alabama's coastal and estuarine ecosystems through the re-establishment and/or enhancement of oyster reefs in Mobile Bay and Mississippi Sound. Oysters are an ecological keystone species and successful restoration of oyster reefs would provide habitat for a diversity of marine organisms, provide structure integrity to reduce shoreline erosion, and improve water quality.

3.7.4.7 Effects on Public Health and Safety

The Oyster Hatchery at Claude Peteet Mariculture Center-High Spat Production with Study project is not expected to affect public health and safety. The project would involve growing oyster spat at an onshore mariculture facility that is not widely visited by the public. Deploying additional oyster spat to the environment is not expected to create risks to public health or safety (e.g., risks to recreational boaters) that would not be fully mitigated during implementation through observance of oyster reef work safety practices and other BMPs.

[53] See http://www.aces.edu/dept/fisheries/aumerc/AuburnUniversityShellfishLaboratory_000.php

3.7.4.8 Summary OPA Evaluation: Oyster Hatchery at Claude Peteet Mariculture Center

The OPA evaluation indicates that implementation of this alternative (High Spat Production with Study) would meet the Trustees' goals by increasing the production and deployment of oyster spat and help the AL TIG mitigate long-term oyster recruitment and survivorship problems in Alabama coastal waters. The proposed direct and indirect costs of the project are reasonable. The proposed approach is well documented and tested, and has a high probability of success. The alternative would not cause any collateral injury to natural resources. The project has the potential to support a broad range of ecological benefits in the marine and estuarine environment. Public health and safety issues are not expected to be a concern. Beyond the 4-year project life, long-term funding may be derived from sack fees collected by AMRD from commercial oyster harvesters using public reefs. The small fee, however, may not be sufficient to operate the hatchery as described in this project. Therefore, a scaled down version of the hatchery, in terms of operating costs and production, is anticipated long term.

3.7.5 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

3.7.5.1 Project Summary

Under the Low Spat Production without Study option, AMRD is proposing to construct a smaller oyster hatchery at its Claude Peteet Mariculture Center and operate the facility over a 4-year period. The oyster spat produced by the project would be used to encourage oyster recruitment in portions of Mobile Bay that have experienced reduced oyster production compared to the early 20th century. The proposed oyster hatchery differs from High Spat Production with Study option described above in terms of the facility's annual capacity to produce spat. The facility for the Low Spat Production without Study option is anticipated to produce half the quantity of spat each year as the High Spat Production with Study Alternative. Spat would be deployed based on identification of favorable locations, potentially in coordination with the cultch relief and configuration, side-scan radar and oyster 'grow-out' projects also under consideration as part of this draft RP II/EA. Areas conditionally approved for oyster harvest, as well as conditionally restricted or restricted waters, would all potentially be candidates for spat deployment. After spat deployment, reefs available for harvest would be monitored to determine when significant quantities of harvestable oysters (> 3 inch) were present, at which time the reefs would be opened to harvest. Beyond the 4-year project life, long-term funding may be derived from sack fees collected by AMRD from commercial oyster harvesters using public reefs. The small fee, however, may not be sufficient to operate the hatchery as described in this project. Therefore, a scaled down version of the hatchery, in terms of operating costs and production, is anticipated long term.

3.7.5.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore a diversity of oyster reef habitats that provide ecological functions for estuarine- dependent fish species, vegetated shoreline and marsh habitat, and nearshore benthic communities.*

This project meets the Trustees' oyster restoration goals through the production and deployment of oyster spat that would help the AL TIG mitigate long-term oyster recruitment and survivorship problems in Alabama coastal waters where recruitment was injured by the spill. For a variety of complex reasons, related both to the DWH spill (see Final PDARP/PEIS, Section 4.6.5) and other factors, oyster recruitment and subsequent survivorship in Alabama waters has been in decline in recent years. By (1) funding construction of a hatchery capable of producing 35 million spat per year and (2) employing juvenile oysters to populate restoration reefs, the project will allow the state authorities to populate new reefs in mid- and lower Mobile Bay and in Mississippi Sound. The deployment of spat will contribute to the

Final PDARP/PEIS goal of restoring larval source reefs in coastal Alabama. The contribution of this facility to solving the survivorship problem, however, is substantially less than what is expected from implementation of the High Spat Production with Study option, discussed above, because of the much lower area of reef acreage that could be seeded each year.

3.7.5.3 Cost to Carry Out the Alternative

The proposed cost of the Oyster Hatchery at Claude Peteet Mariculture Center (Low Spat Production without Study) project is $2,018,109. These funds are solely devoted to facility construction costs, vessel transport for cultch and spat deployment, operation and maintenance over the 4-year project duration, monitoring, and project oversight, supervision, and contingency. The estimated costs were developed by AMRD experts based on experience. The AL TIG reviewed these cost estimates and found them reasonable for a facility of the proposed size, although the facility is less cost-effective than the larger High Spat Production with Study option facility because of that facility's economies of scale. If selected for implementation, contracts for construction, cultch and spat deployment would go through the State of Alabama's competitive bidding process to ensure the reasonableness of the costs. The AL TIG also reviewed the estimated project O&M, oversight and supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate over the 4-year implementation time frame but not as cost-effective as the High Spat Production with Study option.

3.7.5.4 Likelihood of Success

This alternative has a high likelihood of successfully producing the projected quantity of spat, which in turn would contribute to the restoration of more sustainable larval source reefs in coastal Alabama. The proposed approach is well documented and has been successfully implemented previously.[54] In conjunction with the other potential initiatives under consideration by the TIG that would identify optimal locations and methods for ensuring recruitment, the project has a good likelihood of making a measurable contribution towards the AL TIG's broad goal of increasing survivorship of oysters in Mobile Bay and Mississippi Sound, although one that from a restoration perspective would have less of an impact than the larger proposed hatchery for the High Spat Production with Study option.

3.7.5.5 Avoids Collateral Injury

The project is not expected to cause any collateral injury to natural resources as it simply enhances a naturally occurring process—deployment of oyster spat. The reasons why this project avoids collateral injury are discussed more fully in Chapter 13 of this draft RP II/EA.

3.7.5.6 Benefits More Than One Natural Resource or Services

Over the long-term, if this alternative is successfully implemented, it has the potential to benefit the health of Alabama's coastal and estuarine ecosystems—although not to the same extent as the High Spat Production with Study option—through the reestablishment and/or enhancement of oyster reefs in Mobile Bay and Mississippi Sound. Oysters are an ecological keystone species and successful restoration of oyster reefs would provide habitat for a diversity of marine organisms, provide structure integrity to reduce shoreline erosion, and improve water quality.

[54] See http://www.aces.edu/dept/fisheries/aumerc/AuburnUniversityShellfishLaboratory_000.php

3.7.5.7 Effects on Public Health and Safety

The Oyster Hatchery at Claude Peteet Mariculture Center (Low Spat Production without Study) project is not expected to affect public health and safety. The project would involve growing oyster spat at an onshore mariculture facility that is not widely visited by the public. Deploying additional oyster spat to the environment is not expected to create risks to public health or safety (e.g., risks to recreational boaters) that would not be fully mitigated during implementation through observance of oyster reef work safety practices and other BMPs.

3.7.5.8 Summary OPA Evaluation: Oyster Hatchery at Claude Peteet Mariculture Center

The OPA evaluation indicates that implementation of this alternative (Low Spat Production without Study) would contribute to the Trustees' goals by increasing the production and deployment of oyster spat. This would help the AL TIG mitigate long-term oyster recruitment and survivorship problems in Alabama coastal waters, although not to the same degree as the High Spat Production with Study option. The proposed direct and indirect costs of the project are reasonable for a facility of its size, although less cost-effective than the larger the High Spat Production with Study option. The proposed approach is well documented and tested, and has a high probability of success. The alternative would not cause any collateral injury to natural resources. The project has the potential to support a broad range of ecological benefits in the marine and estuarine environment. Public health and safety issues are not expected to be a concern.

3.7.6 Oyster Grow-Out and Restoration Reef Placement

3.7.6.1 Project Summary

The Oyster Grow-Out and Restoration Reef Placement project would create up to three "off-bottom oyster grow-out areas" in Grand Bay, Portersville Bay, and Bon Secour Bay. The project, which would be conducted by ACES in coordination with its other oyster gardening activities, would also identify and establish priorities for locating future restoration reefs (including nearshore living shorelines and intertidal reefs). Project success would also be monitored in terms of oyster survival and reproduction at both the grow-out areas and restoration sites in order to determine effectiveness of these techniques to increase the sustainability of oyster populations in Alabama. This project would build on other efforts such as ACF's Oyster Shell Recycling Program and the Mobile Bay Oyster Gardening effort, which recently received approval to expand into Little Lagoon. In addition, the project would extend investigations similar to those of the recently completed NFWF-GEBF funded project that demonstrated plantings of advanced stock-sized oysters in Mobile Bay and Mississippi Sound can potentially reduce aggressive predation by oyster drills. Monitoring would be conducted for the 5-year duration of the project to determine its effectiveness and support adaptive management activities.

3.7.6.2 Trustee Goals and Objectives

PDARP Restoration Goal: *Restore a diversity of oyster reef habitats that provide ecological functions for estuarine-dependent fish species, vegetated shoreline and marsh habitat, and nearshore benthic communities.*

This project meets the Trustees' Oyster restoration goals by restoring oyster abundance and spawning stock to support a regional oyster larvae pool sufficient for healthy recruitment levels to subtidal and nearshore oyster reefs and enhanced survivorship. It does this through an oyster gardening grow-out approach (Final PDARP/PEIS, page 5-224) designed to reduce the threat of predation on oysters grown to stock restoration reefs. Adult oysters are less affected by predation from oyster drills than juvenile oysters, and the grow-out sites would give oysters a chance to mature without the risk of predation prior to being used for restoration projects. In addition, this project would fill an important data gap by determining how best to reduce predation on oyster populations in Alabama, which would provide information that is easily transferrable to other Gulf States.

3.7.6.3 Cost to Carry Out the Alternative

The proposed cost for the Oyster Grow-Out and Restoration Reef Placement project is $962,370. These funds are solely devoted to direct and indirect project costs and project oversight, supervision, and contingency. ACES experts developed the estimated costs based on experience. The AL TIG reviewed these cost estimates and found them reasonable. If selected for implementation, project construction contracts would go through the State of Alabama's competitive bidding process to ensure the reasonableness of the costs. The AL TIG also reviewed the estimated project oversight, supervision, and contingency costs. Based on similar past projects, the AL TIG found these costs to be reasonable. In summary, based on this review, the AL TIG finds the total estimate of the proposed costs for this project to be reasonable and appropriate.

3.7.6.4 Likelihood of Success

This alternative has a reasonable likelihood of successfully developing alternative oyster grow-out approaches, thereby increasing the abundance of live multiple-size class oysters at restoration sites in Alabama. This goal is to combat the effects of predatory oyster drills through placement of adult oysters that are less susceptible to predation on restoration sites. Previous efforts have demonstrated that oysters can be successfully grown "off-bottom," although not using the specific techniques proposed by this project.[55] The proposed initiative would further test the salinity and other environmental conditions under which grow-out can take place. Additionally, the project would monitor the success of the grow-out areas at increasing the oyster larval pool nearby. Since this technique has not been used previously, the likelihood of success is unknown; however, in areas that currently have low densities of oysters producing larvae, such as Bon Secour Bay, it is likely that a dense aggregation of living, spawning age oysters will enhance the larval pool. Additionally, these adult, spawning age oysters will be placed on other restoration reefs, which has been shown to be a successful technique for restoring existing oyster reefs while minimizing predation.

3.7.6.5 Avoids Collateral Injury

The grow-out approach is not expected to cause any collateral damage to natural resources as BMPs will be used during installation of the grow-out areas and placement of oysters on restoration reefs. Work on restoration reefs will be conducted from a small boat that will operate in sufficient water depth to avoid impacts on soft and hard bottoms and SAV that may be present. The three proposed grow-out sites each would be approximately 0.5 acre and are not expected to have any negative impacts on ecological functions in the areas in which they are located. The reasons why this project avoids collateral injury are discussed more fully in Chapter 13 of this RP II/EA.

3.7.6.6 Benefits More Than One Natural Resource or Services

Over the long term, if this alternative is successful, it will lead to the development of new restoration methods that will broadly benefit the health of Alabama's coastal and estuarine ecosystems. Oysters are an ecological keystone species, and successful restoration of oyster reefs through improved survivorship would provide habitat for a diversity of marine organisms, provide structure integrity to reduce shoreline erosion, and improve water quality.

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[55] See http://www.aces.edu/pubs/docs/A/ANR-1207/index2.tmpl

3.7.6.7 Effects on Public Health and Safety

The Oyster Grow-Out and Restoration Reef Placement project is not expected to affect public health and safety. The project would involve creation of offshore structures in areas that are currently used for recreational and commercial boating. However, installation of navigational markers and observance of oyster reef work safety practices would mitigate any potential impacts on boating safety.

3.7.6.8 Summary OPA Evaluation: Oyster Cultch Relief and Reef Configuration

The OPA evaluation indicates that implementation of this alternative would meet the Trustees' goals by promoting the development of methods for increasing oyster abundance and spawning stock to support a regional oyster larvae pool sufficient for healthy recruitment levels to subtidal and nearshore oyster reefs and enhanced survivorship. The costs of the project are reasonable. The proposed approach is well-designed and has a reasonable probability of success. The project is not expected to cause any collateral injury to natural resources. The project has the potential for a broad range of ecological benefits in the marine and estuarine environment. Any potential public health and safety issues would be adequately mitigated.

3.7.7 Natural Recovery—Oysters

Pursuant to the OPA regulations, the Final PDARP/PEIS considered a "natural recovery alternative in which no human intervention would be taken to directly restore injured natural resources and services to baseline" (40 CFR 990.53[b][2]). Under a natural recovery alternative, the Trustees would not conduct additional restoration to accelerate the recovery of Oysters in the Alabama Restoration Area using DWH NRDA funding at this time. The 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. Although injured resources could presumably recover to or near baseline conditions under this scenario, recovery would take much longer compared to a scenario in which restoration actions were undertaken. Given that technically feasible restoration approaches are available to compensate for interim natural resource and service losses, the Trustees rejected this alternative from further OPA evaluation in the Final PDARP/PEIS. Based on this determination, tiering this RP II/EA from the Final PDARP/PEIS and incorporating that analysis by reference, the AL TIG did not evaluate natural recovery as a viable alternative under OPA. Natural recovery is not considered further in this RP II/EA.[56]

3.8 SUMMARY OF OPA EVALUATION

The AL TIG completed the OPA evaluation of 26 alternatives across seven Restoration Types proposed in the Alabama Restoration Area. Five of these projects represented E&D activities:

- Lower Perdido Islands Restoration Phase I (E&D)
- Southwestern Coffee Island Habitat Restoration Project—Phase I (E&D)
- Toulmins Spring Branch E&D (E&D)
- Restoring the Night Sky–Assessment, Training, and Outreach (E&D)
- Side-scan Mapping of Mobile Bay Relic Oyster Reefs (E&D)

[56] NEPA requires evaluation of a "no action" alternative. This differs from the natural recovery alternative under OPA. The environmental consequences of the NEPA no action alternative are considered separately in Chapter 5.

The OPA evaluation indicated all five E&D projects would contribute to meeting the Trustees' restoration goals for their Restoration Type at reasonable and appropriate costs, with a high likelihood of success, providing potential benefits to more than one natural resource or service, with minimal likelihood of causing any collateral environmental injury or any impacts to public health or safety.

For the remaining projects, seventeen fully met the Trustees' restoration goals for their Restoration Type at reasonable and appropriate costs, with a high likelihood of success, in some cases providing potential benefits to more than one natural resource or service, and all with minimal likelihood of causing any collateral environmental injury or any negative impacts to public health or safety.

- Magnolia River Land Acquisition (Holmes Tract)
- Weeks Bay Land Acquisition East Gateway Tract
- Weeks Bay Land Acquisition Harrod Tract
- Little Lagoon Living Shoreline
- Fowl River Nutrient Reduction
- Weeks Bay Nutrient Reduction
- CAST Conservation Program
- CAST Triage
- CAST Habitat Usage and Population Dynamics
- CAST Protection: Enhancement and Education
- Enhancing Capacity for the Alabama Marine Mammal Stranding Network
- Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health
- Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education
- Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species
- Oyster Cultch Relief and Reef Configuration
- Oyster Hatchery at Claude Peteet Mariculture Center–High Spat Production with Study
- Oyster Grow-Out and Restoration Reef Placement

The AL TIG determined through the OPA evaluation process that four projects did not fully meet the Trustees' restoration goals at this time.

- Perdido River Land Acquisition (Molpus Tract)
- Bayou La Batre Nutrient Reduction
- Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species
- Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

The 26 alternative evaluated under OPA in Chapter 3 are further evaluated under NEPA in Chapters 4 through 13 of this draft RP II/EA.

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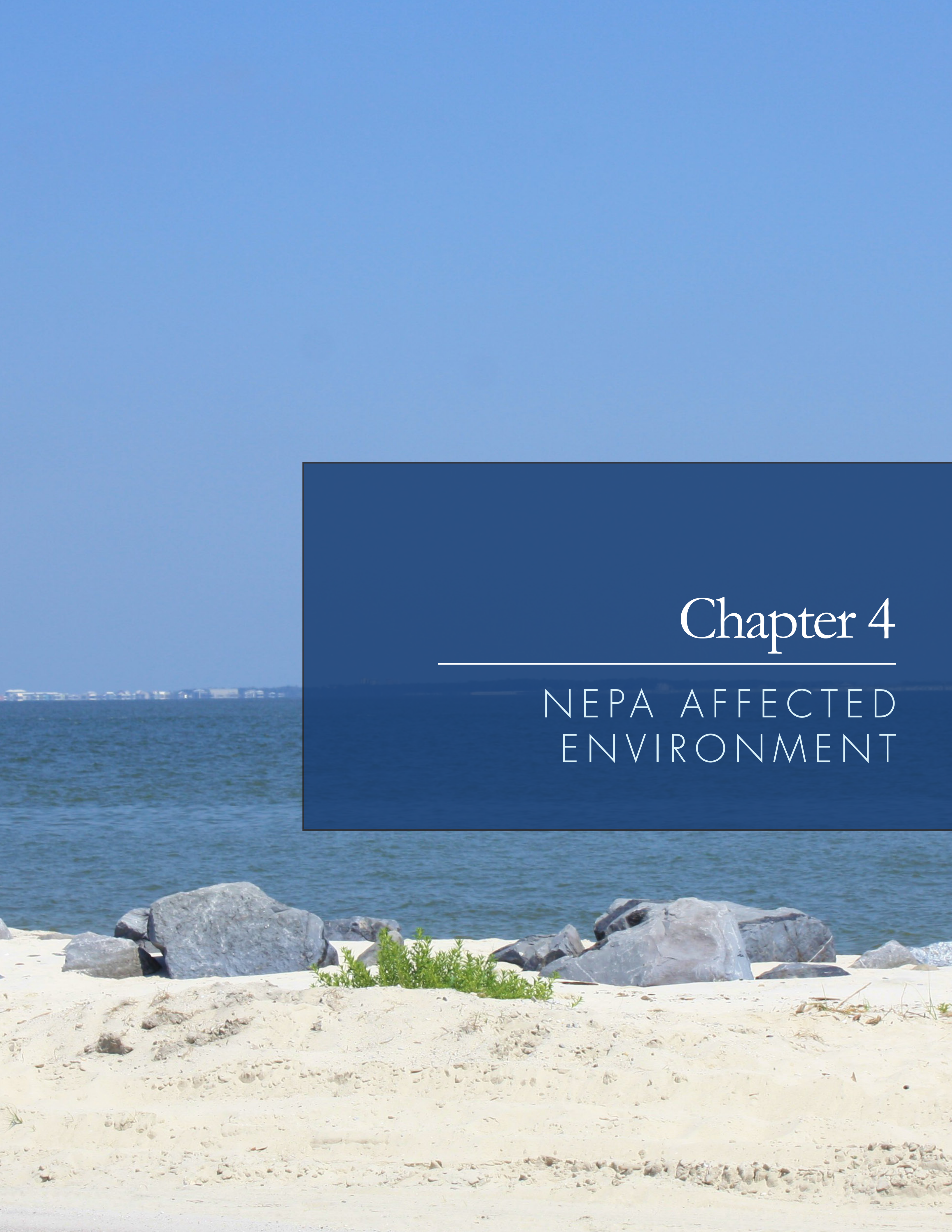


Chapter 4

NEPA AFFECTED ENVIRONMENT

4.0 NEPA AFFECTED ENVIRONMENT—COASTAL ALABAMA OVERVIEW

The purpose of this chapter is to describe the environment of the area(s) to be affected or created by the alternatives under consideration (40 C.F.R. §1502.15). This chapter provides the context in which the impacts described in Chapters 5–13, would occur. This chapter provides a description of the affected environment across coastal Alabama that includes areas that may be affected by the restoration actions under this draft RP II/EA. Chapters 7–13 provide a more site-specific affected environment for each Restoration Type.

The northern Gulf of Mexico comprises a vast regional ecosystem—an interactive, interdependent network of organisms (from microbes to plants to animals) and their chemical, biological, and physical environment. Ranging from the coastline, to its bays and estuaries, expansive continental shelf, and vast open ocean and deep sea, the northern Gulf of Mexico ecosystem contains some of the nation's most diverse and productive natural resources, as described in detail in Chapter 3 of the Final PDARP/PEIS, which is incorporated here by reference.

Focusing on the State of Alabama Restoration Area, which also has a diverse set of ecosystems, the following section describes the existing conditions for each of the resources potentially affected by the restoration actions proposed in this plan in Baldwin and Mobile counties. Where applicable, site-specific information is provided for each alternative under the chapter for each Restoration Type.

4.1 PHYSICAL ENVIRONMENT

4.1.1 Geology and Substrates

Alabama spans three geologic provinces, as defined by USGS. These provinces include the East Gulf Coastal Plain, Appalachian Highlands, and the Interior Plains. The East Gulf Coastal Plain stretches across the southern portion of the state and contains hills, valleys, mountains, and plateaus contained within the southern extent of the Appalachian Mountains. The Appalachian Highlands extends north from the fall line to northern Alabama. The Interior Plains are located in north Alabama and are characterized by flat and gently rolling terrain that is generally contained above the Tennessee River (WBWP, 2002).

The East Gulf Coastal Plain province is moderately dissected and contains a southward sloping plain that is underlain by sediments of the Miocene to Pleistocene age. The southern part of this province contains shallow saucer-like depressions that are scattered over nearly level interfluves that hold water throughout most of the year. Alabama contains abundant natural resources, including commercially viable deposits of coal, natural gas, limestone, and marble. Numerous and extensive oil and gas deposits have developed in the southern portion of the state, including Mobile Bay and other coastal state waters (WBWP, 2002).

Alabama soils are grouped according to common characteristics; three of the major soils types include zonal soils, intrazonal soils, and azonal soils. Zonal soils consist of soils that have well-developed profile characteristics that reflect active factors in the environment such as climate, vegetation, and animal life. Zonal soils also have an illuviated A horizon that is underlain by a finer textured illuviated B horizon (WBWP, 2002). These soils are well drained, acidic, and are considered productive agriculture soils. Examples of these types of soils include Norfolk, Marlboro, Tifton, Bowie, Facebille, Lynchburg, and Greenville (USDA-NRCS, 2015).

Intrazonal soils have genetically related horizons that reflect the dominant influence of a local factor of relief or parent material more so than the environmental influences of climate, plant, and animal life. These soils are poorly drained to very poorly drained. They are normally associated with swamp-forest or marsh vegetation. These soils are often considered hydric and are associated with wetlands. They have high organic content and are very acidic (WBWP, 2002). Examples of these types of soil include Bibb, Grady, Myatt, Hyde, and Scranton (USDA-NRCS, 2015). Another group of intrazonal soils is planosols. These soils are separated from other intrazonal soils because of their high clay content (WBWP, 2002). Planosols are normally not hydric but have a fragipan that is extremely compact and restricts root growth in plants. The major soils in the planosols group include Leaf, Wahee, and Robertsdale (USDA-NRCS, 2015).

Azonal soils consist of soils that lack distinct genetically related horizons because of youth, resistant parent material, or steep topography (WBWP, 2002). These soils are well drained to excessively well drained and contain sands and loamy sands. The major azonal soils are Lakeland, Klej, and Lakewood (USDA-NRCS, 2015).

4.1.2 Hydrology and Water Quality

The range of projects under consideration in this RP II/EA lies within the Southern Coastal Plains ecoregion, a subtropical region with abundant water resources and heavy precipitation events. Storm surges drive the precipitation input in this region. Storms are the driving agent of sediment transport and land loss on time scales relative to humans, while sea level rise is the dominant cause of land loss along coasts when analyzed on a geologic time scale (Morton, 2008). Large storm surges off the Gulf provide heavy precipitation to the area, resulting in 40 to 70 inches of rain per year (Drummond, 2016; AUWRC, 2016). The Alabama coast has one of the highest rates of hurricane landfall in the country (AUWRC, 2016). Periodic hurricanes and tropical storms have been found to be beneficial to coastal ecosystems because they bring in inorganic sediments that contribute to wetland formation and productivity (Conner et al., 1989). However, these extreme rainfall events have increased 27 percent in the last 64 years as a result of climate change and are projected to continue to increase (USGCRP, 2014), both in frequency and intensity (Di Liberto, 2016). Increased storm intensity and frequency could nullify the beneficial impacts the coastline would gain from periodic storms by overburdening an already fragile ecosystem.

Precipitation is the primary source for groundwater recharge in the Gulf Coast area (Lambert and Aharon, 2008; Robinson et al., 1996). Precipitation feeds the Coastal Lowlands Aquifer System, which is the main water source for Baldwin County (Robinson et al., 1996). The aquifer area that extends along the Gulf peninsula of Baldwin County has groundwater levels that are less than 5 feet above sea level, which results in groundwater water quality issues for this region from salt intrusion. The Coastal Lowlands Aquifer System, the main water source for Baldwin County, is recharged by precipitation and discharges into the Gulf of Mexico (Robinson et al., 1996).

Groundwater recharge and large precipitation events feed the abundant surface waterbodies in the region. All of the alternative sites are in the Mobile-Tensaw and Perdido River Basin. The Mobile-Tensaw River Basin is the sixth largest watershed in the United States and discharges 65 percent of Alabama’s land area drainage (AUWRC, 2016). Mobile Bay, the outfall of the Mobile and Tensaw River Basins, is Alabama’s largest estuary system (AUWRC, 2016). It has an average freshwater discharge of 62,000 cubic feet per second (AUWRC, 2016).

While water quantity is not an issue in the Alabama coastal region, water quality is. Water quality issues are prominent in the area’s bays and many of their main tributaries. Impairment issues primarily arise from pathogen pollution from urban runoff, nutrients from agriculture, and metals from atmospheric deposition from manufacturing facilities. The main waterbodies in the region, Mobile Bay and its sub-estuary, Bon Secour Bay, were listed on the USEPA 2016 303(d) list of impaired waters for pathogen pollution from urban runoff and storm sewers (ADEM, 2016a).

Because of the abundant water resources in the area and the prominence of water quality problems, many of the proposed projects are focused on improving hydrologic conditions through acquisition and nutrient reduction.

4.1.3 Air Quality and Greenhouse Gases

Because of the proximity of the various proposed alternatives, the affected environment for air quality and greenhouse gases (GHGs) is discussed regionally rather than by specific project site.

4.1.3.1 Air Quality

USEPA defines ambient air in 40 CFR 50.1 as "that portion of the atmosphere, external to buildings, to which the public has access." In compliance with the Clean Air Act, USEPA has promulgated National Ambient Air Quality Standards (NAAQS). NAAQS were enacted for the protection of public health and welfare, allowing for an adequate margin of safety. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as children, the elderly, and those suffering from asthma. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. To date, USEPA has issued NAAQS for six criteria air pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter with a diameter less than or equal to a nominal 10 micrometers or 2.5 micrometers (PM_{10} and $PM_{2.5}$, respectively), sulfur dioxide (SO_2), and lead. A description of each criteria air pollutant is below (USEPA, 2017a). Table 4-1 shows the federal standards for criteria air pollutants.

- CO is a colorless, odorless gas emitted from combustion processes, including engine exhaust. Elevated CO concentrations can cause adverse health impacts by reducing oxygen delivery to vital organs. Very high concentrations can cause death.
- NO_2 is one of a group of reactive gases called oxides of nitrogen or nitrogen oxides (NO_x). NO_x react with ammonia, moisture, and other compounds to form small particles that penetrate deep in the lungs and can cause or worsen existing respiratory system problems such as asthma, emphysema, or bronchitis. NO_x is also a precursor that can lead to the chemical reactions forming ground-level O_3.
- Ground level O_3 is an important component of smog and is formed through reactions of NO_x and volatile organic compounds in the presence of sunlight. Sources of NO_x and volatile organic compound emissions include both mobile and stationary sources. Health effects of O_3 exposure include respiratory irritation, reduced lung function, and worsening of diseases such as asthma. People with lung disease, children, older adults, and people who are active outdoors may be particularly sensitive to O_3. Elevated O_3 can also affect sensitive vegetation.
- PM is a broad class of air pollutants that exist as liquid droplets or solids with a wide range of size and chemical composition. PM_{10} and $PM_{2.5}$ are of particular health concern because they can get deep into the lungs and affect respiratory and heart function. Particulates can also affect visibility; damage soil, plants, and water quality; and stain stone materials. Fugitive dust is a primary source of respirable airborne particulate matter. Fugitive dust results from land clearing, grading, excavation, concrete work, blasting, dynamiting, vehicle traffic, and low-flying air traffic. The amount of dust generated is related to the type and duration of mechanical activities, silt and moisture content of the soil, wind speed, frequency of precipitation, vehicle traffic, vehicle types, and roadway characteristics. Particulate matter arising from fugitive dust is regulated by federal, state, and local agencies.

- SO_2 is part of a group of reactive gases called sulfur oxides. Health effects of SO_2 exposure include adverse respiratory effects, such as increased asthma symptoms. The largest sources of SO_2 emissions nationally are from fossil fuel combustion at power plants/industrial facilities, electrical utilities, and residential/commercial boilers. Mobile sources are not a significant source of SO_2 emissions.
- Lead is a toxic heavy metal that can have numerous adverse health impacts, including neurological damage to children and cardiovascular effects in adults. Lead emissions can contribute to exposure directly through the air or indirectly by causing soil/water contamination. Before leaded gasoline was phased out, automobiles were a source of lead emissions. According to USEPA, the major sources of lead emissions today are ore and metal processing and piston-engine aircraft operating on leaded aviation gasoline (USEPA, 2016a).

Table 4-1: Federal Standards for Criteria Air Pollutants

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
CO	Primary	8 hours	9 ppm	Not to be exceeded more than once per year
		1-hour	35 ppm	
Lead	Primary and secondary	Rolling 3-month average	0.15 $\mu g/m^3$	Not to be exceeded
NO_2	Primary	1-hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Primary and secondary	1-year	53 ppb	Annual mean
O_3	Primary and secondary	8 hours	0.07 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
$PM_{2.5}$	Primary	1-year	12.0 $\mu g/m^3$	Annual mean, averaged over 3 years
	Secondary	1-year	15.0 $\mu g/m^3$	Annual mean, averaged over 3 years
	Primary and secondary	24 hours	35 $\mu g/m^3$	98th percentile, averaged over 3 years
PM_{10}	Primary and secondary	24 hours	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years
SO_2	Primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
	Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Source: USEPA (2017a).

Notes: CO–carbon monoxide, μg/m^3–microgram per cubic meter, NO_2–nitrogen dioxide, O_3–ozone, $PM_{2.5}$–particulate matter with a diameter less than or equal to nominal 2.5 micrometers, PM_{10}–particulate matter with a diameter less than or equal to nominal 10 micrometers, ppm–parts per million, SO_2–sulfur dioxide; ppb–parts per billion.

Counties in the United States that do not meet the NAAQS are called nonattainment areas. Former non-attainment areas are called maintenance areas. Federal actions located in nonattainment or maintenance areas are required to demonstrate compliance with the general conformity guidelines established in Determining Conformity of Federal Actions to State or Federal Implementation Plans (40 CFR 93). Section 93.153 of this rule sets the applicability requirements for projects subject to it through the establishment of de minimis levels for annual criteria air pollutant emissions. These de minimis levels can vary based on criteria air pollutant nonattainment area designations (e.g., moderate, serious, severe, extreme). Projects with emissions below the de minimis levels, and projects in counties that are in attainment areas, are not subject to the rule. Those projects in non-attainment areas with emissions at or above the de minimis levels are required to perform a conformity analysis as established in the rule. The de minimis levels apply to direct and indirect sources of emissions that can occur during the construction and operational phases of a project.

Two ambient air quality monitoring stations are located in Mobile County and one in Baldwin County (USEPA, 2017b). The Mobile County stations are found in the towns of Theodore and Chickasaw, and the Baldwin County station is found in the City of Fairhope. The Theodore station only monitors for O_3, while the Chickasaw station monitors for O_3, $PM_{2.5}$, and SO_2. The Fairhope station monitors for O_3 and $PM_{2.5}$. Both counties are in attainment for all criteria air pollutants (USEPA, 2017c). Therefore, the general conformity guidelines described above are not applicable to the projects discussed in this document.

4.1.3.2 Greenhouse Gases

GHGs are chemical compounds found in Earth's atmosphere that absorb and trap infrared radiation as heat. As incoming solar radiation is absorbed and emitted back from the Earth's surface as infrared energy, GHGs in the atmosphere prevent some of this heat from escaping into space, instead reflecting the energy back to further warm the surface (CSS, 2016). Global atmospheric GHG concentrations are a product of continuous release and storage of GHGs over time. In the natural environment, the release and storage of GHGs are recurring. Deforestation, soil disturbance, and the burning of fossil fuels disrupt the natural carbon cycle discussed below by increasing the GHG emission rate over the storage rate, resulting in a net increase of GHGs into the atmosphere. The accumulation of increased GHG levels in the atmosphere increases temperatures and warms the planet through a greenhouse effect (USEIA, 2017).

The GHGs emitted into the atmosphere through human activities are carbon dioxide (CO_2), methane, NO_x, and fluorinated gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (USEPA, 2016b).

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

Predicted sea level rise and increasingly frequent coastal storms, hurricanes, and associated storm surges can affect Alabama's shorelines, altering coastal wetland hydrology, geomorphology, biotic structure, and nutrient cycling.

4.1.3.3 Noise

The sound levels on the coast of the Gulf of Mexico are generated by high waves and wind. This is especially true on Dauphin Island because it is located in the open ocean and receives the strongest winds from the Gulf. Vehicular traffic and the use of other motorized equipment, maintenance of commercial buildings, and recreational activities influence noise levels at the proposed project sites. The predominant anthropogenic sources of noise experienced along Dauphin Island, Fort Morgan, Gulf Islands, Gulf Shores, and Orange Beach are automobile and truck traffic from Bienville Boulevard, State Highway 182, and State Highway 180. Other noise sources include ground maintenance and occasional watercraft traffic on Little Lagoon and the Gulf of Mexico. Because Little Lagoon is close to the BSNWR, most natural sound production comes from wildlife, especially birds. Fort Morgan was designated as an Important Bird Area because birds use the area during the fall and spring avian migration periods. Natural sound production in the area during these periods can be attributed to avian vocalization.

4.2 BIOLOGICAL RESOURCES

4.2.1 Habitats

The projects contained in this RP II/EA are located along the Gulf Coast of Alabama, within Baldwin and Mobile counties. Numerous habitat types exist within the project locations, ranging from estuary and marine habitat to terrestrial habitats up to approximately 20 miles inland from the Gulf of Mexico. Each habitat type maintains a specific set of conditions required by different plants and animals, although some crossover of species occurs in the transition zones between habitats. The habitats found within the region are described below. These habitats support a diversity of fish and wildlife, which support many economic and cultural activities. They also help to guard coastal communities and infrastructure from the effects of powerful storms.

4.2.1.1 Coastal and Nearshore Habitats

The Alabama Gulf Coast includes numerous riverine estuaries and associated bays, tidal marshes and creeks, and barrier islands. These coastal areas and nearshore waters are created by natural processes and are primarily made up of intertidal, subtidal, and benthic zones. They are important for nesting, feeding, and migration to a variety of commercial and recreational fisheries, crustaceans, shellfish, marine mammals, sea turtles, and birds.

Submerged Aquatic Vegetation

SAV includes seagrass beds, which are extremely productive habitats within the marine and estuarine waters of coastal Alabama. SAV consists of rooted vascular plants that grow in fresh, brackish, and saltwater. SAV beds provide important foraging grounds and nursery habitat for many marine and estuarine species in the Gulf of Mexico, including nearly all managed fisheries. Seagrass communities also support many threatened and endangered species, including sea turtles and manatees. These submerged habitats have a patchy distribution behind protective barrier islands and other nearshore areas where sediment accumulates, with extensive occurrences in Perdido Bay, Wolf Bay, and

Mississippi Sound, and the Mobile-Tensaw Delta. Common SAV species that occur within Baldwin and Mobile counties include Wigeongrass (*Ruppia maritime*), American wild celery (*Vallisneria americana*), shoal grass (*Halodule wrightii*), southern naiad (*Najas guadalupenis*), and slender pondweed (*Potamogeton pusillus*) (ADCNR, 2015).

Intertidal Marshes and Flats

Intertidal marshes and flats occur in shallow depositional areas of estuaries. They are generally shallow-water areas that support a great diversity of fishes and other aquatic and terrestrial wildlife. These habitats are most commonly associated with mud-bottomed bays behind barrier bottoms (ADCNR, 2015). Fresh and saltwater marshes provide valuable ecosystem services, including filtration of nutrients and pollutants, shoreline and sediment stabilization, and flood protection. Marshes include plants whose root systems are suited to withstand more frequent and longer durations of inundation than plants in low wetlands. Salt marshes in Alabama are primarily dominated by black needlerush (*Juncus roemerianus*) and saltmeadow cordgrass (*Spartina patens*). Common freshwater marsh plants include common reed (*Phragmites australis*), cattail (*Typha sp.*), bulrushes (*Scirpus sp.*), sawgrass (*Cladium jamaicense*) and water lily (*Nymphaea odorata*) (Alabama State Parks, 2013).

Oyster Reefs

Oysters are important as both organisms and habitat with an integral role in the functioning of the ecosystem. The aggregations of oysters that comprise an oyster reef result in a complex and hard substrate that provides habitat for multiple benthic organisms and fish, increasing biodiversity in estuaries. Within an oyster reef community, oysters (*Crassostrea virginica*) are the dominant species, although more than 300 other macrofauna species may be living on an oyster reef. Oysters are an ecological keystone species[57] in most estuaries along the Atlantic and Gulf Coasts, and oyster populations contribute to the integrity and functionality of estuarine ecosystems. Oyster reefs also provide a number of ecosystem services, including improved water clarity, sediment stabilization, and nutrient sequestration. Oyster reefs along the Gulf Coast also provide nursery and foraging habitat for other economically and ecologically important species, including blue crab (*Callinectes sapidus*), shrimp, and various fish species. Currently, threats to oyster populations include loss of hard bottom habitat, degradation of water quality, predation (primarily by the Atlantic oyster drill [*Urosalpinx cinerea*]), and disease (primarily dermo).

The total area of public reefs in Alabama, including historically harvested reef footprints, cover approximately 5,300 acres, which includes reefs in Mississippi Sound and Portersville Bay. In Alabama, private oyster beds adjacent to riparian and leased areas are harvested commercially. The area of the riparian and leased water bottoms in which these private, commercially harvested oyster beds are found currently totals approximately 870 acres. The largest areas of oyster reef habitat in Alabama currently include the Cedar Point Reef in Portersville Bay and several small patches of oyster reef in Bon Secour Bay.

Beaches and Dunes

Beaches are landforms that consist of coastal accumulations of sandy sediment deposits that are shaped by wave and tidal activity. Because of the constant wave action, vegetation is typically restricted to above the high-tide elevation where dunes are formed. Beaches provide habitat for a number of species, including nesting female sea turtles, beach mice, birds, and shellfish.

[57] A species on which other species in an ecosystem largely depend, such that if it were removed, the ecosystem would change drastically.

Dunes are hills of sand formed by wind or the flow of water. Dunes require a healthy plant community to hold substrate in place. The plant root structure prevents shifting of the sand from wind or water erosion, causing dune decay. Dune habitats are separated into four different sections: primary dunes that reside closest to the water, secondary dunes, tertiary dunes, and scrubland. Common dune vegetation in coastal Alabama includes sea oats (*Uniola paniculata*), panic grasses (*Panicum* spp.), coastal bluestem (*Schizachyrium maritimum*), and beach sunflower (*Helianthus debilis*). Many shorebirds and waterbirds use these areas for resting and feeding.

Maritime Forest and Coastal Scrub

Maritime forest habitat consists of sandy soils that support a mosaic of woody vegetation, often dominated by oaks (*Quercus sp.*) and pines (*Pinus sp.*). Maritime forest habitat occurs on barrier islands and near-coastal areas that are influenced by salt spray, coastal winds, and extreme disturbance such as hurricanes (ADCNR, 2015). Maritime forests also contain species such as pignut hickory (*Carya glabra*), southern magnolia (*Magnolia grandifolia*), and red maple (*Acer rubrum*). Beneath the trees and in recently disturbed areas, an understory of shrubs and herbaceous species occurs, including dwarf huckleberry (*Gaylussacia dumosa*), wax myrtle (*Myrica cerifera*), hollies (*Ilex sp*.), and coreopsis (*Coreopsis tinctoria*).

Coastal scrub habitat occurs on areas of deep, well-washed, sterile sands in temperate or subtropical environments. This habitat consists of dense hardwood patches of low-growing oaks interspersed with bare areas of white sand and are dominated by myrtle oak (*Quercus myrtifolia*), Chapman's oak (*Qercus chapmanii*), sand live oak (*Quercus geminata*), scrub holly (*Ilex cumulicola*), scrub plum (*Prunus geniculate*), scrub hickory (*Carya floridana*), gray false rosemary (*Conradina canescens*), and saw palmetto (*Serenoa repens*) (Alabama State Parks, 2013).

4.2.1.2 Inland Habitats

Inland ecosystems of the Alabama Gulf Coast occur within the Gulf Coast Flatwoods and Southern Pine Plain and Hills ecoregions. These ecoregions have sandy loam, sandy clay, or sandy soils, and are relatively flat and low in elevation. The Gulf Coast Flatwoods ecoregion occurs closer to the coast and is generally lower elevation, with less relief and wetter soils than the Southern Pine Plain and Hills ecoregion (Griffith et al., 2001). Further detail on the inland habitats within these ecoregions, within Baldwin and Mobile counties, is provided below.

Coastal Flatwoods

Coastal flatwoods is a generic description for the pine woodlands that occupy sandy flatlands, principally in the Gulf Coast Flatwoods and the Southern Pine Plain and Hills ecoregions (Griffith et al., 2001). Even though this habitat is subject to seasonally high water tables because of its low elevation, soils are typically well drained. Overstory vegetation is characterized by longleaf pine (*Pinus palustris*) and to a lesser degree by slash pine (*Pinus elliottii*). The understory ranges from dense shrubs to open and herbaceous-dominated and is heavily influenced by fire history. Much of this habitat has been lost to development, and much of the better-drained land has been cleared for pasture or crops. This habitat shares many wildlife species with drier upland forest.

Floodplain Forest

Floodplain forests occur only along certain river and stream drainages within the Gulf Coast region. Vegetation along theses larger waterways is generally dominated by bottomland hardwood species and other trees tolerant of flooding. Typical trees of these forests include bald cypress (*Taxodium distichum*), water tupelo (*Nyssa aquatica*), swamp tupelo (*Nyssa biflora*), green ash (*Fraxinus pennsylvanica*), sweetgum *(Liquidambar styraciflua*), sweetbay (*Magnolia virginiana*), Atlantic white cedar

(*Chamaecyparis thyoides*), and several oaks (*Quercus* spp.). Common shrubs are buckwheat tree (*Cliftonia monophylla*) and swamp cyrilla (*Cyrilla racemiflora*).

Upland Forest

Much of the upland forested habitat in this region has been converted to pine plantations. Where natural forest remains, longleaf pine (*Pinus palustris*), shortleaf pine (*Pinus echinata*), and loblolly pine (*Pinus taeda*) pines dominate most uplands, with slash pine (*Pinus elliottii*) in the lower areas with scattered areas of the hardwood species mentioned above. Prior to modern fire suppression, these forests naturally burned every few years, and fire-adapted species such as longleaf pine were dominant. Before European settlement, longleaf pine was probably the most abundant tree in southern Alabama, but it has been greatly reduced in extent, largely displaced by urbanization, agriculture, and/or silviculture. Most stands of longleaf pine have been converted to loblolly pine (ADCNR, 2015), and longleaf pine communities now exist in just 3 percent of their previous range throughout the Southeast (Lopez et al., 2014), although efforts to restore longleaf pine habitat are ongoing. Many of the wildlife species associated with this habitat type have been reduced to a fraction of their former distribution and abundance. The greatest number of imperiled wildlife species in Alabama are associated with fire-maintained longleaf pine forests (Mirarchi, 2004) and are considered species of conservation concern. These species include the gopher tortoise (*Gopherus polyphemus*), eastern indigo snake (*Drymarchon couperi*), Florida and black pine snakes (*Pituophis melanoleucus* spp.), gopher frog (*Lithobates capito*), and red-cockaded woodpecker (*Picoides borealis*) (NatureServe, 2009; ADCNR, 2015), as discussed in Section 4.2.4, Rare and Protected Species. These forests are inland of the coastal flatwoods and extend landward into the Upper East Gulf Coastal Plain. Under natural conditions, forest fires occurred at regular intervals and limited the development of shade-tolerant species of hardwoods.

Wet Pine Savanna

This habitat consists of primarily herbaceous vegetation with relatively thick cover of grass and sedge species with a scattered, open overstory of pine trees, including longleaf and slash pine. In some cases, it can also include a dense shrub understory. It occupies low, flat plains on poorly drained soils, often saturated for 50 to 100 days per year. Frequent fires, including growing-season burns, are essential for maintenance of this system (ADCNR, 2015).

Isolated Wetlands

Isolated wetlands are typically depressional areas embedded within upland habitats, such as some palustrine-forested wetlands, herbaceous bogs, or temporary ponds and marshes. Such wetlands host a significant portion of the biodiversity of the region. These wetlands are dominated primarily by plants that are adapted to living in saturated soils, but not in frequently inundated soils. Low wetlands include palustrine-forested wetlands, palustrine scrub-shrub wetlands, and palustrine-emergent wetlands. Palustrine-forested wetlands are often dominated by pines, oaks, and water tupelo (*Nyssa aquatic*), while palustrine scrub-shrub wetlands are often dominated by black willow (*Salix nigra*), elderberry (*Sumbucus canadensis*), saw palmetto (*Serenoa repens*), and sweet bay (*Magnolia virginiana*). Palustrine-emergent wetlands are dominated by a number of herbaceous species, including cardinal flower (*Lobelia cardinalis*), cinnamon fern (*Osmunda cinnamomea*), chain fern (*Woodwardia fimbriata*), and royal fern (*Osmunda regalis*) (ADCNR, 2015).

4.2.2 Wildlife

Wildlife includes all native and naturalized vertebrate and invertebrate species of animals. This section provides an overview of the common animal species that have the potential to occur, or are known to occur, in the project area of one or more restoration alternative. Of particular importance are species that are rare or declining, as well as those of general importance to the regional ecosystem and economy.

The project areas of the 26 proposed projects, which are located in Baldwin and Mobile counties, provide habitats supporting a variety of wildlife. Species are grouped as mammals, reptiles, amphibians, birds, fish, invertebrates, and one marsupial. The two counties on the Alabama Gulf Coast reportedly include 73 native amphibians, 420 bird species (migratory and native), 62 native mammals, and 93 native reptiles (Gulf Shores and Orange Beach Tourism, 2016). According to the Mobile Bay National Estuary Program, the Mobile Bay region provides habitat for more than 300 species of birds, 310 species of fish, 68 species of reptiles, 57 species of mammals, 40 species of amphibians, and 15 species of shrimp (MBNEP, 2002). Vertebrates are the focus of this discussion, but several important invertebrates are also mentioned, including a diversity of insects, oysters, crabs, worms, clams, octopus, snails, and many other small organisms.

Many wildlife species, particularly those that are mobile such as mammals, birds, some amphibians, and reptiles, may frequent the project sites but are not necessarily present at all times. For example, approximately half of the birds in the region are migratory and stop to rest and refuel during their annual migration. Based on species accounts by Mirarchi (2004) and ADCNR (2017a), as well as the frequency of observations in eBird.org (2017) and iNaturalist.org (2017), commonly occurring wildlife within Baldwin and Mobile counties are described below.

Aquatic wildlife under review in the RP II/EA include harvested finfish fishes and shellfish (e.g., shrimp, crabs, and oysters); they are discussed under Section 4.2.3, Marine and Estuarine Fauna. Many finfish and shellfish in Alabama's Gulf of Mexico are important commercial and recreational fisheries and are discussed in Section 4.2.5, Federally Managed Fisheries. Many of the managed fish species use both estuarine and marine waters. Many species in the region are protected under the ESA and are discussed in more detail in Section 4.2.4, Rare and Protected Species. All migratory birds within North America are protected under the Migratory Bird Treaty Act, and marine mammals are protected under the MMPA; both acts are described in Chapter 15.

4.2.2.1 Mammals

Of Alabama's 64 species native mammals, more than 50 inhabit coastal Alabama, occurring within all habitats of the Gulf Coast region. The most abundant mammals include small mammals such as southeastern shrew (*Sorex longirostris*), southern short-tailed shrew (*Blarina carolinensis*), least shrew (*Cryptotis parva*), eastern mole (*Scalopus aquaticus*), eastern chipmunk (*Tamias striatus*), and several species of mice. Twelve bat species could be found on the Alabama Gulf Coast, with the northern yellow bat (*Lasiurus intermedius*), little brown myotis (*Myotis lucifugus*), and southeastern myotis (*Myotis austroriparius*) having the highest conservation concern. The nine-banded armadillo (*Dasypus novemcinctus*) is common, as are the eastern cottontail (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), white-tailed deer (*Odocoileus virginianus*), hispid cotton rat (*Sigmodon hispidus*), eastern woodrat (*Neotoma floridana*), eastern gray squirrel (*Scurius carolinensis*), fox squirrel (*Scurius niger*), and southern flying squirrel (*Glaucomys volans*). Where suitable aquatic habitat is available, beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), nutria (*Myocastor coypus*), mink (*Neovison vison*), swamp rabbit (*Sylvilagus aquaticus*), and river otter (*Lontra canadensis*) are present. Marsh rabbit (*Sylvilagus palustris*) is a species of high conservation concern because it is restricted to the Gulf Coast area. Carnivores such as coyote (*Canis latrans*), bobcat (*Lynx rufus*), long-tailed weasel (*Mustela frenata*), and red and gray fox (*Vulpes* and *Urocyon cinereoargenteus*) occur throughout the region and are likely to be within many of the project areas. Black bear (*Ursus americanus*), a species of highest conservation concern, is restricted to only the largest remaining intact forested ecosystems. Lastly, feral hog (*Sus scrofa*) are a widespread invasive species in the region

(Mirarchi, 2004; Mirarchi et al., 2004; ADCNR, 2017a). Alabama beach mouse (*Peromyscus polionotus ammobates*) and Perdido key beach mouse (*Peromyscus polionotus trissyllepsis*) are endemic to coastal Alabama beaches and dunes and both are listed as endangered under the ESA.

Bottlenose dolphin (*Tursiops truncatus*) is the only marine mammal in Alabama's coastal waters that was documented to be affected by the DWH oil spill. This species was adversely affected by the 2010 accident, with over 1,000 dolphins reportedly killed in the Gulf of Mexico after the spill (ADCNR, 2015). DISL coordinates both the ALMMSN (http://www.disl.org/about/faculty/faculty-projects/almmsn/) and the Manatee Sighting Network (http://manatee.disl.org/). Marine mammals are discussed in Section 4.2.4, Rare and Protected Species.

One species of marsupial, the Virginia opossum (*Didelphis virginiana*), is common throughout the Gulf Coast region and is likely to reside within the project areas of some proposed alternatives. It uses nearly all habitats, including urban areas (Mirarchi, 2004).

4.2.2.2 Reptiles

Commonly observed reptiles on the Alabama coast include various types of snakes, lizards and skinks, and turtles. Common snakes in the region include garter snake (*Thamnophis sirtalis*), green tree snake (*Hyla cinerea*), black racer (*Coluber constrictor*), eastern kingsnake (*Lampropeltis getula getula*), speckled kingsnake (*Lampropeltis getula holbrooki*), northern redbelly snake (*Storeria occipitomaculata*), northern scarlet snake (*Cemophora coccinea copei*), eastern ribbonsnake (*Thamnophis sauritus*), and rat snake (*Elaphe obsoleta*). Eastern diamondback rattlesnake (*Crotalus adamanteus*) is a rare species that is likely to occur within the project areas of several proposed alternatives. Other less common species including rough greensnake (*Opheodrys aestivus*), red corn snake (*Pantherophis guttatus*), ring-necked snake (*Diadophis punctatus*), eastern coral snake (*Micrurus fulvius*), and coachwhip (*Masticophis flagellum*). Several other common water snakes that occur in Mobile or Baldwin counties include cottonmouth (*Agkistrodon piscivorus*), Gulf saltmarsh snake (*Nerodia clarkia*), brown water snake (*Nerodia taxispilota*), Mississippi green water snake (*Nerodia cyclopion*), Florida green water snake (*Nerodia floridana*), eastern water snake (*Nerodia fasciata*), rainbow snake (*Farancia erytrogramma*), and glossy crayfish snake (*Regina rigida sinicola*). Additional snakes that are possibly extirpated from Alabama but that could still occur within the Gulf Coast region include southern hognose snake (*Heterodon simus*) and eastern indigo snake, the latter species being tied to fire-maintained longleaf pine forest and listed under the ESA. The eastern indigo snake is described further in Section 4.2.4, Rare and Protected Species.

Lizards and skinks that likely occur within the project include green anole (*Anolis carolinensis*), brown anole (*Anolis sagre*, exotic), common five-lined skink (*Plestiodon fasciatus*), eastern fence lizard (*Sceloporus undulatus*), and eastern six-lined racerunner (*Aspidoscelis sexlineata*) (iNaturalist, 2017). Broadhead skink (*Plestiodon laticeps*) and ground skink (*Scincella lateralis*) are also common in forested habitats. Less common lizard species within Baldwin and Mobile counties include the southeastern five-lined skink (*Plestiodon inexpectatus*), eastern glass lizard (*Ophisaurus ventralis*), and mimic glass lizard (*Ophisaurus mimicus*). American alligator (*Alligator mississippiensis*) are common to the region's rivers and estuaries (Mirarchi, 2004; ADCNR, 2017a).

Turtles along the Alabama Gulf Coast are both aquatic and terrestrial, with the most common species including common box turtle (*Terrapene carolina*), common snapping turtle (*Chelydra serpentina serpentine*), pond slider (*Trachemys scripta*), southern painted turtle (*Chrysemys dorsalis*), chicken turtle (*Deirochelys reticularia*), and river cooter (*Pseudemys concinna*). Less abundant species include Florida softshell (*Apalone ferox*), alligator snapping turtle (*Macrochelys temminckii*), eastern mud turtle (*Kinosternon subrubrum*), Mississippi diamondback terrapin (*Malaclemys terrapin pileata*), Alabama red-bellied turtle (*Eretmochelys imbricata*), and gopher tortoise, an ESA-listed species (see Section 4.2.4, Rare and Protected Species). Additionally, five species of sea turtles could potentially occur in coastal Alabama waters, two of which are documented as nesting on Alabama beaches—loggerhead sea turtle (*Caretta caretta*) and Kemp's ridley sea (*Lepidochelys kempii*) (Fritts, 1983; USFWS, 2008a). All sea turtles are listed under the ESA and are described further in Section 4.2.4, Rare and Protected Species.

4.2.2.3 Amphibians

Amphibians include salamanders, frogs, and toads, and are found within wet or damp areas of all habitat types of the Alabama Gulf Coast. They use isolated wetland areas within dry forests, floodplains alongside creeks, riverine habitats, swamps, lakeshores, and other wet areas. Many amphibians and snakes seek protection beneath rotting logs and other woody debris. Even the most common species often go unnoticed by people because they spend most of their lives beneath debris and are primarily nocturnal. Some toads can use upland habitats and burrow beneath litter and soil during dry periods. Salamanders and frogs generally require moist freshwater environments, with some species being fully aquatic, others intermittently aquatic, and others mostly terrestrial as adults. Although amphibians could occur within the project area of some restoration alternatives, their need for a constant source of salt-free moisture makes them unlikely within coastal ecosystems. However, several species would occur within the project areas that occur within inland ecosystems, such as the protection of the Molpus Tract on the Perdido River or the three watershed-based nutrient reduction projects.

Salamanders that would most likely occur within the project areas, especially within forested floodplains and seasonally wet habitats, include the southern two-lined salamander (*Eurycea cirrigera*), three-lined salamander (*Eurycea guttolineata*), Mississippi slimy salamander (*Plethodon mississippi*), spotted dusky salamander (*Desmognathus conanti*), dwarf salamander (*Eurycea quadridigitata*), southern red salamander (*Pseudotriton ruber vioscai*), Gulf Coast mud salamander (*Pseudotriton montanus flavissimus*), and mole salamander (*Ambystom taploideum*). Another uncommon salamander of moderate to high conservation concern and possibly occurring within the project areas is the southern dusky salamander (*Desmognathus auriculatus*). Three species of amphiuma, which are large limbless eel-like aquatic salamanders, are uncommon in slow, backwater habitats such as swamps, ponds, and muddy ditches. The three species include one-toed amphiuma (*Amphiuma pholeter*), two-toed amphiuma (*Amphiuma means*), and three-toed amphiuma (*Amphiuma tridactylum*). The least siren (*Siren intermedia*) is a another seldom-seen aquatic eel-like salamander with external gills and small forelegs that could be found within Alabama Gulf Coast ponds, swamps, and other weedy, shallow wetlands. The eastern newt (*Notophthalmus viridescens*) and Gulf Coast waterdog (*Necturus beyer*) may also occur in the project areas (Mirarchi, 2004; ADCNR, 2017a).

Frogs are more likely to be found within the project areas include common species such as southern leopard frog (*Lithobates sphenocephala*), northern spring peeper (*Pseudacris crucifer crucifer*), greenhouse frog (E*leutherodactylus planirostris*), southern cricket frog (*Acris gryllus*), green tree frog (*Hyla cinerea*), and Cope's gray tree frog (*Hyla chrysoscelis*). Additional tree frogs in southern Alabama include bird-voiced tree frog (*Hyla avivoca*), pine woods tree frog (*Hyla femoralis*), barking tree frog (*Hyla gratiosa*) and squirrel tree frog (*Hyla squirella*). Ornate chorus frog (*Pseudacris ornata*) are found west of Mobile Bay, often in the same coastal flatwoods habitats as other winter-breeding amphibians of conservation concern, such as gopher frog and flatwoods salamander (*Ambystoma bishopi*). Aquatic frogs in Baldwin and Mobile counties include bronze frog (*Rana clamitans clamitans*), pig frog, (*Rana grylio*), river frog (*Lithobates heckscheri*), and American bullfrog (*Rana catesbeiana*). Common toads that are expected to occur in the area are southern toad (*Anaxyrus terrestris*) and Fowler's toad (*Anaxyrus fowleri*). In addition, oak toad (*Anaxyrus quercicus*) is a species of moderate conservation concern found in sandy soils, especially fire-maintained coastal flatwoods. Eastern narrow-mouthed toad

(*Gastrophryne carolinensis*) and eastern spadefoot (*Scaphiopus holbrooki holbrooki*) are two additional toads that are common statewide in Alabama (Mirarchi, 2004; ADCNR, 2017a; iNaturalist, 2017).

4.2.2.4 Birds

Birds that frequent the Gulf Coast of Alabama include passerines (songbirds), seabirds, waterfowl, shorebirds, wading birds, and hawks. The majority of the birds in the region are migratory. Approximately 200 species of migratory birds are known in the Western Hemisphere. In spite of its small size, the Gulf Coast region of Alabama contains a large percentage of the state's birds. Of the 445 species listed for the entire state, 420, or about 95 percent, have been observed in Baldwin and Mobile counties. About 30 percent, or 130 species, of those 420 species have been documented as breeding in Baldwin and Mobile counties (Rosenberg et al., 2016; Mobile Bay Audubon Society, 2011).

Alabama is located in the Mississippi Flyway, or bird migration corridor, and coastal Alabama provides important stopover habitat for birds crossing the Gulf of Mexico during seasonal migrations, especially portions of Dauphin Island and along the Fort Morgan Peninsula. When migrating north, the coastal habitats encountered on the Alabama coast provide birds with the first potential foraging habitat after crossing the Gulf of Mexico. When returning south, Alabama coast habitats provide birds with one last foraging opportunity before crossing open water (Rosenberg et al., 2016). In the spring, when the weather conditions are right, Dauphin Island and Fort Morgan may have spectacular "fallouts" of colorful warblers, tanagers, grosbeaks, buntings, and orioles. In September and October, thousands of hawks, mostly broad-winged hawks, pass over Fort Morgan. The Fort Morgan Peninsula and Dauphin Island are also "vagrant traps" where a number of rare birds have been recorded. During winter, thousands of gulls, including laughing gull (*Leucophaeus atricilla*), ring-billed gull (*Larus delawarensis*), and herring gull (*Larus argentatus*) gather at the Magnolia Landfill in south Baldwin County, and 10 species of hummingbirds have been documented during winter in the Gulf Coast region (Mobile Bay Audubon Society, 2011).

The majority of birds along the Alabama coast are passerines, such as finches, warblers, sparrows, and buntings. Numerous species of migratory birds have been observed within the project areas of each alternative. Most bird species found within project areas of the restoration alternatives are covered under the Migratory Bird Treaty Act; resident species such as red-tailed hawk (*Buteo jamaicensis*) or house sparrows (*Passer domesticus*) are not covered. Common seabird species are found within open-water, estuarine, and marine habitats of several proposed restoration alternatives. Seabird species in the project areas would include Wilson's storm petrel (*Oceanites oceanicus*), band-rumped storm petrel (*Oceanodroma castro*), Audubon's shearwater (*Puffinus lherminieri*), northern gannet (*Morus bassanus*), and magnificent frigatebird (*Fregata magnificens*) (Mobile Bay Audubon Society, 2011). The brown pelican (*Pelicnus occidentalis*) is a coastal seabird that was previously listed under the ESA and was removed in 2009 because of population recovery. The species is now commonly nesting along the Alabama Gulf Coast, feeding on fish in shallow estuarine waters and nearshore marine areas. American white pelican (*Pelecanus erythrorhynchos*) are also present in the project area. Waterfowl, such as ducks, geese, and swans, are more commonly associated with freshwater habitats than marine or estuarine environments, but are sometimes found in Alabama's coastal habitats. Common waterfowl on the Alabama Gulf Coast that would likely occur within wetland and open-water areas of the proposed alternatives include lesser scaup (*Aythya affinis*), ring-necked duck (*Aythya collaris*), mallard duck (*Anas platyrhynchos*), mottled duck (*Anas fulvigula*), blue-winged teal (*Anas discors*), and snow goose (*Chen caerulescens*) (Mobile Bay Audubon Society, 2011).

Shorebirds are species that are associated with coastal or nearshore habitats and include gulls, terns, skimmers, sandpipers, and plovers. Shorebirds inhabit shallowly flooded coastal and freshwater wetlands, shorelines, intertidal mudflats, shallowly flooded fields, dry grasslands, and sandy coastal beaches (Helmers, 1992). Some species migrate very long distances, seasonally traversing between the North American Arctic and wintering habitats in South America. Certain species use the Alabama Gulf Coast as wintering habitat, while most others only reside temporarily when they stop over in “staging” habitat to forage and refuel (Helmers, 1992). Six species of shorebirds are known to breed in the Gulf region and almost 40 species occur during migration or winter. Common shorebirds that may be found within the project areas of the alternatives include black tern (*Chlidonias niger*), least tern (*Sternula antillarum*), black-bellied plover (*Pluvialis squatarola*), Wilson’s plover (*Charadrius wilsonia*), semipalmated plover (*Charadrius semipalmatus*), American oystercatcher (*Haematopus palliatus*), greater yellowlegs (*Tringa melanoleuca*), willet (*Tringa semipalmata*), and spotted sandpiper (*Actitis macularius*) (Mobile Bay Audubon Society, 2011). Two ESA-listed shorebirds that could occur along the beaches of the Alabama Gulf Coast include red knot (*Calidris canutus rufa*) and piping plover (*Charadrius melodus*), which are discussed further under Section 4.2.4, Rare and Protected Species. Red knot have a global distribution, so throughout this document, “red knot” is used to refer to the *rufa* subspecies that migrates past the Alabama coast.

Wading birds are generally large, long-legged species associated with coastal marshes, riverine shorelines, swamps, or other wetland habitats. These species typically forage while standing in shallow water. This includes species such as herons, egrets, ibises, storks, and bitterns. Prey for these species includes fish, frogs, aquatic insects, and crustaceans. Along the Alabama Gulf Coast, common species would include great blue heron (*Ardea herodias*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), white ibis (*Eudocimus albus*), and American bittern (*Botaurus lentiginosus*).

Raptor species that would likely occur at the sites of the proposed restoration alternatives include osprey (*Pandion haliaetus*), bald eagle (*Haliaeetus leucocephalus*), red-tailed hawk (*Buteo jamaicensis*), peregrine falcon (*Falco peregrinus*), Mississippi kite (*Ictinia mississippiensis*), swallow-tailed kite (*Elanoides forficatus*), and broad-winged hawk (*Buteo platypterus*). The bald eagle, which was removed from the ESA in 2007, could occur near any open-water habitat of the proposed project areas. After nearly disappearing from most of the United States during the mid-20th century, the bald eagle is still increasing in Alabama and across the nation. Bald eagles retain protections under the Bald and Golden Eagle Protection Act, which is described in Chapter 15, Compliance with Other Laws and Regulations.

4.2.2.5 Freshwater Fish, Crayfish, and Freshwater Mussels

Although many of the proposed alternatives are focused on marine and estuarine habitats (i.e., sea turtle and marine mammal restoration projects), freshwater resources would be affected by several proposed land acquisition projects and watershed nutrient reduction projects. The two major river basins that could be affected by those projects are the Mobile and Tensaw River Basin/Mobile Bay Basin and Perdido River Basin. Although each river system has a unique fauna, they share many common species. Within all waters, popular gamefish would include largemouth bass (*Micropterus salmoides*), chain pickerel (*Esox niger*), bluegill (*Lepomis macrochirus*), and longear sunfish (*Lepomis megalotis*).

The Mobile and Tensaw River Basin/Mobile Bay Basin includes the independent drainages of Mobile Bay, within which are proposed three Wetlands, Coastal, and Nearshore Habitats (land acquisition) projects and three Nutrient Reduction (Nonpoint Source) projects. These projects could affect fishes within the Fish River, Magnolia River, Fowl River, and Bayou La Batre. Within the greater river basin, Boschung et al. (2004) recognized 135 native fish species, 29 of which are marine but enter fresh water on a regular basis. Fourteen mussel taxa are historically known (Williams et al., 2008) and one, monkeyface (*Quadrula metanevra*), is listed as a species of greatest conservation need (SGCN) Priority 2 (ADCNR, 2015). According to ADCNR (2015), 17 native crayfish species occur in the basin, 7 of which are SGCN. At least 135 fish are native to the basin, 5 of which are SGCN (ADCNR, 2015).

The Perdido River Basin is where all or portions of activities for three projects would occur: the Perdido River Land Acquisition, the Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health, and the Lower Perdido Islands Restoration Phase I. Within the Perdido River Basin, ADCNR (2015) reports 58 native fish species, 2 of which are SGCN: the ironcolor shiner (*Notropis chalybaeus*) and Gulf sturgeon (*Acipenser oxyrinchus*). No native mussels are found in the basin (Wiliams et al., 2008), and 4 of 10 native crayfish found within the Perdido River basin are listed as SGCN.

4.2.3 Marine and Estuarine Fauna

The coastal and nearshore habitats of Alabama support a broad diversity of marine and estuarine fauna. Marine and estuarine fauna include commercially and recreationally harvested finfish and shellfish species (discussed under Section 4.2.5, Federally Managed Fisheries) like shrimp, crabs, oysters, and a variety of finfish. Coastal Alabama habitats also support a number of protected aquatic species, including sea turtles and marine mammals (discussed under Section 4.2.4, Rare and Protected Species). Coastal Alabama's benthic communities include an abundance and diversity of invertebrate species representing many taxa.

4.2.3.1 Finfish

Finfish species found in Alabama's marine and estuarine habitats range from species commonly associated with freshwater environments to fully marine reef fish species. The mixing of freshwater, riverine inputs from Mobile Bay with marine inputs from the Gulf of Mexico creates an estuarine mixing zone within much of Mobile Bay. Estuarine influence declines south of Mobile Bay, and Alabama's coastal and offshore waters are fully marine environments. Many of the finfish species found in Alabama's marine and estuarine habitats are commercially harvested and are federally managed. These species are discussed in detail in Section 4.2.5, Federally Managed Fisheries.

Common finfish species found within Alabama's estuarine habitats include southern flounder (*Paralichthys lethostigma*), mullet (*Mugil cephalus*), southern kingfish (*Menticirrhus americanus*), Atlantic croaker (*Micropogonias undulatus*), spot (*Leiostomus xanthurus*), weakfish (*Cynoscion regalus*), speckled seatrout (*Cynoscion nebulosus*), red drum (*Sciaenops ocellatus*), and black drum (*Pogonias cromis*), among many others. Many of these species use salt marsh habitats within Mobile Bay and along much of Alabama's shoreline as nursery habitat and play and important role in estuarine food webs. Alabama's oyster reefs provide habitat for estuarine bottom-dwelling species including Gulf toadfish (*Opsanus beta*) as well as various species of blennies and gobies.

Fully marine and offshore species are found in south Mobile Bay and occupy open waters of the northern Gulf of Mexico as well as natural and artificial reef complexes. Common marine species in Alabama waters include spadefish (*Chaetodipterus faber*), sheepshead (*Archosargus probatocephalus*), sea bream (*Archosargus rhomboidalis*), pinfish (*Lagodon rhomboides*), tomtate (*Haemulon aurolineatum*), and pigfish (*Orthopristis chrysoptera*). Offshore reefs and other structures, including oil and gas rigs, provide habitat for many species within the grouper/snapper complex. Common grouper and snapper species include red snapper (*Lutjanus campechanus*), vermilion snapper (*Rhomboplites aurorubens*), lane snapper (*Lutjanus synagris*), Nassau grouper (*Epinephelus striatus*), snowy grouper (*Epinephelus niveatus*), black grouper (*Mycteroperca bonaci*), and scamp (*Mycteroperca phenax*). Open water offshore species include cobia (*Rachycentron canadum*), dolphin (*Coryphaena hipparus*), greater amberjack (*Serioloa dumerili*), blue runner (*Caranx cryos*), Spanish mackerel (*Scomberomorus maculatus*), crevalle jack (*Caranx hippos*), horse-eye jack (*Caranx lauts*), yellowfin tuna (*Thunnus albacares*), blackfin tuna (*Thunnus atlanticus*), bluefin tuna (*Thunnus thynnus*), and blue marlin (*Makaira nigrigcans*). Many of these species are roaming or migratory species that may only be present in Alabama waters during certain times of year. Alabama's offshore waters also support an abundance of sharks and rays including tiger shark (*Galeocerdo cuvieri*), bonnethead (*Sphyrna tiburo*), finetooth shark (*Carcharhinus isodon*), blacknose shark (*Carcharhinus acronouts*), spinner shark (*Carcharhinus brevipinna*), southern stingray (*Dasyatis americana*), and cownose ray (*Rhinoptera bonasus*).

4.2.3.2 Shellfish

Shellfish is term commonly used to describe a variety of invertebrate species, especially mollusks and crustaceans. The eastern oyster is among the most important (both ecologically and economically) shellfish species in the Northern Gulf of Mexico, including Alabama. Oysters, in addition to being a species of commercial importance, play a vital role in the ecosystem because they provide habitat (oyster reefs) for many other species, as noted under Section 4.2.1, Habitats. Most of the U.S. oyster harvest comes from the Gulf Coast. The massive reefs supporting the Alabama oyster fishery are the foundation of a healthy and resilient coastal ecosystem, not only for the oyster, but also for other species relying upon the reefs for food or shelter. They also provide coastline protection from erosion, and they help to maintain water quality. However, oysters have been severely affected over the past decade, mainly because of predation by oyster drills from drought, tropical weather events, and declining water quantity and quality from land use changes. Currently, several programs working are underway to restore reefs and several projects are included as part of this RP II/EIS.

Other shellfish species found within Alabama's marine and estuarine habitats include shrimp, crabs, mussels, and clams. Commercially harvested shrimp species in Alabama waters include white shrimp, brown shrimp, and pink shrimp. These species are discussed in more detail in Section 4.2.5, Federally Managed Fisheries*.* Grass shrimp (*Hippolyte pleuracantha*) is among the most abundant invertebrate species in Alabama's SAV and coastal salt marsh habitats. Crabs include the commercially harvested blue crab (*Callinectes sapidus*), as well as marsh crabs (*Sesarma reticulatum*), mud crabs (*Hexapanopeus angustifrons*), fiddler crabs (*Uca* spp.), and ghost crabs (*Ocypode quadrata*), which are common along Alabama's Gulf-facing beaches.

Mussels, clams, and other bivalves, aside from oysters, common in Alabama's marine and estuarine habitats include bent mussel (*Brachidontes recurvus*), coquina clam (*Donax variabilis*), and stout tagelus (*Tagelus plebeius*). Scallop and cockle shells are common along Alabama beaches, but live specimens are rare.

4.2.3.3 Benthic Organisms and Other Invertebrates

Benthic communities in coastal Alabama comprise macroinvertebrate groups such as mollusks, sponges, polychaetes, and arthropods, including amphipods, isopods, and copepods. These groups are diverse and are found in Gulf habitats spanning from the intertidal zone to the soft sediments on the continental shelf. Benthic communities perform important ecological functions in the nearshore food web. Other invertebrates present in Alabama's marine and estuarine habitats include jellyfish, such as moon jellies (*Aurelia aurita*) and sea nettles (*Chrysaora quinquecirrha*). While true starfish and other echinoderms are relatively uncommon along the Northern Gulf Coast, brittle stars are abundant in offshore marine habitats. Barnacles are common in the intertidal zone where hard substrates are present.

4.2.4 Rare and Protected Species

Both Baldwin and Mobile counties harbor species that are federally protected under the ESA, MMPA, Bald and Golden Eagle Protection Act, and the Migratory Bird Treaty Act, as well as Alabama Regulations on Game and Fish and Fur Bearing Animals. These federal laws and their subsequent amendments provide specific protections for the conservation of threatened and endangered species and their habitats, marine mammals, migratory birds, and bald and golden eagles. Chapter 6, Compliance with Other Laws and Regulations, provides further detail on each of these relevant authorities.

4.2.4.1 State Protected Species

Alabama does not implement state-level regulatory protection for endangered and threatened species, except for those species that are protected under the Alabama Regulations on Game and Fish and Fur Bearing Animals, which is updated annually (Alabama Administrative Code r. 220-1-1 *et seq.*) (ALNHP, n.d.). These regulations afford protections for some species in Alabama and are administered by ADCNR. The Alabama Natural Heritage Program (ALNHP) maintains species inventory lists to help promote state-level conservation efforts (ALNHP, 2017).

Table 4-2 lists the rare species that have been documented as occurring in Baldwin and Mobile counties. Listed are higher-level organisms, including amphibians, birds, mammals, reptiles, fishes, crayfish, and freshwater mussels. The list is not inclusive of all species that are tracked by the ALNHP because a diversity of rare invertebrate taxa could also occur within the project areas (ALNHP, 2017).

Seventy-four species of animals are given state-protected status and may potentially occur within the project areas in Baldwin and Mobile counties. This includes 6 mammals, 19 reptiles, 5 amphibians, 38 birds, and 7 fishes. These species are listed in Table 4-2. A conservation status for each listed species is given by its global rank (G) or state rank (S), as defined by NatureServe (NatureServe, 2017a, 2017b) and tracked by the ALNHP. According to this ranking, the conservation status of each species is assigned a state (S) and global (G) rank that ranges from imperiled (G1 or S1) to secure (G5 or S5). If the taxon has a trinomial classification (e.g., subspecies), the global rank is followed by a trinomial (T) rank that also range from imperiled (T1) to secure (T5). “Q" at the end of the global rank indicates that taxonomic questions surround the taxon’s classification. For each species, it is also noted whether they are listed under the federal ESA as threatened (LT), endangered (LE), or candidates for listing (C); further detail on potentially affected ESA-listed species is provided in Section 4.2.4, Rare and Protected Species. The State of Alabama identifies species as Protected Species (SP), including nongame species, invertebrates, sturgeon, paddlefish, and alligator. Lastly, the level of conservation priority (i.e., State Priority) is provided for the SGCN, which are identified in by the 2015 Alabama Wildlife Action Plan and range from (ADCNR 2015, 2017a).

Table 4-2: Rare and Protected Species Potentially Occurring Near the Project Areas in Baldwin and Mobile Counties, Alabama

Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	State Priority
Mammals						
Southeastern Pocket Gopher	*Geomys pinetis*	G5	S3	-	SP	P2
Northern Yellow Bat	*Lasiurus intermedius*	G4G5	S1	-	-	P2
Long-tailed Weasel	*Mustela frenata*	G5	S3	-	SP	P2
Alabama Beach Mouse	*Peromyscus polionotus ammobates*	G5T1	S1	LE	SP	P1
Perdido Key Beach Mouse	*Peromyscus polionotus trissyllepsis*	G5T1	S1	LE	SP	P1

Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	State Priority
Marsh Rabbit	*Sylvilagus palustris*	G5T2	S3	-	-	P2
West Indian Manatee	*Trichechus manatus*	G2	S1	LE	SP	P1
Bottlenose Dolphin	*Tursiops truncatus*	G5	-	-	-	N/A
Black Bear	*Ursus americanus*	G5T2	S2	-	GANOS	P1
Reptiles						
Eastern Diamond-backed Rattlesnake	*Crotalus adamanteus*	G4	S3	-	-	P2
Eastern Indigo Snake	*Drymarchon couperi*	G3	S1	LT	PS	P1, possibly extirpated
Rainbow Snake	*Farancia erytrogramma*	G4	S3	-	PS	P2
Southern Hognose Snake	*Heterodon simus*	G2	SH	-	PS	P1, possibly extirpated
Mole Kingsnake	*Lampropeltis calligaster rhombomaculata*	G5T5	S3	-	-	-
Eastern Kingsnake	*Lampropeltis getula getula*	G5T5	S4	-	PS	P2
Coachwhip	*Masticophis flagellum*	G5	S3	-	PS	
Eastern Coral snake	*Micrurus fulvius*	G5	S3	-	PS	P2
Gulf Saltmarsh Watersnake	*Nerodia clarkii clarkii*	G4T4	S2	-	PS	-
Green Watersnake	*Nerodia cyclopion*	G5	S1S2	-	-	-
Florida Green Watersnake	*Nerodia floridana*	G5	S1S2	-	-	-
Brown Watersnake	*Nerodia taxispilota*	G5	S3	-	-	-
Mimic Glass Lizard	*Ophisaurus mimicus*	G3	S2	-	PS	P2
Black Pine Snake	*Pituophis melanoleucus lodingi*	G4T2T3	S2	LT	PS	P1
Florida Pine Snake	*Pituophis melanoleucus mugitus*	G4T3	S2	-	PS	P2
Pine Woods Littersnake	*Rhadinaea flavilata*	G4	S2	-	-	-
Florida Softshell	*Apalone ferox*	G5	S2	-	RT	-

Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	State Priority
Loggerhead Sea Turtle	*Caretta caretta*	G3	S1	LT	PS	P1
Green Sea Turtle	*Chelonia mydas*	G3	S1	LT	PS	P1
Chicken Turtle	*Deirochelys reticularia*	G5	S3	-	-	-
Leatherback Sea Turtle	*Dermochelys coriacea*	G2	N/A	LE	PS	P1
Hawksbill Sea Turtle	*Eretmochelys imbricata*	G2	N/A	LE	N/A	N/A
Gopher Tortoise	*Gopherus polyphemus*	G3	S3	C, LT	PS	P2
Delta Map Turtle	*Graptemys nigrinoda delticola*	G3T2Q	S2	-	PS	-
Alabama Map Turtle	*Graptemys pulchra*	G4	S3	-	PS	-
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	G1	S1	LE	PS	P1
Alligator Snapping Turtle	*Macrochelys temminckii*	G3G4	S3	-	PS	P2
Mississippi Diamondback Terrapin	*Malaclemys terrapin pileata*	G4T3Q	S2	-	PS	P1
Alabama Redbelly Turtle	*Pseudemys alabamensis*	G1	S1	LE	PS	P1
Razorback Musk Turtle	*Sternotherus carinatus*	G5	S1	-	-	P2
Amphibians						
Reticulated Flatwoods Salamander	*Ambystoma bishopi*	G2	S1	LE	SP	P1
Two-toed Amphiuma	*Amphiuma means*	G5	S3	-	-	-
One-toed Amphiuma	*Amphiuma pholeter*	G3	S1	-	SP	P2
Southern Dusky Salamander	*Desmognathus auriculatus*	G5	S2	-	SP	P1
Gopher Frog	*Lithobates capito*	G3	S2	-	SP	P1
River Frog	*Lithobates heckscheri*	G5	S1	-	SP	P1

Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	State Priority
Mississippi Gopher Frog	*Lithobates sevosa*	G1	SH	LE	SP	P1
Birds						
Henslow's Sparrow	*Ammodramus henslowii*	G4	S2N	-	SP	P1
Le Conte's Sparrow	*Ammodramus leconteii*	G4	S3N	-	SP	-
Seaside Sparrow	*Ammodramus maritimus*	G4	S2	-	SP	P2
Nelson's Sparrow	*Ammodramus nelsoni*	G5	S3N	-	SP	P2
Mottled Duck	*Anas fulvigula*	G4	S2N,S3B	-	SP	-
Short-eared Owl	*Asio flammeus*	G5	S2N	-	SP	P2
Burrowing Owl	*Athene cunicularia*	G4	S2N	-	SP	-
Red Knot	*Calidris canutus rufa*	G4	S3N	LT	SP	P2
Piping Plover	*Charadrius melodus*	G3	S1N	LT	SP	P1
Snowy Plover	*Charadrius nivosus*	G3	S1B,S2N	-	SP	P1
Wilson's Plover	*Charadrius wilsonia*	G5	S1	-	SP	P1
Northern Harrier	*Circus cyaneus*	G5	S3N	-	SP	P2
Marsh Wren	*Cistothorus palustris*	G5	S2B,S4N	-	SP	-
Common Ground-dove	*Columbina passerina*	G5	S3	-	SP	-
Yellow Rail	*Coturnicops noveboracensis*	G4	S2N	-	SP	P2
Groove-billed Ani	*Crotophaga sulcirostris*	G5	S2N	-	SP	-
Reddish Egret	*Egretta rufescens*	G4	S1B,S3N	-	SP	P2
Swallow-tailed Kite	*Elanoides forficatus*	G5	S2	-	SP	P2
White Ibis	*Eudocimus albus*	G5	S2B,S3N	-	SP	-
Gull-billed Tern	*Gelochelidon nilotica*	G5	S2B,S4N	-	SP	-
Mississippi Sandhill Crane	*Grus canadensis pulla*	G5T1	SH	LE	SP	-
Caspian Tern	*Hydroprogne caspia*	G5	S2B,S4N	-	SP	-
Least Bittern	*Ixobrychus exilis*	G5	S2N,S4B	-	SP	P2
Wood Stork	*Mycteria americana*	G4	S2N	LT	SP	P2

Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	State Priority
Long-billed Curlew	*Numenius americanus*	G5	S2N	-	SP	-
Painted Bunting	*Passerina ciris*	G5	S2B	-	SP	-
Bachman's Sparrow	*Peucaea aestivalis*	G3	S3	-	SP	P2
Red-cockaded Woodpecker	*Picoides borealis*	G3	S2	LE	SP	P1
Purple Gallinule	*Porphyrio martinicus*	G5	S3B	-	GB	-
King Rail	*Rallus elegans*	G4	S2S3B,S4N	-	GB	-
Clapper Rail	*Rallus longirostris*	G5	S2	-	GB	-
Black Skimmer	*Rynchops niger*	G5	S2B,S4N	-	SP	-
American Woodcock	*Scolopax minor*	G5	S3B,S5N	-	GB	P2
Forster's Tern	*Sterna forsteri*	G5	S1B,S5N	-	SP	-
Common Tern	*Sterna hirundo*	G5	S1B,S4N	-	SP	-
Least Tern	*Sternula antillarum*	G4	S2B,S4N	-	SP	-
Royal Tern	*Thalasseus maximus*	G5	S2B, S5N	-	SP	-
Sandwich Tern	*Thalasseus sandvicensis*	G5	S1B,S5N	-	SP	-
Willet	*Tringa semipalmata*	G5	S2B,S5N	-	SP	-
Gray Kingbird	*Tyrannus dominicensis*	G5	S2B	-	SP	-
Scissor-tailed Flycatcher	*Tyrannus forficatus*	G5	S2	-	SP	-
Fishes						
Lake Sturgeon	*Acipenser fulvescens*	G3G4	SX	-	SP	PX
Gulf Sturgeon	*Acipenser oxyrinchus desotoi*	G3T2	S1	LT	SP	P2
Alabama Shad	*Alosa alabamae*	G2G3	S2	-	SP	P2
Florida Sand Darter	*Ammocrypta bifascia*	G4	S3	-	-	-
Scaly Sand Darter	*Ammocrypta vivax*	G5	S1	-	-	-
Alligator Gar	*Atractosteus spatula*	G3G4	S2	-	CNGF	-
Crystal Darter	*Crystallaria asprella*	G3	S3	-	SP	-
Southeastern Blue Sucker	*Cycleptus meridionalis*	G3G4	S3	-	CNGF	-

Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	State Priority
Everglades Pygmy Sunfish	*Elassoma evergladei*	G5	S3	-	-	-
Bluespotted Sunfish	*Enneacanthus gloriosus*	G5	S3	-	GF	-
Banded Sunfish	*Enneacanthus obesus*	G5	S1	-	GF	-
Swamp Darter	*Etheostoma fusiforme*	G5	S3	-	-	-
Brighteye Darter	*Etheostoma lynceum*	G5	S1	-	SP	P1
Western Starhead Topminnow	*Fundulus blaire*	G4	S3	-	-	-
Golden Topminnow	*Fundulus chrysotus*	G5	S3	-	-	-
Banded Topminnow	*Fundulus cingulatus*	G4	S2	-	-	-
Marsh Killifish	*Fundulus confluentus*	G5	S2	-	-	-
Starhead Topminnow	*Fundulus dispar*	G4	S2	-	-	-
Russetfin Topminnow	*Fundulus escambia*	G4	S3	-	-	-
Saltmarsh Topminnow	*Fundulus jenkinsi*	G3	S1	-	-	-
Bayou Killifish	*Fundulus pulvereus*	G5	S2	-	-	-
Least Killifish	*Heterandria formosa*	G5	S3	-	-	-
Mooneye	*Hiodon tergisus*	G5	S3S4	-	-	-
Rainwater Killifish	*Lucania parva*	G5	S3	-	-	-
Mississippi Silvery Minnow	*Hybognathus nuchalis*	G5	S4	-	-	-
Pygmy Killifish	*Leptolucania ommata*	G5	S1	-	-	-
Rainwater Killifish	*Lucania parva*	G5	S3	-	-	-
Cherryfin Shiner	*Lythrurus roseipinnis*	G5	S2	-	-	-
Ironcolor Shiner	*Notropis chalybaeus*	G4	SH	-		P1
Taillight Shiner	*Notropis maculatus*	G5	S3	-	-	-
Blackmouth Shiner	*Notropis melanostomus*	G2	S1	-	-	-
Coastal Shiner	*Notropis petersoni*	G5	S2	-	-	-
Freckled Madtom	*Noturus mocturnus*	G5	S3	-	CNGF	-
Yellow Perch	*Perca flavescens*	G5	S3	-	GF	-

Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	State Priority
Freckled Darter	*Percina lenticula*	G3	S2S3	-	-	-
Gulf Logperch	*Percina suttkusi*	G5	S3	-	-	-
Sailfin Molly	*Poecilia latipinna*	G5	S2	-	-	-
Paddlefish	*Polyodon spathula*	G4	S3	-	SP, CNGF	
Flagfin Shiner	*Pteronotropis signipinnis*	G5	S3	-	-	-
Alabama Sturgeon	*Scaphirhynchus suttkusi*	G1	S1	LE	SP	P1
Crayfishes						
Least Crayfish	*Cambarellus diminutus*	G3	S3	-	-	P2
Cajun Dwarf Crayfish	*Cambarellus shufeldtii*	G5	S2	-	-	-
Thornytail Crayfish	*Cambarus acanthura*	G4G5	S3	-	-	-
Angular Dwarf Crayfish	*Cambarus lesliei*	G3	S3	-	-	P2
Speckled Burrowing Crayfish	*Fallicambarus danielae*	G2	S1	-	-	P2
Rusty Grave Digger	*Cambarus miltus*	G3	S1	-	-	P2
Burrowing Bog Crayfish	*Fallicambarus burrisi*	G3	S1	-	-	P2
Lavender Burrowing Crayfish	*Fallicambarus byersi*	G4	S2	-	-	-
Digger Crayfish	*Fallicambarus fodiens*	G5	S3	-	-	-
Flatwoods Digger	*Fallicambarus oryktes*	G4	S1	-	-	P2
Shrimp Crayfish	*Orconectes lancifer*	G5	S1	-	-	-
Ribbon Crayfish	*Procambarus bivittatus*	G5	S3S4	-	-	-
Cockscomb Crayfish	*Procambarus clemmeri*	G5	S2	-	-	-
Escambia Crayfish	*Procambarus escambiensis*	G2	S1	-	-	P2
Panhandle Crayfish	*Procambarus evermanni*	G4	S3	-	-	-
Lagniappe Crayfish	*Procambarus lagniappe*	G2	S1	-	-	P2
Mobile Crayfish	*Procambarus lecontei*	G3G4	S3	-	-	-

Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	State Priority
Pearl Blackwater Crayfish	*Procambarus penni*	G3	S2	-	-	-
Gulg Crayfish	*Procambarus shermani*	G4	S2	-	-	-
Freshwater Musslels						
Cypress Floater	*Anodonta hartfieldorum*	G4	S1	-	PSM	-
Rock Pocketbook	*Arcidens confragosus*	G4	S3	-	PSM	-
Round Pearlshell	*Glebula rotundata*	G4G5	S2	-	PSM	-
Pondmussel	*Ligumia subrostrata*	G5	S3	-	PSM	-
Alabama Heelsplitter	*Potamilus inflatus*	G1G2Q	S1S2	LT	PSM	P2

Source: ALNHP, 2017

Notes: Global Rank (G) and State Rank (S): 1 = critically imperiled; 2 = imperiled; 3 = vulnerable; 4 = apparently secure; 5 = demonstrably secure; SH = historical (possibly extirpated); SX = presumed extirpated; B = the breeding population of the species in Alabama; N = the non-breeding population of the species in Alabama

Federal Status: LE = ESA-listed Endangered; LT = ESA-listed Threatened

State Status: SP = State Protected; GANOS = State Game Animal - No Open Season; GB = State Game Bird; GF = State Game Fish; CNGF = State Commercial or Non-Game Fish; PSM = Partial Status Mussels for which commercial harvest is illegal

State Priority: P1 = SGCN Priority 1/Highest Conservation Concern; P2 = SGCN Priority 2/High Conservation Concern; PX = Extirpated; N/A = Not Applicable

4.2.4.2 Federally Listed Threatened or Endangered Species

The ESA prohibits jeopardizing endangered and threatened species or adversely modifying critical habitats essential to their survival. Section 7 of the ESA requires consultation with NMFS and/or USFWS to determine whether any federally listed endangered or threatened species under their jurisdiction may be affected by a proposed project. Generally, NMFS manages marine species, while USFWS manages terrestrial and freshwater species. Section 10 of the ESA regulates activities that may potentially affect any species designated as threatened or endangered or any habitat upon which they depend. Section 10 prohibits any such activities without a valid incidental take permit. An incidental take permit is required for any non-federal activity that may result in take of threatened or endangered species, where "take" is defined as any action that may harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species, and can include any significant habitat modification that may indirectly result in take. An incidental take permit must be accompanied by a habitat conservation plan, which is designed to ensure that the effects of the authorized incidental take are adequately minimized and mitigated.

Baldwin and Mobile counties are home to several ESA-listed special-status species. This section focuses on the species that are most likely to occur in or around the proposed alternative locations. Protected species lists for each alternative site were determined by downloading information from the USFWS

Information for Planning and Conservation system, reviewing scientific literature, and using professional judgment. ESA-listed species known to occur or which may potentially occur within the project areas include three mammals, eight reptiles, four birds, and one fish.

- **Alabama beach mouse** (*Peromyscus polionotus ammobates*) and its designated critical habitat—Occurs on the coastal beaches and sand dunes of Baldwin County. Habitat loss from beachfront development.
- **Perdido Key beach mouse** (*Peromyscus polionotus trissyllepsis*)—Only occurs on the coastal beaches and sand dunes of Perdido Key, which comprise about 2 miles in Alabama. Also at risk from beachfront development.
- **Gopher tortoise** (*Gopherus polyphemus*)—Large, long-lived tortoise found in sandy coastal habitats where it seeks shelter in burrows.
- **Eastern indigo snake** (*Drymarchon couperi*)—Snake relies on fire-maintained pine forests with sandy soils. Historically reported from extreme southern Alabama, but no natural populations reported since 1954, although extant natural populations may remain in Mobile County.
- **Black pine snake** (*Pituophis melanoleucus lodingi*)—Rare in periodically burned, open pine and mixed pine-scrub oak forest with abundant understory vegetation to the west of Mobile Bay.
- **Piping plover** (*Charadrius melodus*)—A migratory shorebird that is fairly common in winter, and less abundant during migration in spring and fall, along the coastline on sandy beaches, dunes, and tidal flats.
- **Red knot** (*Calidris canutus rufa*)—A long-distant migratory shorebird that breeds in Arctic regions and is found on mudflats and sandy beaches during migration. Very rare in spring, and late summer.
- **Wood stork** (*Mycteria americana*)—A large white wading bird that is fairly common in late summer and early fall, but rarely breeds on the Alabama Coast. Feeds in shallow water.
- **Red cockaded woodpecker** (*Picoides borealis*)—Rare and local in all seasons. Breeds in old-growth pine forests, especially longleaf pine.
- **Loggerhead sea turtle** (*Caretta caretta*) and its designated critical habitat—Most frequently encountered sea turtle species in Alabama's waters. The only sea turtle that regularly nests on Alabama beaches.
- **Kemp's ridley sea turtle** (*Lepidochelys kempii*)—Known to occur in Alabama's waters. Kemp's ridleys nest on sandy beaches in Mexico and southern Texas. Nesting in Alabama is occasional, averaging fewer than two nests per year.
- **Green sea turtle** *(Chelonia mydas)*—Small numbers occasionally found in Alabama's waters, although foraging habitat of SAV is limited. Nesting in Alabama very rare.
- **Hawksbill Sea Turtle** (*Eretmochelys imbricata*)—Occasionally documented in the Gulf of Mexico, but rarely in Alabama waters and not been documented to nest on Alabama beaches.
- **Leatherback sea turtle** (*Dermochelys coriacea*)—Occasional visitor to Alabama waters, but does not nest on Alabama beaches. This is the largest sea-turtle, which can dive very deep and eats mainly jellyfish.
- **Alabama red-bellied turtle** (*Eretmochelys imbricata*)—Relatively large freshwater turtle found in most of the rivers flowing into Mobile Bay.

- **Gulf sturgeon** (*Acipenser oxyrinchus desotoi*)—Spawning populations still known in the Choctawhatchee and Yellow rivers and occasionally caught or sighted in the Mobile-Tensaw River delta and Tombigbee and Alabama rivers.
- **West Indian manatee** (*Trichechus manatus*)—Regularly found in Alabama waters in relatively low numbers; annual sightings usually in late spring, summer, and early fall in inland waterways around Mobile Bay. Individuals are likely migrants from populations that occur along the Florida coast.

In addition, the reticulated flatwoods salamander (*Ambystoma bishopi*) is an ESA-listed endangered species that was historically known to occur in four southern counties in Alabama, including Baldwin and Mobile counties. Despite more recent survey efforts, the last observation of the species in Alabama was in Houston County in 1981 (USFWS, 2014a). Reticulated flatwoods salamander are thus not expected to occur in the project area.

A more detailed discussion of the aforementioned ESA-listed species follows.

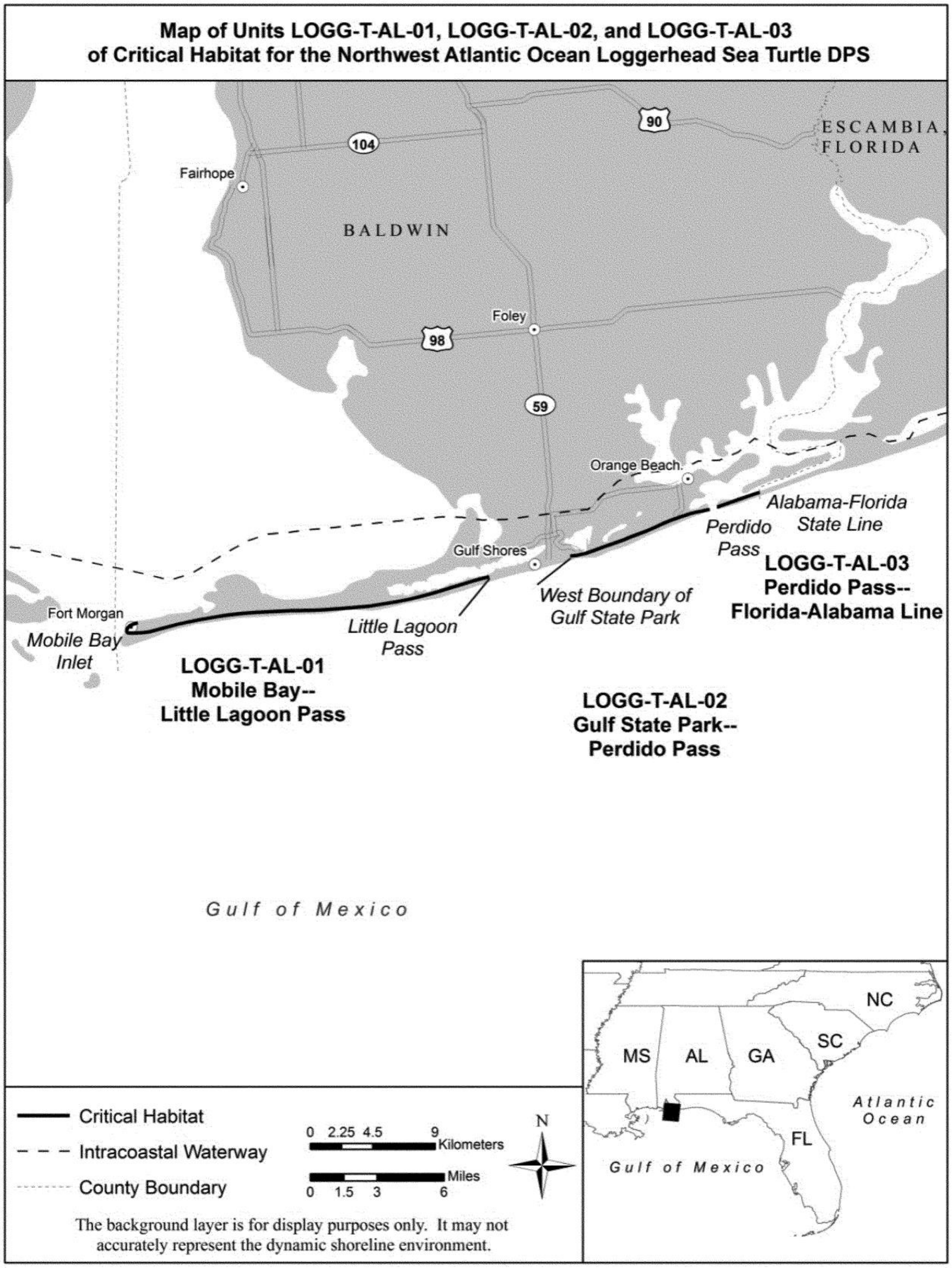
Sea Turtles

Sea turtles are globally imperiled and those that occur in the United States are federally listed as threatened or endangered under the ESA. Fisheries bycatch, fishing gear entanglement, and coastal development are the main causes of decline for all sea turtle species (Seaturtles.org, 2017). A primary threat to sea turtles in the Gulf of Mexico is the incidental capture, injury, and mortality during fishing operations, particularly shrimp trawling. Since 1987, shrimp otter trawlers in the United States have been required to equip their nets with TEDs (ADCNR, 2015).

In general, sea turtles are found in the nearshore and estuarine waters of Alabama. While all five species of sea turtles found in the Gulf of Mexico have been documented in Alabama waters, only loggerhead and Kemp's ridley sea turtles are known to nest on Alabama's Gulf Coast beaches (Fritts, 1983).

Loggerhead Sea Turtle. The loggerhead sea turtle is a medium- to large-bodied sea turtle, relative to other species. Loggerhead sea turtles occur throughout the temperate and tropical regions of the Atlantic, Gulf of Mexico, Pacific, and Indian Oceans. The loggerhead sea turtle is by far the most common sea turtle found nesting on beaches in coastal Alabama; the 5-year annual mean number of loggerhead nests on Alabama's beaches is 132 nests (USFWS 2016). This species may be found hundreds of miles out to sea, as well as in inshore areas such as bays, lagoons, salt marshes, creeks, and the mouths of large rivers.

The loggerhead sea turtle was listed as threatened under the ESA in 1978. The species' global listing was refined in 2011 and the Northwest Atlantic Loggerhead Distinct Population Segment was listed as threatened. USFWS designated critical habitat for that Distinct Population Segment of loggerhead sea turtle in 2014 (79 FR 51264). In total, 685 miles of loggerhead sea turtle nesting beaches are designated as critical habitat in North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi. In Alabama, approximately 27 miles of beaches are designated critical habitat for nesting loggerhead sea turtle, extending from Mobile Bay to Little Lagoon Pass, from Gulf State Park to Perdido Pass, and from Perdido Pass to the Florida-Alabama line (Figure 4-1; USFWS, 2014b). The designated critical habitat includes beach and dune areas that are extra-tidal, or dry sandy beaches from the mean high water line (high tide) to the toe of the secondary dune.



Source: USFWS, 2014b

Figure 4-1: Loggerhead Sea Turtle Critical Habitat for Nesting

The primary constituent elements of critical habitat essential to the conservation of nesting loggerhead sea turtles include:

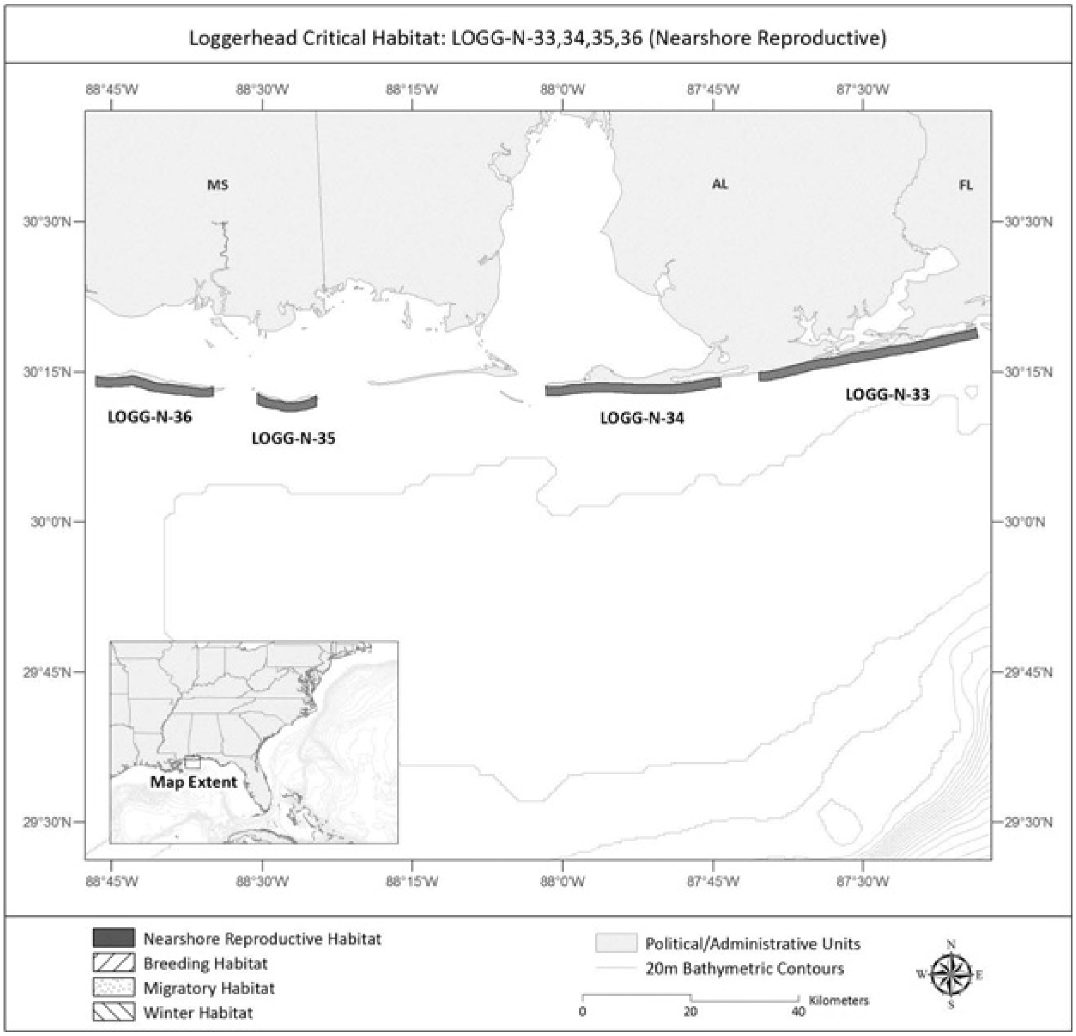
- Suitable nesting beach habitat that: (1) has relatively unimpeded nearshore access from the ocean to the beach for nesting females and from the beach to the ocean for both post-nesting females and hatchlings; (2) is located above mean high water to avoid being inundated frequently by high tides; and (3) provides sufficient darkness to ensure that nesting turtles are not deterred from emerging onto the beach, and hatchlings and post-nesting females are not disoriented away from the sea.
- Sand that allows for suitable nest construction, meaning that it is (1) suitable for facilitating gas diffusion conducive to embryo development; and (2) able to develop and maintain temperatures and moisture content conducive to embryo development.

Coastal Alabama waters also encompass portions of nearshore reproductive critical habitat for loggerhead sea turtle (Figure 4-2; NMFS, 2014). This critical habitat includes waters adjacent to nesting beaches that are used by hatchlings to navigate towards open-water of the Gulf of Mexico, as well as by nesting females to transit between nesting beaches and open water during the nesting season (May 1–August 31). Its primary constituent elements are:

i) Nearshore waters directly off the highest density nesting beaches and their adjacent beaches, as identified in 50 CFR 17.95(c), to 1.6 kilometers offshore;

ii) Waters sufficiently free of obstructions or artificial lighting to allow transit through the surf zone and outward toward open water; and

iii) Waters with minimal manmade structures that could promote predators (i.e., nearshore predator concentration caused by submerged and emergent offshore structures), disrupt wave patterns necessary for orientation, and/or create excessive longshore currents.



Source: NMFS, 2014

Figure 4-2: Loggerhead Sea Turtle Critical Habitat for Nearshore Reproduction

Kemp's Ridley Sea Turtle. Kemp's ridley sea turtle was listed as endangered under the ESA in 1970 (35 FR 18319). No critical habitat has been designated for Kemp's ridley sea turtle. Adults are found mainly in the Gulf of Mexico, but immature turtles can be found along the Atlantic coast as far north as Massachusetts and Canada. The species' historical range are subtropical and temperate seas in the Atlantic Basin and in the Gulf of Mexico. Nesting occurs primarily in the state of Tamaulipas, Mexico. In the United States, a small number of nests are found primarily in Texas and rarely in other southern states during the summer, including occasional nests in the Carolinas, Georgia, Florida, and Alabama (NPS, 2017). From 2006 to 2010, there were about seven confirmed Kemp's ridley nests along the Alabama coast (Alabama State Parks, 2013).

Green Sea Turtle. The green sea turtle was listed as threatened under the ESA in 1978 and its North Atlantic Distinct Population Segment was listed as threated on May 6, 2016 (81 FR 20057). This species is circumglobal in tropical and sub-tropical waters. In the continental United States, green sea turtles occur from Texas to Massachusetts. Primary nesting beaches in the southeastern United States occur in a 6-county area of east-central and southeast Florida. Occasional nesting has also been documented along the Gulf Coast of Florida. Green sea turtle nest counts across Florida have increased approximately 10-fold from a low of 267 in the early 1990s to a high of 27,975 (NMFS, 2016). Green sea turtles occur in Alabama waters, but the species has been suspected nesting in Alabama once, but has not been confirmed to nest on Alabama beaches.

Leatherback Sea Turtle. The leatherback sea turtle was listed as endangered under the ESA in 1970 (35 FR 8491). Critical habitat has been designated, but is limited to the U.S. Virgin Island and the Pacific Ocean. Leatherback sea turtles are the largest, deepest diving, and most migratory sea turtles. Leatherbacks are listed as endangered throughout the range. They feed primarily on jellyfish and salps. Although leatherbacks have been sighted in Alabama state waters, the species is not common and has not been documented to nest on Alabama beaches.

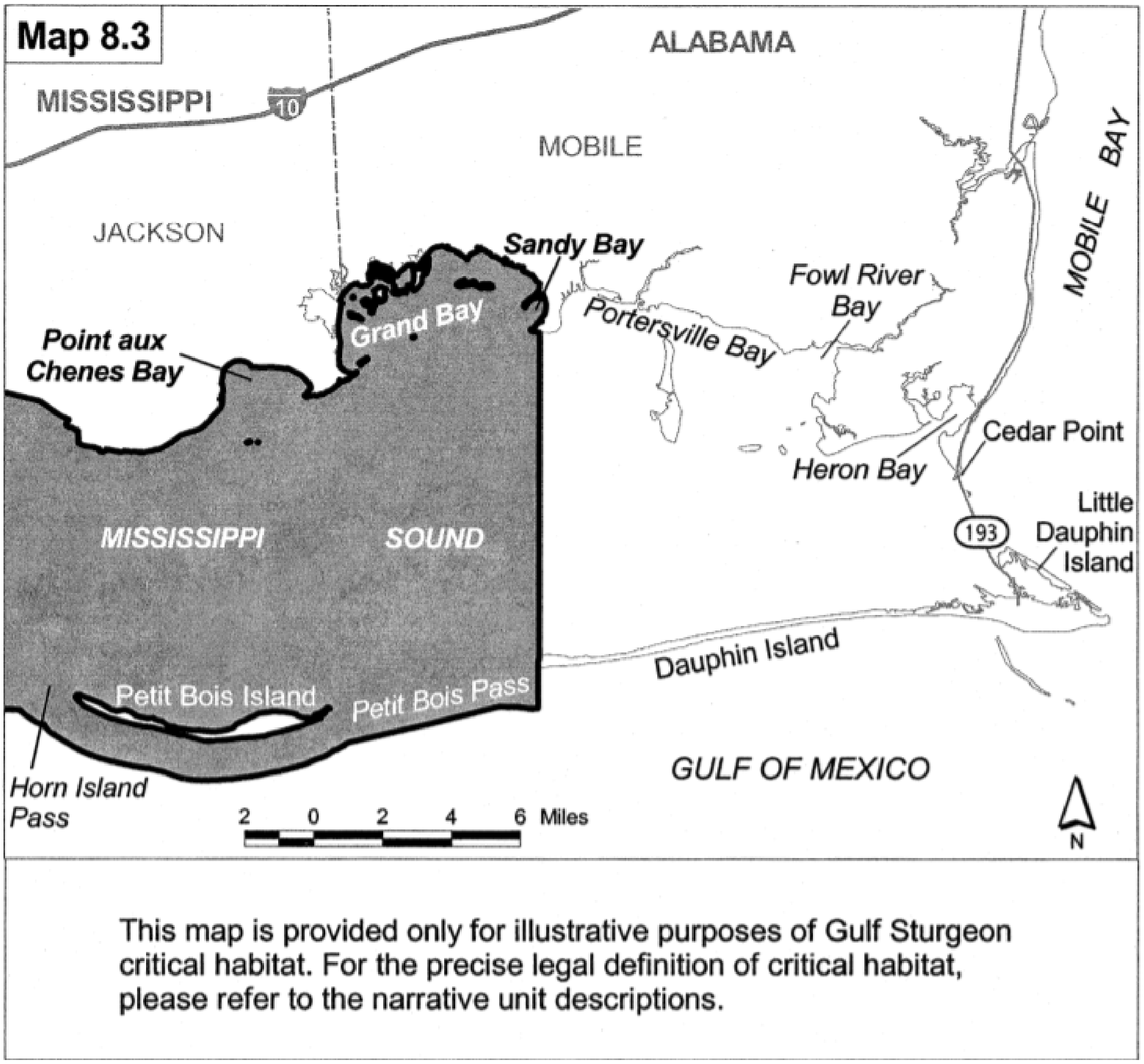
Hawksbill Sea Turtle. The hawksbill sea turtle was listed as a federally endangered species under the ESA in 1970 (35 FR 8491). Critical habitat has been designated, but is limited to Puerto Rico. One of the smaller sea turtles, it has overlapping scutes (plates) that are thicker than those of other sea turtles. Adults range in size from 30 to 36 inches (0.8 to 1.0 meter) carapace length, and weigh 100 to 200 pounds (45 to 90 kilograms). Its carapace (upper shell) is an attractive dark brown with faint yellow streaks and blotches and a yellow plastron (under shell). The name “hawksbill” refers to the turtle's prominent hooked beak. Although hawksbill turtles occasionally are documented as stranded in Alabama, the species is considered rare and has not been documented to nest on Alabama beaches.

Gulf Sturgeon

The Gulf sturgeon is a subspecies of the Atlantic sturgeon (*Acipenser oxyrinchus*) and is among the oldest fish species in the world. The Gulf sturgeon was listed as threatened under the ESA in 1991. Gulf sturgeon are anadromous, meaning that they live in the ocean and brackish waters and travel upstream to spawn and spend their first few years in freshwater. Males migrate into freshwater a month earlier than females during March and April (Fox et al., 1999). Because of slow reproduction and a lifespan similar to humans, rebound of the species is slow and often goes unnoticed.

Gulf sturgeon diet consists of worms, snails, shellfish, crustaceans, and small fish as well as a large amount of mud and debris. The Gulf sturgeon was once distributed widely throughout the coastal rivers of the northeastern Gulf of Mexico occurring primarily from the Mississippi River east to Tampa Bay, including Louisiana, Mississippi, Alabama, and Florida and occurring sporadically as far west as the Rio Grande in Texas and as far south as Florida Bay in southern Florida. The current range of the species extends from Lake Pontchartrain and the Pearl River system in Louisiana and Mississippi east to the Suwannee River in Florida. Efforts to conserve the species in Alabama include the allowance of fish passage at Alabama River dams to provide access to historic habitat in the Alabama, Cahaba, Coosa, and Tallapoosa rivers. To improve habitat conditions, the natural flow regime in the Alabama River should be restored by providing acceptable flows and effective fish passage structures to allow unobstructed spawning migrations and for larvae to complete their early-life stage. Other actions to benefit gulf sturgeon include reduced sedimentation and dredging in the Alabama River (ADCNR, 2015).

While the Gulf sturgeon does not occur in great abundance in the Mobile Bay watershed and the Mobile River and its tributaries, individuals are consistently reported in these areas (USFWS et al., 1995). Occurrences of Gulf sturgeon near the proposed projects would be rare, occurring only briefly during spring and fall migrations. Although no listed critical habitat is present in the project areas, critical habitat does exist on the Gulf Coast of bordering Mississippi and Florida with minimal designation in Alabama near the borders of Mississippi and Florida (Figure 4-3; USFWS, 2003a).



Source: USFWS, 2003a

Figure 4-3: Gulf Sturgeon Critical Habitat in Alabama (Unit 8)

West Indian Manatee

See Section 4.2.4.3, Federally Protected Marine Mammals.

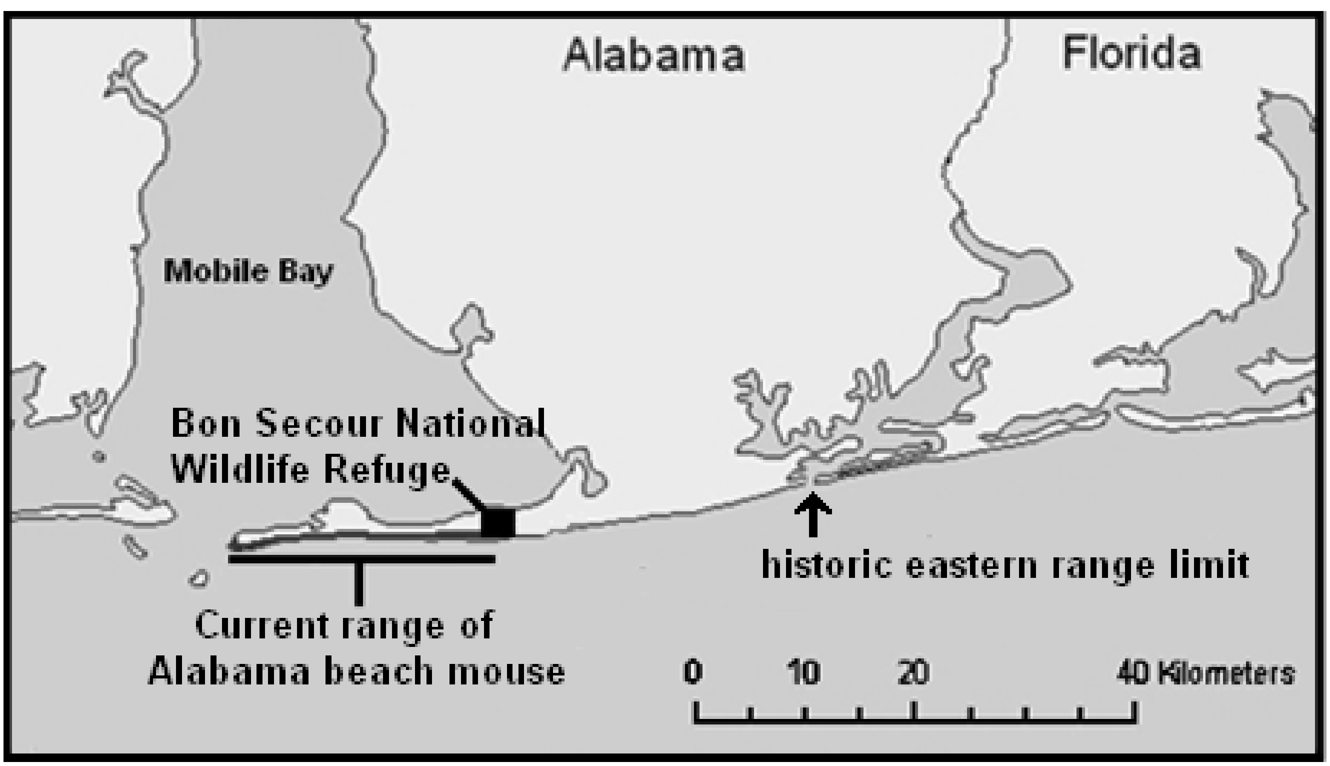
Alabama Beach Mouse

The Alabama beach mouse was listed as an endangered species in 1985. The mouse historically occurred in frontal, secondary, and scrub dunes from Fort Morgan eastward about 32 miles to Ono Island in Perdido Bay. At its time of listing, the Alabama beach mouse was considered extirpated on Ono Island, but present elsewhere throughout its original range. Coastal development has fragmented and destroyed large areas of Alabama beach mouse habitat. This gray and white mouse, with a dark stripe running down the upper surface of its tail, is a nocturnal rodent inhabiting burrows and nests in frontal, secondary, and scrub dunes. Thriving beach mouse populations indicate a healthy dune system. The mice themselves contribute by collecting and distributing seeds, which grow into plants that help to stabilize dunes. Beach mice are also an important part of the food chain, providing a food source for dune predators such as the snakes and owls (Mirarchi et al., 2004).

The Alabama beach mouse is one of several subspecies of beach mice (*Peromyscus polionotus*) that live in coastal sand dune areas. Alabama beach mice feed on a variety of vegetation, including seeds of sea oats, beach grass, evening primrose, ground cherry, saltmeadow cordgrass, bluestem, and panic grass. Alabama beach mice forage plants in scrub areas include sand live oak, bluestem, greenbrier, gopher apple, and jointweed (USFWS, 2004).

The Alabama beach mouse range is shown in Figure 4-4. However, the subspecies was only found in small parcels of habitat east of Gulf State Park, at Romar Beach (USFWS, 2004). USFWS reintroduced Alabama beach mouse on the Fort Morgan Peninsula in 2010, and since that time, their population numbers have increased considerably (Volkert, Inc., 2014). Numerous surveys have documented the presence and relative abundance of the Alabama beach mouse (USFWS, 2004). Relative abundance of the subspecies, as surveyed throughout its range using live trap/capture and release methods, has varied from 1.69 to 61.0 mice per 100 trap-nights (i.e., 100 mousetraps set for one night).

Alabama beach mouse populations fluctuate within and among sites on a monthly, seasonal, and annual basis. These spatial and temporal differences have been attributed to habitat type, food availability, recruitment following peak reproductive periods, temperature, predation, and storms. While Alabama beach mice are typically found within primary or secondary dunes, their relative abundance can be comparable within open scrub dunes, which are characterized by patchy scrub ridges and intervening swales or interdunal flats dominated by herbaceous plants types of scrub dunes (USFWS, 2004). Scrub dunes occupied by the mice can function as crucial refuge during severe hurricanes that overwash, flood, and destroy most of the lower frontal and secondary dunes.

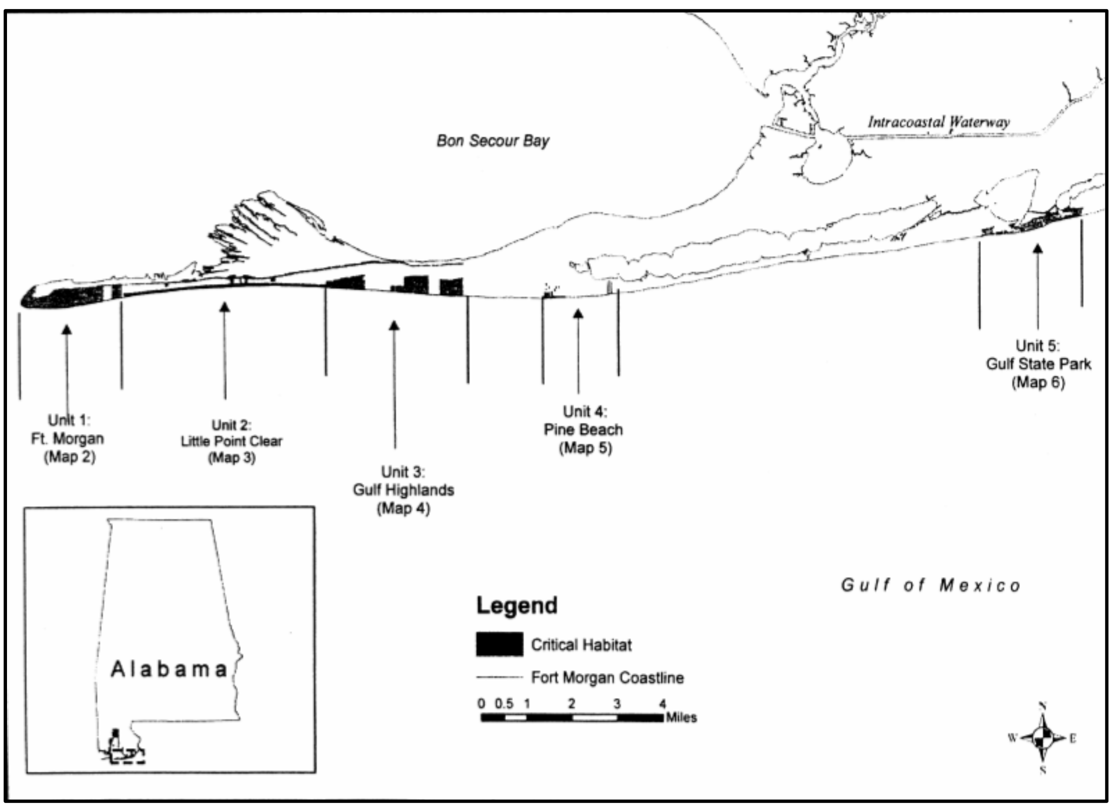


Source: Falcy, 2011

Figure 4-4: Alabama Beach Mouse Range

When the Alabama beach mouse was listed in 1985, critical habitat was designated and subsequently revised on January 30, 2007 (72 FR 4329). In the final rule, USFWS identified 1,211 acres in five units that met the standard for critical habitat (see Figure 4-5; USFWS, 2006a), which includes the physical and biological features that are essential to the conservation of the species and may require special management considerations or protection. USFWS identified the following primary constituent elements of critical habitat that are essential to the conservation of the Alabama beach mouse:

1. Continuous mosaic of primary, secondary, and scrub (i.e., interconnected frontal and tertiary dunes and interior scrub) vegetation and dune structure, with a balanced level of competition and few or no competitive or predaceous non-native species present, that collectively provide foraging opportunities, cover and burrow sites;
2. Frontal dunes, generally dominated by sea oats, that, despite occasional temporary impacts and reconfiguration from tropical storms and hurricanes, provide abundant food resources, burrow sites, and protection from predators;
3. Scrub (i.e., tertiary dune/suitable interior scrub) dunes, generally dominated by scrub oaks (*Quercus* spp.), that provide food resources and burrow sites, and provide elevated refugia during and after intense flooding from rainfall and/or hurricane-induced storm surge;
4. Unobstructed habitat connections that facilitate genetic exchange, dispersal, natural exploratory movements, and recolonization of locally extirpated areas; and
5. Natural light regime within the coastal dune ecosystem, compatible with the nocturnal activity of beach mice, necessary for normal behavior, growth, and viability of all life.



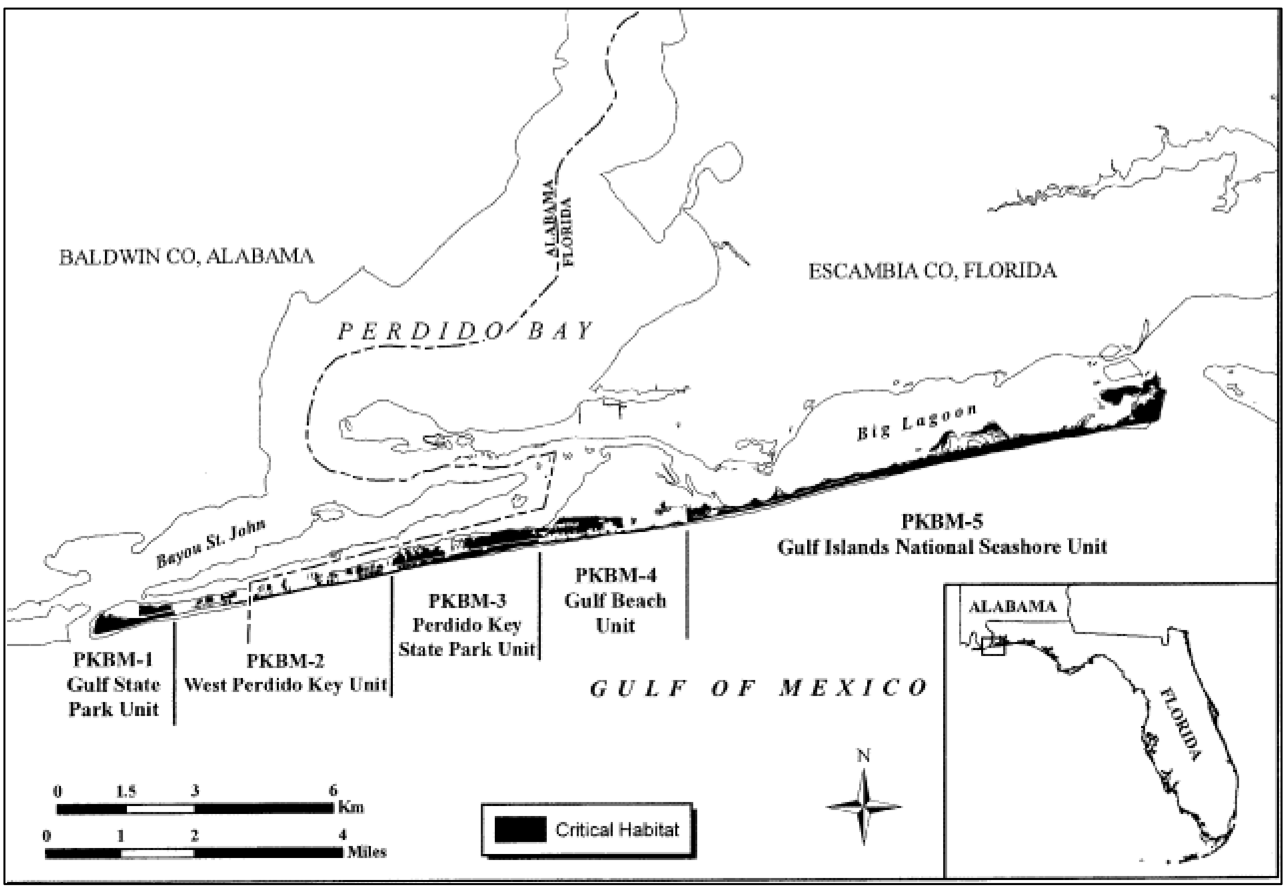
Source: USFWS, 2006a

Figure 4-5: Alabama Beach Mouse Critical Habitat

Perdido Key Beach Mouse

The Perdido Key beach mouse is similar to the Alabama beach mouse, but has an even more restricted range, limited to the beaches and dunes of the island of Perdido Key. The subspecies was listed as an endangered under the ESA in 1985, mostly because of habitat loss from beachfront development and as a result of hurricanes and predation by house cats. Despite distinct morphological and genetic differences, the natural history of the Perdido Key beach mouse is almost identical to that of the Alabama beach mouse.

When listed, the Perdido Key beach mouse was restricted to only one population at Florida Point, in Alabama on the westernmost end of Perdido Key. To recover the species, 15 pairs of Perdido Key beach mice were relocated to the Johnson Beach Unit of Gulf Islands National Seashore, on the east side of the island in Florida. The Alabama population at Florida Point was extirpated shortly afterward, in large part because of a series of storm events. Today, the only remaining known Perdido Key beach mice are restricted to Florida, within the Johnson Beach population and another population that has been introduced to the Perdido Key Recreation Area (ADCNR, 2017b). However, critical habitat designated for Perdido Key includes some Alabama beaches from the west tip of Perdido Key at Perdido Pass east to about 1 mile west of where the Alabama-Florida State line bisects Perdido Key (see Figure 4-6). The primary constituent elements of this critical habitat are similar to those described for Alabama beach mouse.



Source: USFWS, 2006

Figure 4-6: Perdido Key Beach Mouse Critical Habitat

Gopher Tortoise

The gopher tortoise was listed in 1987 as a threatened species wherever it is found west of the Mobile and Tombigbee rivers in Alabama, Mississippi, and Louisiana. Thus, while listed as threatened in Mobile County, the gopher tortoise is currently a candidate species for protection under the ESA in Baldwin County. The gopher tortoise is a large-shelled (i.e., 15 to 37 centimeters or 5.9 to 14.6 inches long), dark-brown to grayish-black terrestrial turtle with elephantine hind feet, shovel-like forefeet, and a gular projection beneath the head on the yellowish, hingeless plastron or undershell (Ernst and Barbour, 1972).

Gopher tortoises are dry land turtles that usually live in relatively well-drained, sandy soils generally associated with longleaf pine and dry oak sandhills. They also occupy other habitats that provide an abundance of herbaceous ground cover for food, and a generally open canopy that allows sunlight to reach the ground. These habitats include coastal scrub, pine flatwoods, dry prairie, coastal dunes, mixed hardwood-pine communities, and a variety of habitats that have been disturbed or altered by humans, such as power line rights-of-way and along roadsides. Gopher tortoise mate in the spring, between April and June, and the female digs a nest at the mouth of her burrow or another sunny site where she buries approximately 5 to 15 eggs that hatch about 3 months later. Predators destroy more than 80 percent of gopher tortoise nests and first-year survival is very low, with up to 95 percent of the hatchlings being eaten by raccoons, skunks, dogs, and other predators. For those that survive to adulthood, gopher tortoises do not become reproductively mature until they are 10 to 25 years old and can live up to 80 years in the wild (Mirarchi et al., 2004). An active petition exists to designate critical habitat and maintain their threatened status (74 FR 173, 4,6401–46,406).

Alabama Red-Bellied Turtle

The Alabama red-bellied turtle was listed as endangered under the ESA in 1987. This large, freshwater turtle feeds almost entirely on aquatic plants. Their range is restricted to the Mobile-Tensaw River Delta in Baldwin and Mobile counties adjacent to Mobile Bay (Mirarchi et al., 2004). They feed on plants such as submergent aquatic macrophytes like hydrilla, brushy pondweed, eel-grass, arrowhead, and mud plantain. Alabama red-bellied turtles leave their aquatic environment to nest and lay eggs on dry land from April to early August, with a peak in July. Nests are located in openings or sparsely vegetated areas where a shallow depression is excavated in sandy soil and four to nine eggs are deposited. Young may emerge in fall or over-winter until spring. Predators are a common threat to hatchlings, including fish crows, wading birds, snakes, large fishes, and raccoons, while alligators and humans are significant threats to adult turtles. The species was designated the state reptile by the Alabama Legislature (ADCNR, 2017a).

Systematic sampling of major tributaries in coastal Alabama have shown Alabama red-bellied turtles to be present in major rivers and tributaries of the Mobile Bay; Bayou La Batre; and Fowl, Dog, Fish, Magnolia, and Bon Secour rivers. Specimens have also been recorded from Daphne and Point Clear, Alabama (ADCNR, 2017a).

Eastern Indigo Snake

The eastern indigo snake was listed as threatened under the ESA in 1978. The eastern indigo snake is non-venomous and is the longest snake native to the United States (60–84 inches). It is presumed that the species was extirpated, and sightings in Alabama were extremely rare by the 1960s before experimental releases were completed in the 1970s and 1980s in both Baldwin and Mobile counties.

Eastern indigo snakes are typically found in open, dry, sandy regions historically dominated by longleaf pines. The burrows of the gopher tortoise serve as winter den sites for eastern indigo snakes and are important as shelter during winter and as nesting and refuge during summer (ADCNR, 2017a). Breeding season occurs between October and February before the warmer months arrive, and they begin to move to nearby wetland edges where food is abundant (ADCNR, 2015). Eastern indigo snakes are known to feed mainly upon other venomous and non-venomous snakes, turtles, mammals, frogs, birds, and lizards.

A captive breeding program for the threatened eastern indigo snake began in 2006 in cooperation with USFWS, the United States Forest Service, ALNHP, and Auburn University for reintroduction into the Conecuh National Forest. Approximately 100 snakes have been released in Covington County on the Conecuh National Forest (Godwin et al., 2011). Conservation efforts to recover this species include ongoing reintroduction efforts and further development of a list of sites where ADCNR intends to establish and maintain viable populations. The Perdido River Longleaf Hills Tract, Fred T. Stimpson Wildlife Sanctuary, and Grand Bay Savanna are additional potential reintroduction sites (Godwin and Steen, 2015). Because of concerns for tortoises and other SGCN such as eastern indigo snakes that also take shelter in the burrows, the Alabama Conservation Advisory Board in 2009 unanimously passed a motion to make it illegal to pour gasoline or any other noxious chemical substance into wildlife burrows, dens, or retreats (Godwin et al., 2011; ADCNR, 2015). With growing interest to restore longleaf pine and other favorable habitats, recovery of the species looks promising (ADCNR, 2010).

Black Pine Snake

Black pine snake was listed as a threatened species under the ESA in 2014 and critical habitat was designated in 2015 (USFWS, 2015a). The black pine snake is a large, non-venomous snake, and one of three subspecies of pine snake in the southeastern United States. The black pine snake inhabits some of the same geographic locations as the eastern indigo snake and is similar in appearance; however, black pine snakes are differentiated from eastern indigo snakes by having keeled scales rather than smooth scales (ADCNR, 2017a). Like the eastern indigo snake, eastern black pine snake use underground stump holes and tunnels, which are also inhabited by gopher tortoise. They prefer sandy, well-drained soils with an open-canopied forest of longleaf pine, a reduced shrub layer, and a dense, vegetative ground cover. They may prefer longleaf pine habitat, but are found in all types of pine forest (USFWS, 2015b).

The black pine snake's decline is primarily attributed to the loss and degradation of the longleaf pine ecosystem because of habitat fragmentation, fire suppression, conversion of natural pine forests to densely stocked pine plantations, and agricultural and urban development. Other threats to the snake's survival include road mortality and killing by humans. Conservation actions taken to restore the longleaf pine ecosystem will benefit the black pine snake. Black pine snake diet includes a variety of small rodents such as rats and mice, small rabbits, squirrels, and birds and their eggs. They breed during the summer from mid-May through August, although little information on the black pine snake's breeding and egg laying is available from the wild. It is unknown whether the subspecies exhibits nest site fidelity; however, nest site fidelity has been described for *Pituophis* specie (USFWS, 2015b).

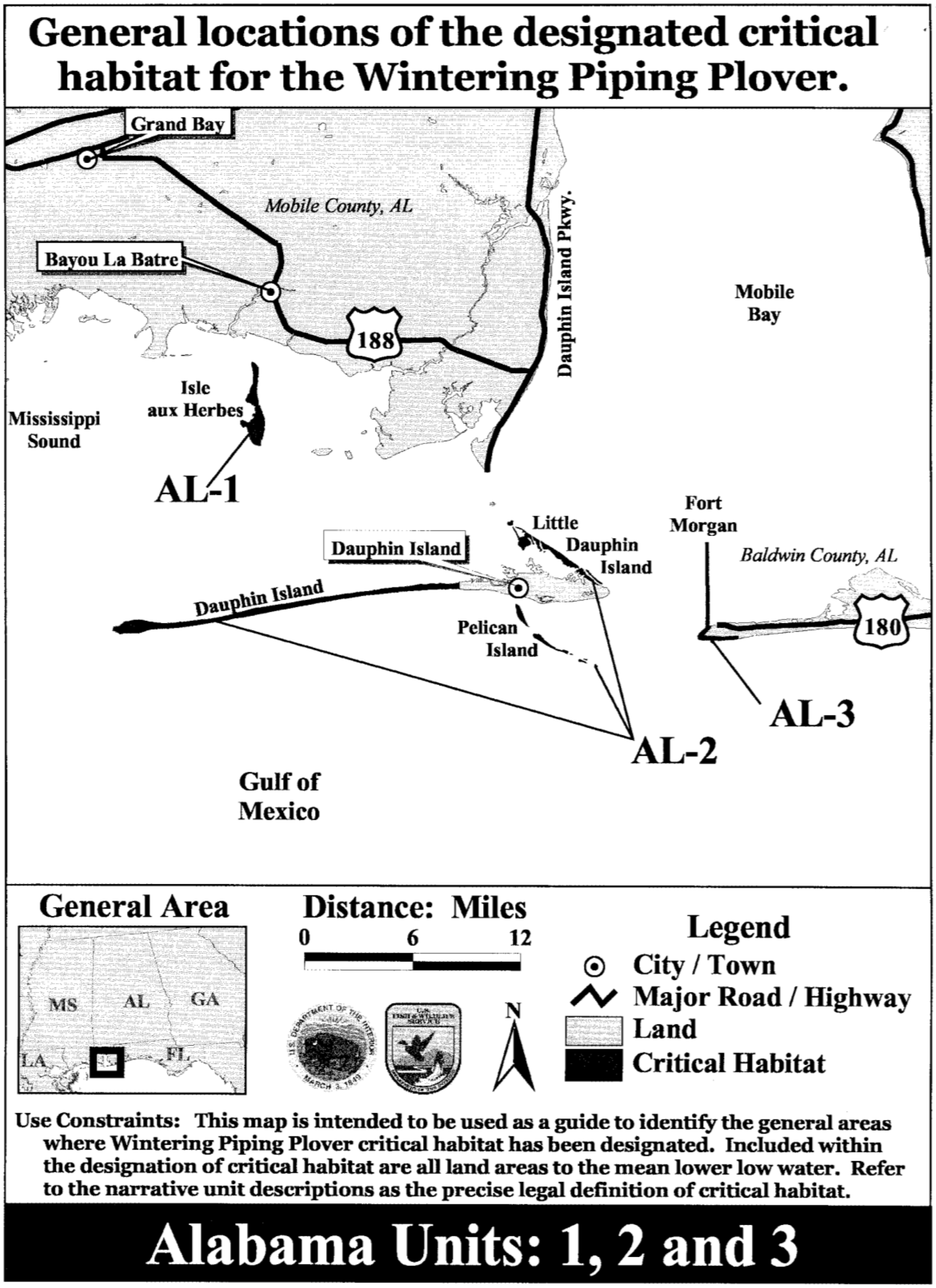
Populations of the black pine snake are known in 11 counties in Mississippi and 3 counties in Alabama, including Mobile County. However, while small populations of the species may exist in Mobile County, critical habitat was not designated in Alabama because of high levels of fragmentation (USFWS, 2015a).

Piping Plover

The piping plover is a small, pale-colored North American shorebird. Piping plover was listed as threatened under the ESA in 1985. Along the Alabama Gulf Coast, piping plover are limited to a few sites presenting optimal foraging conditions, with birds possibly present from August to May, and peak numbers during winter. Most of these sites are in Mobile County, where Little Dauphin Island, Pelican Island, and parts of Dauphin Island are traditional wintering sites (Nicholls and Baldassarre, 1990).

Occasionally birds are seen in Baldwin County, on the western tip of Fort Morgan Peninsula around washover pools along the shoreline.

Critical habitat for wintering piping plover was designated in 2001 and extends along the coastal shoreline of North Carolina and south along the eastern coast of the U.S. to the Gulf of Mexico. The primary constituent elements are found in geologically dynamic coastal areas that support or have the potential to support such as intertidal beaches and flats and the sparsely vegetated back beach areas. Important components of intertidal flats include sand and or mud flats with no or sparse emergent vegetation. In Alabama, wintering critical habitat for piping plover encompassed the tidal zones, flats, and associated dune systems of Dauphin Island, Little Dauphin Island, Pelican Island, Isle Aux Herbes, and the western tip of Fort Morgan Peninsula. Observations from the International Piping Plover Census have reported low numbers of wintering piping plovers in Alabama, totaling 31, 30, 29, and 38 birds during surveys in 1996, 2001, 2006, and 2011, respectively (USFWS, 2017a). Figure 4-7 shows the habitat range of the piping plover (66 FR 132, 36,038–36,143).



Source: USFWS, 2001

Figure 4-7: Wintering Piping Plover Critical Habitat

Red Knot

The red knot is a wide-ranging species of sandpiper that was listed as threatened under the ESA in 2015. This medium-sized shorebird has one of the longest migrations of any bird. During both the northbound and southbound migrations, to and from their wintering grounds in South America and breeding areas in the Arctic, red knots use key staging and stopover areas to rest and feed. During stopover, from March to April during their northward migration and September and October during their southward migration, red knots could be found foraging for mollusks, worms, insect larvae, and crustaceans on beaches, mud and sand flats, and salt marshes. Such roosting and resting habitat for red knots includes areas above the high tide line such as reefs and high sand flats (USFWS, 2014c).

Red knot observations on the Alabama Gulf Coast are limited because of their low numbers and infrequent usage of the area as stopover habitat. Records show that 17 individual red knots have been sighted from 1981 (2 sighted at Alabama Point) to 2013 (2 sighted at Lake Shelby in Gulf State Park) (eBird.org, 2017). The actual number of birds stopping in Alabama may actually be higher, as 250 to 500 red knots were incidentally counted from Alabama, Louisiana, and Mississippi during the International Piping Plover Censuses in 2006 and 2011 (USFWS, 2014c). These observations suggest that the red knot is a very uncommon visitor to the Alabama beaches. Habitat used by red knots during migration include coastal marine and estuarine areas with large expanses of exposed intertidal sediments. Suitable foraging habitat for this species would be found along the shoreline of all Alabama beaches and on the mud flats and sand flats of estuaries.

Wood Stork

The wood stork was listed as endangered under the ESA in 1984 and was down-listed to threatened in 2014, reflecting a successful conservation and recovery effort. When USFWS originally listed the U.S. breeding population, the wood stork's range included Florida, Georgia, South Carolina, and Alabama. Breeding was primarily in Central and South Florida. Historically, the Florida Everglades and the Big Cypress ecosystems supported large breeding colonies. Since listing, its range has expanded north and west, and now includes portions of North Carolina and Mississippi, with significant nesting in Florida, Georgia, South Carolina, and North Carolina.

This large, white, subtropical and tropical bird is a resident breeder in lowland wetlands with trees where it can build large stick nests. It is the only stork that breeds in North America, in rookeries with sometimes several pairs in a single tree. Wood storks feed on minnows in shallow water, typically isolated pools where fish congregate, by using their bills to catch fish. They are not considered true migrants. When food is scarce, the birds relocate to areas of greater abundance (Coulter et al., 1999). They are uncommon on the Alabama Gulf Coast and records show three sightings since 2012, on Dauphin Island, near Magnolia Springs, and by the USS Alabama battleship (eBird.org, 2017).

Red-cockaded Woodpecker

The red-cockaded woodpecker is a small, non-migratory woodpecker endemic to mature, fire-maintained pine forests in the southeastern United States, where it was historically common. The species was listed in 1970 and has specific habitat requirements within southern pine forests, which have declined across the region. Prime nesting habitat includes open, mature southern pine forests dominated by longleaf, loblolly, pond, slash, or other southern pine species greater than 60 years of age with little or no mid- or understory development. Pine flatwoods and pine-dominated savannas that are maintained by frequent natural fires serve as ideal nesting and foraging habitat for the species. Foraging habitat is composed of open pine or pine/mixed hardwood stands 30 years of age or older. More than 75 percent of the diet of red-cockaded woodpeckers consists of arthropods, especially ants and roaches, but also beetles, spiders, centipedes, crickets, and moths (USFWS, 2003b).

4.2.4.3 Federally Protected Marine Mammals

The MMPA was enacted on October 21, 1972, to prohibit, with certain exceptions, the “take” of marine mammals in waters of the United States or by United States citizens on the high seas, and the importation of marine mammals and marine mammal products into the United States. The MMPA was passed based on findings that some marine mammal species or stocks were in danger of extinction as a result of human activity, measures needed to be taken to replenish stocks, there is inadequate knowledge of the ecology and population dynamics, and marine mammals have proven to be a resource of international significance (NOAA, 2016d). Marine mammals that may occur near the proposed projects include West Indian manatee, an ESA-listed species discussed above, and bottlenose dolphin.

Bottlenose Dolphin

The bottlenose dolphin is a common inhabitant of the Gulf of Mexico. The species occurs worldwide in tropical and temperate ocean waters, including throughout the entire Gulf of Mexico. They use a wide range of habitats including inshore environments, such as bays and sounds, and offshore habitats, such as the deep waters of the continental shelf and inner continental slope (NOAA, 2010). Bottlenose dolphin tend to concentrate over the continental slope or near cold-core eddies, and they prefer the relatively shallow waters of the continental shelf and upper slope. An estimated 30 percent of the total bottlenose dolphin population in U.S. waters lives in the Gulf of Mexico (NOAA, 2010).

Adult bottlenose dolphins range from about 6.5 to 13 feet in length and weigh up to 1,400 pounds. They typically live approximately 50 years, and female bottlenose dolphins generally reach sexual maturity between the ages of 5 and 13 years. They give birth every 3 to 6 years. Males generally reach maturity between 9 and 14 years of age (NOAA, 2010).

Bottlenose dolphins that would be affected by the proposed alternatives are part of the Western North Atlantic Northern Migratory Coastal Stock, which is a morphotype that is genetically distinct from the larger, more robust morphotype that occupies habitats further offshore in the western North Atlantic and Gulf of Mexico. This coastal morphotype of bottlenose dolphins is continuously distributed in nearshore coastal and estuarine waters along the U.S. Atlantic coast south of Long Island, New York, around the Florida peninsula and into the Gulf of Mexico. However, along the southeastern coast, including the Alabama Coast, the coastal morphotype also occurs in lower densities over the continental shelf and overlaps spatially with the offshore morphotype. In addition to inhabiting coastal nearshore waters, bottlenose dolphin also inhabit inshore estuarine waters in the Gulf of Mexico. Insufficient data are available to determine population trends for this stock of bottlenose dolphin (NMFS, 2015).

Current threats to the bottlenose dolphin are incidental capture in fisheries, exposure to contaminants, and viral outbreaks. Some of the estuaries and bays in the northern Gulf inhabited by bottlenose dolphins received heavy and prolonged exposure to oil resulting from the DWH oil spill (NOAA, 2012). An unusual number of dolphin strandings occurred in the northern Gulf during 2010 through 2012, totaling more than 900 bottlenose dolphins found dead or stranded in the oil spill area (not only Alabama) since April 2010 (ADCNR, 2015). The combination of the DWH oil spill and large volumes of cold freshwater entering the Gulf may have contributed to this unusual mortality event (Carmichael et al., 2012).

West Indian Manatee

The West Indian manatee was listed as endangered throughout its range in 1967 and is protected under the MMPA, which prohibits the take of all marine mammals (USFWS, 2008b). The West Indian manatee was reclassified from endangered to threatened in April 2017 (82 FR 16668). West Indian manatees have large, seal-shaped bodies with paired flippers and a round, paddle-shaped tail (NWF, 2017). Because manatees prefer shallow, slow-moving waters of rivers, estuaries, saltwater bays, canals, and coastal areas, many deaths are contributed to watercraft engines that unexpectedly hit the mammals (Florida Fish and Wildlife Conservation Commission, 2017).

West Indian manatees reach sexual maturity between 3 and 10 years of age. They have no distinct breeding season and after a 13-month gestation, calves may be born at any time during the year. Usually a single calf is born, but twins can occur. An adult manatee will usually give birth to a calf every 2 to 5 years. The low reproductive rate makes the species less capable of rebounding from threats to its survival (USFWS, 2008b). Their diet consists of aquatic plants, requiring them to eat between 40 and 60 pounds of plants a day over a 5- to 8-hour period (NWF, 2017). This makes them especially vulnerable to development within their range. In Alabama, West Indian manatees frequently occur in coastal waters of both Baldwin and Mobile counties, during only summer months (DISL, 2017).

4.2.5 Federally Managed Fisheries

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), which was first passed in 1976, is the primary law governing marine fisheries management in federal waters of the United States. In general, the Magnuson-Stevens Act seeks to foster long-term biological and economic sustainability of the nation's marine fisheries within 200 nautical miles of the nation's coasts. The key objectives of the Magnuson-Stevens Act are to prevent overfishing, rebuild overfished stocks, increase long-term economic and social benefits, and ensure a safe and sustainable supply of seafood. The Act provides a transparent and robust process of science, management, innovation, and collaboration with the fishing industry to evaluate and determine if a stock status is subject to overfishing or is overfished (NOAA, 2017a).

4.2.5.1 Managed Fish Species

The project sites provide habitat for commercially important species, including spotted sea trout, striped mullet, southern flounder, Atlantic croaker, and Gulf menhaden, as well as their prey. Table 4-3 provides a list of the species that are managed by the Gulf of Mexico Fishery Management Council (GMFMC) and NMFS, under federally Implemented Fisheries Management Plans (FMPs) near the project area, hereafter referred to as managed fish species.

Table 4-3: List of FMP Species that are Managed by NMFS near the Project Areas

Management Unit / Species	Lifestage(s) Found at Project Site(s)	NOAA Fisheries Management Plan
Red Drum (*Sciaenops ocellatus*)	All	Red Drum
Highly Migratory Species		
Scalloped hammerhead shark (*Sphyrna lewini*)	Neonate, Juvenile	Highly Migratory Species
Bonnethead shark (*Sphyrna tiburo*)	Neonate, Juvenile, Adult	Highly Migratory Species
Blacktip shark (*Carcharhinus limbatus*)	Neonate, Juvenile, Adult	Highly Migratory Species
Bull shark (*Carcharhinus leucas*)	Juvenile	Highly Migratory Species
Spinner shark (*Carcharhinus brevipinna*)	Juvenile	Highly Migratory Species

Management Unit / Species	Lifestage(s) Found at Project Site(s)	NOAA Fisheries Management Plan
Atlantic sharpnose shark (*Rhizoprionodon terraenovae*)	Neonate, Juvenile, Adult	Highly Migratory Species
Finetooth shark (*Carcharhinus isodon*)	Neonate, Juvenile, Adult	Highly Migratory Species
Blacknose shark (*Carcharhinus acronotus*)	Adult	Highly Migratory Species
Great hammerhead shark (*Sphyrna mokarran*)	All	Highly Migratory Species
Shrimp		
Brown shrimp (*Farfantepenaeus aztecus*)	All	Shrimp
Pink shrimp (*Farfantepenaeus duararum*)	All	Shrimp
White shrimp (*Litopenaeus setiferus*)	All	Shrimp
Royal red shrimp (*Pleoticus robustus*)	All	Shrimp
Coastal Migratory Pelagics		
King mackerel (*Scomberomorus cavalla*)	All	Coastal Migratory Pelagics
Spanish mackerel (*Scomberomorus maculatus*)	All	Coastal Migratory Pelagics
Cobia (*Rachycentron canadum*)	All	Coastal Migratory Pelagics
Reef Fish		
Balistidae–Triggerfishes		
Gray triggerfish (*Balistes capriscus*)	All	Reef Fishes
Carangidae–Jacks		
Greater amberjack (*Seriola dumerili*)	All	Reef Fishes
Lesser amberjack (*Seriola fasciata*)	All	Reef Fishes
Almaco jack (*Seriola rivoliana*)	All	Reef Fishes
Banded rudderfish (*Seriola zonata*)	All	Reef Fishes
Labridae–Wrasses		
Hogfish (*Lachnolaimus maximus*)	All	Reef Fishes
Lutjanidae–Snappers		
Queen snapper (*Etelis oculatus*)	All	Reef Fishes
Mutton snapper (*Lutjanus analis*)	All	Reef Fishes
Schoolmaster (*Lutjanus apodus*)	All	Reef Fishes

Management Unit / Species	Lifestage(s) Found at Project Site(s)	NOAA Fisheries Management Plan
Blackfin snapper (*Lutjanus buccanella*)	All	Reef Fishes
Red snapper (*Lutjanus campechanus*)	All	Reef Fishes
Cubera snapper (*Lutjanus cyanopterus*)	All	Reef Fishes
Gray (mangrove) snapper (*Lutjanus griseus*)	All	Reef Fishes
Dog snapper (*Lutjanus jocu*)	All	Reef Fishes
Mahogany snapper (*Lutjanus mahogoni*)	All	Reef Fishes
Lane snapper (*Lutjanus synagris*)	All	Reef Fishes
Silk snapper (*Lutjanus vivanus*)	All	Reef Fishes
Yellowtail snapper (*Ocyurus chrysurus*)	All	Reef Fishes
Wenchman (*Pristipomoides aquilonaris*)	All	Reef Fishes
Vermilion snapper (*Rhomboplites aurorubens*)	All	Reef Fishes
Malacanthidae–Tilefishes		
Goldface tilefish (*Caulolatilus chrysops*)	All	Reef Fishes
Blackline tilefish (*Caulolatilus cyanops*)	All	Reef Fishes
Anchor tilefish (*Caulolatilus intermedius*)	All	Reef Fishes
Blueline tilefish (*Caulolatilus microps*)	All	Reef Fishes
Golden Tilefish (*Lopholatilus chamaeleonticeps*)	All	Reef Fishes
Serranidae–Groupers		
Dwarf sand perch (*Diplectrum bivittatum*)	All	Reef Fishes
Sand perch (*Diplectrum formosum*)	All	Reef Fishes
Rock hind (*Epinephelus adscensionis*)	All	Reef Fishes
Speckled hind (*Epinephelus drummondhayi*)	All	Reef Fishes
Yellowedge grouper (*Epinephelus flavolimbatus*)	All	Reef Fishes
Red hind (*Epinephelus guttatus*)	All	Reef Fishes
Goliath grouper (*Epinephelus itajara*)	All	Reef Fishes
Red grouper (*Epinephelus morio*)	All	Reef Fishes
Misty grouper (*Epinephelus mystacinus*)	All	Reef Fishes
Warsaw grouper (*Epinephelus nigritus*)	All	Reef Fishes
Snowy grouper (*Epinephelus niveatus*)	All	Reef Fishes
Nassau grouper (*Epinephelus striatus*)	All	Reef Fishes

Management Unit / Species	Lifestage(s) Found at Project Site(s)	NOAA Fisheries Management Plan
Marbled grouper (*Epinephelus inermis*)	All	Reef Fishes
Black grouper (*Mycteroperca bonaci*)	All	Reef Fishes
Yellowmouth grouper (*Mycteroperca interstitialis*)	All	Reef Fishes
Gag (*Mycteroperca microlepis*)	All	Reef Fishes
Scamp (*Mycteroperca phenax*)	All	Reef Fishes
Yellowfin grouper (*Mycteroperca venenosa*)	All	Reef Fishes

4.2.5.2 Essential Fish Habitat

Essential Fish Habitat (EFH) is defined in the Magnuson-Stevens Act as "those waters and substrates necessary for fish to spawn, breed, feed, or grow to maturity." The designation and conservation of EFH seeks to minimize adverse effects on habitat caused by fishing and non-fishing activities. Any federal agency that takes an action that could adversely affect EFH by reducing the quantity or quality of habitat must work with NMFS to identify impacts and steps for conserving the habitat and reducing the impact of the action (NMFS, 2004). NMFS has identified EFH habitats for the Gulf of Mexico in its FMP Amendments. These habitats include estuarine emergent wetlands; seagrass beds; algal flats; mud, sand, shell, and rock substrates; and the estuarine water column. The EFH components within the areas of the proposed alternatives include emergent wetlands, mud substrate, and estuarine water columns.

The seasonal and year-round locations of designated EFH for managed fisheries (Figure 4-8) are available on the NMFS website,[58] and both inshore and offshore species abundance maps are available on the NOAA website.[59] EFH figures for Highly Migratory Species are found in the 2009 amendments to the Consolidated Atlantic Highly Migratory Species FMP. EFH, according to NOAA (2017b) for each managed fishery that could occur within the project area of the proposed alternatives, is described below:

- **Red drum FMP—**EFH for red drum consists of all Gulf of Mexico estuaries; waters and substrates extending from Vermilion Bay, Louisiana, to the eastern edge of Mobile Bay, Alabama, out to depths of 25 fathoms; Crystal River, Florida, to Naples, Florida, between depths of 5 and 10 fathoms; and Cape Sable, Florida, to the boundary between the areas covered by GMFMC and the South Atlantic Fishery Management Council (SAFMC) between depths of 5 and 10 fathoms.
- **Highly migratory species—**Highly migratory species may be found in large expanses of the world's oceans, straddling jurisdictional boundaries. Although many of the species frequent other oceans of the world, the Magnuson-Stevens Act only authorizes the description and identification of EFH in federal, state, or territorial waters, including areas of the U.S. Caribbean, Gulf of Mexico, and the Atlantic coast of the United States, to the seaward limit of the U.S. Exclusive Economic Zone (waters 3 to 200 miles offshore). These areas are connected by

[58] Available at: http://sero.nmfs.noaa.gov/hcd/efh.htm

[59] Available at: http://www.habitat.noaa.gov/protection/efh/habitatmapper.html

currents and water patterns that influence the occurrence of highly migratory species at particular times of the year. Based on the habitat requirements of each species, provided by NMFS (2009), EFH for each highly migratory species potentially occurring near the project area is described below:

- Scalloped hammerhead shark
  - ✓ Neonate/Young of Year (≤ 60 centimeters total length [cm TL]): Coastal areas in the Gulf of Mexico from Texas to the southern west coast of Florida; Atlantic coast from the mid-east coast of Florida to southern North Carolina.
  - ✓ Juveniles (61 to 179 cm TL): Coastal areas in the Gulf of Mexico from the southern to mid-coast of Texas, eastern Louisiana to the southern west coast of Florida, and the Florida Keys; offshore from the mid-coast of Texas to eastern Louisiana; Atlantic coast of Florida through New Jersey.
  - ✓ Adults (≥ 180 cm TL): Coastal areas in the Gulf of Mexico along the southern Texas coast and eastern Louisiana through the Florida Keys; offshore from southern Texas to eastern Louisiana; Atlantic coast of Florida to Long Island, New York.
- Bonnethead shark
  - ✓ Neonate/Young of Year (≤ 55 cm TL): Coastal areas in the Gulf of Mexico along Texas, and from eastern Mississippi through the Florida Keys; Atlantic coast from the midcoast of Florida to South Carolina.
  - ✓ Juveniles (56 to 81 cm TL): Coastal areas in the Gulf of Mexico along Texas, and from eastern Mississippi through the Florida Keys; Atlantic coast from the mid-coast of Florida to South Carolina.
  - ✓ Adults (≥ 82 cm TL): Coastal areas in the Gulf of Mexico along Texas, and from eastern Mississippi through the Florida Keys; Atlantic east coast from the mid-coast of Florida to Cape Lookout, North Carolina.
- Blacktip Shark
  - ✓ Neonate/Young of Year (≤ 75 cm TL): Coastal areas in the Gulf of Mexico from Texas through the Florida Keys; Atlantic coastal areas from northern Florida through Georgia and the mid-coast of South Carolina.
  - ✓ Juvenile (76 to 136 cm TL): Coastal areas in the Gulf of Mexico from Texas through the Florida Keys; Atlantic coastal areas localized off the southeast Florida coast and from West Palm Beach, Florida to Cape Hatteras, North Carolina.
  - ✓ Adult (≥ 137 cm TL): Coastal areas in the Gulf of Mexico from Texas through the Florida Keys. In Atlantic coastal areas southeast Florida to Cape Hatteras.
- Bull Shark
  - ✓ Neonate/Young of Year (≤ 95 cm TL): Gulf of Mexico coastal areas along Texas, and localized areas off Mississippi, the Florida Panhandle, and west coast of Florida; as well as the Atlantic mid-east coast of Florida.
  - ✓ Juveniles (96 to 219 cm TL): Gulf of Mexico coastal areas along the Texas coast, eastern Louisiana to the Florida Panhandle, and the west coast of Florida through the Florida Keys; Atlantic coastal areas localized from the mid-east coast of Florida to South Carolina.
  - ✓ Adults (≥ 220 cm TL): Gulf of Mexico along the southern and mid-coast of Texas to western Louisiana, eastern Louisiana to the Florida Keys; Atlantic coast from Florida to South Carolina.
- Spinner Shark

- ✓ Neonate/Young of Year (≤ 70 cm TL): Localized coastal areas in the Gulf of Mexico along Texas, eastern Louisiana, the Florida Panhandle, Florida west coast, and the Florida Keys; Atlantic coast of Florida to southern North Carolina.
- ✓ Juveniles (71 to 179 cm TL): Gulf of Mexico coastal areas from Texas to the Florida Panhandle and the mid-west coast of Florida to the Florida Keys; Atlantic coast of Florida through North Carolina.
- ✓ Adults (≥ 180 cm TL): Localized areas in the Gulf of Mexico off southern Texas, Louisiana through the Florida Panhandle, and from the mid-coast of Florida through the Florida Keys; Atlantic coast throughout Florida and localized areas from South Carolina to Virginia.

– Atlantic Sharpnose Shark
  - ✓ Neonate/Young of Year (≤ 60 cm TL): Gulf of Mexico coastal areas from Texas through the Florida Keys; Atlantic from the mid-coast of Florida to Cape Hatteras, North Carolina.
  - ✓ Juveniles (61 to 71 cm TL): Gulf of Mexico coastal areas from Texas through the Florida Keys; Atlantic from the mid-coast of Florida to Cape Hatteras, North Carolina, and a localized area off Delaware.
  - ✓ Adults (≥ 72 cm TL): Gulf of Mexico from Texas through the Florida Keys out to a depth of 200 meters; Atlantic from the mid-coast of Florida to Maryland.

- **Shrimp FMP—**EFH for shrimp in the Gulf of Mexico comprises waters and substrates extending from the U.S./Mexico border in a clockwise direction to Fort Walton Beach, Florida, including estuarine waters out to depths of 100 fathoms. From Grand Isle, Louisiana, to Pensacola Bay, Florida, it includes waters of depths from 100 and 325 fathoms. From Pensacola Bay, Florida, southwardly to the Florida Keys, it includes waters out to depths of 35 fathoms, with the exception of waters with depths from 10 to 25 fathoms between Crystal River, Florida, and Naples, Florida, and in Florida Bay between depths of 5 and 10 fathoms.
- **Coastal migratory pelagics FMPs—**EFH for coastal migratory pelagics consists of Gulf of Mexico waters and substrates extending from the U.S./Mexico border to the boundary between the areas covered by GMFMC and SAFMC on the north side of the Florida Keys, from estuarine waters out to depths of 100 fathoms. Managed fish species included as coastal migratory pelagics include king mackerel, Spanish mackerel, and cobia. Non-managed species in this fishery include cero mackerel, little tunny, dolphin, and bluefish.
- **Reef fish FMP—**EFH for reef fish consists of Gulf of Mexico waters and substrates extending from the U.S./Mexico border to the boundary between the areas covered by GMFMC and SAFMC from estuarine waters out to depths of 100 fathoms.
- **Gulf Stone Crab—**EFH for stone crab consists of Gulf of Mexico waters and substrates extending from the U.S./Mexico border to Sanibel, Florida, from estuarine waters out to depths of 10 fathoms and waters and substrates extending from Sanibel, Florida, to the boundary between the areas covered by GMFMC and SAFMC from estuarine waters out to depths of 15 fathoms.

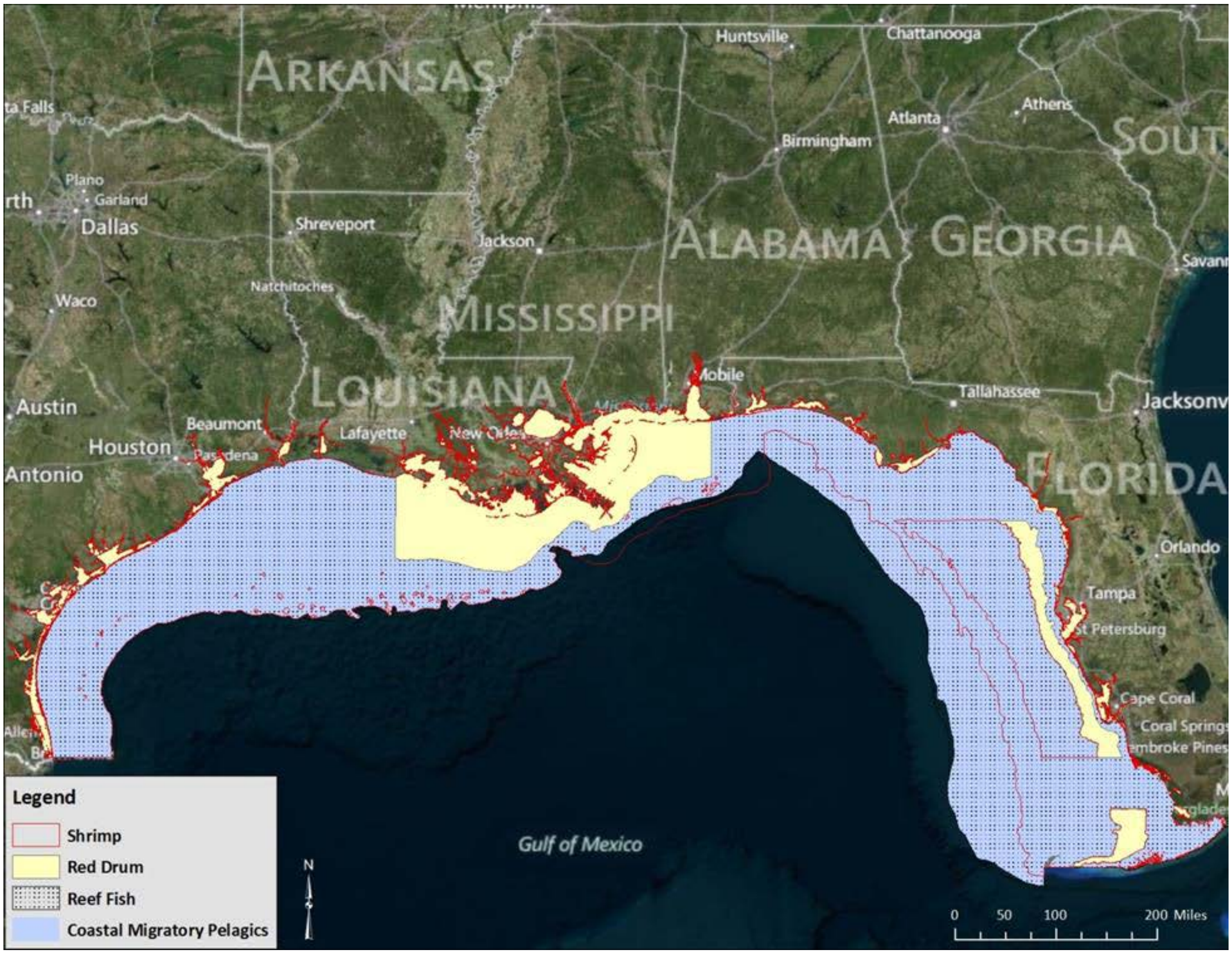


Figure 4-8: Essential Fish Habitat within the Nearshore Environment of the Gulf of Mexico

4.3 SOCIOECONOMIC RESOURCES

4.3.1 Socioeconomics and Environmental Justice

Two counties are included in the Restoration Area: Baldwin and Mobile. The population in Baldwin County was 195,000 in 2015, according to American Community Survey 2011–2015 estimates. The population in Mobile County was 414,000 in 2015 (U.S. Census, 2015a). In 2015, median household income was $50,254 for Baldwin County and $43,809 for Mobile County, both higher than the state median household income of $43,623 (U.S. Census, 2015b). In 2015, 13.4 percent of all individuals in Baldwin County had incomes that fell below the federal poverty level, substantially lower than the state rate of 18.8 percent. Mobile County had a slightly higher percentage of individuals whose incomes fell below the federal poverty level, with 19.3 percent in 2015 (U.S. Census, 2015b).

Baldwin County had a much higher percentage of residents who identified as white alone in 2015 than the state of Alabama, at 83.1 percent compared to the state's 66.3 percent. Mobile County had a slightly lower percentage of residents who identified as white alone, with only 58.1 percent (Table 4-4).

Table 4-4: Latino Origin by Race, 2015

	Baldwin County	Mobile County	Alabama
Total population	*195,121*	*414,251*	*4,830,620*
Non-Latino			
White Alone	83.1%	58.1%	66.3%
Black	9.5%	35.0%	26.3%
Asian	0.7%	1.9%	1.2%
Other	2.2%	2.3%	2.1%
Latino	4.5%	2.6%	4.0%

Source: U.S. Census, 2015a

The largest industries in Baldwin County in 2015 were retail trade, accommodation and food services, and health care and social assistance. In Mobile County, the largest industries were health care and social assistance, retail trade, and manufacturing (Table 4-5) (U.S. Bureau of Economic Analysis, 2015).

Table 4-5: Employment by Industry within Study Area Geographies, 2015

Industry	Baldwin County	Mobile County
Nonfarm employment	*102,507*	*233,144*
Forestry, fishing, and related activities	0.7%	0.5%
Mining, quarrying, and oil and gas extraction	0.7%	0.4%
Utilities	0.3%	0.4%
Construction	6.5%	6.6%
Manufacturing	4.5%	8.8%
Wholesale trade	2.6%	3.9%
Retail trade	15.8%	10.5%
Transportation and warehousing	2.2%	3.9%
Information	0.7%	1.1%
Finance and insurance	3.9%	3.8%
Real estate and rental and leasing	7.8%	4.3%
Professional, scientific, and technical services	4.7%	5.5%
Management of companies and enterprises	0.4%	0.4%
Administrative and support and waste management and remediation services	5.7%	8.3%
Educational services	2.1%	2.0%

Industry	Baldwin County	Mobile County
Health care and social assistance	9.3%	11.2%
Arts, entertainment, and recreation	2.2%	1.3%
Accommodation and food services	13.0%	7.2%
Other services (except public administration)	7.1%	7.8%
Federal, civilian	0.3%	1.1%
Military	0.9%	1.2%
State and local	8.7%	9.9%

Source: U.S. Bureau of Economic Analysis, 2015

The Port of Mobile located at Mobile, Alabama, is an important commercial hub for the state. In 2015, 58.6 million short tons of commodities moved through the port, making it one of the top 20 largest ports in the country, similar in size to the ports at Boston and Philadelphia. The largest commodities moving through the port include coal and lignite, petroleum, iron and steel products, sand and gravel, and gasoline. Approximately 57.4 percent of all shipments were foreign-bound in 2015 (USACE, 2015). Approximately 517 persons are directly employed by the Alabama State Port Authority, and the port supports approximately 124,328 indirect and direct jobs (Alabama State Port Authority, 2016).

On February 11, 1994, President Clinton issued Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Executive Order 12898 directs agencies to address environmental and human health conditions in minority and low-income communities to avoid the disproportionate placement of any adverse effects from federal policies and actions on these populations.

As defined by the Environmental Justice Guidance Under NEPA (USEPA, 1998a), “minority populations” include persons who identify themselves as Asian or Pacific Islander, Native American or Alaskan Native, Black (not of Latino origin), or Latino. Race refers to census respondents’ self-identification of racial background. Latino or Hispanic origin refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, and Central or South American. Minority populations should be identified where the minority population percentage is greater than 50 percent, or the percentage is meaningfully greater than in the general population.

Neither Baldwin nor Mobile counties qualify as areas with a high minority population based on this threshold. Neither county has a minority population that exceeds 50 percent, with Baldwin county at 17 percent minority (not white alone) and Mobile County at 42 percent minority. Nor are minority populations in either county meaningfully greater than the general population at the state level, which has a minority population of approximately 33 percent.

The National Guidance recommended threshold for determining a low-income population is based on “very low-income” and/or “low-income” characteristics. The very low-income characteristic is defined as persons in households below the U.S. Census Bureau’s poverty threshold. The low-income characteristic is defined as below two times the poverty threshold (USEPA, 1998b). Poverty thresholds are set at a national level. The National Guidance recommends a relative threshold for low or very low-income populations as the state average percentage of persons in low- or very low-income households (USEPA, 1998b).

By this measure, Mobile County would be classified as low-income, with a higher percentage of individuals whose income fell below 200 percent of the poverty level than is true for the state. Forty-one percent of individuals had incomes that fell below 200 percent of the poverty level in 2015, compared to 40.0 percent for the state. Mobile County would also be classified as very low-income, with 19.3 percent of individuals with incomes that fell below the poverty level, compared to 18.8 percent for the state (U.S. Census Bureau, 2015c).

Some of the projects listed can be geographically located in census tracts in Baldwin and Mobile counties. If any part of a census tract intersects, population and minority data for the entire tract is included in the project description. Please see references for a list of census tracts used.

4.3.2 Cultural Resources

Cultural resources are evidence of past human activity. These may include pioneer homes, buildings, or old roads; structures with unique architecture; prehistoric village sites; historic or prehistoric artifacts or objects; rock inscription; human burial sites; or earthworks, such as battlefield entrenchments, prehistoric canals, or mounds. These nonrenewable resources often yield unique information about past societies and environments and provide answers for modern-day social and conservation problems. Although many have been discovered and protected, numerous forgotten, undiscovered, or unprotected cultural resources exist in rural America (USDA-NRCS, n.d.).

Although neither NEPA nor any other federal law defines “cultural resource,” several laws and executive orders deal with resources that are cultural in character (National Preservation Institute, 2016), including:

- The National Historic Preservation Act (NHPA), which sets forth government policy and procedures regarding “historic properties” (i.e., districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places).
- The Native American Graves Protection and Repatriation Act, which requires federal agencies and federally assisted museums to return “Native American cultural items” to the federally recognized Indian tribes or Native Hawaiian groups with which they are associated.
- The American Indian Religious Freedom Act, which obligates the U.S. government to respect and protect the rights of Indian tribes to the free exercise of their traditional religions.
- The Archeological Resources Protection Act, which prohibits the excavation of archaeological resources (anything of archaeological interest) on federal or Indian lands without a permit from the land manager.
- The Archeological Data Preservation Act or Archeological and Historic Preservation Act, which requires agencies to report any perceived impacts that their projects and programs may have on archaeological, historical, and scientific data and requires them to recover such data or assist the Secretary of the Interior in recovering them.
- The Federal Records Act, which requires that agencies manage documents in such a way as to protect their historical value, and the Abandoned Shipwrecks Act, which asserts U.S. title to abandoned shipwrecks and transfers title to the states.
- Executive Order 12898, which requires that agencies try to avoid disproportionate and adverse environmental impacts on low-income and minority populations.
- Executive Order 13006, which requires that agencies give priority to using historic buildings in historic districts in central business areas to meet their mission requirements.

- Executive Order 13007, which requires that agencies try not to damage “Indian sacred sites” on federal land and avoid blocking access to such sites by traditional religious practitioners (National Preservation Institute, 2016).

The Alabama Gulf Coast is one of the most historically significant regions of the South. It was popular with prehistoric Native Americans for fishing and food gathering long before the first European explorers arrived on the coast (Cox, 2012).

Coordination with the Alabama Historical Commission regarding the extent and nature of cultural resources at all of the locations under consideration in this RP II/EA is ongoing. This information is not available at this time but will be included in the final RP II/EA.

4.3.3 Infrastructure and Transportation

The alternatives evaluated in this RP II/EA involve land acquisition, studies, and other conservation measures. No changes to capacity demands or configurations of infrastructure or transportation networks would occur; therefore, this topic was not carried forward for further analysis.

4.3.4 Land and Marine Management

Land use and marine resources are managed through various local, regional, state, and federal entities throughout the greater Mobile Bay area. Specific entities exercising land use authority differ by project area, as described below. The federal Coastal Zone Management Act (CZMA) of 1972, which is implemented through the Alabama Coastal Area Management Program), defines coastal zones wherein development must be managed to protect areas of natural resources unique to coastal regions. In addition, the CZMA requires federal agency activities to be fully consistent with a state’s approved coastal management program. The Alabama coastal zone extends inland to the continuous 10-foot contour in Baldwin and Mobile counties (NOAA, 2017c). For all of the projects below, AMRD is responsible for the management of Alabama's marine fisheries resources through data collection and enforcement programs. AMRD is responsible for enforcing state laws and regulations pertaining to Alabama’s marine resources and working cooperatively with other state agencies and federal fisheries enforcement agencies to protect federal fisheries resources in federal waters adjacent to Alabama (ADCNR, 2017c).

4.3.5 Tourism and Recreation

Opportunities for various forms of recreation exist within the larger Alabama Gulf region, including boating, fishing, and bird watching. A variety of passive recreational areas exist in the region; these areas are defined as generally undeveloped space or environmentally sensitive areas that require minimal development. Management emphasis is placed on preservation of wildlife and the environment in these areas. Active recreational areas are, by contrast, more intensively developed, typically municipally owned areas where organized recreational activities such as sporting events may occur. The region exhibits abundant natural resources for passive recreational use as well as providing for active recreation.

4.3.6 Aesthetics and Visual Resources

Much of the landscape within the various portions of the Alabama Gulf where proposed projects are located is undeveloped and semi-forested, with open agricultural and peri-urban areas. A greater development footprint is evident in populated areas where rural and semi-rural landscapes give way to denser residential areas with associated infrastructure. Designed protected viewsheds in the larger Gulf region include scenic highways and byways such as the Alabama Coastal Connection Scenic Byway, which traverses through the region offering motorists opportunities to experience scenic landscapes characteristic of the Gulf area. Where coastline is present, the visual character of the landscape is natural in undeveloped and protected areas. Portions of the coastline also exhibit a more developed, industrialized aesthetic in areas of Mobile Bay that are devoted to commercial shipping and where such industrial land uses are present.

4.3.7 Public Health and Safety

The Gulf Coast of Alabama is composed of barrier islands and peninsulas that naturally accrete and entrain sand. Influences such as longshore sediment transport, eolian processes, storm events, seasonal variation, and human activity influence the rates of accretion and entrainment. Sand enters the sediment transport system of waves, winds, and currents. The sand is transported until a reduction of energy allows deposition. When sand is deposited on an area, accretion occurs. Alabama's beaches typically accrete sediment during the summer months and entrain sediment during the winter months. Eroded beach profiles occur in the winter or following storm events and represent beaches with lowered average elevations and decreased slopes along the surf and swash zones. These morphological changes allow periods of winter storm waves to erode sediment from the beach face and to transport sediment to the offshore bar areas. The sediment will move ashore in the spring and summer months when periods of low-energy waves approach the coastline. If the process is allowed to occur naturally, there should be little annual net loss or gain in overall sediment volume over a given area.

Provision of public health and safety services 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 and to infrastructure such as roadways, bridges, and buildings. The Gulf's coastal communities are at increased risk for severe shoreline damage and storm surges. More than half of the nation's population lives in coastal counties in densities five times greater than inland counties (NOAA, 2009). Coastal development has accelerated wetlands loss, as well as the loss of other coastline protections, including reefs, barrier islands, tidal marshes, and sand dunes along the Gulf Coast. These losses contribute to the damage and public health and safety threat that large storm events pose to the communities and individuals in the Gulf Coast region.

During these large storm events, public safety personnel and facilities may be cut off from individuals caught in the path of the storm, thereby limiting the ability of police, fire, and rescue personnel to reach affected populations. In addition, these affected populations may not be able to evacuate or access hospitals or emergency shelters if roadways or other infrastructure becomes impassable.

Flood control refers to all methods used to reduce or prevent the detrimental effects of floodwaters, including the construction of floodways (human-made channels to divert floodwater), levees, lakes, dams, reservoirs, or gates to hold extra water during times of flooding. Shoreline protection consists of engineered structures, living shorelines, or other solutions meant to slow erosion by rising sea levels and wave action.

The USACE civil works programs and services include water resources development such as flood control, navigation, recreation, infrastructure, and environmental stewardship. These projects include structural projects and beach nourishment (USACE, 2003). In addition, USACE owns lands associated with these programs and services.

4.3.8 Fisheries and Aquaculture

Alabama naturally hosts a rich diversity of fish species through the inland and marine water network. As a result of the temperate climate and high annual rainfall, Alabama is dominated by a freshwater system, including naturally occurring rivers, lakes, reservoirs, and ponds. In addition to the endemic species occurring here, many other species have traveled south to Alabama following the melting of icecaps and the changing temperatures of the ocean. Currently, Alabama hosts 450 species of fish from more than 29 different families. Of these, 41 species are endemic to the Mobile Basin. For these reasons, fisheries and aquaculture are both important to the economic and environmental health of this state (Alabama Fisheries Association, 2015). This review of the affected environment focuses on commercial fisheries because recreational fishing is addressed under “Tourism and Recreation.”

Since 1953, AMRD has collaborated with USACE to create the Alabama’s Artificial Reef Program. The goal of this project is to create and improve habitat for commercially and recreationally harvested fish species through the placement of hard structures on offshore mud/sand bottom types. Currently, this project includes an extensive network of artificial reefs.

Aquaculture production is vitally important to Alabama’s economic system. One of the largest sources of employment and income in Alabama is the catfish industry, which is the dominant form of aquaculture in Alabama. In 2008, Alabama produced 132 million pounds of catfish product. The well-being of aquaculture production in Alabama faces many threats, including reduced water quality and foreign competition for producing more cost-effective alternatives (USDA, 2015).

4.3.9 Marine Transportation

Alabama has one of the longest inland waterway systems in the nation. Four waterway corridors exist, including the GIWW, Tennessee Waterway, Tennessee-Tombigbee Waterway, and Warrior-Tombigbee Waterway. These water corridors are a part of the larger national inland waterway system that connects to more than 15,000 miles of both inland and intercostal waterways and ports in 23 states (Economic Development Partnership of Alabama, n.d.). None of the alternatives being considered in this RP II/EA would affect marine transportation within these waterways; therefore, this topic was not carried forward for analysis in this document, and the affected environment is not provided.

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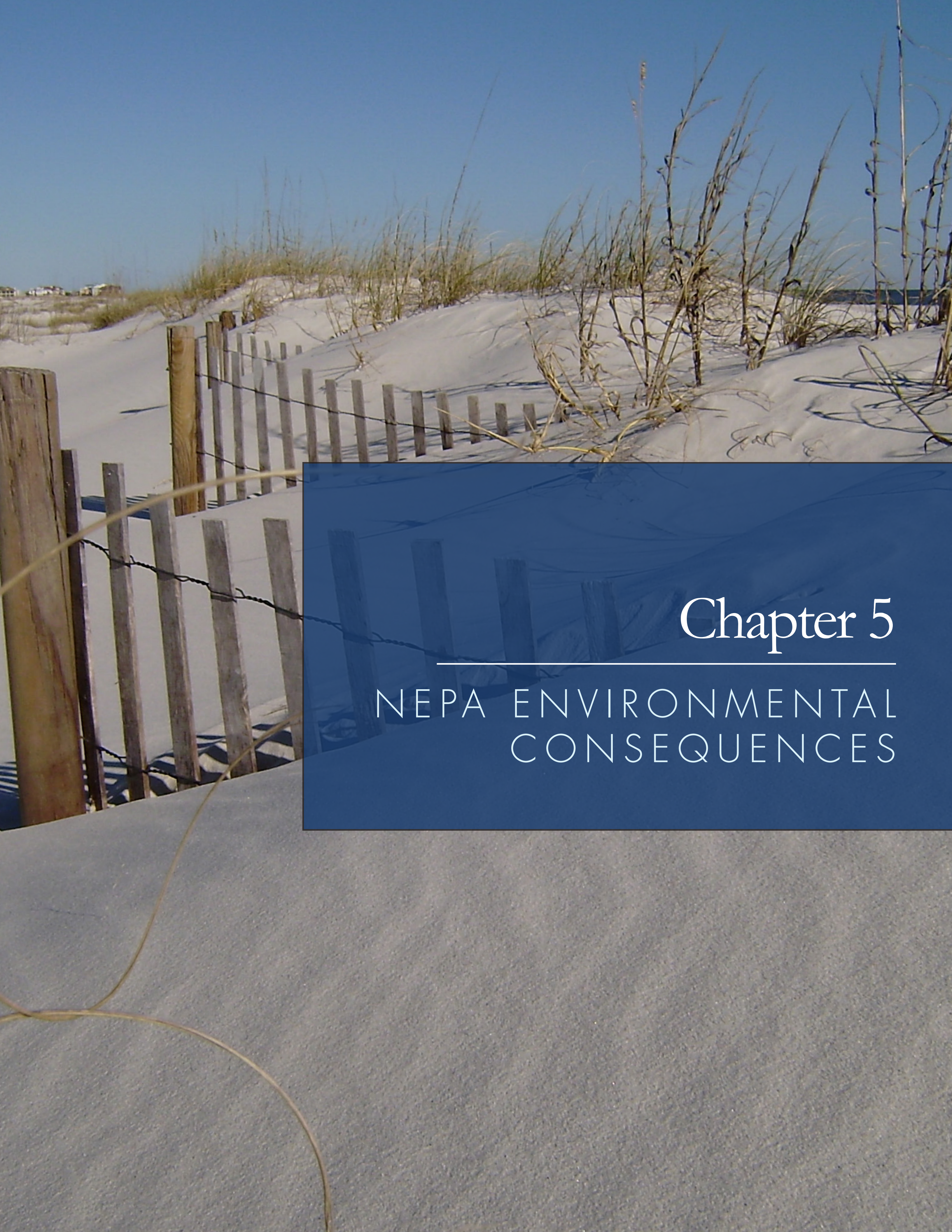

Chapter 5

NEPA ENVIRONMENTAL CONSEQUENCES

5.0 NEPA ENVIRONMENTAL CONSEQUENCES—GENERAL APPROACH TO IMPACT ANALYSIS

Under NEPA (40 C.F.R. §1502.16), federal agencies must consider environmental effects of their actions that include, among others, impacts on social, cultural, and economic resources, as well as natural resources. In order to determine whether an action has the potential to result in significant impacts, the context and intensity of the action must be considered. Context refers to area of impacts (local, state-wide) and their duration (e.g., whether they are short- or long-term impacts). Intensity refers to the severity of impact and could include the timing of the action (e.g., more intense impacts would occur during critical periods like high visitation or wildlife breeding/rearing). Intensity is also described in terms of whether the impact would be beneficial or adverse. For purposes of this document, impacts are characterized as minor, moderate, or major and temporary or long-term. The analysis of beneficial impacts focuses on the duration (short- or long-term), without attempting to specify the intensity of the benefit. "Adverse" is used in this section only to describe the federal Trustees' evaluation under NEPA. That term is defined and applied differently in consultations conducted pursuant to the ESA and other protected resource statutes. Accordingly, in the protected resources sections in each Restoration Type chapter, there may be adverse impacts identified under NEPA; however, this does not necessarily mean that an action would be likely to "adversely affect" the same species because that term is defined and applied under protected resources statutes. The results of any completed protected resource consultations are included in the Administrative Record and discussed in Chapter 15 of this draft RP II/EA. The definition of these characterizations is consistent with that used in the Final PDARP/PEIS, and the table from the Final PDARP/PEIS is presented below in Table 5-1.

Additionally, 40 C.F.R. §1502.14(d) requires the alternatives analysis in the NEPA process to "include the alternative of no action," and "no action" in this case would mean that the AL TIG would not, at this time, select and implement any of the restoration alternatives identified for each of the Restoration Types in this draft RP II/EA to compensate for lost natural resources or resource services associated with those Restoration Types from the DWH oil spill. The resulting environmental effects from taking no action are compared with the impacts of the action alternatives going forward, by Restoration Type.

In this draft RP II/EA, Chapters 6–13 present NEPA analysis for the reasonable alternatives as determined by the OPA screening process described in Chapter 3—these chapters evaluate the beneficial and adverse impacts or "the environmental consequences" that would result from implementation of any of the restoration alternatives considered in this document. Additionally, Chapter 9 provides additional information on the methodology for NEPA analysis specific to Nutrient Reduction (Nonpoint Source) projects.

Specifically, Chapter 6 addresses the restoration alternatives that are only being considered in this RP/EA for E&D funding only at this time: Lower Perdido Island Restoration Phase I; Restoring the Night Sky—Assessment, Training and Outreach; Toulmins Spring Branch, Side-scan Mapping of Mobile Bay Relic Oyster Reefs; and Southwestern Coffee Island Habitat Restoration Project Phase I. As further discussed in Chapter 6 of this draft RP II/EA, the evaluation of E&D activities tiers from the Final PDARP/PEIS (Section 6.4.14).

Once necessary project-specific details are developed based on the information gathered through E&D, the AL TIG may consider funding the implementation of subsequent phases of such projects in a future restoration plan and environmental analysis. If this occurs, NEPA analysis of the impacts from the further implementation of one of these E&D projects would be included in a future restoration plan and NEPA analysis.

Table 5-1: Impact Thresholds Used in for the Analysis of Environmental Consequences, as Presented in the Final PDARP/PEIS

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
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 on 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 on 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 groundwater 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.	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 groundwater flows. Water quality: Impacts on 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 groundwater 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 waterbody. 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.

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
		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 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.	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.
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 USEPA'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 USEPA's *de minimis* criteria levels for general conformity determination.	The impact on air quality could be measurable over a widespread area. Emissions would be high, such that they could exceed USEPA'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.
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.	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 adversely affect local populations 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	Impacts on native vegetation could be measurable and widespread. Frequent disturbances of individual plants could be expected, with adverse impacts on both local and regional population levels. These disturbances could adversely affect range-wide population stability. Some impacts might occur in key habitats, and habitat impacts could adversely affect the viability of the species both locally and throughout its range.

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
		Opportunity for increased spread of non-native species could be detectable but temporary and localized and could not displace native species populations and distributions.	detectable and limited to local and adjacent areas but could only result in temporary changes to native species population and distributions.	Actions could result in the widespread increase of non-native species and result in broad and permanent changes to native species populations and distributions.
Wildlife	<u>Short-term</u>: Lasting up to two breeding seasons, depending on length of breeding season. <u>Long-term</u>: Lasting more than two breeding seasons.	Impacts on 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 adverse impacts on 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 adverse impacts on 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 and result in broad and permanent changes to native species populations and distributions.
Marine and Estuarine Fauna	<u>Short-term</u>: Lasting up to two spawning seasons, depending on length of season.	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	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.	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

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
	Long-term: Lasting more than two spawning seasons.	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 temporary and localized and these species could not displace native species populations and distributions.	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-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.	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 and result in broad and permanent changes to native species populations and distributions.
Rare and Protected Species	Short-term: Lasting up to one breeding/growing season. Long-term: Lasting more than one breeding/ growing season.	Impacts on rare and protected species, their habitats, or the natural processes sustaining them could be detectable but would be 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 ESA-listed species.	Impacts on rare and 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 adverse impacts on 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 on potential or designated critical habitat could occur. Impacts could likely result in a “may affect, likely to adversely affect” determination for at least one ESA-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 on the population numbers of protected species, or interference with their survival, growth, or reproduction could be expected. There could be impacts on 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 ESA-listed species.
Federally Managed Fisheries	Short-term: Lasting up to two spawning seasons,	Impacts could be detectable and localized but small. Disturbance of individual species could occur;	Impacts could be readily apparent and result in a change managed fish populations in local and adjacent	Impacts could be readily apparent and could substantially change managed fish populations over a

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
	depending on length of season. Long-term: Lasting more than two spawning seasons.	however, there could be no change in the diversity or local populations of managed fish 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 temporary and localized and these species could not displace native species populations and distributions.	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-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.	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 and result in broad and permanent changes to native species populations and distributions.
Socioeconomics and Environmental Justice	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.

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
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.
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	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	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.

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
		few visitors or could not affect any related recreational activities.	in other available local or regional areas.	
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 viewshed 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 viewshed 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, groundwater, 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, groundwater, 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.	Actions could result in (1) exposure, mobilization and/or migration of existing contaminated soil, groundwater, or surface water to an extent that requires mitigation; and/or (2) could introduce detectable levels of contaminants to soil, groundwater, and/or surface water in localized areas within the project boundaries such that mitigation/remediation is required to restore the affected area to the pre-construction 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, groundwater, 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, groundwater, 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, groundwater, 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 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.

Chapters 7–13 of this RP II/EA present NEPA analyses for each of the restoration alternatives in the reasonable range of alternatives. A NEPA analysis is provided for each Restoration Type considered for funding in this draft RP II/EA, i.e., Wetland, Coastal, and Nearshore Habitats; Habitat Projects on Federally Managed Lands; Nutrient Reduction (Nonpoint Source); Sea Turtles; Marine Mammals; Birds; and Oysters. The impact analyses presented in those chapters correspond to the descriptions of existing conditions in Chapter 4, NEPA Affected Environment—Coastal Alabama Overview, which provides an overview of the general affected environment, and within Chapters 7–13, where the site-specific affected environments are described for the respective Restoration Type. The methodology for determining impacts and the definitions of thresholds for each resource topic or area (i.e., Hydrology and Water Quality, Air Quality) are described in Section 6.3.2 of the Final PDARP/PEIS and in Table 5.1, above. For each resource area in Chapters 7–13, the analysis in Chapters 7–13 addresses impacts by discussing any background or methodology that is applicable to all sites. A site-specific analysis follows, which is broken down by and restoration alternative and proposed project location. The analysis of the no action alternative precedes the analysis of the action alternatives under each Restoration Type.

Section 6.4 of the Final PDARP/PEIS describes the potential long- and short-term, physical, biological, and socioeconomic impacts of restoration under the program alternatives. Restoration approaches in the Final PDARP/PEIS 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. The Final PDARP/PEIS found beneficial and adverse, and minor, moderate, or major impacts as a result of Alternative A: Comprehensive Integrated Ecosystem Alternative, 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, some of the impacts across resources are similar. For example, benefits to physical and biological resources are typically long-term and result from habitat preservation that results from land acquisition. Adverse impacts are generally short-term, such as disturbances associated with construction activities. Long-term, adverse impacts would include impacts on geology, substrates, and habitat resulting from conversion of habitat from one type to another that occurs as part of a restoration action, construction of infrastructure, and/or increased human presence in the area. Therefore, the findings of the impacts analyses for the restoration alternatives included in the reasonable range of alternatives are consistent with the findings of the Final PDARP/PEIS.

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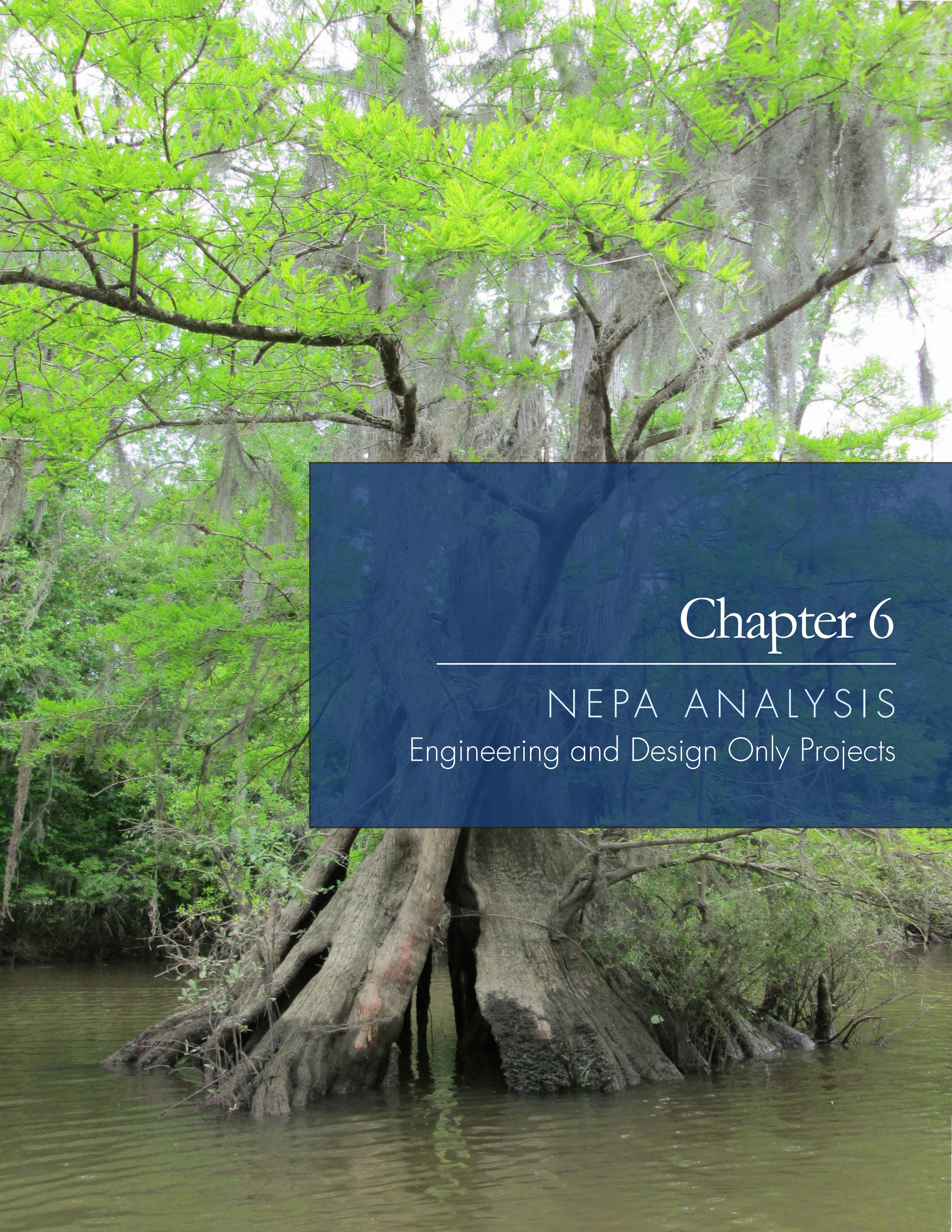


Chapter 6

NEPA ANALYSIS

Engineering and Design Only Projects

6.0 NEPA ANALYSIS—ENGINEERING AND DESIGN ONLY PROJECTS

E&D alternatives evaluated in this section include:

- The Lower Perdido Islands Restoration Phase I (Wetlands, Coastal, and Nearshore Habitats)
- Restoring the Night Sky–Assessment, Training, and Outreach (Habitat Projects on Federally Managed Lands and Sea Turtles)
- Toulmins Spring Branch E&D (Nutrient Reduction [Nonpoint Source])
- Side-scan Mapping of Mobile Bay Relic Oyster Reefs (Oysters)
- Southwestern Coffee Island Habitat Restoration Project—Phase I (E&D) (Wetlands, Coastal, and Nearshore Habitats and Birds)

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 data collection into historical conditions, modeling of hydrologic response to the project, and creating maps and scale drawings of the project site. These activities may also include minimally intrusive field activities such as drilling into the soil or sediment with a soil auger, vibracore, or hand probe to remove core samples for grain size or chemical analysis; determining existing and predicted groundwater levels and elevations; and performing geotechnical evaluation. Additional activities could 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. The purpose of the E&D alternatives is to develop sufficient information to fully evaluate a reasonable range of alternatives in a subsequent restoration plan. Although information gathered may inform future alternatives, the outcome of the preliminary phases does not commit the AL TIG to future actions. Once necessary project-specific details are developed based on the E&D projects, the AL TIG may consider further implementation of such projects, at which time full NEPA analysis of the impacts from construction and implementation would be included in a future restoration plan. Compliance related to these projects, such as ESA or Section 106 compliance, would occur when the project is further developed prior to selection for implementation. Likewise, MAM plans would also be developed at that time.

An evaluation of environmental consequences related to E&D activities is discussed in Section 6.4.14 of the Final PDARP/PEIS and summarized in this section. The Final PDARP/PEIS determined that some preliminary phases of alternative planning would cause minor, direct, short-term impacts through associated fieldwork. These impacts would be very minor and localized to the alternative site. Temporary impacts on 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. The E&D alternatives proposed in this draft RP II/EA are consistent with the Final PDARP/PEIS and ROD and incorporate by reference the PEIS NEPA analysis for the E&D phase. When the analyses of relevant conditions and environmental effects described in the Final PDARP/PEIS do not fully consider the conditions or effects of a proposed project, the AL TIG considered the extent to which supplemental NEPA analysis was necessary.

6.1 LOWER PERDIDO ISLANDS RESTORATION PHASE I

The Lower Perdido Islands Restoration Phase I alternative is proposed for E&D evaluation to support preliminary planning at this time.

This preliminary phase of planning for any future project may include activities such as developing a conservation management plan to evaluate the most appropriate methods for minimizing adverse impacts on sensitive habitats, and a sediment modeling study would be conducted to provide information on erosion that would inform future habitat restoration activities on the islands. Specific activities may include a habitat survey, baseline monitoring, recreational use monitoring/behavioral observations, preliminary permit and compliance investigations, stakeholder coordination, and identification of factors that may assist in restoration and improved conservation. Other interim habitat enhancement activities associated with the project would include the installation of signage on the islands alerting visitors to nesting bird habitat, tree plantings for bird nesting habitat, and marine debris monitoring.

While many of the activities proposed under this project would be limited to desktop data collection, activities related to sign installation and tree planting would include minimally intrusive activities such as drilling into the soil or sediment for installation. E&D activities may also include archaeological studies at and around the site, which would involve digging test pits, and collecting and documenting historic features. Some data collection may also require permits (e.g., when collecting data related to threatened and endangered species).

Some preliminary phases of project planning would cause minor, direct, short-term impacts through associated fieldwork (e.g., including sign and tree installation). Because these activities fall within the Final PDARP/PEIS definition of an E&D project, the impacts fall within the analysis provided in Section 6.4.14 of the Final PDARP/PEIS; therefore, no further NEPA analysis is required at this time.

6.2 RESTORING THE NIGHT SKY—ASSESSMENT, TRAINING, AND OUTREACH

The Restoring the Night Sky–Assessment, Training, and Outreach alternative is proposed for E&D evaluation to support preliminary planning at this time. This preliminary phase of planning for any future project may include activities such as creating an inventory of light sources near the BSNWR and assessing how to address problematic lighting in coordination with local governments. This phase of the project would have three primary objectives: (1) assessing the issue of light pollution on the Alabama coast; (2) developing a detailed strategy to improve the identified problematic lighting; and (3) working with local governments to improve their understanding and capacity to address lighting concerns in the future. The phase would involve data collection and coordination and would not include any ground-disturbing activities. Because these activities fall within the Final PDARP/PEIS definition of an E&D project, the impacts fall within the analysis provided in Section 6.4.14 of the Final PDARP/PEIS; therefore, no further NEPA analysis is required at this time.

6.3 TOULMINS SPRING BRANCH

The Toulmins Spring Branch alternative is proposed for E&D evaluation to support preliminary planning at this time. This preliminary phase of planning for any future project may include activities such as developing a conceptual plan and designs for 600 linear feet of bioswales and a 1-acre retention area. Other activities in this phase could include identifying existing infrastructure (e.g., utilities), investigating cultural resources, identifying construction access and staging areas, acquiring survey and geotechnical data/geotechnical engineering, submitting permits, developing operations and maintenance plans, delineating wetlands, surveying for threatened and endangered species, and developing bidding documents. Such activities may also include researching historical conditions, modeling hydrologic response to the alternative, and creating maps and scale drawings of the site. This may also include minimally intrusive field activities such as drilling into the soil or sediment with a soil auger, vibracore, or hand probe to remove core samples for grain size or chemical analysis; determining existing and predicted groundwater levels and elevations; and performing geotechnical evaluation. E&D activities may also include archaeological studies at and around the site, which would involve digging test pits, and collecting and documenting historic features.

Some preliminary phases of project planning would cause short-term, minor, direct impacts through associated fieldwork (e.g., including drilling into soil or sediment with an auger, drill rig, or other tools to remove surface, subsurface, or core samples). Because these areas are relatively small compared to the overall project area, impacts would be minor and localized to the project site. Temporary impacts on 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 environments. Permits for E&D activities will be secured when necessary.

The use of equipment for any needed studies such as gathering elevation data, soil strength and compaction data would cause short-term, temporary impacts similar to those described above. Adherence to permit conditions and other requirements would minimize adverse impacts. Because these activities fall within the Final PDARP/PEIS definition of an E&D project, the impacts fall within the analysis provided in Section 6.4.14 of the Final PDARP/PEIS; therefore, no further NEPA analysis is required at this time.

6.4 SIDE-SCAN MAPPING OF MOBILE BAY RELIC OYSTER REEFS

The project consists of side-scan surveys of potentially suitable oyster reef habitat in Mobile Bay and does not involve any construction. The surveys are expected to be completed within 1 year.

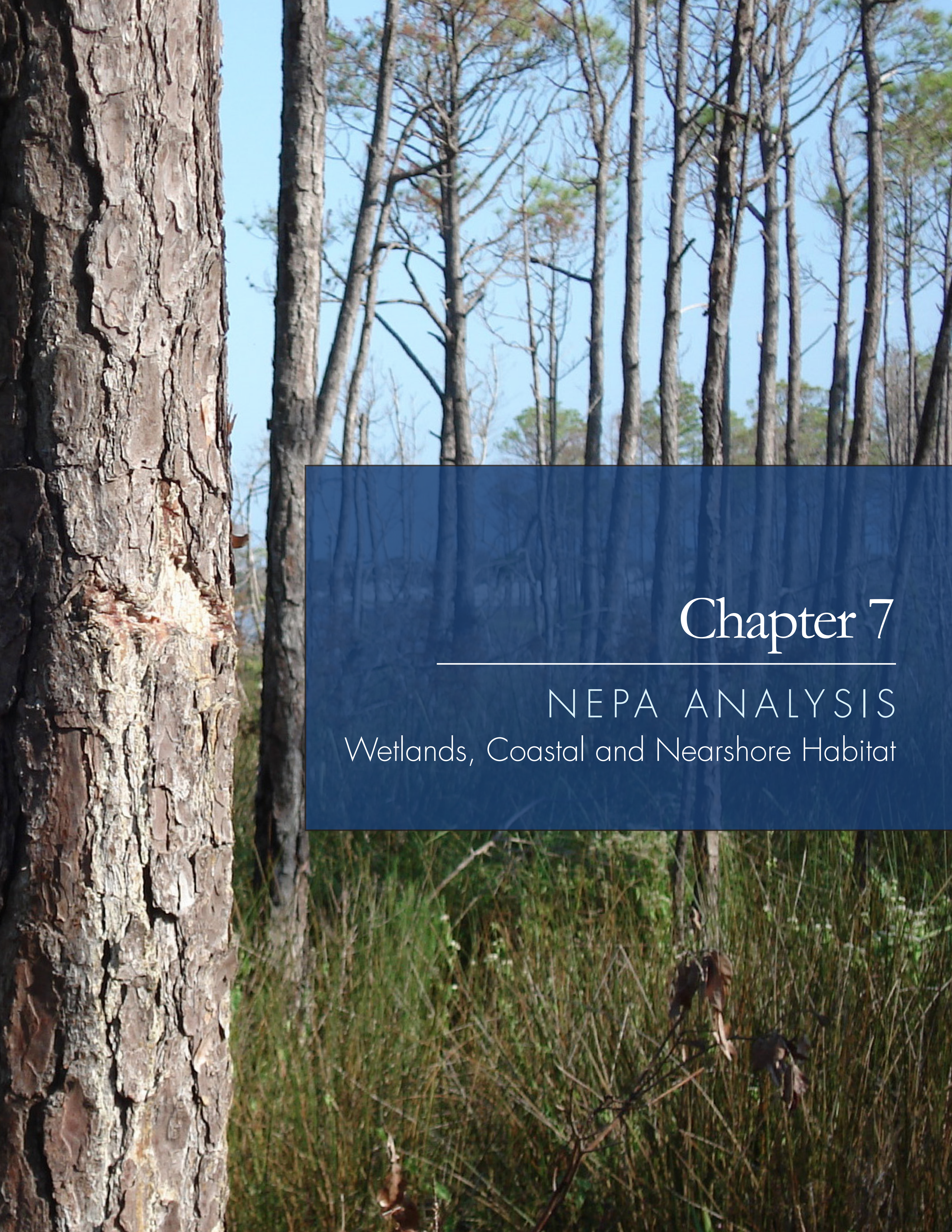
The short-term impacts would include temporary disturbances to marine habitats and species from the presence of boats and sampling equipment that would be used for both side-scan mapping and ground-truthing surveys. Side-scan mapping would involve driving the boat along transects and ground-truthing would involve hand dredge sampling and/or cane pole sounding. Direct impacts include possible collision or disturbance from boat noise and human presence during side-scan mapping and ground-truthing. Some individual West Indian manatees, Gulf sturgeon, or sea turtles could alter their behavior or flee the area. Indirect impacts may include increased stress levels or energy expenditure by disturbed animals. However, this temporary impact would not ultimately reduce the survival or reproduction of individual manatees. Thus, the project *May Affect, but is Not Likely to Adversely Affect* West Indian manatees; Gulf sturgeon; or loggerhead, Kemp's ridley, or green sea turtle. Additionally, the sound frequencies used in side-scan sonar usually range from 400 to 1,600 kHz, which is beyond the range of most marine mammal communication (ADCNR, 2017d). Bottlenose dolphins can hear tones with a frequency up to 160 kHz and communicate at a frequency between about 0.02 to 150 kHz. Therefore, the potential effects from side-scan sonar to marine mammals is negligible.

No long-term impacts would occur as a result of the proposed project. Beneficial impacts would result from increased understanding about existing conditions and oyster restoration opportunities for oysters in Mobile Bay. Because these activities fall within the Final PDARP/PEIS definition of an E&D project, the impacts fall within the analysis provided in Section 6.4.14 of the Final PDARP/PEIS; therefore, no further NEPA analysis is required at this time.

6.5 SOUTHWESTERN COFFEE ISLAND HABITAT RESTORATION PROJECT—PHASE I

This alternative would fund E&D activities that would include conducting field studies, biological assessments, data synthesis, modeling, sediment source investigations, development of drawings and construction plans, and preliminary construction cost estimates as well as obtaining required permits. This would inform the next phase, in a later plan, that would further develop the restoration project, which would involve the restoration and creation of colonial nesting birds breeding habitat as well as tidal wetlands along the southwest shoreline of Coffee Island, located in Mississippi Sound in south Mobile County, Alabama.

No infrastructure or other proposed improvements would be constructed. The E&D project would involve data collection and coordination. No short- or long-term impacts on any of the resources considered in this draft RP II/EA are expected from any phase of this preliminary planning. Because these activities fall within the Final PDARP/PEIS definition of an E&D project, the impacts fall within the analysis provided in Section 6.4.14 of the Final PDARP/PEIS; therefore, no further NEPA analysis is required at this time.



Chapter 7

NEPA ANALYSIS

Wetlands, Coastal and Nearshore Habitat

7.0 NEPA ANALYSIS—WETLANDS, COASTAL, AND NEARSHORE HABITATS

This section provides the NEPA analysis for all of the non-E&D restoration alternatives considered in this plan for funding under the Wetlands, Coastal, and Nearshore Habitats Restoration Type.

The general affected environment for coastal Alabama described in Chapter 4 of this draft RP II/EA is applicable to this section. CEQ guidance states that agencies should "focus on significant environmental issues," and for issues that are other than significant, there should be "only enough discussion to show why more study is not warranted." After preliminary investigation, some resource areas under the Wetlands, Coastal, and Nearshore Habitat Restoration Type alternatives were determined to be either unaffected or minimally affected by the restoration actions being proposed for this Restoration Type. Accordingly, these resources are discussed briefly below. Only those resource areas for which potential, adverse impacts are expected are discussed in detail in this draft RP II/EA. Additionally, the NEPA analysis for the Wetlands, Coastal, and Nearshore Habitat alternatives looks at a further subset of the total resource areas and topics described in Chapter 4, Affected Environment, as part of the biological, physical, and socioeconomic environment for each restoration alternative. To avoid redundant or unnecessary information, resource areas and topics that are not expected to be affected by a proposed restoration alternative are not evaluated further under that a given project. Further, the general affected environment for coastal Alabama described in Chapter 4 of this draft RP II/EA is also applicable to this section.

Resource areas not analyzed in detail for the Wetlands, Coastal, and Nearshore Habitats Restoration Type here are identified below, with brief rationale for non-inclusion:

- **Geology and Substrates:** Projects related to Wetlands, Coastal, and Nearshore Habitats involve land acquisition with the intent of land preservation of these habitat types. No development is expected to occur as part of these projects. If any changes to geology or substrates were to occur, they would be localized and negligible in both the long and short term; therefore, this resource area was not carried forward for detailed analysis.
- **Air Quality and Greenhouse Gases:** Projects related to Wetlands, Coastal, and Nearshore Habitats would involve land acquisition, but no specific on-site construction is proposed. For projects using prescribed burns, a variety of air pollutants would be released during the burn, including aerosols of organic acids and hydrocarbons and particulate matter of various size fractions. Production of these air pollutants would not adversely affect regional air quality because the burns would be of low intensity and would follow applicable codes established by the Alabama Forestry Commission, Mobile and Baldwin counties, and local municipalities. Because the properties would be acquired for conservation and vegetation on these properties would continue to remove O_3, NO_2, and to a lesser extent, particulate matter, long-term, beneficial impacts are anticipated. Implementation of these projects would also result in long-term, beneficial impacts because the conserved vegetation would sequester carbon and reduce local evaporative emissions through cooling effects produced by canopy cover.
- **Noise:** All proposed Wetlands, Coastal, and Nearshore Habitats projects would involve land acquisition, but no specific on-site construction is proposed. The existing soundscapes would remain the same. Therefore, no short- or long-term noise impacts would occur because of the projects, and this resource area was not carried forward for detailed analysis.
- **Socioeconomics and Environmental Justice:** Project areas related to the proposed Wetlands, Coastal, and Nearshore Habitats alternatives are undeveloped and under private ownership. Conservation efforts would result in minor, direct, long-term economic benefits from passive

recreation, and possibly indirect, long-term, beneficial economic benefits in supporting the construction industry during implementation. Short-term economic benefits would be minimal because no construction would occur. Therefore, this resource area was not carried forward for detailed analysis.

- **Infrastructure and Transportation:** None of the projects evaluated under the Wetlands, Coastal, and Nearshore Habitat Restoration Type would create increased demands on area infrastructure that could not be accommodated by existing infrastructure or would affect traffic and transportation in the areas. Therefore, this topic was not carried forward for detailed analysis.
- **Fisheries and Aquaculture:** There are no commercial fisheries or aquaculture operations in the area that would be affected by the proposed projects under the Wetlands, Coastal, and Nearshore Habitat Restoration Type. Therefore, no impacts on fisheries or aquaculture associated with this project are expected, and this resource topic was not carried forward for detailed analysis.
- **Marine Transportation:** None of the proposed project under consideration in this draft RP II/EA for the Wetlands, Coastal, and Nearshore Habitats Restoration Type would affect marine transportation; therefore, this topic was not carried forward for detailed analysis.

7.1 PHYSICAL RESOURCES

7.1.1 Hydrology and Water Quality—Affected Environment

7.1.1.1 Perdido River Land Acquisition (Molpus Tract)

Hydrology

The Molpus Tract covers more than 4 miles of riverfront land on the Perdido River. The Perdido River is a blackwater river that creates the border between Alabama and Florida and creates Perdido Bay before flowing into the Gulf of Mexico (AUWRC, 2016). In addition to the Perdido River, the site area is pocketed by small freshwater ponds. More than half of the area is composed of freshwater wetlands, which exhibit wetland hydrological characteristics, including, depending on the time of year, soil saturation and standing water. The Perdido River watershed receives, on average, 64 inches of rain a year (AUWRC, 2016) and input from the surficial aquifer (Liefer et al., 2009).

Water Quality

The Perdido River is listed on the 2016 303(d) list of impaired waters for mercury because of atmospheric deposition (ADEM, 2016a). The river was originally placed on the list for pathogens (Enterococci) in 2006. A total maximum daily load (TMDL) was created for Perdido Bay in 2010 that extended to the rest of the Perdido River Basin (ADEM, 2010a). Under the USEPA rule, an impaired waterbody can be removed from the 303(d) list once a TMDL plan has been established. However these waterbodies are not listed as official priorities because ADEM will be developing a statewide mercury TMDL in the near future (ADEM, 2016a).

Floodplains

The project site is adjacent to the Perdido River and is within the Federal Emergency Management Agency (FEMA)-designated 100-year floodplain with a designation of Zone A. The remainder of the site that stretches west away from the river is designated as Zone X, which is a 500-year floodplain with minimal flood risk (FEMA, 2017).

Wetlands

The site contains approximately 705 acres of wetland habitat. These wetlands are primarily freshwater forested/shrub wetlands (609 acres), plus 2 acres of freshwater emergent wetlands, and another 94 acres of riverine and freshwater habitat (USFWS, 2017b).

7.1.1.2 Magnolia River Land Acquisition (Holmes Tract)

Hydrology

The Holmes Tract is located along the Magnolia River and contains more than 1 mile of riverfront. Magnolia River is a coastal river that empties into Weeks Bay approximately 2 miles west of the project site, which ultimately drains into Mobile Bay (Google Earth, 2017). The project site, adjacent to the Magnolia River, is seasonally flooded during the growing season and recedes at the end of the season throughout the fall and winter.

Water Quality

The Magnolia River has been designated as an "Outstanding Alabama Water" (ADEM, 2014a). This designation is one of the five designated uses assigned to Alabama waters to work toward protecting the waterway for "fishable/swimmable" usage, consistent with the Clean Water Act. Waterbodies assigned the Outstanding Alabama Water designation are high quality waters and support a range of beneficial uses, including aquatic life support and wildlife propagation, fish and shellfish harvesting and consumption, water recreation, irrigation, livestock watering, and industrial cooling and process supply (ADEM, 2014a).

Even though the Magnolia River is designated as an Outstanding Alabama Water, it is still listed on the 2016 303(d) list of impaired waters for mercury pollution as a result of atmospheric deposition (ADEM, 2016a). The river has been listed since 2014. The addition was based on a fish consumption advisory issued by the Alabama Department of Public Health (ADEM, 2014b). Mercury is not listed under the Toxic Pollutant Criteria Applicable to State Waters (Rule 335-6-10-.07) and does not have an exceedance criteria (ADEM, 2014c). According to ADEM (2014c), the waterbody may remain designated as an Outstanding Water of Alabama as long as the state is using BMPs that are consistent with the ADEM nonpoint source control program. The state is slated to develop a TMDL plan to limit mercury deposition in the near future (ADEM, 2016a).

Floodplains

The project site is adjacent to the Magnolia River and is within the FEMA-designated 100-year floodplain with a designation of Zone AE. The remainder of the site that stretches west away from the river is designated as Zone X, which is a 500-year floodplain (FEMA, 2017).

Wetlands

The site area contains approximately 38 acres of freshwater forested/shrub wetland, approximately 1.3 acres of estuarine and marine wetland and approximately 0.2 acre of freshwater emergent wetland (USFWS, 2017b). The area is listed with the Mobile Bay National Estuary Program-Comprehensive Coastal Management Plan as having "Prioritized Wetlands."

7.1.1.3 Weeks Bay Land Acquisition (East Gateway Tract)

Hydrology

The East Gateway Tract is located at the mouth of Weeks Bay. Weeks Bay is a shallow tidal estuary fed by the Fish and Magnolia rivers as well as tidal fluctuations from Mobile Bay (Weeks Bay Watershed

Project, 2002). The site also includes part of a small freshwater pond on the southeastern border and a small, unnamed stream that runs through the western side of the site.

Water Quality

While Weeks Bay itself is not listed on the ADEM 303(d) list of impaired waters, its two main tributaries, the Fish River and Magnolia River, are listed for mercury from atmospheric deposition. The watershed experiences additional quality problems because of various nonpoint source activities, including agriculture, construction, unpaved roads, defective septic systems and increased development, and population growth (Weeks Bay Watershed Project, 2002). USEPA lists Weeks Bay as an "Outstanding National Resource Water," which makes it eligible for special protections (Weeks Bay Watershed Project, 2002).

Floodplains

The west side of the project bordering Weeks Bay is in a 100-year floodplain designated as VE, with a base flood elevation (BFE) ranging between 12 and 15 feet. The floodplain transitions into an AE zone as the project extends away from the water with a BFE ranging between 10 and 12 feet. The eastern, upland side of the project site is designated as Zone X, which is at minimal flood risk (500-year floodplain) (FEMA, 2017).

Wetlands

The site area is predominately made up of wetlands, with approximately 175 acres wetlands. The wetlands consist primarily of freshwater forested/shrub wetland and estuarine and marine wetland (USFWS, 2017b).

7.1.1.4 Weeks Bay Land Acquisition (Harrod Tract)

Hydrology

The Harrod Tract is located along the Fish River near where the river discharges into Weeks Bay. Fish River is a small, coastal river with a 158-square-mile watershed between the towns of Stapleton (north) and Magnolia Springs (south) (ADCNR, 2014a). The river flows south for 30 miles before emptying into Weeks Bay (ADEM, 2013). The river is a tidal system characterized by water level and salinity fluctuations (ADCNR, 2014a).

The site is pocketed by approximately 15 small, freshwater ponds and a small, unnamed stream. The ponds are continually fed through precipitation and groundwater recharge from the underlying aquifer.

Water Quality

Fish River has been listed on ADEM's 303(d) list of impaired waters since 1998. In the past, Fish River was impaired because of the presence of pathogens (ADEM, 2013); however, currently it is listed for elevated mercury levels from atmospheric deposition (ADEM, 2016a). It is unknown whether the ponds on the site are, or have been, impaired.

Floodplains

Most of the project area lies within the 100-year floodplain, designated as Zone AE with a BFE of 10 feet. The remainder of the site, away from the Fish River, lies within Zone X, the 500-year floodplain (FEMA, 2017).

Wetlands

The site contains more than 100 acres of wetlands made up of freshwater forested/shrub wetland and estuarine and marine wetland. The wetlands are located on the southeastern border of the project along the Fish River (USFWS, 2017b).

7.1.2 Hydrology and Water Quality—Environmental Consequences

7.1.2.1 No Action Alternative

Under the no action alternative, projects related to the restoration of Wetlands, Coastal, and Nearshore Habitats would not occur. The parcels being considered for purchase to preserve these habitats could remain undeveloped or could be developed for commercial and/or residential use. If properties were acquired for preservation, impacts would be similar to the action alternatives described below. If the properties were developed, there would be short- and long-term, adverse impacts on hydrology, water quality, floodplains, and wetlands because development of infrastructure (e.g., parking lots or buildings) would result in soil disturbance and earth compaction during construction that would increase runoff and decrease infiltration. In the long term, development of the parcels would increase the area of impervious surfaces, increasing runoff and decreasing infiltration. The level of adverse impacts would be directly related to the intensity and type of development, if it were to occur.

7.1.2.2 Perdido River Land Acquisition (Molpus Tract)

Hydrology

The Molpus Tract project involves acquiring nearly 1,400 acres along the Perdido River for conservation and hydrologic restoration. Because this project would not involve any construction, no ground-disturbing activities that would compact the soil and increase runoff and/or limit groundwater recharge would occur. The overall hydrologic processes of the area would not be affected. No short-term impacts on hydrology would occur.

In the long term, turning the Molpus Tract into a conservation area would restore natural hydrologic regimes to the riverside parcel and protect the area from hydrologic modifications from future development. By protecting against development, this project would result in long-term, beneficial impacts on hydrology.

Water Quality

This project would not involve any construction, therefore nearby waterbodies would not see increased siltation from erosion as a result of the use of heavy machinery and ground-disturbing activities. As such, there would be no short-term impacts on water quality as a result of this project.

Conserving this land area would result in improved water quality in the region from the restoration of native species and decreased anthropogenic activity in the project area. Conservation would also protect against water quality degradation from development. Long-term, beneficial impacts on water quality are expected because of this project.

Floodplains

This project would not involve any construction; therefore, the floodplain would not be compacted, excavated, or eroded from the use of heavy machinery and grading. The lack of floodplain filling and soil compaction would prevent the BFE to be raised or runoff to increase, resulting in no short-term impacts on floodplains.

Over the long term, the project would not change the floodplain in the project area and would protect against future development that would include increased impervious surfaces in the project area. Development would increase flood risk, extend the floodplain, and raise the BFE. Protection from development is considered a long-term, beneficial impact on floodplains within the site.

Wetlands

This project would not involve any construction, therefore project wetlands would not be compacted, excavated, or eroded from the use of heavy machinery and ground-disturbing activities. The lack of wetland filling and soil compaction would prevent increased runoff and decreased soil infiltration capacity. As such, the project would not have any short-term impacts on wetlands.

The conservation of the Molpus Tract would allow wetland habitat and hydrology to be restored and protect wetlands from future development. This project would result in long-term, beneficial impacts on wetlands in the project area.

7.1.2.3 Magnolia River Land Acquisition (Holmes Tract)

Hydrology

The Holmes Tract project involves acquiring 80 acres along the Magnolia River for conservation and hydrologic restoration. Because this project would not involve any construction, ground-disturbing activities that would compact the soil and increase runoff and/or limit groundwater recharge would not occur. The overall hydrologic processes of the area would not be affected. No short-term, adverse impacts on hydrology are expected.

In the long term, turning the Holmes Tract into a conservation area would restore natural hydrologic regimes to the riverside parcel and protect the area from hydrologic modifications from future development. Development at the site would result in increased impervious surfaces and compacted substrates that would increase the amount of runoff in the watershed. By protecting against development, this project would have long-term, beneficial impacts on hydrology.

Water Quality

This project would not involve any construction; therefore, nearby waterbodies would not see increased siltation from erosion as a result of the use of heavy machinery and grading. As such, no short-term impacts on wetlands are expected.

Conserving this land area would result in improved water quality in the region from the restoration of native species and decreased anthropogenic activity in the project area. Conservation would also protect against water quality degradation from development. Long-term, beneficial impacts on water quality are expected because of this project.

Floodplains

This project would not involve any construction; therefore, the floodplain would not be compacted, excavated, or eroded from the use of heavy machinery and ground-disturbing activities. Because these activities would not occur, the BFE would not be raised and runoff would not increase. As such, no short-term impacts on floodplains are expected.

The project would not change the floodplain in the project area and would protect against future development that would include increased impervious surfaces in the project area. Development would increase flood risk, extend the floodplain, and raise the BFE. Protection from development is considered a long-term, beneficial impact on floodplains within the site.

Wetlands

This project would not involve any construction; therefore, project wetlands would not be compacted, excavated, or eroded from the use of heavy machinery and grading. The lack of wetland filling and soil compaction would prevent increased runoff and decreased soil infiltration capacity, allowing the wetlands to function naturally. As such, the project would not result in any short-term impacts on wetlands.

The conservation of the Holmes Tract would allow wetland habitat and hydrology to be restored and would protect the wetlands from future development. This project would result in long-term, beneficial impacts on wetlands in the project area.

7.1.2.4 Weeks Bay Land Acquisition (East Gateway Tract)

Hydrology

The Weeks Bay Land Acquisition East Gateway Tract project aims to acquire more than 175 acres of undeveloped land and protect it in perpetuity. Because this project would not involve any construction, no ground-disturbing activities would occur that would compact the soil and increase runoff and/or limit groundwater recharge. The overall hydrologic processes of the area would not be affected. No short-term, adverse impacts on hydrology are expected.

In the long term, turning the East Gateway Tract into a conservation area would restore natural hydrologic regimes to the riverside parcel and protect the area from hydrologic modifications from future development. The project would facilitate the E&D for future removal of a dilapidated bulkhead that disrupts the natural hydrologic connection between Weeks Bay and Mobile Bay, which would restore the natural flow between the site and these bays, resulting in long-term, beneficial impacts on the hydrology of the area.

Water Quality

This project would not involve any construction; therefore, nearby waterbodies would not see increased siltation from erosion as a result of the use of heavy machinery and ground-disturbing activities. As such, no short-term impacts on water quality are expected.

The removal of the bulkhead and reconnection of Weeks and Mobile bays would enhance the water quality of Weeks Bay by allowing water to interact with the wetlands on the East Bay Gateway Tract where they would be filtered and naturally returned via tidal fluctuation, resulting in more circulation in the bay. Conservation would also enhance water quality in the region from the restoration of native species, decreased anthropogenic activity in the project area, and protection against water quality degradation from development. This project would result in beneficial impacts on the water quality of the site through restoration of these natural processes, including restoring the site to its native plant composition.

Floodplains

This project would not involve any construction; therefore, the floodplain would not be compacted, excavated, or eroded from the use of heavy machinery and grading. As a result, the BFE would not be raised and runoff would not increase. No short-term impacts on floodplains are expected.

Over the long term, acquiring and protecting the East Gateway Tract would restore an area that has been degraded by the presence of the bulkhead. The project would facilitate the future removal of the bulkhead, which would restore the floodplain to its natural regime, resulting in long-term, beneficial impacts on the floodplains within the site.

Wetlands

This project would not involve any construction; therefore, project wetlands would not be compacted, excavated, or eroded from the use of heavy machinery and grading. The lack of wetland filling and soil compaction would prevent the increase of runoff and decrease of soil infiltration capacity, allowing the wetlands to function naturally. As such, the project would not result in any short-term impacts on wetlands.

Acquiring and protecting the East Gateway Tract would restore the natural wetland habitat and hydrologic processes as well as protect the area from future development. Re-introducing native species to the area would improve the overall health of the wetlands. Long-term, beneficial impacts on wetlands would occur because of this project.

7.1.2.5 Weeks Bay Land Acquisition (Harrod Tract)

Hydrology

The Weeks Bay Land Acquisition Harrod Tract project aims to acquire more 230 acres of undeveloped land. Because this project would not involve any construction, no ground-disturbing activities that would compact the soil and increase runoff and/or limit groundwater recharge would occur. The overall hydrologic processes of the area would not be affected. No short-term, adverse impacts on hydrology are expected.

Acquiring and restoring the Harrod Tract would ensure the continuation and maintenance of natural hydrologic processes by protecting the area from hydrologic modifications from future development. This would result in long-term, beneficial impacts on the hydrology of the site.

Water Quality

This project would not involve any construction; therefore, nearby waterbodies would not see increased siltation from erosion as a result of the use of heavy machinery and ground-disturbing activities. As such, no short-term impacts on water quality are expected.

Conservation would also enhance water quality in the region from the restoration of native species and implementation of erosion control measures and would protect against water quality degradation from future development. This project would result in long-term, beneficial impacts on the water quality of the site.

Floodplains

This project would not involve any construction; therefore, the floodplain would not be compacted, excavated, or eroded from the use of heavy machinery and grading. As a result, the BFE would not be raised and runoff would not increase. No short-term impacts on floodplains are expected.

Acquiring and restoring the Harrod Tract would protect the area from future development that would otherwise increase impervious surfaces. Increased impervious surfaces in the floodplain would result in increased flood risk, an extended floodplain, and a higher BFE. By protecting against development, this project would have a long-term, beneficial impact on floodplains within the site.

Wetlands

This project would not involve any construction; therefore, project wetlands would not be compacted, excavated, or eroded from the use of heavy machinery and ground-disturbing activities. The lack of wetland filling and soil compaction would prevent increased runoff and decreased soil infiltration capacity, allowing the wetlands to function naturally. As such, the project would not have any short-term impacts on wetlands.

The acquisition and protection of the Harrod Tract would restore the natural wetland habitat and hydrologic processes as well as protect the area from future development. Reintroducing native species to the area would improve the overall health of the wetlands. Long-term, beneficial impacts on wetlands would occur because of this project.

7.2 BIOLOGICAL RESOURCES

7.2.1 Habitats—Affected Environment

7.2.1.1 Perdido River Land Acquisition–Molpus Tract

The Molpus Tract consists of 1,391 acres of coastal habitat on the Perdido River. The site is dominated by palustrine-forested wetland containing cypress and Atlantic white cedar trees. The uplands are dominated by mixed slash and loblolly pine. Of the 1,391 acres proposed for purchase, approximately 686 acres are upland and 705 acres are wetland.

7.2.1.2 Magnolia River Land Acquisition–Holmes Tract

The Holmes Tract is one of the largest undeveloped tracts on Magnolia River and includes about 80 acres. It contains more than 1 mile of frontage on Magnolia River and Weeks Creek, including a perimeter of small marsh and forested wetland fringe. Habitat types on the property include estuarine and marine wetlands, freshwater emergent wetlands, and freshwater forested/shrub wetlands.

7.2.1.3 Weeks Bay Land Acquisition–East Gateway Tract

The East Gateway Tract contains approximately 175 acres of undeveloped land near the mouth of Weeks Bay. A large salt marsh with an unnamed stream provides protected habitat and shelter for wading birds, duck species, and various indigenous marine life. This tract also contains a palustrine-forested wetland that is seasonally flooded, as well as a maritime forest (NWI, 2017).

7.2.1.4 Weeks Bay Land Acquisition–Harrod Tract

The Harrod Tract contains a total of 231 acres, including more than 100 acres of intact wetlands (salt marsh) habitat. The property is one of the largest remaining undeveloped parcels of swamp, marsh, and river shoreline in coastal Alabama and is the largest privately owned tract in the lower part of Fish River. The property is adjacent to previously protected wetlands and includes 7,600 feet of Fish River shoreline, including frontage along Turkey Branch and Waterhole Branch, two of Fish River's primary tributaries. Multiple smaller bayous are also present on the property. Delineated wetlands are composed of fringing marsh grading into hardwood cypress and gum swamp. The adjacent uplands included in the property provide areas for wetlands to retreat under projected sea level rise. The upland areas are suitable for restoration as pitcher plant bog and pine savanna.

The site consists of approximately 705 acres of wetlands. These wetlands are primarily freshwater forested/shrub wetlands and a small area of freshwater emergent wetlands (USFWS, 2017b).

7.2.1.5 Magnolia River Land Acquisition (Holmes Tract)

Hydrology

The Holmes Tract is located along the Magnolia River and contains more than 1 mile of riverfront. Magnolia River is a coastal river that empties into Weeks Bay approximately 2 miles west of the project site, which ultimately drains into Mobile Bay (Google Earth, 2017). The project site, adjacent to the Magnolia River, is seasonally flooded during the growing season and recedes at the end of the season throughout the fall and winter.

Water Quality

The Magnolia River has been designated as an “Outstanding Alabama Water” (ADEM, 2014a). This designation is one of the five designated uses assigned to Alabama waters to work toward protecting the waterway for “fishable/swimmable” usage, consistent with the Clean Water Act. Waterbodies assigned the Outstanding Alabama Water designation are high quality waters and support a range of beneficial uses, including aquatic life support and wildlife propagation, fish and shellfish harvesting and consumption, water recreation, irrigation, livestock watering, and industrial cooling and process supply (ADEM, 2014a).

Even though the Magnolia River is designated as an Outstanding Alabama Water, it is still listed on the 2016 303(d) list of impaired waters for mercury pollution as a result of atmospheric deposition (ADEM, 2016a). The river has been listed since 2014. The addition was based on a fish consumption advisory issued by the Alabama Department of Public Health (ADEM, 2014b). Mercury is not listed under the Toxic Pollutant Criteria Applicable to State Waters (Rule 335-6-10-.07) and does not have an exceedance criteria (ADEM, 2014c). According to ADEM (2014c), the waterbody may remain designated as an Outstanding Water of Alabama as long as the state is using BMPs that are consistent with the ADEM nonpoint source control program. The state is slated to develop a TMDL plan to limit mercury deposition in the near future (ADEM, 2016a).

Floodplains

The project site is adjacent to the Magnolia River and is within the FEMA-designated 100-year floodplain with a designation of Zone AE. The remainder of the site that stretches west away from the river is designated as Zone X, which is a 500-year floodplain (FEMA, 2017).

Wetlands

The site area contains approximately 38 acres of freshwater forested/shrub wetland, approximately 1.3 acres of estuarine and marine wetland, and approximately 0.2 acre of freshwater emergent wetland (USFWS, 2017b). The area is listed with the Mobile Bay National Estuary Program-Comprehensive Coastal Management Plan as having “Prioritized Wetlands.”

7.2.1.6 Weeks Bay Land Acquisition (East Gateway Tract)

Hydrology

The East Gateway Tract is located at the mouth of Weeks Bay. Weeks Bay is a shallow tidal estuary fed by the Fish and Magnolia rivers as well as tidal fluctuations from Mobile Bay (Weeks Bay Watershed Project, 2002). The site also includes part of a small freshwater pond on the southeastern border and a small, unnamed stream that runs through the western side of the site.

Water Quality

While Weeks Bay itself is not listed on the ADEM 303(d) list of impaired waters, its two main tributaries, the Fish River and Magnolia River, are listed for mercury from atmospheric deposition. The watershed experiences additional quality problems because of various nonpoint source activities, including agriculture, construction, unpaved roads, defective septic systems and increased development, and population growth (Weeks Bay Watershed Project, 2002). USEPA lists Weeks Bay as an “Outstanding National Resource Water,” which makes it eligible for special protections (Weeks Bay Watershed Project, 2002).

Floodplains

The west side of the project bordering Weeks Bay is in a 100-year floodplain designated as VE, with a BFE ranging between 12 and 15 feet. The floodplain transitions into an AE zone as the project extends away from the water, with a BFE ranging between 10 and 12 feet. The eastern, upland side of the project site is designated as Zone X, which is at minimal flood risk (500-year floodplain) (FEMA, 2017).

Wetlands

The site area is predominately made up of wetlands, with a total of 175 wetland acres. The most prominent type of wetlands is freshwater forested/shrub followed by estuarine and marine wetlands (USFWS, 2017b). Because this project would not involve any construction, no ground-disturbing activities that would compact the soil and increase runoff and/or limit groundwater recharge would occur. The overall hydrologic processes of the area would not be affected. No short-term, adverse impacts on hydrology are expected.

Acquiring and restoring the East Gateway Tract would ensure the continuation and maintenance of natural hydrologic processes by protecting the area from hydrologic modifications from future development. This would result in long-term, beneficial impacts on the hydrology of the site.

Water Quality

This project would not involve any construction; therefore, nearby waterbodies would not see increased siltation from erosion as a result of heavy machinery use and ground-disturbing activities. As such, no short-term impacts on water quality are expected.

Conservation would also enhance water quality in the region from the restoration of native species and implementation of erosion control measures and would protect against water quality degradation from future development. This project would result in long-term, beneficial impacts on the water quality of the site.

Floodplains

This project would not involve any construction; therefore, the floodplain would not be compacted, excavated, or eroded from the use of heavy machinery and grading. As a result, the BFE would not be raised and runoff would not increase. No short-term impacts on floodplains are expected.

Acquiring and restoring the East Gateway Tract would protect the area from future development that would otherwise increase impervious surfaces. Increased impervious surfaces in the floodplain would result in increased flood risk, an extended floodplain, and a higher BFE. By protecting against development, this project would have a long-term, beneficial impact on floodplains within the site.

Wetlands

This project would not involve any construction; therefore, project wetlands would not be compacted, excavated, or eroded from heavy machinery use and ground-disturbing activities. The lack of wetland filling and soil compaction would prevent increased runoff and decreased soil infiltration capacity, allowing the wetlands to function naturally. As such, the project would not have any short-term impacts on wetlands.

The acquisition and protection of the East Gateway Tract would restore the natural wetland habitat and hydrologic processes and protect the area from future development. Reintroducing native species to the area would improve the overall health of the wetlands. Long-term, beneficial impacts on wetlands would occur because of this project.

7.2.2 Habitats—Environmental Consequences

The habitats affected by the proposed alternatives include both coastal and nearshore habitat types, as well as inland habitat types.

7.2.2.1 No Action Alternative

Under the no action alternative, projects related to the restoration of Wetlands, Coastal, and Nearshore Habitats would not occur. The parcels being considered for purchase under the action alternatives would remain undeveloped or could be developed and disturbed by a variety of human activities. If the properties remained undeveloped (e.g., acquired for future preservation by other entities or funding mechanisms), there would be no short- or long- term, adverse impacts on habitat because the ecosystems would remain intact. If the properties were to be developed at some point in the future, short- and long-term, adverse impacts on habitat would occur because human infrastructure and occupation would destroy and fragment habitat. Future development of the properties could directly kill and disturb wildlife, and reduce the habitat's capacity to provide native wildlife with food, water, shelter, and space to live. Development would also make the remaining habitat more susceptible to adverse impacts from coastal storms, erosion, and invasion by non-native species. The level of adverse impacts would be directly related to the intensity and type of future development that could occur on each property.

7.2.2.2 Perdido River Land Acquisition—Molpus Tract

The proposed acquisition of the Molpus Tract would have no short- or long-term, adverse impacts on habitat. The project would have long-term, beneficial impacts on habitat values because no future development would occur on this 1,391-acre property. The project would lessen the impacts of future human development in the region by protecting wetlands and floodplains. Future management actions by ADCNR would include efforts to restore longleaf pine forests to the uplands through mechanical thinning and prescribed burns, resulting in long-term, beneficial impacts. Longleaf pine restoration could re-create an important habitat type that has been lost across much of the region and is essential to the survival of numerous rare and protected species.

7.2.2.3 Magnolia River Land Acquisition—Holmes Tract

The proposed acquisition of the Holmes Tract would have no short- or long-term, adverse impacts on habitat. The project would have long-term, beneficial impacts on habitat values because no future development would occur on this 80-acre property of intact riverfront forest alongside the Magnolia River. Future restoration activities that could occur on the Holmes Tract, including invasive species control, native vegetation planting, and erosion control measures, could have minimal, short-term impacts on habitat during implementation that include disturbance or temporary habitat destruction. However, future habitat restoration activities would have long-term, beneficial impacts by providing habitat that is currently lacking (e.g., longleaf pine forest).

7.2.2.4 Weeks Bay Land Acquisition—East Gateway Tract

The proposed acquisition of the East Gateway Tract would have no short- or long-term, adverse impacts on habitat. The project would have long-term, beneficial impacts on habitat values because no future development would occur on approximately 175 acres of terrestrial and wetland habitat adjacent to the mouth of Weeks Bay. The project would protect approximately 100 acres of wetlands, including estuarine intertidal marsh and freshwater forested wetlands, which are critical breeding and nursery habitat to a wide variety of marine and estuarine fauna in the area. Future restoration activities that could occur on the Holmes Tract, including invasive species control and habitat restoration could have minimal, short-term impacts on habitat during implementation, which includes habitat disturbance or temporary destruction. Long-term, beneficial impacts would result from the future restoration of two habitat types that have become uncommon in the region, longleaf pine savanna and pitcher plant bog.

7.2.2.5 Weeks Bay Land Acquisition—Harrod Tract

The proposed acquisition of the Harrod Tract would have no short- or long-term, adverse impacts on habitat. The project would have long-term, beneficial impacts on habitat values because no future development would occur on one of the largest remaining undeveloped parcels of swamp, marsh, and river shoreline in coastal Alabama that provide habitat for a host of estuarine organisms, including shrimp, crabs, and fish. The protection of this extensive wetland habitat would serve to absorb and clean runoff and preserve water quality in Fish River. The upland areas are also suitable for the restoration of pitcher plant bog and pine savanna, two habitat types that have been mostly lost and degraded across the Gulf Coast region.

7.2.3 Wildlife—Affected Environment

7.2.3.1 Perdido River Land Acquisition—Molpus Tract

Mammals

Common species could include striped skunk, eastern cottontail, raccoon, white-tailed deer, gray and red foxes, southern flying squirrel, chipmunks, coyote, bobcat, bats, mice, voles, moles, long-tailed weasel, eastern woodrat, and feral hog. The Perdido River could be inhabited by beaver, muskrat, and mink, and possibly river otter. Although a marsupial and not a mammal, opossum would also likely occur on the Molpus Tract.

Reptiles

Turtles within the project area may include common snapping turtle, alligator snapping turtle, pond slider, river cooter, and Florida softshell. Lizards may include eastern glass lizard, common five-lined skink, and green anole. Snakes may include ring-necked snake, red corn snake, northern scarlet snake, black racer, northern redbelly snake, eastern ribbonsnake, garter snake, eastern water snake, Florida green water snake, cottonmouth, rough greensnake, and eastern diamondback rattlesnake.

Amphibians

In areas near swamps, streams, isolated wetlands, and other aquatic habitats on the Molpus Tract, numerous amphibians could occur, including the following more common species: cricket frog, northern spring peeper, eastern spadefoot, green tree frog, pine woods tree frog, ornate chorus frog, southern leopard frog, eastern narrow-mouthed toad, southern toad, and Fowler’s toad. Several salamander species could also occur within the project area.

Birds

Approximately 75 birds have been documented nearby on Perdido River Wildlife Management Area (eBird.org, 2017), with common passerines including Carolina wren, common yellowthroat, northern cardinal, American robin, red-winged blackbird, white-throated sparrow, chipping sparrow, common grackle, blue grosbeak, eastern towhee, red-bellied woodpecker, pileated woodpecker and pine warbler. Turkey vulture, black vulture and red-tailed hawk are common raptors in the project vicinity. Wading birds such as great blue heron and cattle egret are common in swamp habitats and the margins of the Perdido River.

7.2.3.2 Magnolia River Land Acquisition—Holmes Tract

Mammals

Potential species present on the Holmes Tract could include red fox, chipmunks, coyotes, bats, white-tailed deer, mice, voles, long-tailed weasel, striped skunk, eastern woodrat, and bobcat.

Reptiles

Snakes that could occur near the Holmes Tract could include rough greensnake, ring-necked snake, eastern ribbonsnake, eastern water snake, glossy crayfish snake, and cottonmouth. American alligator could occur along and within the bordering Magnolia River and Weeks Creek. Turtles that may be present could include but are not limited to common snapping turtle, alligator snapping turtle, common box turtle, and southern painted turtle. Common lizards could include the green anole, six-lined racerunner, and ground skink.

Amphibians

In areas near swamps, streams, and other aquatic habitats on the Holmes Tract, numerous amphibians could occur, including northern cricket frog, squirrel tree frog, green tree frog, eastern spadefoot, southern leopard frog, greenhouse frog, southern toad, and Fowler's toad. Several salamander species could also occur within the project area, although data on their presence and distribution are not available.

Birds

Common passerines in the vicinity of the Holmes Tract could include species such as red-winged blackbird, barn swallow, indigo bunting, yellow-rumped warbler, fish crow, mourning dove, northern flicker, brown thrasher, pine warbler, blue jay, belted kingfisher, blue-gray gnatcatcher, northern cardinal, and common grackle. Other less common passerines could also use the property, especially during spring and fall migration. Shorebirds that are common on the Holmes Tract could include laughing gull, royal tern, and Forester's tern. Wading birds frequenting the property include but are not limited to clapper rail, great blue heron, great egret, and cattle egret. Waterfowl using the area could include pied-billed grebe and wood duck. Raptors often observed from the property are osprey, bald eagle, red-tailed hawk, and black vulture. Other common seabirds are brown pelican and double-crested cormorant.

7.2.3.3 Weeks Bay Land Acquisition—East Gateway Tract

Mammals

Species potentially present on the East Gateway Tract could include grey and red fox, chipmunks, coyotes, bats, white-tailed deer, mice, voles, shrews, striped skunk, long-tailed weasel, eastern woodrat, and bobcat.

Reptiles

Turtles that may be present could include common snapping turtle, common box turtle, and southern painted turtle. The Gulf saltmarsh snake would be the most likely snake to occur on the East Gateway Tract. Other snakes that could occur in the project vicinity include rough greensnake, ring-necked snake, eastern ribbonsnake, glossy crayfish snake, eastern water snake, and cottonmouth. American alligator would be found using the shorelines of the property in both Weeks Bay and Mobile Bay.

Amphibians

In areas near swamps, small streams, and other aquatic habitats, numerous amphibians could occur, including northern cricket frog, squirrel tree frog, green tree frog, eastern spadefoot, southern leopard frog, greenhouse frog, southern toad, and Fowler's toad. Salamander species could occur in proximity to freshwater wetlands and other moist forest environments of the East Gateway Tract, although data on their presence and distribution are not available.

Birds

Common passerines in the vicinity of the East Gateway Tract could include red-winged blackbird, barn swallow, indigo bunting, yellow-rumped warbler, fish crow, mourning dove, northern flicker, brown thrasher, pine warbler, blue jay, belted kingfisher, blue-gray gnatcatcher, northern cardinal, and common grackle. Other less common passerines use the property, especially during spring and fall migration. Shorebirds common in the vicinity of the East Gateway Tract could include laughing gull, royal tern, and Forester's tern and wading birds frequenting the property include clapper rail, great blue heron, great egret, and cattle egret. Waterfowl using the area include pied-billed grebe, common loon, and wood duck. Raptors often observed from the property are osprey, bald eagle, red-tailed hawk, and black vulture. Other common seabirds could include brown pelican and double-crested cormorant.

7.2.3.4 Weeks Bay Land Acquisition—Harrod Tract

Mammals

Mammals found in the vicinity of the Harrod Tract include nine-banded armadillo, eastern gray squirrel, shrews, striped skunk, common raccoon, and whitetail deer. Mice, voles, coyote, red fox, bobcat, bats, mink, river otter, long-tailed weasel, and nutria are also found in the Weeks Bay watershed. The West Indian manatee and bottlenose dolphin could occasionally occur within Weeks Bay.

Reptiles

Turtles that may be present could include common snapping turtle, common box turtle, and southern painted turtle. The Gulf saltmarsh snake would be the most likely snake to occur on the Harrod Tract and other snakes that could occur on the property may include, but not be limited to rough greensnake, glossy crayfish snake, eastern ribbonsnake, ring-necked snake, eastern water snake, and cottonmouth. American alligator occurs within Fish River and other wetlands on the property. Common lizards could include the green anole, six-lined racerunner, and ground skink. Although uncommon, loggerhead or Kemp's Ridley sea turtles could occasionally use Weeks Bay.

Amphibians

In wetlands and nearby areas, numerous amphibians could occur, including the following frogs and toads: green tree frog, squirrel tree frog, northern cricket frog, greenhouse frog, southern leopard frog, southern toad, Fowler's toad, and eastern spadefoot. Several salamander species could also occur within the project area.

Birds

Hundreds of species of migratory birds use the Harrod Tract annually, as well as more than a dozen resident species. Common passerines include but are not limited to red-winged blackbird, barn swallow, indigo bunting, yellow-rumped warbler, fish crow, mourning dove, northern flicker, brown thrasher, pine warbler, blue jay, belted kingfisher, blue-gray gnatcatcher, northern cardinal, and common grackle. Other less common passerines use the property during spring and fall migration. Shorebirds that are common on the Harrod Tract include but are not limited to laughing gull, royal tern, and Forester's tern and wading birds frequenting the property include clapper rail, great blue heron, great egret, and cattle egret. Waterfowl using the area include pied-billed grebe, common loon, and wood duck. Raptors often observed from the property are osprey, bald eagle, red-tailed hawk, and black vulture. The most common seabirds near the Harrod Tract are brown pelican and double-crested cormorant.

7.2.4 Wildlife—Environmental Consequences

Wildlife species play a significant role in the local economy by enhancing the human experience through activities such as hunting, bird watching, hiking, and other wildlife-related and recreational activities. The proposed projects are intended to enhance wildlife populations and restore key species that were adversely impacted by the DWH oil spill, namely sea turtles, marine mammals, colonial nesting wading birds, and oysters. In the long term, all projects would have beneficial impact on the targeted species and other wildlife residing within the project area. In the short term, however, some projects would have temporary adverse impacts on some wildlife, especially those projects that involve construction activities. Other projects involving human activities such as assessment, education, or enforcement would have minimal adverse impact on any wildlife.

7.2.4.1 No Action Alternative

Under the no action alternative, projects related to the restoration of wetlands, coastal, and nearshore habitats would not occur. The parcels being considered for purchase under the action alternatives would either remain undeveloped and in conservation (through other funding mechanisms) or would be developed and disturbed by a variety of human activities. If the properties remained undeveloped, or acquired for future preservation by other entities, their ecosystems would remain intact and impacts would be similar to those described under the action alternatives. However, the properties could be developed at some point in the future under the no action alternative and if so, it would have short- and long-term, major, adverse impacts on wildlife habitat because human infrastructure and occupation would destroy and fragment habitat. Such impacts on habitat would reduce the property's capacity to provide native wildlife with food, water, shelter, and space to live. The level of adverse impacts would be directly related to the intensity and type of future development that would occur on each property.

7.2.4.2 Perdido River Land Acquisition—Molpus Tract

Long-term, beneficial impacts on wildlife would occur from the acquisition of the Molpus Tract because critical wetland and upland habitat would be conserved. All wildlife within the project area would benefit from the continued existence of the habitat upon which they depend. No adverse long-term impacts on any wildlife species would occur because of this project. Future management actions to restore longleaf pine forests to the uplands through mechanical thinning and prescribed burns would have short-term, minor impacts on native wildlife because of human activity, equipment noise, and vegetation disturbance. However, numerous species would benefit in the long term through the restoration of an important forest type that has been lost across most of the region, including some of the most imperiled (ESA-listed) species in the region whose life histories are almost fully dependent on longleaf pine.

7.2.4.3 Magnolia River Land Acquisition—Holmes Tract

Long-term, beneficial impacts on wildlife would occur from the acquisition of the Holmes Tract because critical wetland and upland habitat supporting a diversity of species would be conserved. All wildlife within the project area would benefit from the continued existence of the habitat upon which they depend. No long-term, adverse effects on any wildlife species would occur because of this project. Future restoration activities on the Holmes Tract could include invasive species control, native vegetation planting, and erosion control measures. These actions could have short-term, minor impacts on wildlife during implementation that include disturbance and associated stress or displacement to some species. However, future habitat restoration activities would have long-term, beneficial impacts on all species through the provision of habitat that is currently lacking, such as longleaf pine forest.

7.2.4.4 Weeks Bay Land Acquisition–East Gateway Tract

The action of acquiring the East Gateway Tract would have no short- or long-term, adverse impacts on any wildlife species would occur because of this project. Long-term, beneficial impacts would occur from the acquisition of the East Gateway Tract because critical wetland and upland habitat would be conserved. All wildlife within the project area would benefit from the continued existence of the habitat upon which they depend. Future habitat management activities and the removal of a dilapidated bulkhead on the waterfront would have short-term impacts on native wildlife, including minor, temporary disturbance that could stress some species or cause them to flee the area during both activities. However, all wildlife, including numerous wading birds, waterfowl, and various indigenous marine life, would benefit in the long term through the restoration of native habitat.

7.2.4.5 Weeks Bay Land Acquisition—Harrod Tract

The acquisition of the Harrod Tract would have long-term, beneficial impacts on wildlife because critical wetland and upland habitat that they depend on would be conserved and not destroyed or fragmented by development. The action of acquiring the East Gateway Tract would have no short- or long-term adverse effects on any wildlife species would occur because of this project. Future management activities that could occur on the Holmes Tract, including but limited to invasive species control, native vegetation restoration, and erosion control measures, could have short-term, minimal, adverse impacts on wildlife during implementation that include disturbance and associated stress or displacement to some species. However, any adverse impacts on wildlife from such human activities would not be lasting and would be offset by long-term benefits.

7.2.5 Marine and Estuarine Resources—Affected Environment

7.2.5.1 Perdido River Land Acquisition—Molpus Tract

The project is located along the Perdido River, approximately 15 miles upstream of Perdido Bay. No marine or estuarine habitats or fauna are located within the project area.

7.2.5.2 Magnolia River Land Acquisition—Holmes Tract

The project is located along the Magnolia River, approximately 2.5 miles upstream of Weeks Bay and includes salt marsh habitat. The salt marsh provides nursery habitat for economically and ecologically important finfish and shellfish species. Marine and estuarine species that may be present in the project area include the following:

- **Finfish:** southern flounder, mullet, southern kingfish, Atlantic croaker, spot, weakfish, speckled seatrout, red drum, and black drum
- **Shellfish:** white shrimp, brown shrimp, pink shrimp, grass shrimp, blue crabs, marsh crabs, mud crabs, fiddler crabs, and bent mussels
- **Benthic Organisms and Other Invertebrates:** polychaetes, amphipods, copepods, isopods, and barnacles

7.2.5.3 Weeks Bay Land Acquisition—East Gateway Tract

The project is located at the mouth of Weeks Bay and includes extensive salt marsh habitat. The site provides nursery habitat for economically and ecologically important finfish and shellfish species. Marine and estuarine species that may be present in the project area include the following:

- **Finfish:** southern flounder, mullet, southern kingfish, Atlantic croaker, spot, weakfish, speckled seatrout, red drum, and black drum
- **Shellfish:** white shrimp, brown shrimp, pink shrimp, grass shrimp, blue crabs, marsh crabs, mud crabs, fiddler crabs, and bent mussels
- **Benthic Organisms and Other Invertebrates:** polychaetes, amphipods, copepods, isopods, and barnacles

7.2.5.4 Weeks Bay Land Acquisition—Harrod Tract

The project is located along the Fish River approximately 1 mile upstream of Weeks Bay and receives some tidal and wind-driven estuarine influence. Fringing marsh habitat provides habitat for marine and estuarine species including but not limited to those listed below. The site also provides nursery habitat for economically and ecologically important finfish and shellfish species.

- **Finfish:** southern flounder, mullet, southern kingfish, Atlantic croaker, spot, weakfish, speckled seatrout, red drum, and black drum
- **Shellfish:** white shrimp, brown shrimp, pink shrimp, grass shrimp, blue crabs, marsh crabs, mud crabs, fiddler crabs, and bent mussels
- **Benthic Organisms and Other Invertebrates:** polychaetes, amphipods, copepods, isopods, and barnacles

7.2.6 Marine and Estuarine Resources—Environmental Consequences

7.2.6.1 No Action Alternative

Under the no action alternative, projects related to the conservation of Wetlands, Coastal, and Nearshore Habitats would not occur. The parcels being considered for purchase under the action alternatives could remain undeveloped or could be developed and disturbed by a variety of human activities. If the properties remained undeveloped (e.g., acquired for future preservation by other entities or funding mechanisms), there would be no short- or long- term, adverse impacts on marine and estuarine fauna because the ecosystems would remain intact. If the properties were to be developed at some point in the future, development would have short- and long-term, adverse impacts on habitat because human infrastructure and occupation would destroy and fragment habitat and degrade water quality. This could contribute to population declines or displacement of marine and estuarine fauna by reducing habitat suitability or availability. The level of adverse impacts would be directly related to the intensity and type of future development that could occur on each property.

7.2.6.2 Perdido River Land Acquisition—Molpus Tract

The proposed acquisition of the Molpus Tract would have no short- or long-term impacts on marine or estuarine fauna because the project area is located along the Perdido River, approximately 15 miles upstream of Perdido Bay, and does not contain marine or estuarine habitats or fauna.

7.2.6.3 Magnolia River Land Acquisition—Holmes Tract

The proposed acquisition of the Holmes Tract would have long-term, beneficial impacts on marine and estuarine fauna within the project area because the project would conserve salt marsh habitat along the shoreline of the Magnolia River, eliminating the potential for future development. The project would conserve and protect nursery habitat for economically and ecologically important finfish and shellfish species. No short- or long-term, adverse impacts on marine or estuarine fauna would occur because of the proposed land acquisition.

7.2.6.4 Weeks Bay Land Acquisition—East Gateway Tract

The proposed acquisition of the East Gateway Tract would have long-term, beneficial impacts on marine and estuarine fauna within the project area because the project would conserve approximately 175 acres of habitat, including extensive salt marsh habitat at of the mouth of Weeks Bay, eliminating the potential for future development. The project would conserve and protect nursery habitat for economically and ecologically important finfish and shellfish species. No short- or long-term, adverse impacts on marine or estuarine fauna would occur because of the proposed land acquisition.

7.2.6.5 Weeks Bay Land Acquisition—Harrod Tract

The proposed acquisition of the Harrod Tract would have long-term, beneficial impacts on marine and estuarine fauna within the project area because the project would conserve approximately 231 acres of habitat, including salt marsh, along the Fish River, approximately 1 mile upstream of Weeks Bay, eliminating the potential for future development. The project would conserve and protect nursery habitat for economically and ecologically important finfish and shellfish species. No short-or long-term, adverse impacts on marine or estuarine fauna would occur because of the proposed land acquisition.

7.2.7 Rare and Protected Species—Affected Environment

7.2.7.1 Perdido River Land Acquisition—Molpus Tract

Rare species of highest conservation concern (SGCN P1) that could occur near the Molpus Tract include black bear, southeastern pocket gopher, long-tailed weasel, river frog, southern dusky salamander, Bewick’s wren, and Henslow’s sparrow. Rare species of high conservation concern (SGCN P2) that could occur near the project include one-toed amphiuma, mimic glass lizard, southeastern five-lined skink, rainbow snake, eastern kingsnake, speckled kingsnake, eastern coral snake, eastern diamondback rattlesnake, alligator snapping turtle, least bittern, northern harrier, American kestrel, American woodcock, wood thrush, worm-eating warbler, Swainson’s warbler, Kentucky warbler, and Bachman’s sparrow.

ESA-listed species that are known to occur or may potentially occur on the Molpus Tract include:

- **Gulf sturgeon:** potentially present in downstream coastal waters but not documented in the Perdido River near the Molpus Tract
- **Eastern indigo snake:** potentially present in upland habitat areas with sandy soils and open canopies, especially within any longleaf pine forest
- **Gopher tortoise:** potentially present in upland habitat areas with sandy soils and open canopies, especially within any longleaf pine forest
- **Wood stork:** potentially present within wooded wetlands and river margin where shallow-water foraging habitat exists

- **Red-cockaded woodpecker:** potentially present in upland pine forest habitat, especially within any longleaf pine forest
- **Reticulated flatwoods salamander:** not documented in Alabama since 1981; low potential to occur in the project area

The Molpus Tract contains no designated critical habitat for ESA-listed species.

Protected marine mammals are unlikely to occur in the vicinity of the Molpus Tract. Downstream, in Perdido Bay, the threatened West Indian manatee and bottlenose dolphin would occasionally occur.

7.2.7.2 Magnolia River Land Acquisition—Holmes Tract

Rare species of highest conservation concern (SGCN P1) that could occur near the Holmes Tract include river frog, southern dusky salamander, Mississippi diamondback terrapin, Bewick’s wren, and Henslow’s sparrow. Rare species of high conservation concern (SGCN P2) that could occur near the project area include rainbow snake, eastern kingsnake, eastern coral snake, eastern diamondback rattlesnake, alligator snapping turtle, least bittern, reddish egret, swallow-tailed kite, northern harrier, American kestrel, yellow rail, black rail, worm-eating warbler, Swainson’s warbler, Kentucky warbler, and seaside sparrow.

ESA-listed species that are known to occur or may potentially occur near the Holmes Tract include:

- **West Indian manatee:** likely present on rare occasions within the Magnolia River, adjacent to the project area
- **Gopher tortoise:** documented in the project area using upland habitats with sandy soils and open canopies, especially pine forest
- **Alabama red-bellied turtle:** potentially present in shallow vegetated backwaters of freshwater streams within the project area
- **Eastern indigo snake:** potentially present in upland habitat areas with sandy soils and open shrub or forest canopy
- **Wood stork:** potentially present within wooded wetlands and river margin where shallow-water foraging habitat exists

The Holmes Tract contains no designated critical habitat for ESA-listed species.

Protected marine mammals that may possibly occur near the Holmes Tract include the threatened West Indian manatee in the Magnolia River and downstream in Weeks Bay and Mobile Bay. Bottlenose dolphin occur in Mobile Bay.

7.2.7.3 Weeks Bay Land Acquisition—East Gateway Tract

Rare species of highest conservation concern (SGCN P1) that could occur near the East Gateway Tract include southern dusky salamander, Mississippi diamondback terrapin, snowy plover, Wilson’s plover, Bewick’s wren, and Henslow’s sparrow. Rare species of high conservation concern (SGCN P2) that could occur near the project area include rainbow snake, eastern kingsnake, eastern coral snake, eastern diamondback rattlesnake, least bittern, reddish egret, northern harrier, American kestrel, yellow rail, black rail, American oystercatcher, worm-eating warbler, Swainson’s warbler, Kentucky warbler, Nelson’s sharp-tailed sparrow, and seaside sparrow.

ESA-listed species that are known to occur or may potentially occur on the Gateway Tract include:

- **Gulf sturgeon:** potentially present in Weeks Bay, likely to occur in Mobile Bay, and documented within the Perdido River
- **West Indian manatee:** potentially present on rare occasions within Weeks Bay or Mobile Bay, adjacent to the project area
- **Gopher tortoise:** potentially present in upland habitat areas with sandy soils and open canopies
- **Alabama red-bellied turtle:** potentially present in shallow vegetated backwaters of estuarine streams within the project area
- **Eastern indigo snake:** potentially present in upland habitat areas with sandy soils and open canopies
- **Wood stork:** potentially present within wooded wetlands, marshes, and creek margins where shallow-water foraging habitat exists

The East Gateway Tract contains no designated critical habitat for ESA-listed species.

Protected marine mammals that have been documented in Weeks Bay and Mobile Bay adjacent to the East Gateway Tract include West Indian manatee and bottlenose dolphin.

7.2.7.4 Weeks Bay Land Acquisition—Harrod Tract

Rare species of highest conservation concern (SGCN P1) that could occur near the Harrod Tract include river frog, southern dusky salamander, Mississippi diamondback terrapin, Bewick's wren, Henslow's sparrow, and American oystercatcher. Rare species of high conservation concern (SGCN P2) that could occur near the project area include mimic glass lizard, rainbow snake, eastern kingsnake, eastern coral snake, eastern diamondback rattlesnake, least bittern, reddish egret, northern harrier, American kestrel, yellow rail, black rail, Nelson's sharp-tailed sparrow, and seaside sparrow.

ESA-listed species that are known to occur or may potentially occur on the Harrod Tract include:

- **Gulf sturgeon:** likely present on rare occasions within Weeks Bay and Mobile Bay, downstream of the project area
- **West Indian manatee:** likely present on rare occasions within Weeks Bay and Mobile Bay, downstream of the project area
- **Gopher tortoise:** likely present in upland habitat areas with sandy soils and open canopies, especially within any longleaf pine forest
- **Alabama red-bellied turtle:** likely present in shallow vegetated backwaters of the Fish River or Turkey Branch, bordering the project area
- **Eastern indigo snake:** potentially present in upland habitat areas with sandy soils and open shrub or forest canopy
- **Wood stork:** potentially present within wetlands and along the Fish River margin where shallow-water foraging habitat exists

The Harrod Tract contains no designated critical habitat for ESA-listed species.

Protected marine mammals that have been documented nearby in Weeks Bay and Mobile Bay adjacent to the East Gateway Tract include West Indian manatee and bottlenose dolphin.

7.2.8 Rare and Protected Species—Environmental Consequences

The proposed projects are located in the Gulf Coast region of Alabama, which includes Baldwin and Mobile counties. The project locations occur along and within nearshore, coastal, and inland habitat types. The level of effect that proposed actions could have on each species is also described. The alternatives include land conservation projects, habitat projects on federally managed lands, and watershed-based nutrient reduction programs. Other projects focus on sea turtles, marine mammals, birds, and oysters.

In some cases, based on coordination with resource agencies, the Trustees have made preliminary determinations that a proposed project *May Affect, but is Not Likely to Adversely Affect* certain ESA-listed species. The effects determinations and the respective listed species are described in this section. The Trustees are engaged in technical assistance with the appropriate agencies for ESA compliance, and the compliance status will be updated in the final plan.

7.2.8.1 No Action Alternative

Under the no action alternative, projects related to the conservation of Wetlands, Coastal, and Nearshore Habitats would not occur. The parcels being considered for purchase under the action alternatives could remain undeveloped or could be developed and disturbed by a variety of human activities. If the properties remained undeveloped (e.g., acquired for future preservation by other entities or funding mechanisms), there would be no short- or long- term, adverse impacts on any state-protected, ESA-listed, or protected marine mammals, and their habitat would remain mostly unaltered. If the properties were to be developed at some point in the future, it would have short- and long-term, adverse impacts on state-protected, ESA-listed, or protected marine mammals because development could destroy and fragment habitat, and degrade water quality. This could contribute to population declines or displacement of rare and protected species by reducing habitat suitability or availability. The level of adverse impacts would be directly related to the intensity and type of future development that could occur on each property.

7.2.8.2 Perdido River Land Acquisition—Molpus Tract

Acquiring the Molpus Tract for conservation purposes would have no long-term, adverse impacts on any state-protected or ESA-listed species or protected marine mammals. Because their habitat would remain mostly unaltered, long-term, beneficial impacts would result from habitat conservation. The project would include the development of a management plan for the Molpus Tract, which would involve site evaluations, wildlife and/or habitat surveys, and other data collection to document the property's conservation values. These activities would involve temporary human disturbance, which could have negligible impacts on rare and protected species, but would not involve any ground disturbance. Adverse impacts from future restoration projects would be addressed by additional NEPA compliance and permitting, if necessary.

Rare species of highest conservation concern (SGCN P1) that could benefit from the conservation of the Molpus Tract include black bear, southeastern pocket gopher, long-tailed weasel, river frog, southern dusky salamander, Bewick's wren, and Henslow's sparrow. Rare species of high conservation concern (SGCN P2) that could benefit from the conservation of the Molpus Tract are listed in Table 4-2.

Because the project would only involve occasional human presence to plan for future management actions, this land protection project would have *No Effect* on the ESA-listed species that could potentially be affected by the conservation of the Molpus Tract, including: Gulf sturgeon, eastern indigo snake, gopher tortoise, wood stork, red-cockaded woodpecker, reticulated flatwoods salamander.

7.2.8.3 Magnolia River Land Acquisition—Holmes Tract

Acquiring the Holmes Tract to protect it from development would not have any long-term, adverse impacts on any state-protected or ESA-listed species or protected marine mammals. Because their habitat would remain mostly unaltered, beneficial impacts would result from habitat conservation over the long term. The project would include the development of a management plan for the Holmes Tract, which would involve site evaluations, wildlife and/or habitat surveys, and other data collection to document the property's conservation values. These activities would involve temporary human disturbance, which could have negligible impacts on rare and protected species, but would not involve any ground disturbance. Adverse impacts from future restoration projects would be addressed by additional NEPA compliance and permitting, if necessary.

Rare species of highest conservation concern (SGCN P1) that could benefit from the conservation of the Holmes Tract include river frog, southern dusky salamander, Mississippi diamondback terrapin, Bewick’s wren, and Henslow’s sparrow. Other rare species of high conservation concern (SGCN P2) that could benefit from the conservation of the Holmes Tract are listed in Table 4-2.

Because the project would only involve occasional human presence to plan for future management actions, this land protection project would have *No Effect* on the ESA-listed species that could potentially occur on the Holmes Tract, including: West Indian manatee, gopher tortoise, Alabama red-bellied turtle, eastern indigo snake, and wood stork.

7.2.8.4 Weeks Bay Land Acquisition—East Gateway Tract

Acquiring the East Gateway Tract to protect it from development would not have any long-term, adverse impacts on any state-protected or ESA-listed species or protected marine mammals. Because their habitat would remain mostly unaltered, long-term, beneficial impacts would result from habitat conservation. The project would include the development of a management plan for the East Gateway Tract, which would involve site evaluations, wildlife and/or habitat surveys, and other data collection to document the property's conservation values. These activities would involve temporary human disturbance, which could have negligible impacts on rare and protected species, but would not involve any ground disturbance. Any adverse impacts from future restoration projects would be addressed by additional NEPA compliance and permitting, if necessary.

Rare species of highest conservation concern (SGCN P1) that could benefit from the conservation of the East Gateway Tract include southern dusky salamander, Mississippi diamondback terrapin, snowy plover, Wilson’s plover, Bewick’s wren, and Henslow’s sparrow. Rare species of high conservation concern (SGCN P2) that could benefit from the conservation of the East Gateway Tract are listed in Table 4-2.

Because the project would only involve occasional human presence to plan for future management actions, this land protection project would have *No Effect* on the ESA-listed species that could potentially occur on the East Gateway Tract, including: Gulf sturgeon, West Indian manatee, gopher tortoise, Alabama red-bellied turtle, eastern indigo snake, and wood stork.

7.2.8.5 Weeks Bay Land Acquisition—Harrod Tract

Acquiring the Harrod Tract to protect it from development would not have any long-term, adverse impacts on any state-protected or ESA-listed species or protected marine mammals. Because their habitat would remain mostly unaltered, long-term, beneficial impacts would result from habitat conservation. The project would include the development of a management plan for the Harrod Tract, which would involve site evaluations, wildlife and/or habitat surveys, and other data collection to document the property's conservation values. These activities would involve temporary human disturbance, which could have negligible impacts on rare and protected species, but would not involve any ground disturbance. Any adverse impacts from future restoration projects would be addressed by additional NEPA compliance and permitting, if necessary.

Rare species of highest conservation concern (SGCN P1) that could benefit from the conservation of the Harrod Tract include river frog, southern dusky salamander, Mississippi diamondback terrapin, Bewick’s wren, Henslow’s sparrow, and American oystercatcher. Rare species of high conservation concern (SGCN P2) that could benefit from the conservation of the Harrod Tract are listed in Table 4-2.

Because the project would only involve occasional human presence to plan for future management actions, this land protection project would have *No Effect* on the ESA-listed species that could potentially occur on the Harrod Tract, including: Gulf sturgeon, West Indian manatee, gopher tortoise, Alabama red-bellied turtle, eastern indigo snake, and wood stork.

7.2.9 Federally Managed Fisheries—Affected Environment

7.2.9.1 Perdido River Land Acquisition—Molpus Tract

This land conservation project would occur along the Perdido River, approximately 15 river miles upstream of its delta in Perdido Bay; Perdido River empties into the Gulf of Mexico. Because the project would be land based, no managed fish species or EFH would occur within the project area. However, downstream in Perdido Bay, EFH exists for shrimp, red drum, reef fishes, coastal migratory pelagics, and for the neonate and juvenile life stages of the highly migratory species described above.

7.2.9.2 Magnolia River Land Acquisition—Holmes Tract

This land conservation project would occur along the Magnolia River, approximately 2 river miles upstream of Weeks Bay; Weeks Bay empties into Mobile Bay and the Gulf of Mexico. Because the project would be land based, no managed fish species or EFH would occur within the project area. However, the project lands drain into Weeks Bay, an estuary that contains EFH for many shrimp species (brown, pink, and white), red drum, and certain coastal migratory pelagics (e.g., Spanish mackerel). Weeks Bay also provides nursery habitat that is important for most of the major prey species of coastal migratory pelagics, including a variety of fishes, squid, and shrimp. Juveniles of some managed reef fishes (e.g., some grouper and snappers) occupy estuaries to some extent, and gray snappers are likely to occur within Weeks Bay.

7.2.9.3 Weeks Bay Land Acquisition–East Gateway Tract

This land conservation project would occur near the mouth of Weeks Bay. Because the project would be land based, no managed fish species or EFH would occur within the project area. However, project lands drain into Weeks Bay, an estuary that contains EFH for many species as described above for the Holmes Tract.

7.2.9.4 Weeks Bay Land Acquisition–Harrod Tract

This land conservation project would occur along the Fish River and to the north of Turkey Branch, approximately 1.25 miles upstream of Weeks Bay. Because the project activities would be land based, no managed fish species or EFH would occur within the project area. However, project lands drain into Weeks Bay, an estuary that contains EFH for many species as described above for the Holmes Tract.

7.2.10 Federally Managed Fisheries—Environmental Consequences

7.2.10.1 No Action Alternative

Under the no action alternative, projects related to the conservation of Wetlands, Coastal, and Nearshore Habitats would not occur. The parcels being considered for purchase under the action alternatives could remain undeveloped or could be developed and disturbed by a variety of human activities. If the properties remained undeveloped (e.g., acquired for future preservation by other entities or funding mechanisms), no short- or long- term, adverse impacts would occur on federally managed fisheries in adjacent waters because the ecosystems would remain intact. If the properties were to be developed at some point in the future, development would have short- and long-term, adverse impacts on federally managed fisheries because it could destroy and fragment habitat and degrade water quality. This could contribute to population declines or displacement of federally managed species by reducing habitat suitability or availability. The level of adverse impacts would be directly related to the intensity and type of future development that could occur on each property.

7.2.10.2 Perdido River Land Acquisition—Molpus Tract

This project is located along the Perdido River, approximately 15 miles upstream of Perdido Bay. No marine or estuarine habitats or fauna exist within the project area, and EFH is located at such a distance that there would be no noticeable impacts; therefore, no destruction or adverse modification to FMP species or EFH would occur.

7.2.10.3 Magnolia River Land Acquisition—Holmes Tract

This land conservation project occurs along the Magnolia River, approximately 2 river miles upstream of Weeks Bay. The proposed acquisition of the Holmes Tract would result in no destruction or adverse modification to FMP species or EFH because the project area is a land conservation project. The project would prevent development on the site, preventing degradation of downstream water quality and shoreline habitat enhancement that would benefit EFH for red drum, coastal migratory pelagics, shrimp, gulf stone crab, and juvenile reef fish that may use estuaries for nursery habitat (e.g., some grouper and snapper).

7.2.10.4 Weeks Bay Land Acquisition—East Gateway Tract

This land conservation project occurs near the mouth of Weeks Bay. The proposed acquisition of the East Gateway Tract would result in no destruction or adverse modification to FMP species or EFH because the project area is a land conservation project. The project would prevent development on the site, preventing degradation of downstream water quality and shoreline habitat enhancement that would benefit EFH for red drum, coastal migratory pelagics, shrimp, gulf stone crab, and juvenile reef fish that may use estuaries for nursery habitat (e.g., some grouper and snapper).

7.2.10.5 Weeks Bay Land Acquisition—Harrod Tract

This land conservation project occurs along the Fish River and to the north of Turkey Branch, approximately 1.25 miles upstream of Weeks Bay. The proposed acquisition of the Harrod Tract would result in no destruction or adverse modification to FMP species or EFH because the project area is a land conservation project. The project would prevent development on the site, preventing degradation of downstream water quality and shoreline habitat enhancement that would benefit nearby EFH for red drum, coastal migratory pelagics, shrimp, gulf stone crab, and juvenile reef fish that may use estuaries for nursery habitat (e.g., some grouper and snapper).

7.3 SOCIOECONOMIC RESOURCES

7.3.1 Cultural Resources—Affected Environment

The affected environment for cultural resources for all projects considered in this draft RP II/EA is discussed in Section 4.3.2.

7.3.2 Cultural Resources—Environmental Consequences

For all projects in this draft RP II/EA, consultation with the Alabama State Historic Preservation Officer is currently ongoing and will be incorporated into the final RP II/EA. For many projects, the action would involve a study, public education, or land acquisition that does not have the potential to disturb cultural resources. For those projects that include construction, ground disturbance, or other related activities, if any culturally or historically important resources were identified during project preparations or predevelopment surveys, such areas would be avoided during construction. A complete review of all alternatives under Section 106 of the NHPA is ongoing and would be completed prior to any activities that would restrict consideration of measures to avoid, minimize, or mitigate any adverse effects on historic properties located in the project area. Alternatives would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

7.3.3 Land and Marine Management—Affected Environment

7.3.3.1 Perdido River Land Acquisition—Molpus Tract

The Molpus Tract is located north of Interstate 10, immediately south of and contiguous with the Perdido Wildlife Management Area. A privately owned timber organization currently owns the property that is relatively undeveloped and semi-forested with more than 4 miles of riverfront on the Perdido River.

7.3.3.2 Magnolia River Land Acquisition—Holmes Tract

The Holmes Tract is an approximately 80-acre completely forested portion of privately owned land bounded almost completely by the Magnolia River.

7.3.3.3 Weeks Bay Land Acquisition—East Gateway Tract

The East Gateway Tract comprises undeveloped, mostly forested privately owned land located along the shore of the Weeks Bay and immediately north of BSNWR lands (PAD-US, 2017). The property also falls in the Weeks Bay Reserve's Coastal Zone and Core Priority Area, as well as the Weeks Bay Project Acquisition Area. The 2005 Baldwin County Wetland Conservation Plan highlights the property as a wetland to be considered for conservation. In the Mobile Bay National Estuarine Program's Comprehensive Conservation and Management Plan, the Fish River watershed, where the property is located, is listed as the highest priority watershed in coastal Alabama for restoration. The eastern portion of the project site is located in the continuous 10-foot elevation contour, and thus lies within a coastal area regulated by the federal CZMA, which is implemented through the Alabama Coastal Area Management Program. The CZMA defines coastal zones wherein development must be managed to protect areas of natural resources unique to coastal regions. In addition, the CZMA requires federal agency activities to be fully consistent with a state's approved coastal management program.

7.3.3.4 Weeks Bay Land Acquisition—Harrod Tract

The Harrod Tract is the largest privately owned tract in the lower part of Fish River, comprised mostly undeveloped swamp, marsh, and river shoreline. The Fish River and Weeks Bay NERR forms the eastern boundary of the site (PAD-US, 2017).

7.3.4 Land and Marine Management—Environmental Consequences

7.3.4.1 No Action Alternative

Under the no action alternative, projects related to the restoration of Wetlands, Coastal, and Nearshore Habitats would not occur, and parcels being considered for purchase to preserve these habitats could remain undeveloped, purchased, or could be developed in a number of ways. If the parcels remained in their current undeveloped condition, there would be no resulting impact on land and marine management. If developed, there would likely be minor to moderate impacts on land management because land uses in that area would change with the increased development.

7.3.4.2 Perdido River Land Acquisition—Molpus Tract

The proposed project would involve land acquisition, but no construction is proposed. Implementation of the project would not disrupt existing land management. Impacts on land and marine management would be beneficial and long term because acquiring the tract would enhance habitat protection.

7.3.4.3 Magnolia River Land Acquisition—Holmes Tract

Impacts would be the same as those described for the Perdido River Land Acquisition—Molpus Tract.

7.3.4.4 Weeks Bay Land Acquisition—East Gateway Tract

The proposed project would involve land acquisition and E&D for future removal of a dilapidated bulkhead on the waterfront. The East Gateway Tract sits adjacent to existing protected land, the Herndon Tract, owned by the WBF. In addition, it falls within the Weeks Bay Reserve's Coastal Zone and Core Priority Area and the Weeks Bay Project Acquisition Area. The 2005 Baldwin County Wetland Conservation Plan also highlights the property as a wetland to be considered for conservation. In the Mobile Bay National Estuarine Program's Comprehensive Conservation and Management Plan, the Fish River watershed, where the property is located, is listed as the highest priority watershed in coastal Alabama for restoration. Implementation of the project would not disrupt existing land management. Impacts on land and marine management would be beneficial and long term because acquiring the tract would enhance habitat protection.

7.3.4.5 Weeks Bay Land Acquisition—Harrod Tract

Impacts would be the same as those described for the Perdido River Land Acquisition—Molpus Tract.

7.3.5 Tourism and Recreation—Affected Environment

7.3.5.1 Perdido River Land Acquisition—Molpus Tract

The tract is currently undeveloped, under private ownership, and is not used by the public for tourism or recreational uses.

7.3.5.2 Magnolia River Land Acquisition—Holmes Tract

The tract is currently undeveloped, under private ownership, and is not used by the public for tourism or recreational uses.

7.3.5.3 Weeks Bay Land Acquisition—East Gateway Tract

The East Gateway Tract is the largest privately owned tract in the lower part of Fish River and is composed of mostly undeveloped swamp, marsh, and river shoreline. The project area is currently held by private interests that do not permit the public to access the land; however, the Fish River and Weeks Bay NERR forms the eastern boundary of the site (PAD-US, 2017). A variety of both passive and active recreational use occurs at the reserve, including fishing, boating, and bird watching.

7.3.5.4 Weeks Bay Land Acquisition—Harrod Tract

The tract is currently undeveloped, under private ownership, and is not used by the public for tourism or recreational uses.

7.3.6 Tourism and Recreation—Environmental Consequences

7.3.6.1 No Action Alternative

Under the no action alternative, projects related to the restoration of Wetlands, Coastal, and Nearshore Habitats would not occur, and parcels being considered for purchase to preserve these habitats could remain undeveloped or could be developed in a number of ways. If parcels remained in their current undeveloped condition, there would be no resulting impact on tourism and recreational use. If developed, there would likely be minor to moderate impacts on tourism and recreation because these sites would likely restrict public access with future development.

7.3.6.2 Perdido River Land Acquisition—Molpus Tract

No short- or long-term, adverse impacts on tourism and recreational use are anticipated because of the proposed land acquisition. The tract is currently vacant and is not used by the public for tourism or recreational uses. The proposed project would involve land acquisition for the purpose of conservation. Direct impacts on tourism and recreational use would be beneficial and long term because acquiring the tract would result in enhanced habitat protection, which could result in greater opportunities for passive recreation because the site would be integrated into the existing plans for a Perdido River "blueway trail."

7.3.6.3 Magnolia River Land Acquisition—Holmes Tract

Impacts would be the same as those described for the Perdido River Land Acquisition—Molpus Tract; the long-term benefits of conservation would enhance recreation. No short- or long-term, adverse impacts on tourism and recreational use are anticipated as a result of the proposed land acquisition.

7.3.6.4 Weeks Bay Land Acquisition—East Gateway Tract

Impacts would be the same as those described for the Perdido River Land Acquisition—Molpus Tract; the long-term benefits of conservation would enhance recreation. No short- or long-term, adverse impacts on tourism and recreational use are anticipated because of the proposed land acquisition.

7.3.6.5 Weeks Bay Land Acquisition—Harrod Tract

Impacts would be the same as those described for the Perdido River Land Acquisition—Molpus Tract; the long-term benefits of conservation would enhance recreation. No short- or long-term, adverse impacts on tourism and recreational use are anticipated because of the proposed land acquisition.

7.3.7 Aesthetics and Visual Resources—Affected Environment

7.3.7.1 Perdido River Land Acquisition—Molpus Tract

The landscape surrounding the proposed land acquisition is undeveloped and semi-forested, with portions of the tract containing open fields. Several unpaved roads and a railroad extend throughout the tract. County Highway 112, Old Pensacola Road, bisects the northern portion of the project area. No designated protected viewsheds are near the proposed project.

7.3.7.2 Magnolia River Land Acquisition—Holmes Tract

The Holmes Tract is completely forested and bounded along most of the property by the Magnolia River, which forms all but its eastern boundary. Low-density private residential property is located just east of the project site. The Alabama Coastal Connection Scenic Byway is located north of the project site, where it traverses a landscape of semi-forested, peri-urban lands on State Highway 98 (Alabama Tourism Department, 2017).

7.3.7.3 Weeks Bay Land Acquisition—East Gateway Tract

The East Gateway Tract comprises undeveloped, mostly forested land located along the shore of Weeks Bay. The western portion of the tract is characterized by forest, and the eastern extent contains marshland. No designated protected viewsheds are near the proposed project. A 0.25-mile long bulkhead currently obstructs views of the natural shoreline.

7.3.7.4 Weeks Bay Land Acquisition—Harrod Tract

The Harrod Tract comprises mostly undeveloped swamp, marsh, and river shoreline. Several unpaved roads extend throughout the tract and one structure is located beside one of several small waterbodies located in the tract. The surrounding visual setting is characterized by a mosaic of low-density development to the north and west, amid a mixture of forest and marsh habitat. To the southeast, the site bounds the Fish River, which flows southward to Weeks Bay. The Alabama Coastal Connection Scenic Byway is located south of the project site where it traverses a landscape of semi-forested, peri-urban lands on State Highway 98 (Alabama Tourism Department, 2017).

7.3.8 Aesthetics and Visual Resources—Environmental Consequences

In general, where the proposed projects involve construction and/or ground-disturbing activities, they would present a short-term change in the visual setting throughout the duration of construction activities. The use of heavy equipment and ground-moving activities in natural areas would create short-term visual impacts. These impacts would be temporary, and no long-term impacts are expected. Most proposed projects do not involve such immediately visible activities and would thus not present measurable visual effects.

7.3.8.1 No Action Alternative

Under the no action alternative, projects related to the restoration of Wetlands, Coastal, and Nearshore Habitats would not occur, and parcels being considered for purchase to preserve these habitats could remain undeveloped or could be developed in a number of ways. If parcels remained in their current undeveloped condition, there would be no resulting impact on aesthetics and visual resources. If developed, there would likely be minor to moderate impacts on aesthetics and visual resources because further development on the properties would change the visual landscape, with the level of impact related to the intensity of development.

7.3.8.2 Perdido River Land Acquisition—Molpus Tract

No adverse impacts on aesthetics or visual character would occur. The proposed project would involve land acquisition, but no construction is proposed. In addition, no designated protected viewsheds are near the proposed project. Long-term, beneficial effects are expected as the result of preserving the undeveloped character of the landscape.

7.3.8.3 Magnolia River Land Acquisition—Holmes Tract

No adverse impacts on aesthetics or visual character would occur. The proposed project would involve land acquisition, but no construction is proposed. Project activities would not disrupt the existing character of the landscape or detract from current publicly accessible high-quality scenic areas, such as the nearby Alabama Coastal Connection Scenic Byway. Long-term, beneficial effects are expected as the result of enhanced habitat in areas where such improvements would be publicly visible.

7.3.8.4 Weeks Bay Land Acquisition—East Gateway Tract

No adverse impacts on aesthetics or visual character would occur. The proposed project would involve land acquisition and E&D for the future removal of a dilapidated bulkhead on the waterfront. No designated protected viewsheds are near the proposed project. Long-term, beneficial effects on visual quality are expected as the result of enhanced habitat in areas where such improvements would be publicly visible and preserve the undeveloped character of the landscape.

7.3.8.5 Weeks Bay Land Acquisition—Harrod Tract

No adverse impacts on aesthetics or visual character would occur. Acquiring private land for conservation purposes would not result in adverse impacts on aesthetics or visual character. The Alabama Coastal Connection Scenic Byway is located south of the project site where it traverses a landscape of semi-forested, peri-urban lands on State Highway 98. Long-term, beneficial effects on visual quality are expected as the result of enhanced habitat in areas where such improvements would be publicly visible.

7.3.9 Public Health and Safety—Affected Environment

7.3.9.1 Perdido River Land Acquisition—Molpus Tract

This tract is currently undeveloped and under private ownership. The Perdido River suffers from shoreline erosion as a result of human impacts. The Molpus Tract has remained undeveloped and is one of the few sections along the Perdido River that has not suffered severe shoreline erosion.

7.3.9.2 Magnolia River Land Acquisition—Holmes Tract

The Holmes Tract is one of the largest undeveloped tracts on the Magnolia River that has not been timbered. Shoreline erosion has not affected this area because the forested fringe along the river provides an ecologically productive deterrent to t erosion.

7.3.9.3 Weeks Bay Land Acquisition—East Gateway Tract

Private interests hold the 175+/- undeveloped acres that comprise the East Gateway Tract, and public access to the land is not permitted. This area contains ecologically important wetlands that improve water quality, stabilize shorelines, reduce storm-surge risk, and capture and store carbon in organic soils.

7.3.9.4 Weeks Bay Land Acquisition—Harrod Tract

This tract is undeveloped, under private ownership, and is not used by the public. The existing 100 acres of intact wetland habitat prevent shoreline erosion and decrease storm-surge risk, and naturally filter the water system.

7.3.10 Public Health and Safety—Environmental Consequences

Public health and safety issues relate to the short-term construction of projects and their long-term operation and maintenance. Additional discussion of the potential for direct or indirect impacts on public health and safety within the Gulf Coast region is found in the individual proposed alternative descriptions and discussion of possible environmental consequences.

Flood control refers to all methods used to reduce or prevent the detrimental effects of floodwaters, including the construction of floodways (human-made channels to divert floodwater), levees, lakes, dams, reservoirs, or gates to hold extra water during times of flooding. Shoreline protection consists of engineered structures, living shorelines, or other solutions meant to slow erosion by rising sea levels and wave action. Most of the impacts on public health and safety associated with the alternatives proposed for Baldwin and Mobile counties would be beneficial.

7.3.10.1 No Action Alternative

Under the no action alternative, projects related to the restoration of Wetlands, Coastal, and Nearshore Habitats would not occur. The parcels being considered for purchase to preserve these habitats could remain undeveloped or could be developed in a number of ways. If properties were acquired for preservation outside NRDA funding, no long- or short-term impacts on public health and safety are expected because no construction activities would occur and lack of development would reduce shoreline erosion in the area. If the properties were developed, there would be short- and long-term, adverse impacts on public health and safety because development of infrastructure (e.g., parking lots or buildings) would result in soil disturbance during construction, a long-term increase in impervious surfaces, and increases in shoreline erosion. The level of adverse impacts would be directly related to the intensity and type of development.

7.3.10.2 Perdido River Land Acquisition—Molpus Tract

This tract is undeveloped, under private ownership, and is not used by the public. Conservation of the site would reduce shoreline erosion in and around the site. Preservation of these sites has the potential to increase passive recreation, but no adverse impacts on public health or safety would be expected.

7.3.10.3 Magnolia River Land Acquisition—Holmes Tract

Impacts would be the same as those described for the Perdido River Land Acquisition—Molpus Tract.

7.3.10.4 Weeks Bay Land Acquisition—East Gateway Tract

Impacts would be the same as those described for the Perdido River Land Acquisition—Molpus Tract.

7.3.10.5 Weeks Bay Land Acquisition—Harrod Tract

Impacts would be the same as those described for the Perdido River Land Acquisition—Molpus Tract.

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7.4 COMPARISON OF ALTERNATIVES

Table 7-1 provides a summary of the environmental consequences of the evaluated alternatives.

Table 7-1: Summary of Environmental Consequences for Wetlands, Coastal, and Nearshore Habitat Projects

	Hydrology and Water Quality	Habitats	Wildlife	Marine and Estuarine Fauna	Rare and Protected Species	Federally Managed Fisheries	Cultural Resources	Land and Marine Management	Tourism and Recreation	Aesthetics and Visual Resources	Public Health and Safety
Perdido River Land Acquisition—Molpus Tract	No adverse impacts. Long-term, beneficial effects from improved water quality.	No adverse impacts. Long-term, beneficial effects because habitats would be conserved.	No adverse impacts. Long-term, beneficial impacts on wildlife because critical wetland and upland habitat would be conserved.	No adverse impact because the project is located 15 miles inland.	*No Effect* on any rare and protected species. Long-term, beneficial impacts because critical wetland and upland habitat would be conserved.	No adverse effects because the project is located 15 miles inland.	Impacts unknown, pending consultation with the Alabama State Historical Commission.	No impacts on existing land management.	No adverse impacts on tourism and recreational use.	No adverse impacts. Long-term, beneficial effects from preserving the undeveloped character of the landscape.	No impact on public health or safety.
Magnolia River Land Acquisition—Holmes Tract	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	No adverse impacts. Long-term, beneficial impacts because the project would conserve salt marsh habitat.	Same as described above for the Molpus Tract.	No destruction or adverse modification to FMP species or EFH. Beneficial impacts on EFH for red drum, coastal migratory pelagics, shrimp, gulf stone crab, and juvenile reef fish.	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	No impact on public health or safety.
Weeks Bay Land Acquisition—East Gateway Tract	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	Same as described above for the Holmes Tract.	Same as described above for the Molpus Tract.	Same as described above for the Holmes Tract.	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	No impact on public health or safety.
Weeks Bay Land Acquisition—Harrod Tract	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	Same as described above for the Holmes Tract.	Same as described above for the Molpus Tract.	Same as described above for the Holmes Tract.	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	Same as described above for the Molpus Tract.	No impact on public health or safety.

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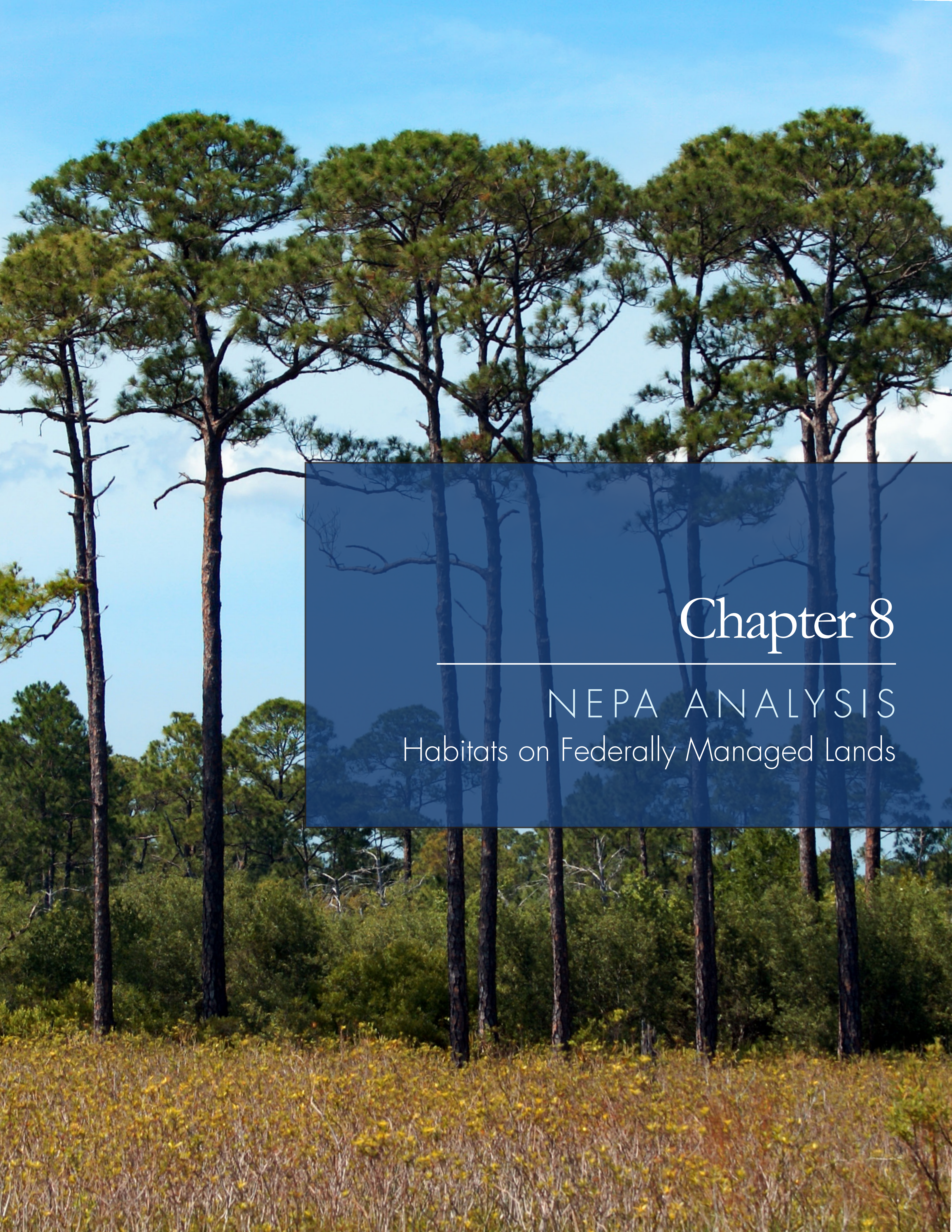

Chapter 8

NEPA ANALYSIS

Habitats on Federally Managed Lands

8.0 NEPA ANALYSIS—HABITAT PROJECTS ON FEDERALLY MANAGED LANDS

This section provides the NEPA analysis for all of the non-E&D restoration alternatives considered in this plan for funding under the Habitat Projects on Federally Managed Lands Restoration Type.

The general affected environment for coastal Alabama described in Chapter 4 of this draft RP II/EA is applicable to this section. CEQ guidance states that agencies should “focus on significant environmental issues,” and for issues that are other than significant, there should be “only enough discussion to show why more study is not warranted.” After preliminary investigation, some resource areas under the Habitat Projects on Federally Managed Lands Restoration Type alternatives were determined to be either unaffected or minimally affected by the restoration actions being proposed for this Restoration Type. Accordingly, these resources are discussed briefly below. Only those resource areas for which potential, adverse impacts are expected are discussed in detail in this draft RP II/EA. Additionally, the NEPA analysis for the Habitat Projects on Federally Managed Lands alternatives looks at a further subset of the total resource areas and topics described in Chapter 4, Affected Environment, as part of the biological, physical, and socioeconomic environment for each restoration alternative. To avoid redundant or unnecessary information, resource areas and topics that are not expected to be affected by a proposed restoration alternative are not evaluated further under that a given project.

Resource areas not analyzed in detail for the Habitat Projects on Federally Managed Lands Restoration Type are identified below, with a brief rationale for non-inclusion:

- **Air Quality and Greenhouse Gases:** The proposed Little Lagoon Living Shoreline project would involve creating a living shoreline to improve storm resiliency and restore natural hydrologic processes at the site. This project would involve the placement of one to two rows of biodegradable coconut fiber coir logs along the eroding shoreline, and placement of grass plantings between the logs and existing eroded shoreline. The use of criteria pollutant generating equipment, such as motor vehicles, to place the fiber logs along the shoreline would result in short-term, negligible, adverse impacts on air quality. The use of this equipment would not adversely affect regional air quality as a result of the scope, scale, and 10 to 12 month duration of construction. No long-term impacts are anticipated. Because the short-term impacts would be minimal and there would be no long-term impacts from operation, this resource area was not carried forward for detailed analysis.
- **Noise:** The proposed living shoreline being evaluated under Habitat Projects on Federally Managed Lands would result in a minimal level of noise impacts during the 10 to 12 month construction period; however, these activities would be short term, and noise would conclude once the construction is completed. Operation of a living shoreline would not result in any long-term noise impacts. Therefore, this resource area was not carried forward for detailed analysis.
- **Socioeconomics and Environmental Justice:** Projects proposed under Habitat Projects on Federally Managed Lands would not have any socioeconomic impacts in the long or short term. While there would be temporary restrictions to recreational access during construction, any impacts would be short term and negligible. The Little Lagoon Living Shoreline project would not generate revenue or other socioeconomics impacts in the long term. Therefore this resource area was not carried forward for detailed analysis.
- **Infrastructure and Transportation:** None of the alternatives evaluated in the draft RP II/EA for Habitat Projects on Federally Managed Lands would create increased demands on area infrastructure that could not be accommodated by existing infrastructure or would affect traffic

and transportation in the area. Therefore, this resource area was not carried forward for detailed analysis.

- **Land and Marine Management:** The Little Lagoon Living Shoreline project is located in the BSNWR, which encompasses some of Alabama's last remaining undisturbed coastal barrier habitat. USFWS manages the 7,000-acre refuge (USFWS, 2017a). The Little Lagoon Living Shoreline project would involve restoration activities such as evaluation, planning, and implementation of a living shoreline project. Pursuant to the CZMA of 1972, federal activities must be consistent to the maximum extent practicable with the federally approved coastal management programs for states where the activities would affect a coastal use or resource. Federal Trustees are submitting consistency determinations (see Appendix C) for state review coincident with public review of this document. The project would be consistent with current land use plans and would provide a long-term benefit to land and marine management in the area; therefore, this resource area was not carried forward for detailed analysis.
- **Public Health and Safety:** Implementation of the proposed Little Lagoon Living Shoreline project would result in short- and long-term, beneficial impacts from the construction of a living shoreline and the reduction of shoreline erosion. No adverse impacts would occur; therefore, this resource area was not carried forward for detailed analysis.
- **Fisheries and Aquaculture:** The Little Lagoon Living Shoreline project would restore natural habitat, functions, and processes around the lagoon by creating a living shoreline. As a result, the overall habitat of the area would improve, benefiting the surrounding fisheries and aquaculture. Long-term, beneficial impacts on fisheries and aquaculture are expected. Therefore this resource area was not carried forward for detailed analysis.
- **Marine Transportation:** None of the alternatives under consideration in this draft RP II/EA for Habitat Projects on Federally Managed Lands would affect marine transportation; therefore, this topic was not carried forward for detailed analysis.

8.1 PHYSICAL ENVIRONMENT

8.1.1 Geology and Substrates—Affected Environment

8.1.1.1 Little Lagoon Living Shoreline

Geology

The Little Lagoon Living Shoreline project is located in Little Lagoon, Gulf Shores, Alabama. Little Lagoon is a shallow body of water, 10 miles long and half a mile wide, that is connected to the Gulf of Mexico with one open surface channel. Shoreline loss/erosion is a chronic issue along Little Lagoon. Heavy rainfall during periods when the lagoon's opening (pass) has been blocked have resulted in high water and contributed to shoreline erosion. Little Lagoon contains sharply defined dune ridges just to its south that are much younger than the eroded ridges to its north from the Pleistocene age. The lagoon was formed when a spit developed between the lagoon and the Gulf. It is assumed that Gator Lake was once a part of Little Lagoon until the spit was developed separating the two bodies of water (Smith, 1986).

Substrates

Coastal expert Scott Douglas estimates that more than 50 percent of Little Lagoon has a hardened shoreline. Of the remaining 50 percent of Little Lagoon that remains unhardened, two-thirds can be found in the boundary of the BSNWR (USDA-NRCS, 2015). Coastal beaches dominate 50 percent of the project site. The rest of the project site is dominated by St. Lucie and Leon sand with gentle slopes that do not exceed 5 percent (USDA-NRCS, 2015). The St. Lucie soil series consists of very deep, excessively drained soils that formed in sandy marine environments or in eolian deposits (USDA-NRCS, 2016). Leon soils are also very deep soils but unlike St. Lucie sands, they are poorly drained and are moderately rapid to moderately slowly permeable soils that appear in tidal areas (USDA-NRCS, 2014).

8.1.2 Geology and Substrates—Environmental Consequences

Alternatives evaluated may include new construction, soil excavation, utility installation, and other environmental modifications that would disturb geology and substrates. Areas where these activities would occur are noted below. These alterations may result in short- and long-term geologic and soil-related impacts at the alternative sites. These impacts could be both adverse and beneficial. Adverse impacts would involve dune alteration, bedrock drilling, sediment excavation, and erosion, while beneficial geologic and soil-related impacts would include dune enhancement and revegetation. Under the Soil Erosion and Sediment Control Model Act of 2009, all states must control sedimentation and erosion through state laws (USEPA, n.d.). Alabama authorizes sediment and erosion control through its soil and water conservation districts (Soil and Water Conservation Districts et al., 2007). Alabama includes 67 districts, one for each county (Soil and Water Conservation Districts et al., 2007). All the districts operate under the guidelines outlined in the Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas to prevent and/or control construction-related erosion (USEPA, n.d.). The handbook ensures that erosion and sedimentation are minimized by using BMPs. Typical examples of BMPs include:

- Using silt fences where appropriate to minimize erosion and deposition.
- Covering piles of removed soil with sod to keep it in place.
- Salvaging and reusing topsoil in place or in other project areas.
- Revegetating the area so that the area of bare soil remaining after construction is eliminated.

Appropriate BMPs depend on the erosion risk of the land, which is influenced by rainfall energy, soil erodibility (grain size), topography, and surface cover (Pitt and Clark, 2002). Although the Gulf Coast has very flat topography, it has fine grained, highly erodible sands; limited surface cover along the beaches; and the highest amount of rainfall energy in the country (Pitt and Clark, 2002). The beaches along the Gulf Coast are constantly being eroded because of their susceptibility to erosion combined with oceanic processes. This erosion is then exacerbated by anthropogenic impacts such as coastal development (TNC, 2017). Each proposed alternative would take the necessary steps to limit the amount of erosion that occurs. Following regulations from ADEM, every construction project that would result in 1-acre of land disturbance or exists on a parcel of 1 acre or more must comply with the Construction Best Management Practices Plan (CBMPP) (ADEM, 2016c). The CBMPP template would be completed with detailed descriptions of the BMPs that would be implemented to mitigate for erosion and runoff. The CBMPP also requires revegetation plans, a phased construction process, and minimization of disturbed areas (ADEM, 2009). Descriptions of BMPs and how to install them are available in the Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas (Alabama Soil and Water Conservation Society, 2003). The BMPs that would be implemented would vary across the proposed alternatives and would depend on the activity being proposed and the resulting level of impact from that activity. A Qualified Credentialed Inspector would be required to conduct regular inspections of construction activities to make sure that the appropriate BMPs are in place and are working effectively throughout the construction process (ADEM, 2016c).

8.1.2.1 No Action Alternative

Under the no action alternative, projects related to Habitat Projects on Federally Managed Lands would not occur. Unless funded through other means, addressing shoreline erosion in the area of the BSNWR would not occur. This would result in short-and long-term impacts on geology and substrates because erosion along the shoreline would continue, with the level of impact dependent on the severity of erosion.

8.1.2.2 Little Lagoon Living Shoreline

No impacts on the regional physiography of the submerged and subaerial portions of the project area are expected, and no impacts associated with geologic hazards are expected. Any impacts on local geology, such a minor ground disturbance from the installation of the project, are expected to be short term and minor and have minimal consequences. This project would have beneficial impacts on the shorelines, the lagoon, and Gator Lake as the shoreline would be better protected, and erosion and sedimentation would be reduced.

Mitigation measures to minimize impacts on geology and substrates could include employment of standard BMPs for construction to reduce erosion and loss of sediments.

8.1.3 Hydrology and Water Quality—Affected Environment

8.1.3.1 Little Lagoon Living Shoreline

Hydrology

The site is bordered by Little Lagoon on the north side, Gator Lake on the northwest side, and the Gulf of Mexico on the south side. Little Lagoon is an estuarine, brackish body of water that receives most of its water from precipitation, groundwater discharge, runoff, and overflow from the surrounding waterbodies of Lake Shelby and the Gulf of Mexico. Gator Lake is a 40-acre freshwater lake that receives its water from precipitation and groundwater recharge.

Water Quality

Little Lagoon has been listed on ADEM’s 303(d) impairment list for excess nutrients in the past. Prior to 2010, the entire waterbody was reported as being impaired (ADEM, 2008). After 2010, only the central and eastern portions of the waterbody were impaired (ADEM, 2010a). Urban runoff and storm sewers have added pollution to this site that elevate nutrient levels in the lagoon (ADEM, 2010a). The lagoon has not been on the list of impaired waters since 2012 (ADEM, 2016a, 2014b, 2012). The Gulf of Mexico is not listed as impaired. Water quality information is not available for Gator Lake.

Floodplains

The southern and northern parts of the project site are in the 100-year floodplain. The southern portion has a zone designation of VE with a BFE ranging from 12 to 15 feet. The northern portion has a zone designation of AE with a BFE ranging from 8 to 10 feet. The middle portion is designated as Zone X with minimal flood hazard (FEMA, 2017).

Wetlands

This project site contains approximately 283 acres of estuarine and marine wetlands stretching from the northern border down the site and extending inland from the Gulf of Mexico. An approximately 139-acre band of freshwater forested/shrub wetland occurs between the northern and southern estuarine wetlands (USFWS, 2017b).

8.1.4 Hydrology and Water Quality—Environmental Consequences

The general approach and background to the analysis of hydrology and water quality is the same as described in Section 7.1.2.

8.1.4.1 No Action Alternative

Under the no action alternative, projects related to Habitat Projects on Federally Managed Lands would not occur. Unless funded through other means, addressing shoreline erosion in Little Lagoon in the BSNWR would not occur. While hydrology would not be affected, the lack of action would result in long-term, moderate, adverse impacts on water quality, floodplains, and wetlands because of continued shoreline erosion. Shoreline erosion would result in saltwater encroachment onto sandy substrates and increased infiltration into the underlying aquifer, heightening the salt content of this freshwater resource. Floodplains would become inundated, heightening their flood risk. Wetlands would see an increase in salt concentrations that could be detrimental to the wetland species that need a healthy salt/freshwater balance to survive.

8.1.4.2 Little Lagoon Living Shoreline

Hydrology

The Little Lagoon Living Shoreline project would involve planting shoreline grass, placing stabilizing biodegradable coconut fiber logs, and seeding native mussels. No soil compaction activities (e.g., grading) would occur that would increase runoff and decrease infiltration. Therefore, no short-term hydrologic impacts are expected because of the construction process of this project.

In the long term, installing a living shoreline along Little Lagoon would restore the shoreline to its previous condition and extent, which would improve storm resiliency and restore natural hydrologic processes at the site. This project would result in long-term, beneficial impacts on hydrology.

Water Quality

The shoreline grass planting, placement of natural stabilizing materials, and native mussel seeding along Little Lagoon may result in short-term, minor, adverse impacts on water quality by temporarily increasing turbidity within Little Lagoon while these activities are occurring. This turbidity is expected to cease shortly after the construction period.

Over the long-term, the project would implement nutrient remediation sources, including natural vegetation and filter feeders. Natural vegetation and biodegradable coconut fiber coir logs would be used as erosion control measures, providing long-term, beneficial impacts on the water quality in Little Lagoon by reducing the amount of pollutants and sediments entering the water.

Floodplains

Construction would not require any filling of the floodplain area; therefore, it would not create any change in the BFE or floodplain level. Construction of the proposed alternatives would comply with all required permits and would not result in changes to the coastal zone or any adverse impacts on the floodplain. No short-term impacts on floodplains are expected.

The living shoreline would remove hard, compacted shoreline features (small pieces of concrete) and restore its previous condition and extent, enhancing the infiltration capacity of the floodplain and resulting in long-term, beneficial impacts.

Wetlands

Short-term, minor, adverse impacts on wetlands would occur during the construction process of this project because of increased disturbance within a designated wetland area. This disturbance is expected to cease when the construction period has been completed, and the disturbed areas would recover. This project would not require any wetland filling.

Over the long-term, the living shoreline would result in long-term, beneficial impacts on wetlands. The implementation of this project would protect shoreline wetlands against erosion and restore them to their previous condition and extent. This would improve the health of the wetlands by restoring natural, hydrologic regimes.

8.2 BIOLOGICAL RESOURCES

8.2.1 Habitats—Affected Environment

8.2.1.1 Little Lagoon Living Shoreline

Little Lagoon is a shallow body of water, 10 miles long and a half mile wide on the north side of the Gulf of Mexico on the Alabama coast. Its brackish water is a mix of overflow from the mostly fresh water Lake Shelby and saltwater from the Gulf of Mexico that enters through the Little Lagoon Pass in Gulf Shores, Alabama. Little Lagoon is surrounded by marine wetland that is irregularly flooded. Additionally, the southern side of Little Lagoon contained in this project is dominated by a forested marine wetland (NWI, 2017).

8.2.2 Habitats—Environmental Consequences

8.2.2.1 No Action Alternative

Under the no action alternative, projects related to Habitat Projects on Federally Managed Lands would not occur. Unless funded through other means, addressing shoreline erosion in Little Lagoon in the BSNWR would not occur. This lack of action would result in long-term, moderate, adverse impacts on habitat because of continued shoreline erosion from a lack of SAV or vegetation to attenuate wave-action and limit shoreline erosion. The affected habitats would include scrub forest and shallow-water shoreline that could support SAV.

8.2.2.2 Little Lagoon Living Shoreline

Implementation of the project would result in short-term, minor, adverse impacts on shoreline and estuarine habitat within the project area, which have been degraded as a result of human alteration of natural processes and ongoing erosion of a nearby road. Short-term impacts would be minor and adverse and include a temporary increase in human disturbance of vegetation and a temporary increase in turbidity in Little Lagoon during vegetation plantings or placement of coconut coir logs. Following construction, long-term impacts on habitat resulting from the project would be beneficial and would include stabilization of at least 2,200 feet of shoreline along Little Lagoon (reduced erosion), which would improve water quality and enhance shoreline vegetation. The project would enhance coastal and estuarine habitats within the project area by providing increased ecological function and improved habitat values for a diversity of estuarine fauna.

8.2.3 Wildlife—Affected Environment

8.2.3.1 Little Lagoon Living Shoreline

Mammals

Mammals within the Little Lagoon Living Shoreline project area could include nine-banded armadillo, eastern mole, southeastern shrew, red fox, striped skunk, raccoon, bobcat, coyote, nutria, and whitetail deer. Other mice, moles and voles could also occur. Although very unlikely, the West Indian manatee and bottlenose dolphin could occasionally occur within Little Lagoon.

Reptiles

Cottonmouth snake, black racer, and Gulf saltmarsh snake are common within the project area, and eastern diamondback rattlesnake could occur among the dunes and maritime scrub habitats. Other common species could include garter snake and eastern water snake. Lizards most likely to occur include six-line racerunner, green anole, and ground skink. American alligator also could occur within Little Lagoon.

Amphibians

Common frogs in the Little Lagoon Living Shoreline project area could include greenhouse frog, southern leopard frog, southern toad, narrow-mouthed toad, oak toad, and southern cricket frog. Salt and brackish waters would not support any salamanders.

Birds

Common passerines could include red-winged blackbird, common grackle, purple martin, American robin, cedar waxwing, yellow-rumped warbler, brown-headed nuthatch, northern cardinal, blue jay, pine warbler, swamp sparrow, belted kingfisher, barn swallow, Carolina chickadee, Carolina wren, northern mockingbird, and black-and-white warbler. These warblers and numerous other passerine species use dune habitats and pine woodlands of the project area as stopover habitats during spring and fall migrations across the Gulf of Mexico. Shorebirds that are common within the project area near the Little Lagoon shoreline could include least sandpiper, sanderling, laughing gull, Forster’s tern, least tern, willet and semipalmated sandpiper. Wading birds frequenting the project area could include great egret, great blue heron, white ibis, and snowy egret. Waterfowl using the area could include red-breasted merganser, lesser scaup, blue-winged teal, and redhead. Raptors often observed from the property are osprey, bald eagle, red-tailed hawk, and black vulture. Other common seabirds could include brown pelican and double-crested cormorant.

8.2.4 Wildlife—Environmental Consequences

8.2.4.1 No Action Alternative

Under the no action alternative, projects related to Habitat Projects on Federally Managed Lands would not occur. Unless funded through other means, addressing shoreline erosion in Little Lagoon in the BSNWR would not occur. This lack of action would result in short-and long-term, minor, adverse impacts on aquatic and terrestrial wildlife because of continued shoreline erosion and the lack of SAV. Species that thrive along the margins of shallow, vegetated lagoons, such as wading birds and American alligator, would suffer from the reduced habitat availability.

8.2.4.2 Little Lagoon Living Shoreline

In general, proposed construction activities may result in temporary, minor, adverse impacts on wildlife species inhabiting the proposed site near the project on the southwest shoreline of Little Lagoon.

Mammals, reptiles, amphibians, and birds would be stressed or displaced temporarily during construction because of noise and human activity. Some less mobile species, including nesting species (e.g., birds) or juveniles would likely experience adverse impacts from direct mortality. However, following completion of the shoreline restoration project, these species would reestablish in the area. Construction activities would not interfere with the overall movement of wildlife species around the site because the area of disturbance on any given day would be localized to a specific portion of the 2,200-foot shoreline. The site is also adjacent to the existing Pine Beach Road, limiting the suitability of the project area for certain species that are more sensitive to human disturbance, such as certain mammals and birds. Some wildlife would be adversely affected because of a slight increase in animal-vehicle collisions or decreased ability to cross the road because of construction vehicles. Impacts on wildlife as a result of noise and displacement would be short term and minor because the construction period would be short (approximately 6 to 10 months) and would occur in a limited area. Shoreline restoration activities would be planned to begin outside the nesting season.

If shoreline restoration work must begin during nesting, hatching, or fledging, surveys for nesting birds would be conducted prior to the implementation of any construction action. If nesting birds were located, activities would not begin around the nests until the chicks have fledged. A buffer distance to avoid the nests would be determined in coordination with USFWS. Impacts on aquatic wildlife would be more substantial than on terrestrial species because the proposed shoreline restoration activities would occur below the high tide elevation, within nearshore, shallow water. Those impacts are discussed further under Section 8.2.6, Marine and Estuarine and Fauna, but would also be short-term, minor, and adverse. Once completed, the project would have long-term, beneficial effects from the restoration of seagrasses and other SAV along approximately 2,200 feet of shoreline, which is important spawning and nursery habitat for fish and shellfish species.

8.2.5 Marine and Estuarine Fauna—Affected Environment

8.2.5.1 Little Lagoon Living Shoreline

Habitat for marine and estuarine fauna at the project site is limited because of a lack of shoreline vegetation and active erosion along the southern shore of Little Lagoon. No nursery habitat is present at the site. Marine and estuarine fauna that may be present in the project area could include the following groups of animals:

- **Finfish:** southern flounder, mullet, southern kingfish, Atlantic croaker, spot, weakfish, speckled seatrout, red drum, black drum, sheepshead, sea bream, pinfish, Spanish mackerel, and blue runner
- **Shellfish:** white shrimp, brown shrimp, pink shrimp, grass shrimp, blue crabs, marsh crabs, mud crabs, and bent mussels
- **Benthic Organisms and Other Invertebrates:** jellyfish, polychaetes, amphipods, copepods, isopods, and barnacles

8.2.6 Marine and Estuarine Fauna—Environmental Consequences

8.2.6.1 No Action Alternative

Under the no action alternative, projects related to Habitat Projects on Federally Managed Lands would not occur. Unless funded through other means, addressing shoreline erosion in Little Lagoon in the BSNWR would not occur. This lack of action would result in short-and long-term, moderate, adverse impacts on marine and estuarine fauna because of continued shoreline erosion and the lack of SAV.

Species that thrive along the margins of shallow, vegetated lagoons would suffer from reduced habitat availability.

8.2.6.2 Little Lagoon Living Shoreline

Implementation of the project would result in short-term, minor impacts on marine and estuarine fauna within the project area. Potential impacts could include injury or mortality of less mobile benthic species, such as burrowing bivalves and polychaetes, from crushing or burial during placement of wave attenuation units. Mobile species such as finfish, crabs, and shrimp would likely avoid the area for the duration of in-water work, avoiding injury or mortality. A temporary increase in underwater noise and activity during project construction and a temporary increase in turbidity would also contribute to temporary disturbance or displacement of marine and estuarine fauna. Following deployment of wave attenuation units, turbidity would return to baseline levels. The project would result in long-term, beneficial impacts on marine and estuarine fauna because at least 2,200 feet of shoreline along Little Lagoon would be stabilized and seeded with native mussels, resulting in reduced erosion, improved water quality, and enhanced habitat conditions. Coconut fiber coir logs would serve as wave attenuation structures and would also attract encrusting species such as mussels and support microphytobenthos.

8.2.7 Rare and Protected Species—Affected Environment

8.2.7.1 Little Lagoon Living Shoreline

Rare species of highest conservation concern (SGCN P1) that could occur near the Little Lagoon Living Shoreline project area include river frog, Mississippi diamondback terrapin, Bewick's wren, and Henslow's sparrow. Rare species of high conservation concern (SGCN P2) that could occur near the project area include rainbow snake, eastern kingsnake, eastern coral snake, eastern coral snake, eastern diamondback rattlesnake, Alabama beach mouse, least bittern, reddish egret, northern harrier, American kestrel, yellow rail, black rail, American oystercatcher, Swainson's warbler, Kentucky warbler, Bachman's sparrow, Nelson's sharp-tailed sparrow, and seaside sparrow.

ESA-listed species and that are known to occur or may potentially occur within the Little Lagoon Living Shoreline project area include:

- **Loggerhead sea turtle:** potentially present in nearby coastal waters, and nesting adults and hatchlings potentially present during summer on beaches approximately 1,000 feet south of the project area
- **Kemp's ridley sea turtle:** potentially present in nearby coastal waters, and nesting adults and hatchlings potentially present during summer on beaches approximately 1,000 feet south of the project area
- **Green sea turtle:** potentially present in nearby coastal waters
- **Hawksbill sea turtle:** potentially present in nearby coastal waters
- **Leatherback sea turtle:** potentially present in nearby coastal waters
- **Gulf sturgeon:** potentially present in nearby coastal waters
- **West Indian manatee:** potentially present in nearby coastal waters
- **Alabama beach mouse** : potentially present in the project area
- **Eastern indigo snake:** potentially present in the project area
- **Gopher tortoise:** potentially present in the project area

- **Piping plover:** potentially present during winter
- **Red knot:** potentially present in the project area during its migration
- **Wood stork:** potentially present within shallow-water near the shoreline

The affected area of this shoreline stabilization project does not contain designated critical habitat for any ESA-listed species. However, dunes and beach habitats approximately 1,000 feet south of the project area are designated critical habitat for both Alabama beach mouse (Unit 4—Pine Beach) and loggerhead sea turtle (LOGG-T-AL-01).

West Indian manatee is the only protected marine mammal that would occur in the project vicinity. Bottlenose dolphin do not typically occur in Little Lagoon.

8.2.8 Rare and Protected Species—Environmental Consequences

The general approach and background to the analysis of rare and protected species is the same as described in Section 7.2.8. In some cases, based on coordination with resource agencies, the Trustees have made preliminary determinations that a proposed project *May Affect, but is Not Likely to Adversely Affect* certain ESA-listed species. The effects determinations and the respective listed species are described in this section. In these cases, the Trustees are engaged in technical assistance with the appropriate agencies for ESA compliance, and the compliance status will be updated in the final plan.

8.2.8.1 No Action Alternative

Under the no action alternative, projects related to Habitat Projects on Federally Managed Lands would not occur. Unless funded through other means, addressing shoreline erosion in Little Lagoon in the BSNWR would not occur. This lack of action would result in short-and long-term, adverse impacts on rare and protected species from continued shoreline erosion and the lack of SAV, which would affect protected species and their habitat. Species that thrive along the margins of shallow, vegetated lagoons, such as the ESA-listed wood stork, would experience minor, adverse impacts because no action would be taken and habitat loss would continue. Rare species of high (SGCN2) and highest (SGCN1) conservation concern that could occur within the project area would similarly experience moderate, adverse impacts by not taking action.

8.2.8.2 Little Lagoon Living Shoreline

Proposed construction activities could result in temporary, minor impacts on rare and protected species inhabiting the proposed site or in the project vicinity. Once completed, the project would have long-term, beneficial effects from the restoration of seagrasses and other SAV along approximately 2,200 feet of shoreline, which is important foraging habitat for many birds, such as the ESA-listed wood stork.

The Little Lagoon Living Shoreline project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: West Indian manatee, loggerhead sea turtle, Kemp's ridley sea turtle, Alabama beach mouse, and wood stork.

Placement of coir logs and vegetation plantings could result in short-term, direct impacts on ESA-listed marine species such as West Indian manatee, loggerhead sea turtle, and Kemp's ridley sea turtle. However, these species are unlikely to occur in the project area because the water is too shallow and the habitat to support them is very limited and of poor quality. In the unlikely event that these species occur in the project vicinity, impacts would include noise from human activity and equipment use and a temporary increase in water turbidity. These impacts could deter manatees and sea turtles from using the project area, temporarily increasing their foraging time or causing them to use alternative areas of lower quality habitat, lower prey abundance, or with increased competition. Most individuals would likely avoid the area during construction and therefore are not likely to be adversely affected by the proposed project. Any potential impacts on West Indian manatee would also be avoided through the implementation of practices to avoid or minimize impacts, including Standard Manatee Conditions for In-Water Work and Measures for Reducing Entrapment Risk to Protected Species.

The project would have *No Effect* on other ESA-listed aquatic species that could potentially occur in the project area, including gulf sturgeon, green sea turtle, leatherback sea turtle, and hawksbill sea turtle, because of the lack of suitable habitat in Little Lagoon. Long-term, minor, beneficial impacts would occur to most ESA-listed marine species as a result of increased shoreline habitat quality.

The wood stork is the only ESA-listed bird that the shoreline restoration project *May Affect, but is Not Likely to Adversely Affect*. Wood storks have not been documented in the vicinity of Little Lagoon and are usually observed farther inland in Alabama, although the project are does provide suitable habitat for this wading bird. If any wood storks were to occur during project implementation, they could be adversely affected by noise and human presence. Potential direct impacts on wood storks would include increased stress or temporary displacement to other nearby habitats, which could provide lower quality forage or greater competition. However, most birds would likely return to the area following construction and find improved habitat conditions. Because of the lack of suitable habitat, the project would have *No Effect* on the ESA-listed piping plover or red knot.

The Little Lagoon Living Shoreline project is too distant from the beach (approximately 1,000 feet) to affect sea turtle nesting habitat; therefore, the project would have *No Effect* on any species of nesting sea turtle, and there would be *No Effect* on nearby critical habitat for loggerhead sea turtle nesting. Other terrestrial ESA-listed species that could occur in the project vicinity include Alabama beach mouse, gopher tortoise, and eastern indigo snake. The Alabama beach mouse is the only species that the project *May Affect, but is Not Likely to Adversely Affect*. Potential adverse impacts would include collision with project vehicles, displacement of individuals, or increased stress to some animals as a result of human activity during project construction. Displaced individuals may be adversely affected from temporary habitat loss or decreased foraging efficiency. However, once the project is completed, long-term, beneficial effects on these species and all other ESA-listed species that may use the project area in the future would occur. The project would have *No Effect* on gopher tortoise because surveys have documented that suitable habitat does not exist in the portion of the BSNWR where the project is proposed. The eastern indigo snake, which depends on gopher tortoise burrows, is almost certainly extirpated from the area, so there would also be *No Effect* on this species.

The project would have *No Effect* on nearby critical habitat for Alabama beach mouse, although suitable beach mouse habitat could be affected. Monitoring during construction would ensure that activities remain within the designated footprint so as not to result in accidental harm to any Alabama beach mouse habitat near construction areas. To avoid impacts, surveys for Alabama beach mouse would be conducted prior to construction, and burrows would be flagged. In the unlikely event that an Alabama beach mouse were present during construction, mitigation measures would be taken to avoid or minimize any potential adverse impacts, although they would be short term and minor. Any individuals that are displaced or disturbed by the project would continue to use the project area after completion, and no terrestrial habitat would be permanently affected.

8.2.9 Federally Managed Fisheries—Affected Environment

8.2.9.1 Little Lagoon Living Shoreline

This shoreline restoration project would occur within the Little Lagoon, an inland waterbody that is connected to the Gulf of Mexico through a single channel. One or more lifestages of all managed species listed in Table 4-3 could occur within the project area. The project area also encompasses EFH for shrimp, red drum, reef fishes, coastal migratory pelagics, and for the neonate and juvenile life stages of the highly migratory species described above as potentially present within the project area.

8.2.10 Federally Managed Fisheries—Environmental Consequences

8.2.10.1 No Action Alternative

Under the no action alternative, projects related to Habitat Projects on Federally Managed Lands would not occur. Unless funded through other means, addressing shoreline erosion in Little Lagoon in the BSNWR would not occur. This lack of action would result in short-and long-term, moderate, adverse impacts on FMP species and EFH for all fisheries that are managed by NMFS and GMFMC, including red drum, coastal migratory pelagics, shrimp, gulf stone crab, and juvenile reef fish that may use estuaries for nursery habitat (e.g., some grouper and snapper) as a result of continued erosion and degradation of water quality within Little Lagoon.

8.2.10.2 Little Lagoon Living Shoreline

This shoreline restoration project would occur within Little Lagoon. Project construction would have short-term, minor impacts on FMP species and EFH for all fisheries that are managed by NMFS and GMFMC, including red drum, coastal migratory pelagics, shrimp, gulf stone crab, and juvenile reef fish that may use estuaries for nursery habitat (e.g., some grouper and snapper). These impacts would include the temporary disturbance or destruction of shoreline habitat that is used for various lifestages, especially fish and shellfish eggs, larvae, and juveniles. However, once completed, the degraded condition of the shoreline would be substantially enhanced to a state that would provide more extensive habitat for managed fish, such as the reestablishment of SAV. Over the long term, approximately 2,200 feet of shoreline would be restored to a condition that would benefit managed fish species within Little Lagoon by providing improved habitat for all lifestages of all fish and shellfish.

8.3 SOCIOECONOMIC RESOURCES

8.3.1 Cultural Resources—Affected Environment

The affected environment for cultural resources for all projects considered in this draft RP II/EA is discussed in Section 4.3.2.

8.3.2 Cultural Resources—Environmental Consequences

For all projects in this draft RP II/EA, consultation with the Alabama State Historic Preservation Officer is currently ongoing and will be incorporated into the final RP II/EA. For many projects, the action would involve a study, public education, or land acquisition that does not have the potential for disturbance of cultural resources. For those projects that include construction, ground disturbance, or other related activities, if any culturally or historically important resources were identified during project preparations or predevelopment surveys, such areas would be avoided during construction. A complete review of all alternatives under Section 106 of the NHPA is ongoing and would be completed prior to any activities that would restrict consideration of measures to avoid, minimize, or mitigate any adverse effects on historic properties located in the project area. Alternatives would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

8.3.3 Tourism and Recreation—Affected Environment

8.3.3.1 Little Lagoon Living Shoreline

The Little Lagoon Living Shoreline project area is located in the BSNWR and is composed of coastal pine forest and beach south of Fort Morgan Road. One trail, the Pine Beach Trail, occurs on the property. The trail is an unpaved road that extends through the project site and ends near the beach sand dunes near Gator Lake and Little Lagoon.

8.3.4 Tourism and Recreation—Environmental Consequences

8.3.4.1 No Action Alternative

Under the no action alternative, projects related to Habitat Projects on Federally Managed Lands would not occur. If no action is taken, erosion would affect the Pine Beach Trail, and the area where it would be relocated is within beach mouse habitat. Impacts on tourism and recreation would be short- and long-term and minor to moderate from the need to relocate the trail and from the presence of the trail in beach mouse habitat. No short- or long-term impacts, either beneficial or adverse, on tourism and recreational use would occur.

8.3.4.2 Little Lagoon Living Shoreline

Evaluation, planning, and implementation of a living shoreline project would have short-term, minor impacts on tourism and recreational opportunities at Little Lagoon. Specific actions would involve the placement of one to two rows of biodegradable coconut fiber coir logs along the eroding shoreline and placement of grass plantings between the logs and existing eroded shoreline. Minor, adverse impacts would occur in areas where visitor use is prevalent, such as the Pine Beach Trail and the beach sand dunes near Gator Lake and Little Lagoon; however, impacts would end once construction is complete. Over the long term, there would be no effect on opportunities for visitor access to the project area. No long-term, adverse impacts on tourism or recreation are anticipated to occur from the project.

8.3.5 Aesthetics and Visual Resources—Affected Environment

8.3.5.1 Little Lagoon Living Shoreline

The Little Lagoon Living Shoreline project area is located in the BSNWR and is composed of coastal pine forest and beach typical of the surrounding landscape. The Pine Beach Trail is an unpaved road that extends through the project site and ends near the beach sand dunes near Gator Lake and Little Lagoon.

8.3.6 Aesthetics and Visual Resources—Environmental Consequences

The general approach and background to the analysis of aesthetic and visual resources is the same as described in Section 7.3.8.

8.3.6.1 No Action Alternative

Under the no action alternative, projects related to Habitat Projects on Federally Managed Lands would not occur. No short- or long-term impacts, either beneficial or adverse, on aesthetics and visual resources would occur.

8.3.6.2 Little Lagoon Living Shoreline

Short-term, minor to moderate impacts would occur. The Little Lagoon Living Shoreline project would involve restoration activities such as evaluating, planning, and implementing a living shoreline project. Specific actions would involve placing one to two rows of biodegradable coconut fiber coir logs along the eroding shoreline and placing grass plantings between the logs and existing eroded shoreline. During placement of structures on the shoreline, aesthetic and visual impacts for recreational boaters and anglers would be short term, minor, and adverse from the use of construction equipment in and around the project area that would change the visual nature of the site from its current condition. In addition, the disrupted/disturbed state of the shoreline stabilization site(s) during and immediately following construction activities would be a short-term, moderate, adverse aesthetic and visual resource impact. However, the shoreline area is anticipated to increase in size because of restoration activities, with the amount and types of vegetation increasing to create a more robust and thriving coastal habitat once construction is completed. Therefore, once the vegetation in the area reaches maturity, impacts on visual and aesthetic resources would be long term and beneficial.

8.4 COMPARISON OF ALTERNATIVES

Table 8-1 provides a summary of the environmental consequences of the evaluated alternatives.

Table 8-1: Summary of Environmental Consequences for Habitat Projects on Federally Managed Lands Projects

	Geology and Substrates	Hydrology and Water Quality	Habitats	Wildlife	Marine and Estuarine Fauna	Rare and Protected Species	Federally Managed Fisheries	Tourism and Recreation	Aesthetics and Visual Resources
Little Lagoon Living Shoreline	Short-term, minor impacts on local geology, with minimal consequences.	No short-term hydrologic impacts and short-term adverse impacts on water quality during construction. Long-term benefits as a result of restored natural hydrologic processes and improved water quality.	Short-term, minor impacts because of vegetation disturbance during construction. Long-term benefits because of shoreline habitat restoration.	Short-term, minor impacts because of disturbance of wildlife during construction. Long-term benefits because of shoreline habitat restoration.	Short-term, minor impacts because of shoreline disturbance during construction. Long-term benefits because of shoreline habitat restoration.	***May Affect, but is Not Likely to Adversely Affect***: West Indian manatee, Alabama beach mouse, wood stork, loggerhead sea turtle, Kemp's ridley sea turtle ***No Effect* on:** green sea turtle, hawksbill sea turtle, leatherback sea turtle, Gulf sturgeon, eastern indigo snake, gopher tortoise, piping plover, red knot	Short-term, minor impacts on FMP species and EFH for all fisheries, including red drum, coastal migratory pelagics, shrimp, gulf stone crab, and juvenile reef fish that may use estuaries for nursery habitat.	Short-term, minor impacts on visitors during construction. Long-term, beneficial impacts once the shoreline develops and becomes covered in vegetation.	Short-term, minor impacts on recreational boaters during construction and immediately afterwards. Long-term, beneficial impacts once the shoreline develops and becomes covered in vegetation.

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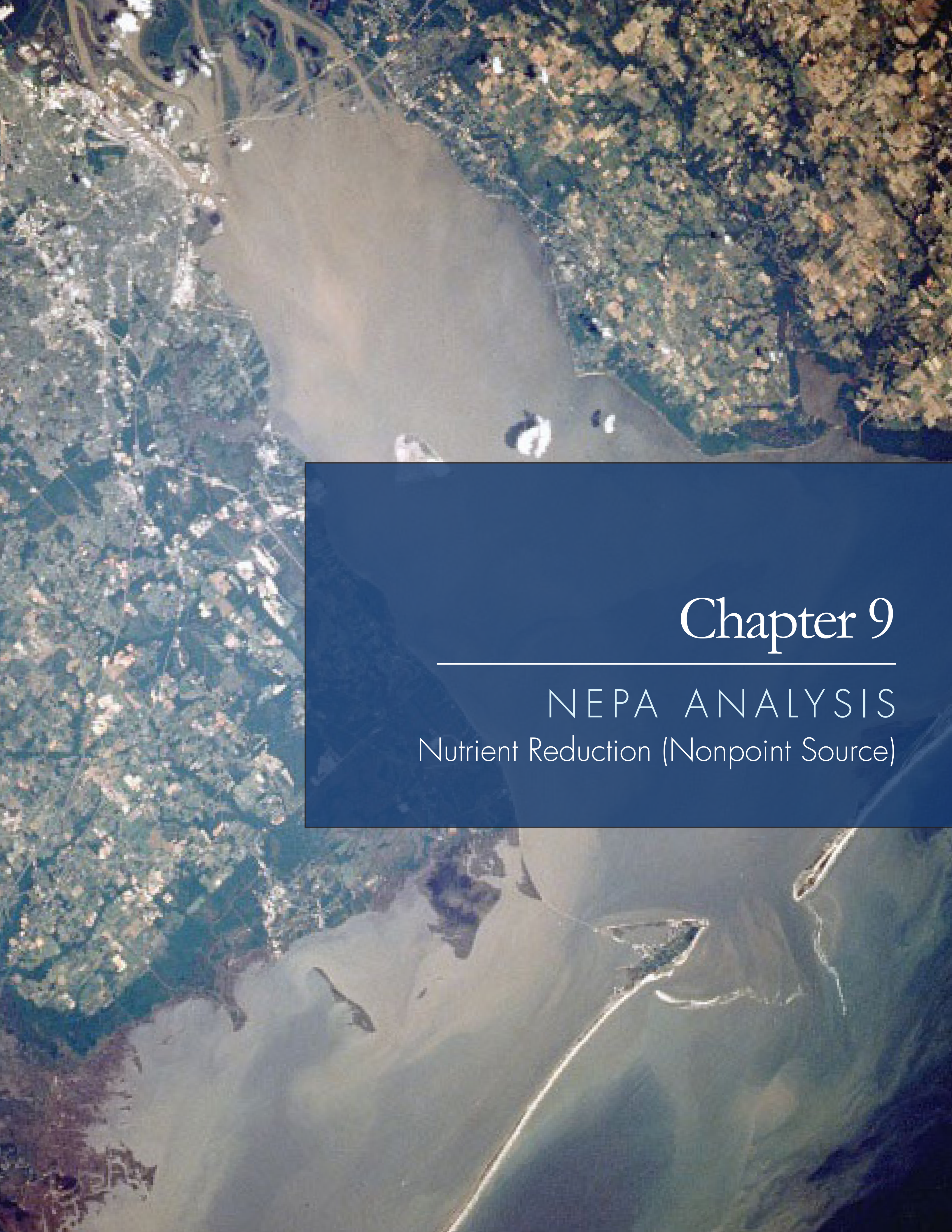


Chapter 9

NEPA ANALYSIS

Nutrient Reduction (Nonpoint Source)

9.0 NEPA ANALYSIS—NUTRIENT REDUCTION (NONPOINT SOURCE)

9.1 NEPA ANALYTICAL APPROACH FOR NUTRIENT REDUCTION (NONPOINT SOURCE) PROJECTS

This section provides the NEPA analytical approach for the Nutrient Reduction (Nonpoint Source) Restoration Type in the following order:

1. **USDA NEPA Analyses for Conservation Practices Incorporated by Reference**: USDA-NRCS has a long-standing structured, interdisciplinary, science-based, and public process for developing CPS and analyzing the effects of those practices.[60] Implementing these conservation practices has been proven to successfully address natural resource concerns related to agricultural and forested lands, and many of these practices can be used to achieve a number of the Restoration Types identified in the Final PDARP/PEIS. Because of this, all of the proposed action alternatives contemplate using USDA-NRCS conservation practices to achieve certain Final PDARP/PEIS restoration goals in Alabama. This analysis hereby incorporates by reference the standards and specifications for the conservation practices in Appendix D found in the USDA-NRCS National Handbook of Conservation Practices and the analysis of the effects of those practices contained in the USDA-NRCS Conservation Practice Physical Effects matrices, the Network Effects Diagrams,[61] and in the USDA-NRCS Conservation Effects Assessment Project reports.[62] Each of those assessments is based on a review of the best available scientific studies and methodological approaches, as well as professional judgment.[63] In addition, this document incorporates by reference the analyses from the USDA-NRCS Environmental Quality Incentives Program Programmatic EA, March 2016, and in particular its discussions of the water quality impacts of USDA-NRCS conservation practices.
2. **The NEPA Analytical Approach for the Development of Nutrient Reduction (Nonpoint Source) Project Alternatives:** This draft II RP/EA analyzes potential environmental impacts at a broad program scale, identifying the qualitative effects that are a reasonably foreseeable result of each proposed alternative. Under all action alternatives, there would be a landowner outreach and a conservation planning phase in which USDA-NRCS would

[60] See, for example, the Environmental Quality Incentives Program Programmatic EA, March 2016 at https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/ec/?cid=nrcseprd387616 and research associated with the USDA-NRCS Conservation Effects Assessment Project at https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/nra/ceap/. See also the national USDA-NRCS CPS and associated Conservation Practice Physical Effects and Network Effects Diagrams at https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/ ?cid=nrcs143_026849

[61] Both the Conservation Practice Physical Effects matrices and network effects diagrams are available from the USDA-NRCS National Handbook of Conservation Practices website at https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/ ?cid=nrcs143_026849

[62] https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/nra/ceap/

[63] The majority of conservation practices likely to be implemented under the proposed action have been determined to fall within established USDA-NRCS categorical exclusions and therefore would not normally require preparation of an EA or EIS if implemented under USDA-NRCS program authorities. However, because this action is proposed for funding under the DWH NRDA Consent Decree and not all DWH NRDA Trustees have such categorical exclusions, the AL TIG decided to prepare this EA to aid their planning, decision-making and compliance with NEPA.

work with private landowners to develop site-specific conservation plans outlining a combination of conservation practices.[64] Conservation practices for each of the alternatives evaluated would be planned and implemented on a site-specific basis and would vary depending on the physical conditions, characteristics, and environmental constraints (e.g. endangered species, cultural resources) associated with each site. Because the specific sites are not yet known, this analysis identifies the environmental impacts that normally occur from implementing USDA-NRCS conservation practices to achieve nutrient and sediment reduction. In addition to incorporating by reference the analysis USDA-NRCS has conducted on the effects of its conservation practices, the discussion in this draft RP II/EA includes examples of the conservation practices that the AL TIG expects will be implemented in the project area for the proposed alternatives and how those practices are expected to affect the environment.

3. **The AL TIG Approach to Site-Specific Environmental Review for the Selected Alternatives:** Subsequent environmental review will occur in addition to this NEPA analytical approach to determine whether a planned site-specific action is below the maximum impacts described in this draft RP II/EA. An example of the Environmental Evaluation Worksheet used to document this review is attached as Appendix E. If the site-specific action falls within the range of impacts described in this draft RP II/EA, the analysis of the effects will be documented on the Environmental Evaluation Worksheet and the action will proceed. The Environmental Evaluation Worksheet will be routed through the AL TIG to the Administrative Record, where it will be publicly available. If the evaluation of the planned site-specific action indicates effects are likely to exceed the maximum impacts described in this draft RP II/EA, the AL TIG will undertake additional site-specific environmental review consistent with NEPA requirements and other requirements for protection of the environment. The AL TIG does not propose to take actions that would result in any significant adverse impacts on the environment.
4. **Organization of the Affected Environment and Environmental Consequences for Nutrient Reduction (Nonpoint Source) Restoration Type:** Guidelines for NEPA impact determinations for the Final PDARP/PEIS are described in Section 6.3.2 of the Final PDARP/PEIS and are hereby incorporated by reference. Alternatives addressing Nutrient Reduction (Nonpoint Source) include development and implementation of conservation plans to reduce nutrient and sediment runoff, which would improve water quality in downstream coastal waters. Sections 9.4, 9.5, and 9.6, below, provide the affected environment and anticipated environmental consequences for each resource area expected to be affected by the Nutrient Reduction restoration alternatives, including for the no action alternative. Approaches and assumptions that apply to all Nutrient Reduction action alternatives are described in Section 9.3.

9.2 NEPA ANALYSIS

This section provides the NEPA analysis for all of the non-E&D restoration alternatives considered in this plan for funding under the Nutrient Reduction (Nonpoint Source) Restoration Type.

The general affected environment for coastal Alabama described in Chapter 4 of this draft RP II/EA is applicable to this section. CEQ guidance states that agencies should "focus on significant environmental

[64] The landowner outreach program, conservation planning activities, and creation of conservation plans would not require project-specific environmental compliance measures described in this section.

issues," and for issues that are other than significant, there should be "only enough discussion to show why more study is not warranted." After preliminary investigation, some resource areas under the Nutrient Reduction (Nonpoint Source) Restoration Type alternatives were determined to be either unaffected or minimally affected by the restoration actions being proposed for this Restoration Type. Accordingly, these resources are discussed briefly below. Only those resource areas for which potential, adverse impacts are expected are discussed in detail in this draft RP II/EA. Additionally, the NEPA analysis for the Nutrient Reduction (Nonpoint Source) alternatives looks at a further subset of the total resource areas and topics described in Chapter 4, Affected Environment, as part of the biological, physical, and socioeconomic environment for each restoration alternative. To avoid redundant or unnecessary information, resource areas and topics that are not expected to be affected by a proposed restoration alternative are not evaluated further under that a given project.

Resource areas not analyzed in detail for the Nutrient Reduction (Nonpoint Source) Restoration Type are identified below, with brief rationale for non-inclusion:

- **Geology and Substrates:** No impacts associated with geologic hazards are expected for the proposed Nutrient Reduction (Nonpoint Source) projects, and any local impacts on geology are expected to be short- to long-term, minor, such as soil movement related to the implementation of BMPs, and have only beneficial effects. Mitigation measures to minimize impacts on geology and substrates could include employing standard BMPs for construction to reduce erosion and loss of sediments. Therefore this resource area was not carried forward for detailed analysis.
- **Air Quality and Greenhouse Gases:** Projects related to Nutrient Reduction (Nonpoint Source) would involve land acquisition with no specific on-site construction proposed at this time. These projects would implement conservation treatment measures in the form of agronomic practices such as cover crops, conservation tillage, and field borders. Treatments would involve regrading or removing water control structures, planting/replanting desirable vegetation, and/or removing nuisance vegetation. Such activities would not present a measurable change in regional criteria air pollutant production because of the minimal motorized equipment required for the project and short duration of the construction activities. Therefore, short-term, negligible impacts on air quality would occur. No long-term impacts are anticipated. CO_2 is the primary GHG produced by motor vehicles. The overall contribution of these vehicles to regional or global CO_2 output would be negligible. The activities associated with this project would have short-term impacts on GHG production, and no long-term impacts are anticipated. Therefore this resource area was not carried forward for detailed analysis.
- **Noise:** All proposed Nutrient Reduction (Nonpoint Source) projects would implement conservation treatment measures in the form of agronomic practices such as cover crops, conservation tillage, and field borders. Treatments would involve regrading or removing water control structures, planting/replanting desirable vegetation, and/or removing nuisance vegetation. Such activities would generate noise from the use of motorized equipment. These impacts would last only as long as the conservation activities, a few days to weeks at a time. Therefore, short-term, minor, adverse noise impacts would occur as a result of these projects. No long-term impacts on the soundscape are anticipated. Therefore this resource area was not carried forward for detailed analysis.
- **Habitats:** All proposed Nutrient Reduction (Nonpoint Source) projects would result in long-term, beneficial impacts on wetlands and marshes within the target watersheds and marine and estuarine habitats near the project areas because of improved water quality associated with reduced nutrient loads, erosion, and sedimentation in upstream portions of the watersheds. There would be no short- or long-term, adverse impacts on habitats because the proposed

conservation actions would not involve any human activities that would disturb or substantially alter the existing configuration of habitat within the target watersheds. Long-term benefit would result from improved aquatic habitat from decreased sediment and other pollutants in the watersheds. Therefore this resource area was not carried forward for detailed analysis.

- **Marine and Estuarine Resources:** All proposed Nutrient Reduction (Nonpoint Source) projects would result in long-term, beneficial impacts on marine and estuarine species in the targeted watersheds because of improved water quality associated with reduced nutrient loads, reduced erosion, and reduced sedimentation in upstream portions of the watershed. No short- or long-term, adverse impacts on marine or estuarine fauna would occur because of these projects. Therefore this resource area was not carried forward for detailed analysis.
- **Federally Managed Fisheries:** Proposed projects related to Nutrient Reduction (Nonpoint Source) would result in no destruction or adverse modification to FMP species or EFH. Rather, as a result of improved water quality associated with reduced land-based pollution, there would be only beneficial effects on downstream EFH for red drum, coastal migratory pelagics, shrimp, gulf stone crab, and juvenile reef fish that may use estuaries for nursery habitat (e.g., some grouper and snapper). Therefore, this resource area was not carried forward for detailed analysis.
- **Socioeconomics and Environmental Justice:** Impacts on socioeconomics resulting from the implementation of projects proposed under the Nutrient Reduction (Nonpoint Source) Restoration Type depend on site-specific conditions associated with a project proposed for implementation. Depending on the techniques employed, short-term benefits on the local economy could accrue through an increase in employment and associated spending in the project area during construction activities. Therefore, this resource area was not carried forward for detailed analysis.
- **Infrastructure and Transportation:** None of the proposed projects evaluated under the Nutrient Reduction (Nonpoint Source) Restoration Type would create increased demands on area infrastructure that could not be accommodated by existing infrastructure or would affect traffic and transportation in the areas. Therefore, this topic was not carried forward for detailed analysis.
- **Land and Marine Management:** For proposed projects related to Nutrient Reduction (Nonpoint Source), each project area is surrounded by a variety of land uses. Each project would implement priority conservation treatment measures in the form of agronomic practices such as cover crops, conservation tillage, and field borders. These projects would be consistent with current land use plans and would be consistent with the CZMA of 1972. Therefore, the projects would not result in adverse impacts on land and marine management in the area, and this topic was not carried forward for detailed analysis.
- **Public Health and Safety:** By reducing nutrients in the targeted watersheds, water quality associated with projects proposed under the Nutrient Reduction (Nonpoint Source) Restoration Type would be improved, which would benefit the public's health and safety, resulting in short- and long-term benefits. Therefore this resource area was not carried forward for detailed analysis.
- **Tourism and Recreation:** The proposed projects under the Nutrient Reduction (Nonpoint Source) Restoration Type would be carried out by the voluntary application of practices by landowners on private land. Private land is not subject to tourism and recreational benefits associated with the implementation of conservation practices (e.g., wildlife). In other areas of

the watershed, improved water quality could result in a long-term benefit to recreation. Therefore, this topic was not carried forward for detailed analysis.

- **Aesthetics and Visual Resources:** Conservation practices would be implemented on cropland, associated agriculture lands, pasture/grassland, and forestland for projects proposed under the Nutrient Reduction (Nonpoint Source) Restoration Type. Conservation practices would not be inconsistent with current farming practices and would have a negligible effect on aesthetic and visual resources. Therefore, this topic was not carried forward for detailed analysis.
- **Fisheries and Aquaculture:** There are no commercial fisheries or aquaculture operations in the area that would be affected by the proposed Nutrient Reduction (Nonpoint Source) alternatives. Therefore, no impacts on fisheries or aquaculture associated are expected, and this topic was not carried forward for detailed analysis.
- **Marine Transportation:** None of the projects under consideration in this draft RP II/EA for the Nutrient Reduction (Nonpoint Source) Restoration Type would affect marine transportation; therefore, this topic was not carried forward for detailed analysis.

9.3 NUTRIENT REDUCTION (NONPOINT SOURCE) ALTERNATIVES—DESCRIPTION OF COMMON FEATURES AND ANALYTICAL APPROACH

USDA-NRCS would implement all alternatives related to Nutrient Reduction (Nonpoint Source) in various watersheds in Alabama for the purpose of improving water quality by implementing conservation practices to reduce nutrient and sediment runoff. USDA-NRCS and its conservation partners would help voluntarily participating landowners by developing conservation plans that identify natural resource concerns and conservation practices the landowner could implement to reduce nutrient and sediment runoff.

The primary goal for the Nutrient Reduction (Nonpoint Source) alternatives is water quality improvement through nutrient and sediment reduction. The health of the Gulf of Mexico depends on the health of its estuaries, and the health of those coastal waters is influenced by land uses in the watersheds of its tributaries. In the five Gulf States, more than 80 percent of the acreage is in private ownership (USDA-NRCS, 2014) and is used for forestry and agriculture. These watershed-scale Nutrient Reduction (Nonpoint Source) alternatives would restore water quality affected by the DWH oil spill by reducing excessive nutrients and the sediment carrying them into coastal waters. Runoff from cropland, pasture/grassland, and forests contributes excess nutrients and sediment that adversely affect the health of coastal waters of the Gulf. While agricultural and forested lands are not the sole contributors (and in many instances, not the leading contributors) of nutrients to coastal waters, opportunities are available to address this resource concern at these sources in the various watersheds of coastal Alabama. Given the success of USDA-NRCS Farm Bill programs such as the Environmental Quality Incentives Program and their strong acceptance by private landowners, a significant opportunity exists to implement conservation practices on private lands that would reduce the levels of nutrients and sediments entering the Gulf of Mexico from these watersheds.

9.3.1 Conservation Practices and Analytical Approach

Conservation practices[65] are technical methods designed to help conserve soil, water, air, energy, and related plant and animal resources. Appendix D provides a complete list of conservation practices that will be available for implementation under proposed Nutrient Reduction (Nonpoint Source) alternatives.

[65] See https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849

Site-specific planning would be conducted to determine which particular practice is appropriate to use given the conditions at each site.

Certain conservation practices are highlighted for the purposes of this draft RP II/EA to provide examples of the types of effects that may result from the application of different types of conservation practices, with a focus on ground-disturbing practices that have potential for adverse impacts. These practices have been grouped into two categories that are discussed below: (1) conservation practices that provide ecological and nutrient reduction benefits (ecological/ nutrient reduction conservation practices); and (2) conservation practices that provide soil and water conservation and nutrient reduction benefits (soil and water conservation/nutrient reduction conservation practices). Some conservation practices, such as CPS 342, Critical Area Planting, can fall into both categories depending on the purpose for which the practice is used.

Table 9-1 provides a limited number of examples of conservation practices that provide ecological/nutrient reduction benefits. These practices will apply to all action alternatives. The CPS and their associated purposes and effects analysis, which have been incorporated by reference into this draft RP II/EA, are available on the USDA-NRCS National Handbook of Conservation Practices website[66] at https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849.

9.3.2 Ecological/Nutrient Reduction Conservation Practices

Examples of conservation practices that support ecological/ nutrient reduction benefits (Table 9-1) include conservation practices implemented primarily on lands associated with agricultural operations, such as streams, riparian areas and forested lands, because these lands also can help to improve water quality by nutrient reduction via removal of sediment, nitrogen, and phosphorous. Eight conservation practices that include vegetative management, restoration of streambanks and shorelines, and structural measures to accomplish work in streams, wetlands and riparian areas are highlighted in this draft RP II/EA as examples of conservation practices likely to be implemented under the proposed alternatives that also have potential for adverse impacts. The Streambank and Shoreline Protection practice (CPS 580), Grade Stabilization Structures (CPS 410) and the Forest Stand Improvement practice (CPS 666[67]) are ground-disturbing practices and are representative of conservation practices with potential for adverse impacts. Critical area planting (CPS 342) is considered to be both an Ecological/ Nutrient Reduction and Soil and Water Conservation/ Nutrient Reduction conservation practice. Any of a number of the conservation practices in Appendix D could be implemented under either of the proposed Nutrient Reduction (Nonpoint Source) alternatives; the conservation practices funded would not be limited to those discussed here and the actual practices selected for each project site and their anticipated impacts would be documented on the Environmental Evaluation Worksheet, described above.

[66] See https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849

[67] Not all applications of CPS 666 require ground disturbance, but when ground disturbance is required, these are the types of short-term adverse effects that normally occur.

Table 9-1: Examples of USDA Conservation Practices That Support Ecological/Nutrient Reduction Benefits

CPC Code	Conservation Practice Name	Purpose	Sediment Reduction	Nutrients (Nitrogen and Phosphorous)
314	Brush Management	Create the desired plant community consistent with the ecological site. Restore or release desired vegetative cover to protect soils, control erosion, reduce sediment, improve water quality or enhance stream flow. Maintain, modify, or enhance fish and wildlife habitat. Improve forage accessibility, quality and quantity for livestock and wildlife. Manage fuel loads to achieve desired conditions.	X	X
390	Riparian Herbaceous Cover	Provide or improve food and cover for fish, wildlife and livestock; Improve and maintain water quality. Establish and maintain habitat corridors. Increase water storage on floodplains. Reduce erosion and improve stability to stream banks and shorelines. Increase net carbon storage in the biomass and soil. Enhance pollen, nectar, and nesting habitat for pollinators. Restore, improve or maintain the desired plant communities. Dissipate stream energy and trap sediment. Enhance stream bank protection as part of stream bank soil bioengineering practices.	X	X
644	Wetland Wildlife Habitat Management	To maintain, develop, or improve wetland habitat for waterfowl, shorebirds, fur-bearers, or other wetland dependent or associated flora and fauna.	X	X
391	Riparian Forest Buffer	Create shade to lower or maintain water temperatures to improve habitat for aquatic organisms. Create or improve riparian habitat and provide a source of detritus and large woody debris. Reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow groundwater flow. Reduce pesticide drift entering the waterbody. Restore riparian plant communities. Increase carbon storage in plant biomass and soils.	X	X
342	Critical Area Planting	Stabilize areas with existing or expected high rates of soil erosion by wind or water. Stabilize stream and channel banks, pond and other shorelines, earthen features of structural conservation practices. Stabilize areas such as sand dunes and riparian areas.	X	

CPC Code	Conservation Practice Name	Purpose	Sediment Reduction	Nutrients (Nitrogen and Phosphorous)
580*	Streambank and Shoreline Protection	Prevent the loss of land or damage to land uses, or facilities adjacent to the banks of streams or constructed channels, shoreline of lakes, or estuaries including the protection of known historical, archeological, and traditional cultural properties. Maintain the flow capacity of streams or channels. Reduce the off-site or downstream effects of sediment resulting from bank erosion. To improve or enhance the stream corridor for fish and wildlife habitat, aesthetics, recreation.	X	
410*	Grade Stabilization Structure	Stabilize grade, reduce erosion, or improve water quality.	X	X
666*	Forest Stand Improvement	Improve and sustain forest health and productivity. Reduce damage from pests and moisture stress. Initiate forest stand regeneration. Reduce fire risk and hazard and facilitate prescribed burning. Restore or maintain natural plant communities. Improve wildlife and pollinator habitat. Alter quantity, quality, and timing of water yield. Increase or maintain carbon storage.	X	

*Practices 580, 410, and 666 are ground-disturbing practices and illustrate the types of adverse environmental impacts the AL TIG expects to occur. During implementation of the selected alternative USDA-NRCS would use any of a number of the practices as shown in Appendix D. (https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849). Section 9.1 describes the environmental review of all site-specific conservation plans that would be developed for the alternative that is selected.

9.3.3 Soil and Water Conservation/Nutrient Reduction Practices

Examples of conservation practices that support soil and water conservation/nutrient reduction benefits (Table 9-2) include conservation practices implemented primarily on agricultural lands including cropland and pasture/grassland, and forestland to provide nutrient reduction via removal and management of sediment, nitrogen, phosphorous, and animal waste. Twelve conservation practices that include crop management measures, plantings, nutrient management, and construction measures to reduce erosion and control runoff are highlighted in this draft RP II/EA as examples of conservation practices likely to be implemented under the proposed alternatives that also have potential for adverse impacts. The Grassed Waterway practice (CPS 412), Stream Crossing (CPS 578), and Terrace (CPS 600) are ground-disturbing practices and are representative of conservation practices with potential for adverse impacts. Because the USDA-NRCS analysis of the effects of the conservation practices listed in Appendix D has been incorporated by reference, any of a number of those practices could be implemented under the proposed action alternative; the conservation practices funded would not be limited to those discussed here and the actual practices selected for each project site and their anticipated impacts would be documented on the Environmental Evaluation Worksheet, described above.(https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849).

Table 9-2: Examples of USDA Conservation Practices That Support Soil and Water Conservation/Nutrient Reduction Benefits

CPC Code	Conservation Practice Name	Purpose	Reduction of Sediment	Nutrient Reduction (Nitrogen and Phosphorous)	Animal Waste
412*	Grassed Waterway	Convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding. To prevent gully formation. To protect/improve water quality.	X	X	
328	Conservation Crop Rotation	Reduce sheet, rill and wind erosion. Maintain or increase soil health and organic matter content. Reduce water quality degradation because of excess nutrients. Improve soil moisture efficiency. Reduce the concentration of salts and other chemicals from saline seeps. Reduce plant pest pressures. Provide feed and forage for domestic livestock. Provide food and cover habitat for wildlife, including pollinator forage, and nesting.	X	X	
342	Critical Area Planting	Stabilize areas with existing or expected high rates of soil erosion by wind or water. Stabilize stream and channel banks, pond and other shorelines, earthen features of structural conservation practices. Stabilize areas such as sand dunes and riparian areas.	X		
329	Residue & Tillage Management	Reduce sheet, rill, and wind erosion and excessive sediment in surface waters. Reduce tillage-induced particulate emissions. Maintain or increase soil health and organic matter content. Reduce energy use.	X	X	
393	Filter Strip	Reduce suspended solids and associated contaminants in runoff and excessive sediment in surface waters. Reduce dissolved contaminant loadings in runoff. Reduce suspended solids and associated contaminants in irrigation tailwater and excessive sediment in surface waters.	X	X	

CPC Code	Conservation Practice Name	Purpose	Reduction of Sediment	Nutrient Reduction (Nitrogen and Phosphorous)	Animal Waste
340	Cover Crop	Reduce erosion from wind and water. Maintain or increase soil health and organic matter content. Reduce water quality degradation by utilizing excessive soil nutrients. Suppress excessive weed pressures and break pest cycles. Improve soil moisture use efficiency. Minimize soil compaction.	X	X	
576	Livestock Shelter Structure	To provide protection for livestock from excessive heat, wind, cold. Protect surface waters from nutrient and pathogen loading. Protect wooded areas from accelerated erosion and excessive nutrient deposition by providing alternative livestock shelter/shade location. Improve the distribution of grazing livestock to enhance wildlife habitat, reduce over-used areas, or correct other resource concerns resulting from improper livestock distribution.	X	X	X
578*	Stream Crossing	Provide access to another land unit. Improve water quality by reducing sediment, nutrient, organic, and inorganic loading of the stream. Reduce streambank and streambed erosion.	X	X	X
600*	Terrace	Reduce erosion and trap sediment. Retain runoff for moisture conservation.	X	X	
590	Nutrient Management	Budget, supply, and conserve nutrients for plant production. To minimize agricultural nonpoint source pollution of surface and groundwater resources. To properly utilize manure or organic by-products as a plant nutrient source. To protect air quality by reducing odors, nitrogen emissions (ammonia, NO_x), and the formation of atmospheric particulates. To maintain or improve the physical, chemical, and biological condition of soil.		X	

CPC Code	Conservation Practice Name	Purpose	Reduction of Sediment	Nutrient Reduction (Nitrogen and Phosphorous)	Animal Waste
528	Prescribed Grazing	Improve or maintain desired species composition and vigor of plant communities. Improve or maintain quantity and quality of forage for grazing and browsing animals' health and productivity. Improve or maintain surface and/or subsurface water quality and quantity. Improve or maintain riparian and watershed function. Reduce accelerated soil erosion, and maintain or improve soil condition. Improve or maintain the quantity and quality of food and/or cover available for wildlife. Manage fine fuel loads to achieve desired conditions.	X	X	
317	Composting Facility	Reduce water pollution potential and improve handling characteristics of organic waste solids, reuse organic waste as animal bedding, or use as a soil amendment that provides soil conditioning, slow-release plant-available nutrients and plant disease suppression.		X	X

*Practices 412, 578, and 600 are ground-disturbing practices and illustrate the types of adverse the AL TIG expects to occur. During implementation of the selected alternative USDA-NRCS would use any of a number of the practices as shown in Appendix D. (https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849). Section 9.1 describes the environmental review of all site-specific conservation plans that would be developed for the alternative that is selected.

9.3.4 Example Conservation Practices Analyzed in this Plan

Table 9-3 provides a description of the types of work that would be carried out to implement each of the exemplar conservation practices discussed in this draft RP II/EA, including both the ecological/nutrient reduction conservation practices and soil and water conservation/reduction conservation practices.

Appendix D provides the list of conservation practices contemplated for the Nonpoint Source alternatives described below. Appendix F provides a conservation practice network effects diagram for the example practices analyzed in this draft RP II/EA.

Table 9-3: Example Ground-Disturbing Practices

Practice Code	Conservation Practice Name	Purpose/Description
410	Grade Stabilization Structure	This practice would be used for grade stabilization and preventing formation of advance gullies and headcuts and include soil excavation, grading, to construct or install grade stabilization structures including berms, rip rap, and hard structures. The majority of these would be installed in agricultural fields, and could be installed in drainageways or tributaries.
412	Grassed Waterway	This practice would involve shaping or grading a channel and grading to form or install a stable outlet. The area would be replanted, where possible with vegetation that would serve to reduce erosion and provide benefit to wildlife. The grassed waterway practice would be implemented primarily on cropland.
561	Heavy Use Area Protection	This practice would be applied to stabilize a ground surface that is frequently and intensively used by people, animals, or vehicles and would include grading, reshaping, and planting areas in and around the disturb area.
580	Streambank and Shoreline Protection	This practice would be applied to stabilize and protect banks of streams or constructed channels and shorelines of open waterbodies and can reduce the off-site effects of sediment resulting from bank erosion and include grading, reshaping, and planting of stream banks, ponds, lakes, and other aquatic systems.
587	Structure for Water Control	This practice would be applied to install a structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation or measures water and include grading, reshaping, and planting of stream banks, ponds, lakes, and other aquatic systems.

9.4 PHYSICAL RESOURCES

9.4.1 Hydrology and Water Quality—Affected Environment

9.4.1.1 Bayou La Batre Nutrient Reduction

Hydrology

This project is focused within the Bayou La Batre watershed. The Bayou La Batre River empties into Portersville Bay along the Gulf of Mexico. The river is approximately 5.5 miles long with a drainage area of around 30 square miles (ADEM, 2009). The Bayou La Batre River is a coastal river, influenced by tides, with fluctuations in water level and salinity (ADEM, 2009). The watershed receives most of its water input from precipitation and groundwater.

Water Quality

The Bayou La Batre River was last listed on ADEM's 303(d) list of impaired waters in 2008 for pathogens (Enterococci) from urban runoff/storm sewers (ADEM, 2008). The waterway was originally listed in 1998 based on data collected in 1995 and 1996 that indicated that the river had exceeded its geometric mean and single sample maximum criterion for pathogens (ADEM, 2009). Nonpoint sources are the driving impairment mechanism, with agricultural land uses and sewer overflows identified as the main pollutants to the river (ADEM, 2009). The waterbody is listed from Portersville Bay to its source, totaling an impaired distance of roughly 5.5 miles (ADEM, 2009). The impaired segment is classified as Fish and Wildlife, meaning the waterway must be suitable for fish and aquatic life. The Bayou La Batre River was removed from the 303(d) list when a TMDL was established in 2009 to address the loading of pathogens into the river.

Floodplains

The floodplain in the Bayou La Batre watershed along the Gulf is designated as VE, which is a 100-year floodplain designation. It transitions to AE as it moves inland. The Bayou La Batre River and Carls Creek are designated as A for the upstream portion and then AE as they near the Gulf. Along Carls Creek, Hammer Creek, and Bishop Manor Creek, the designation is AE along the upstream portion. The remainder of the watershed is designated as X, which has minimal flood risk (FEMA, 2017).

Wetlands

Of the roughly 19,500-acre area of the Bayou La Batre watershed, roughly 7,500 acres are freshwater forested/shrub wetland. The freshwater forested/shrub wetlands are pocketed with freshwater emergent wetlands (equaling approximately 118 acres). About 515 acres of estuarine and marine wetlands exist near the discharge point for the watershed (USFWS, 2017b).

9.4.1.2 Fowl River Nutrient Reduction

Hydrology

The Fowl River watershed encompasses roughly 52,800 acres, drains much of southern Mobile County, and is a direct contributor to Mobile Bay (USFWS 2017b; MBNEP, 2016). Its headwaters are located near the Mobile suburb of Theodore, Alabama, and it splits just south of Bellingrath Gardens into East Fowl River, which flows northeast into Mobile Bay, and West Fowl River, which flows south into Mississippi Sound. Downstream of Fowl River Road, the waterbody is influenced by tides and is referred to as the Fowl River estuary (MBNEP, 2016). Above the road, the river is considered a fresh waterbody.

Fowl River has only two named tributaries, both of which are located in the central portion of the watershed. Muddy Creek originates east of Bellingrath Road, approximately 2 miles north of Laurendine Road (CR 24), and flows south for 4.5 miles to its confluence with Fowl River near Fowl River Road (CR 20). Dykes Creek originates less than 1 mile east of Muddy Creek, south of CR 24, and flows south for 2.5 miles to its confluence with Fowl River just south of CR 20. The permeability of the soils in the Fowl River watershed allows for the abundant rainfall to infiltrate and recharge the underlying aquifer, which eventually recharge the waterways (MBNEP, 2016). The increase of pervious surfaces and agricultural lands in the watershed has resulted in a loss of wetlands and the channelization of streams. This has changed the natural hydrologic regime, resulting in increased runoff and flooding within the watershed (MBNEP 2016).

Water Quality

A watershed management plan was published in 2016 to improve trends in water quality, ecosystem function, and resiliency in the Fowl River Watershed (MBNEP, 2016). The watershed management plan noted that the Fowl River watershed has elevated nutrient levels from urban and agricultural runoff, bacteria levels that often exceed acceptable levels, elevated levels of metals, and levels of organic carbon that suggest anthropogenic inputs (MBNEP, 2016). The Fowl River estuary at the confluence of the watershed appears to be enriched with nitrogen and organic matter (MBNEP, 2016). The main sources of pollution in the watershed include nutrient pollution from agricultural and urban runoff (MBNEP, 2016). Additionally, the Fowl River is listed on ADEM's 303(d) list of impaired waters for mercury from atmospheric deposition and has been listed since 2000 because of a Alabama Fish Consumption Advisory issued by the Alabama Department of Public Health (ADEM, 2000). The river will remain on the 303(d) list until a TMDL for mercury is developed by the State.

Floodplains

Most of the Fowl River watershed is designated as Zone X. The southern portion of the watershed along the Gulf has a designation of VE. Just inland of the Gulf and along the Fowl River, the floodplain is designated as AE. A large wetland west of the Fowl River in the upper portion of the watershed has a floodplain designation of A (FEMA, 2017).

Wetlands

Of the 52,800 acres of drainage area within the watershed, about 12,000 are freshwater forested/shrub wetland, 6,000 are estuarine and marine wetland, and 640 are freshwater emergent wetland (USFWS, 2017b).

9.4.1.3 Weeks Bay Nutrient Reduction

Hydrology

The Weeks Bay watershed has a drainage area of roughly 130,000 acres. The main bodies of water in the watershed include Fish River, Magnolia River, and Weeks Bay (MBNEP, 2017a). For more information on the hydrology of the Fish River, see the Weeks Bay Land Acquisition (Harrod Tract) above (Section 7.1.1.4) and the Magnolia River Land Acquisition (Holmes Tract) (Section 7.1.1.2) for information on the Magnolia River.

Water Quality

Water quality for Weeks Bay Nutrient Reduction is the same as described above for Weeks Bay Land Acquisition—Harrod Tract and Magnolia River Land Acquisition—Holmes Tract for its two major tributaries, the Fish River and Magnolia River watersheds, respectively.

Floodplains

The Weeks Bay watershed is predominately designated as Zone X, with designations of AE around Weeks Bay and along Fish River and Magnolia Springs (FEMA, 2017).

Wetlands

Of the 130,000 acres in the Weeks Bay watershed, about 7,932 are classified as freshwater forested/shrub wetland (surrounding Weeks Bay), 333 acres are classified as estuarine and marine wetland, and another 333 acres are classified as freshwater emergent wetland (USFWS, 2017b).

9.4.2 Hydrology and Water Quality—Environmental Consequences

The general approach and background to the analysis of hydrology and water quality are the same as described in Section 7.1.2. All of the conservation practices would be implemented voluntarily on privately owned land. Detailed information on the conservation practices including practice standards, flow charts, and environmental effects can be found at https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849.

General impacts on hydrology and water quality are addressed below, followed by a summary of impacts of representative exemplary conservation practices with the most potential for impacts.

9.4.2.1 No Action Alternative

Under the no action alternative, projects related to Nutrient Reduction (Nonpoint Source) would not occur, and conservation/restoration practices that reduce nutrient and sediment runoff would not be implemented. This would result in short-and long-term impacts on hydrology, water quality, floodplains, and wetlands because runoff would continue to occur.

9.4.2.2 Bayou La Batre Nutrient Reduction

The Bayou La Batre Nutrient Reduction project aims to enhance water quality in the Bayou La Batre watershed by helping landowners develop and implement conservation plans that limit nonpoint source pollution. Implementing conservation measures may include installing erosion and sediment control structures on cropland. The installation of these structures would not involve any soil compacting activities and would not result in any short-term impacts on hydrology but may result in minor, adverse impacts on water quality and wetlands from ground-disturbing activities that could temporarily increase turbidity levels in nearby waters and temporarily disrupt the ecology of the wetland. This disruption is expected to cease shortly after the construction period. Floodplains would not incur any short-term impacts from the implementation of this project.

The Bayou La Batre Nutrient Reduction project would ultimately decrease nutrient and sediment runoff and improve the hydrology of the watershed by restoring it to a more natural hydrologic cycle. It would also enhance water quality in the Bayou La Batre watershed by helping landowners develop and implement conservation plans that reduce nonpoint source pollution. This would be a long-term, beneficial impact on the hydrology and water quality of the Bayou La Batre watershed. The drainage area for the watershed, Portersville Bay and the Mississippi Sound, would experience long-term, beneficial impacts on water quality as well. The decrease in runoff that would occur from this project would reduce flood hazard within the watershed, resulting in long-term, beneficial impacts on floodplains. The reduction in nonpoint source pollutants would enhance wetland health by decreasing the amount of nutrient and sediment inputs resulting in long-term, beneficial impacts on wetlands within the watershed.

Impacts on these resources are further discussed below except for floodplains, as the proposed alternative would not result in a detectable change to natural and beneficial floodplain values. Stream crossings and grade stabilization installed in streams would be constructed would be designed so as not to cause an appreciable rise in floodwaters.

Hydrology

Grade Stabilization Structure (410). Grade stabilization structures would be used to control the grade in a natural or constructed channel and prevent formation of advance gullies and headcuts. There would be short-term, minor impacts from soil excavation, grading, to construct or install grade stabilization structures including berms, rip rap, and hard structures. The majority of these would be installed in agricultural fields, and could be installed in drainageways or tributaries. For those installed closer to water, short-term impacts would be minor to moderate as the result of an increased possibility of erosion or sedimentation into these features. There would be long-term, beneficial impacts on hydrology from prevention of gully formation, prevention of headcutting, and drainageway destabilization. Areas would be replanted or seeded to prevent erosion and gully formation after regrading. Erosion control plans would be implemented during and after construction.

Grassed Waterway (412). There would be short-term, minor to moderate, adverse impacts on hydrology from shaping or grading a channel and grading to form or install a stable outlet. The area would be replanted, where possible with vegetation that would serve to reduce erosion and provide benefit to wildlife. There would be long-term benefit from controlling and managing flow to prevent soil erosion, increases in soil infiltration and increased soil biological activity, and trapping of sediments in the waterways. The grassed waterway practice would be implemented primarily on cropland.

Heavy Use Area Protection (561). This practice would be applied to stabilize a ground surface that is frequently and intensively used by people, animals, or vehicles. Activities such as grading, reshaping, and planting areas would not occur in water and are not expected to impact hydrology in the long- or short-term. Areas would be replanted with native vegetation and or seeded to prevent erosion after regrading in and around the disturb area. Erosion control plans would be implemented during and after construction.

Streambank and Shoreline Protection (580). This practice would be applied to stabilize and protect banks of streams or constructed channels and shorelines of open waterbodies and can reduce the off-site effects of sediment resulting from bank erosion. There would be short-term, minor to moderate adverse impacts from grading, reshaping, and planting of stream banks, ponds, lakes, and other aquatic systems with temporary disruptions to hydrology during construction of these in-water structures. There would be long-term beneficial impacts as stabilization would result in reducing the off-site, downstream effects of sediment, nutrients, and organic material into surface waters with minor long-term adverse impacts if these structures change the hydrological nature of the waters they are in. Areas would be replanted with native vegetation and or seeded to prevent erosion after bank regrading. Erosion control plans would be implemented during and after construction.

Structure for Water Control (587). This practice would be applied to install a structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation or measures water. There would be short-term, minor to moderate adverse impacts from grading, reshaping, and planting of stream banks, ponds, lakes, and other aquatic systems with temporary disruptions to hydrology during construction of these in-water structures. There would be long-term beneficial impacts as stabilization would result in reducing the off-site, downstream effects of sediment, nutrients, and organic material into surface waters with minor long-term adverse impacts if these structures change the hydrological nature of the waters they are in. Areas would be replanted with native vegetation and or seeded to prevent erosion after bank regrading. Erosion control plans would be implemented during and after construction.

Water Quality

Grade Stabilization Structure (410). This practice would be used for grade stabilization and preventing formation of advance gullies and headcuts. There would be short-term minor to moderate adverse impacts from soil excavation, grading, to construct or install grade stabilization structures including berms, rip rap, and hard structures, which would lead to a temporary increase in erosion and sedimentation into area waterbodies. The majority of these would be installed in agricultural fields, and could be installed in drainageways or tributaries. There would be long-term, beneficial impacts on water quality from prevention of gully formation, reduction of soils, and drainageway stabilization. Areas would be replanted or seeded to prevent erosion after bank regrading. Erosion control plans would be implemented during and after construction.

Grassed Waterway (412). There would be short-term, minor to moderate, adverse impacts from shaping or grading a channel and grading to form or install a stable outlet, which would lead to a temporary increase in erosion and sedimentation into area waterbodies. The area would be replanted, where possible with vegetation that would serve to reduce erosion and provide benefit to wildlife. There would be long-term benefit from controlling and managing flow to prevent soil erosion, increases in soil infiltration and increased soil biological activity, and trapping of sediments in the waterways. The grassed waterway practice would be implemented primarily on cropland.

Heavy Use Area Protection (561). This practice would be applied to stabilize a ground surface that is frequently and intensively used by people, animals, or vehicles. There would be short-term, minor to moderate adverse impacts from grading, reshaping, and planting areas in and around the disturb area, which could lead to a temporary increase in erosion and sedimentation into local waterbodies. There would be long-term beneficial impacts as stabilization would result in reducing the off-site effects of sediment, nutrients, and organic material. Areas would be replanted with native vegetation and or seeded to prevent erosion after regrading in and around the disturb area. Erosion control plans would be implemented during and after construction.

Streambank and Shoreline Protection (580). This practice would be applied to stabilize and protect banks of streams or constructed channels and shorelines of open waterbodies and can reduce the off-site effects of sediment resulting from bank erosion. There would be short-term, minor to moderate, adverse impacts from grading, reshaping, and planting of stream banks, ponds, lakes, and other aquatic systems which could occur in water and result in a greater level of short-term, adverse impacts than other techniques. Additional short-term adverse minor to moderate impacts would occur from a temporary increase in erosion and sedimentation into local waterbodies during construction of this method. There would be long-term, beneficial impacts as stabilization would result in reducing the off-site, downstream effects of sediment, nutrients, and organic material into surface waters. Areas would be replanted with native vegetation and or seeded to prevent erosion after bank regrading. Erosion control plans would be implemented during and after construction.

Structure for Water Control (587). This practice would be applied to install a structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation or measures water. There would be short-term, minor to moderate adverse impacts from grading, reshaping, and planting of stream banks, ponds, lakes, and other aquatic systems, which could lead to a temporary increase in erosion and sedimentation into local waterbodies. There would be long-term beneficial impacts as stabilization would result in reducing the off-site, downstream effects of sediment, nutrients, and organic material into surface waters. Areas would be replanted with native vegetation and or seeded to prevent erosion after bank regrading. Erosion control plans would be implemented during and after construction.

Wetlands

There could be short-term, minor to moderate, adverse impacts on wetlands depending on the location of the conservation practice. Wetlands would be avoided to the greatest extent possible. Any impacts would be localized to the conservation practice area. All conservation practices are intended to conserve and enhance important resources such as wetlands. The practices would have a long-term, beneficial impact on wetland water quality, hydrology, species composition and vigor. Wetlands impacts could be located on any land use type.

Best Practices. The AL TIG would consider best practices referenced in Section 6.15 and Appendix 6A of the Final PDARP/PEIS. Additional best practices may be recommended for site-specific conservation practices in different locations as a result of differences in relevant conditions. The following best practices are contemplated and would be implemented to the extent practicable in order to avoid and minimize impacts on wetlands:

- In the design of conservation practices the AL TIG would consider resiliency measures related to increasing storm intensities and changing weather patterns (CEQ, 2016).
- Any practice that involves disturbance of wetlands would require authorization by USACE. A Nationwide Permit 27 Aquatic Habitat Restoration, Establishment, and Enhancement Activities would be obtained, with adherence to any permit conditions.
- 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 no leaks of antifreeze, hydraulic fluid, or other substances and cleaning and that all equipment that would be used in the water is cleaned and sealed 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.
- 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 on wetlands and other aquatic resources to the maximum extent practicable.
- To the maximum extent possible, implement the placement of sediment to minimize impacts on existing vegetation or burrowing organisms.
- Apply herbicide in accordance with the direction and guidance provided on the appropriate USEPA labels and state statutes during land-based activities.
- 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.
- 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.
- 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.

9.4.2.3 Fowl River Nutrient Reduction

Within the Fowl River watershed, the same conservation practices would be implemented, and impacts would be similar to those discussed under Bayou La Batre Nutrient Reduction.

9.4.2.4 Weeks Bay Nutrient Reduction

Within the Weeks Bay watershed, the same conservation practices would be implemented, and impacts would be similar to those discussed under Bayou La Batre Nutrient Reduction.

9.5 BIOLOGICAL RESOURCES

9.5.1 Wildlife—Affected Environment

9.5.1.1 Bayou La Batre Nutrient Reduction

Mammals

Potential species present include red and gray fox, chipmunks, coyotes, bats, long-tailed weasel, white-tailed deer, mice, voles, striped skunk, eastern woodrat, bobcat, and nutria. The West Indian manatee may rarely occur in the Magnolia River.

Reptiles

Common snakes that could occur in the Bayou La Batre watershed include Gulf saltmarsh snake, ring-necked snake, glossy crayfish snake, rough greensnake, eastern ribbonsnake, eastern water snake, Mississippi green water snake, and cottonmouth. American alligator likely occurs within larger waterbodies in the Bayou La Batre watershed. Turtles that may be present include eastern diamondback terrapin, common snapping turtle, eastern mud turtle, common box turtle, and southern painted turtle.

Amphibians

Numerous amphibians could occur within the Bayou La Batre watershed, including green tree frog, squirrel tree frog, northern cricket frog, greenhouse frog, southern leopard frog, southern toad, Fowler's toad, and eastern spadefoot. Several salamander species could also occur within the project area, although data on their presence and distribution are not available.

Birds

Common passerines include gray catbird, black-and-white warbler, yellow-rumped warbler, red-winged blackbird, purple martin, American robin, blue jay, pine warbler, swamp sparrow, belted kingfisher, barn swallow, cedar waxwing, northern mockingbird, and Carolina wren. Numerous less common passerines use the property, especially during spring and fall migration. Shorebirds that are be common within the Bayou La Batre watershed include laughing gull, sanderling, sandwich tern, ring-billed gull, royal tern, common tern, willet, Forster's tern. Wading birds frequenting the project area include cattle egret, great blue heron, white ibis, and great egret and snowy egret. Waterfowl in the project area include blue-winged teal, red-breasted merganser, and common loon. Raptors often observed from the property are osprey, bald eagle, red-tailed hawk, and black vulture. Other common seabirds would include brown pelican, northern gannet, and double-crested cormorant.

9.5.1.2 Fowl River Nutrient Reduction

Mammals

Potential species present include red fox, chipmunks, coyotes, bats, white-tailed deer, mice, voles, striped skunk, eastern woodrats, bobcat, long-tailed weasel, and nutria. The West Indian manatee could also occur in the Fowl River.

Reptiles

Common snakes that could occur include rough greensnake, eastern ribbonsnake, ring-necked snake, glossy crayfish snake, eastern water snake, Mississippi green water snake, and cottonmouth. American alligator could occur within larger waterbodies in the Fowl River watershed. Turtles that may be present include common snapping turtle, eastern mud turtle, common box turtle, and southern painted turtle.

Amphibians

Amphibians that could occur include green tree frog, squirrel tree frog, northern cricket frog, greenhouse frog, southern leopard frog, southern toad, Fowler’s toad, and eastern spadefoot. Several salamander species could also occur within the project area, although data on their presence and distribution are not available.

Birds

Common passerines in the Fowl River watershed include European starling, eastern towhee, northern parula, Carolina wren, yellow-rumped warbler, red-winged blackbird, American robin, blue jay, tree swallow, northern mockingbird, fish crow, belted kingfisher, cedar waxwing, northern cardinal, and Carolina chickadee. Other less common passerines use the property, especially during spring and fall migration. Shorebirds common in the Fowl River area include laughing gull, sanderling, killdeer, ring-billed gull, royal tern, and clapper rail. Wading birds frequenting the project area include cattle egret, white ibis, great egret, snowy egret, and great blue heron. Waterfowl using the area most likely include American coot, Canada goose, mallard duck, and red-breasted merganser. Raptors often observed from the property are osprey, bald eagle, red-tailed hawk, Mississippi kite, and black vulture. Other common seabirds include brown pelican, northern gannet, and double-crested cormorant (eBird.org, 2017).

9.5.1.3 Weeks Bay Nutrient Reduction

Mammals

Mammals include nine-banded armadillo, gray squirrel, southeastern shrew, striped skunk, common raccoon, and whitetail deer. Mice, voles, coyote, red fox, bobcat, long-tailed weasel, bats, and nutria are also found in the Weeks Bay watershed. The West Indian manatee could occasionally occur within Weeks Bay. Florida black bear may occur within the project area, but in very low densities.

Reptiles

Common turtles that use the Week Bay watershed include common snapping turtle, common box turtle, and southern painted turtle. Lizards would include the green anole, six-lined racerunner, and ground skink. The Gulf saltmarsh snake would be the most likely snake to occur on the East Gateway Tract; other snakes that could occur in the project vicinity include ring-necked snake, rough greensnake, eastern ribbonsnake, glossy crayfish snake, eastern water snake, and cottonmouth. American alligator would be found using the shorelines of the property in both Weeks Bay and Mobile Bay. Loggerhead or Kemp’s ridley sea turtles could occasionally use Weeks Bay.

Amphibians

Common species likely to occur include southern toad, southern leopard frog, green tree frog, and squirrel tree frog. Uncommon species would be the eastern spadefoot and greenhouse frog.

Birds

More than 250 bird species are known to occur on this portion of the Alabama coastline within the Weeks Bay watershed, which includes a wide diversity of habitats that are crucial for migratory species. Common passerines could include red-winged blackbird, barn swallow, indigo bunting, yellow-rumped warbler, fish crow, mourning dove, northern flicker, brown thrasher, pine warbler, blue jay, belted kingfisher, blue-gray gnatcatcher, northern cardinal, and common grackle. Many year-round resident birds use the project area, notably Kentucky warbler, prothonotary warbler, and wood thrush. Common wintering migrants that could be found include Le Conte's sparrow and Nelson's sparrow. Shorebirds that would be common in the Weeks Bay watershed include laughing gull, royal tern, and Forester’s tern and wading birds frequenting the property include clapper rail, great blue heron, great egret, and cattle egret. Waterfowl using the area include pied-billed grebe, common loon, and wood duck. Raptors often observed from the property include osprey, bald eagle, red-tailed hawk, and black vulture. Other common seabirds include brown pelican and double-crested cormorant (Rosenberg et al., 2016; eBird.org, 2017).

9.5.2 Wildlife—Environmental Consequences

9.5.2.1 No Action Alternative

Under the no action alternative, projects related to nutrient reduction within the watersheds encompassing Bayou La Batre, Weeks Bay, and Fowl River would not occur. Unless funded through other means, addressing the excess nutrient inputs into waters of these watersheds would not occur. This lack of action would result in short-and long-term, minor to moderate, adverse impacts on wildlife because of poor habitat quality, reduced ecosystem function, and reduced water quality. The intensity of the impact would depend on the level of development in area and corresponding increase in nonpoint source nutrients.

9.5.2.2 Bayou La Batre Nutrient Reduction

In general, the proposed watershed-scale nutrient reduction project would result in short-term, minor impacts on wildlife as a result of altered land management practices on primarily agricultural land uses, which include increased planting of cover crops to decrease erosion, planting field borders, and reduced application of pesticides and fertilizers. Adverse impacts on wildlife would include the temporary displacement and or disturbance to the species in proximity to the implemented land management practices. However, it is more likely that the altered land management practices would benefit wildlife as a result of reduced crop tillage, increased soil moisture storage, reduced fertilizer application, and reduced heavy equipment usage, all of which have demonstrated adverse impacts on wildlife. These changes to current land management would not have long-term, adverse impacts on any wildlife species because there would be no destruction or other changes to the configuration of wildlife habitat. The project would result in long-term, beneficial impacts on wildlife in the Bayou La Batre watershed, especially for amphibians and aquatic fauna that are most sensitive to water quality. Reducing nutrient and sediment loads to the system would enhance habitat values for all species, and the project would indirectly benefit all downstream species through the improvement of water quality. Impacts related to the specific conservation practices include:

Grade Stabilization Structure (410). There would be short-term, minor to moderate, adverse impacts from soil excavation and grading to construct or install grade stabilization structures, including berms, riprap, and hard structures, which could result in temporary, short-term, adverse impacts on wildlife that use these areas but these species would be able to reoccupy the area after construction. The majority of these structures would be installed in agricultural fields, although some could be installed in drainageways or tributaries that tend to have minimal wildlife. There would be long-term, beneficial impacts on wildlife from prevention of gully formation, reduction of soils, and drainageway stabilization that would contribute to improved habitats for wildlife. Areas would be replanted or seeded to prevent erosion after bank regrading. Erosion control plans would be implemented during and after construction.

Grassed Waterway (412). There would be short-term, minor to moderate, adverse impacts from shaping or grading a channel and grading to form or install a stable outlet, which could result in temporary, short-term, adverse impacts on wildlife that use these areas, but these species would be able to reoccupy the area after construction. The area would be replanted, where possible with vegetation that would serve to reduce erosion and provide benefit to wildlife. There would be a long-term benefit from controlling and managing flow to prevent soil erosion, which could also increase soil infiltration and soil biological activity. The trapping of sediments in the waterways in would improve habitat for wildlife. The grassed waterway practices would be implemented primarily on cropland.

Heavy Use Area Protection (561). This practice would be applied to stabilize a ground surface that is frequently and intensively used by people, animals, or vehicles. There would be short-term, minor to moderate, adverse impacts from grading, reshaping, and planting areas in and around the disturbed area, which could occur result in temporary, short-term, adverse impacts on wildlife that use these areas but these species would be able to reoccupy the area after construction. Impacts would also be long term and beneficial because stabilization would reduce the off-site effects of sediment, nutrients, and organic material and improve habitats for wildlife. Areas would be replanted with native vegetation and or seeded to prevent erosion after regrading in and around the disturbed area. Erosion control plans would be implemented during and after construction.

Streambank and Shoreline Protection (580). There would be short-term, minor to moderate, adverse impacts from grading, reshaping, and planting of streambanks, ponds, lakes, and other aquatic systems which could result in temporary, short-term, adverse impacts on wildlife that use these areas but these species would be able to reoccupy the area after construction. Additional short-term, minor to moderate, adverse impacts would occur from a temporary increase in erosion and sedimentation into local waterbodies during construction of these measures. There would be long-term, beneficial impacts from revegetating areas with native species. This practice would improve or enhance the stream corridor for fish and wildlife habitat. Areas would be replanted with native vegetation and/or seeded to prevent erosion after bank regrading. Erosion control plans would be implemented during and after construction.

Structure for Water Control (587). This practice would be applied to install a structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation, or measures water. There would be short-term, minor to moderate, adverse impacts from grading, reshaping, and planting of streambanks, ponds, lakes, and other aquatic systems, which could result in temporary, adverse impacts on wildlife that use these areas, but these species would be able to reoccupy the area after construction. Impacts would be long term and beneficial because stabilization would reduce the off-site, downstream effects of sediment, nutrients, and organic material into surface waters. Areas would be replanted with native vegetation and/or seeded to prevent erosion after bank regrading. Erosion control plans would be implemented during and after construction.

Best Practices. The AL TIG would consider best practices referenced in Section 6.15 and Appendix 6A of the Final PDARP/PEIS. Additional best practices may be recommended for site-specific conservation practices in different locations as a result of differences in relevant conditions. The following best practices are contemplated and would be implemented to the extent practicable to avoid and minimize impacts on habitats and wildlife and to reduce the spread of invasive species:

- Conservation practices would use natural material in any conservation practice that advises the use of materials and native plantings and seedlings, as well as natural revegetation. The footprint of any disturbance would be minimized the extent practicable. Clearing activities would be discouraged in forested wetlands.
- All equipment to be used during a project, including personal gear, would be inspected and cleaned such that no observable presence of mud, seeds, vegetation, insects and other species are seen.

9.5.2.3 Fowl River Nutrient Reduction

The impacts on wildlife from the Fowl River Nutrient Reduction project would be the same as those described for the Bayou La Batre Nutrient Reduction project.

9.5.2.4 Weeks Bay Nutrient Reduction

The impacts on wildlife from the Weeks Bay River Nutrient Reduction project would be the same as those described for the Bayou La Batre Nutrient Reduction project.

9.5.3 Rare and Protected Species—Affected Environment

9.5.3.1 Bayou La Batre Nutrient Reduction

Rare species of highest conservation concern (SGCN P1) that could occur within the Bayou La Batre watershed include river frog, southern dusky salamander, Mississippi diamondback terrapin, Bewick's wren, and Henslow's sparrow. Rare species of high conservation concern (SGCN P2) that could occur within the Bayou La Batre watershed include one-toed amphiuma, mimic glass lizard, southeastern five-lined skink, rainbow snake, eastern kingsnake, speckled kingsnake, eastern coral snake, eastern diamondback rattlesnake, alligator snapping turtle, least bittern, reddish egret, northern harrier, American kestrel, American oystercatcher, wood thrush, short-eared owl, worm-eating warbler, Swainson's warbler, Kentucky warbler, Bachman's sparrow, Nelson's sharp-tailed sparrow, and seaside sparrow.

ESA-listed species that are known to occur or may potentially occur within the Bayou La Batre watershed include:

- **Loggerhead sea turtle:** potentially present in downstream waters of Portersville Bay and the Gulf of Mexico
- **Kemp's ridley sea turtle:** potentially present in downstream waters of in the Gulf of Mexico
- **Gulf sturgeon:** potentially present in downstream waters of Bayou La Batre and Portersville Bay
- **West Indian manatee:** likely present on rare occasions in downstream waters of Bayou La Batre and Portersville Bay, adjacent to the project area

- **Eastern indigo snake:** potentially present in the project area within habitats with loose, well-drained sandy soils, as well as streams, swamps, and flatwood pine habitats during warmer months
- **Black pine snake:** potentially present in the project area within dry pine forests, especially longleaf pine forest
- **Gopher tortoise:** potentially present in the project area in habitats with loose, well-drained sandy soils, especially within longleaf pine forest
- **Alabama red-bellied turtle:** potentially present in the project area within backwaters and margins of rivers, creeks, and lagoons in areas with dense aquatic vegetation
- **Piping plover:** potentially present in the project area during winter, on intertidal sand and mud flats with no or very sparse emergent vegetation and adjacent beaches
- **Red knot:** potentially present along sparsely vegetated shorelines and beaches in the project area during migration
- **Wood stork:** potentially present within most densely vegetated wetlands in the project area.

The Bayou La Batre watershed does not contain any designated critical habitat for ESA-listed species.

Protected marine mammals that could potentially occur within Bayou La Batre include both West Indian manatee and bottlenose dolphin.

9.5.3.2 Fowl River Nutrient Reduction

Rare species of highest conservation concern (SGCN P1) that could occur within the Fowl River watershed include river frog, southern dusky salamander, Mississippi diamondback terrapin, Bewick's wren, and Henslow's sparrow. Rare species of high conservation concern (SGCN P2) that could occur in the project vicinity include one-toed amphiuma, mimic glass lizard, southeastern five-lined skink, rainbow snake, eastern kingsnake, speckled kingsnake, eastern coral snake, eastern diamondback rattlesnake, alligator snapping turtle, least bittern, reddish egret, northern harrier, American kestrel, yellow rail, black rail, American oystercatcher, wood thrush, short-eared owl, worm-eating warbler, Swainson's warbler, Kentucky warbler, Bachman's sparrow, Nelson's sharp-tailed sparrow, and seaside sparrow.

ESA-listed that are known to occur or may potentially occur within the Fowl River watershed include:

- **Loggerhead sea turtle:** potentially present in downstream waters of Mobile Bay or Mississippi Sound
- **Kemp's ridley sea turtle:** potentially present in downstream waters of in the Gulf of Mexico
- **Gulf sturgeon:** potentially present in downstream waters of Mobile Bay or Mississippi Sound
- **West Indian manatee:** likely present in nearby coastal waters in Mobile Bay or Mississippi Sound, on rare occasions adjacent to the project location.
- **Gopher tortoise:** potentially present in the project area in habitats with loose, well-drained sandy soils, especially within longleaf pine forest
- **Alabama red-bellied turtle:** potentially present in the project area within backwaters and margins of rivers, creeks, and lagoons in areas with dense aquatic vegetation

- **Eastern indigo snake:** potentially present in the project area within habitats with loose, well-drained sandy soils, as well as streams, swamps, and flatwood pine habitats during warmer months
- **Black pine snake:** potentially present in the project area within dry pine forests, especially longleaf pine forest
- **Piping plover:** potentially present in the project area during the winter, on intertidal sand and mud flats with no or very sparse emergent vegetation and adjacent beaches
- **Red knot:** potentially present along sparsely vegetated shorelines and beaches in the project area during migration
- **Wood stork:** potentially present within most densely vegetated wetlands in the project area

The Fowl River watershed does not contain designated critical habitat for any ESA-listed species.

Protected marine mammals that could occur within the Fowl River estuary include both West Indian manatee and bottlenose dolphin.

9.5.3.3 Weeks Bay Nutrient Reduction

Rare species of highest conservation concern (SGCN P1) that could occur within the Weeks Bay watershed include river frog, southern dusky salamander, Mississippi diamondback terrapin, Bewick's wren, and Henslow's sparrow. Rare species of high conservation concern (SGCN P2) that could occur within the Weeks Bay watershed include one-toed amphiuma, mimic glass lizard, southeastern five-lined skink, rainbow snake, eastern kingsnake, speckled kingsnake, eastern coral snake, eastern diamondback rattlesnake, alligator snapping turtle, least bittern, reddish egret, northern harrier, American kestrel, yellow rail, black rail, American oystercatcher, wood thrush, short-eared owl, worm-eating warbler, Swainson's warbler, Kentucky warbler, Bachman's sparrow, Nelson's sharp-tailed sparrow, and seaside sparrow.

ESA-listed species that are known to occur or may potentially occur within the Weeks Bay watershed include:

- **Loggerhead sea turtle:** potentially present in downstream waters of Mobile Bay or the Gulf of Mexico
- **Kemp's ridley sea turtle:** potentially present in downstream waters of the Gulf of Mexico
- **Gulf sturgeon:** potentially present in downstream waters of Mobile Bay
- **West Indian manatee:** potentially present on rare occasions within Weeks Bay, adjacent to the project area
- **Gopher tortoise:** potentially present in upland habitat areas with sandy soils and open canopies
- **Alabama red-bellied turtle:** potentially present in shallow vegetated backwaters of freshwater streams within the project area
- **Eastern indigo snake:** potentially present in upland habitat areas with sandy soils and open canopies
- **Wood stork:** potentially present within wooded wetlands, marshes, and creek margins where shallow-water foraging habitat exists

The Weeks Bay watershed does not contain any designated critical habitat for ESA-listed species.

Protected marine mammals that could occur within the Weeks Bay estuary include both West Indian manatee and bottlenose dolphin.

9.5.4 Rare and Protected Species—Environmental Consequences

The general approach and background to the analysis of rare and protected species is the same as described in Section 7.2.8. In some cases, based on coordination with resource agencies, the Trustees have made preliminary determinations that a proposed project *May Affect, but is Not Likely to Adversely Affect* certain ESA-listed species. The effects determinations and the respective listed species are described in this section. The Trustees are engaged in technical assistance with the appropriate agencies for ESA compliance, and the compliance status will be updated in the final plan.

9.5.4.1 No Action Alternative

Under the no action alternative, projects related to nutrient reduction within the watersheds encompassing Bayou La Batre, Fowl River, and Weeks Bay would not occur. Unless funded through other means, addressing the excess nutrient inputs into waters of these watersheds would not occur. This lack of action would result in short-and long-term, moderate, adverse impacts on rare and protected species because of poor habitat quality, reduced ecosystem function, and reduced water quality.

9.5.4.2 Bayou La Batre Nutrient Reduction

The Bayou La Batre Nutrient Reduction project would have minor, temporary impacts on some ESA-listed species, although their potential to occur on the targeted agricultural lands is very low. Some project activities would involve the use of heavy equipment to implement improved agricultural land management practices (e.g. cover crops) or natural habitat enhancements (e.g., field borders). These activities could directly affect a small number of individual animals through direct mortality or by influencing their reproductive or foraging behavior as a result of human disturbance. However, because of the limited duration of the activities, any adverse effects would be minor and temporary.

This watershed nutrient reduction project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: gopher tortoise, eastern indigo snake, black pine snake, and wood stork.

The conservation practices implemented by this project would have an overall beneficial impact on all rare and protected species. Beneficial impacts on these species would result from water quality improvements because of targeted land management practices intended to reduce (1) nutrient losses from the landscape, (2) nutrient loads to streams and downstream receiving waters, and (3) water quality degradation in watersheds, and thus would provide benefits to coastal watersheds and marine resources. These beneficial impacts could translate downstream to affect protected marine mammals that could occur in estuaries and marine habitats, including bottlenose dolphin and West Indian manatee.

Because of the lack of suitable habitat on lands potentially affected by this watershed nutrient reduction project, there would be *No Effect* on the following ESA-listed species that could potentially occur in the project area: loggerhead sea turtle, Kemp's ridley sea turtle, Gulf sturgeon, West Indian manatee, Alabama red-bellied turtle, piping plover, and red knot.

All project activities would occur on land, so the above aquatic species would not be affected. Also, piping plover and red knot would not be affected by the project because all proposed conservation practices would occur inland and not near beaches, intertidal flats, or other shorebird habitat.

9.5.4.3 Fowl River Nutrient Reduction

The Fowl River Nutrient Reduction project would have minor, temporary impacts on some ESA-listed species, although their potential to occur on the targeted agricultural lands is very low. Some project activities would involve the use of heavy equipment to implement improved agricultural land management practices (e.g. cover crops) or natural habitat enhancements (e.g., field borders). These activities could directly affect a small number of individual animals through direct mortality or by influencing their reproductive or foraging behavior as a result of human disturbance. Because of the limited duration of the activities, any adverse effects would be minor and temporary.

This watershed nutrient reduction project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: gopher tortoise, eastern indigo snake, black pine snake, and wood stork.

The conservation practices implemented by this project would have an overall beneficial impact on all rare and protected species. Beneficial impacts on these species would result from water quality improvements because of targeted land management practices intended to reduce (1) nutrient losses from the landscape, (2) nutrient loads to streams and downstream receiving waters, and (3) water quality degradation in watersheds, and thus would provide benefits to coastal watersheds and marine resources. These beneficial impacts could translate downstream to affect protected marine mammals that could occur in estuaries and marine habitats, including bottlenose dolphin and West Indian manatee.

Because of the lack of suitable habitat on lands potentially affected by this watershed nutrient reduction project, there would be *No Effect* on the following ESA-listed species that could potentially occur in the project area: loggerhead sea turtle, Kemp's ridley sea turtle, Gulf sturgeon, West Indian manatee, Alabama red-bellied turtle, piping plover, and red knot.

All project activities would occur on land, so the above aquatic species would not be affected. Also, piping plover and red knot would not be affected by the project because all proposed conservation practices would occur inland and not near beaches, intertidal flats, or other shorebird habitat.

9.5.4.4 Weeks Bay Nutrient Reduction

The Weeks Bay Nutrient Reduction project would have minor, temporary impacts on some ESA-listed species, although their potential to occur on the targeted agricultural lands is very low. Some project activities would involve the use of heavy equipment to implement improved agricultural land management practices (e.g. cover crops) or natural habitat enhancements (e.g., field borders). These activities could directly affect a small number of individual animals through direct mortality or by influencing their reproductive or foraging behavior as a result of human disturbance. However, because of the limited duration of project activities, any adverse effects would be minor and temporary.

This watershed nutrient reduction project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: gopher tortoise, eastern indigo snake, and wood stork.

The conservation practices implemented by this project would have an overall beneficial impact on all rare and protected species. Beneficial impacts on these species would result from water quality improvements because of targeted land management practices intended to reduce (1) nutrient losses from the landscape, (2) nutrient loads to streams and downstream receiving waters, and (3) water quality degradation in watersheds. These activities would provide benefits to coastal watersheds and marine resources and could translate downstream to affect protected marine mammals that could occur in estuaries and marine habitats, including bottlenose dolphin and West Indian manatee. Also, any changes to the arrangement of habitats within the Weeks Bay watershed would have an overall lasting benefit on all rare and protected species.

Because of the lack of suitable habitat on lands potentially affected by this watershed nutrient reduction project, there would be *No Effect* on the following ESA-listed species that could potentially occur in the project area: loggerhead sea turtle, Kemp's ridley sea turtle, Gulf sturgeon, West Indian manatee, and Alabama bellied turtle.

All project activities would occur on land, so the above aquatic species would not be affected. Also, piping plover and red knot would not be affected by the project because all proposed conservation practices would occur inland and not near beaches, intertidal flats, or other shorebird habitat.

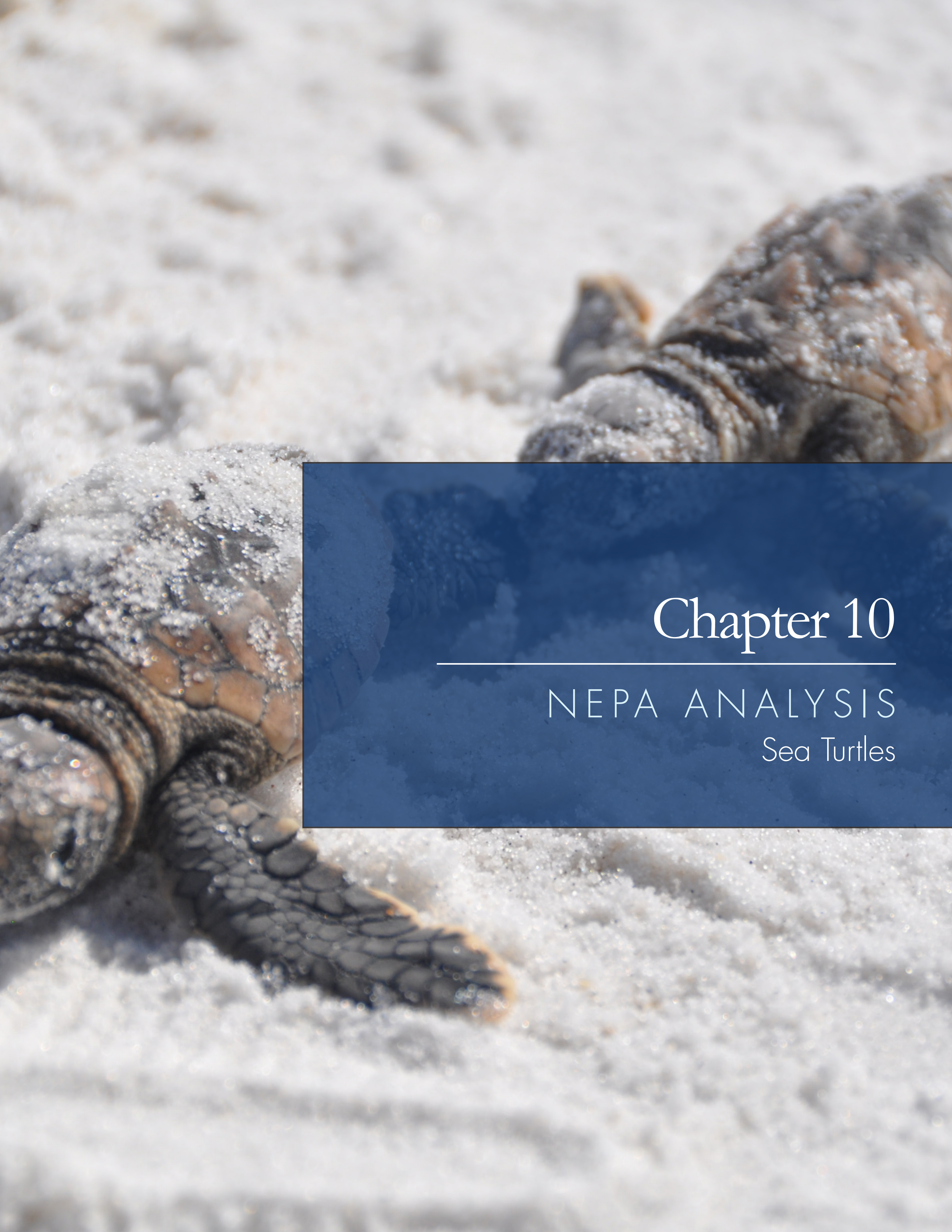
9.6 SOCIOECONOMIC RESOURCES

9.6.1 Cultural Resources—Affected Environment

The affected environment for cultural resources for all projects considered in this draft RP II/EA is discussed in Section 4.3.2.

9.6.2 Cultural Resources—Environmental Consequences

For all projects in this draft RP II/EA, consultation with the Alabama State Historic Preservation Officer is currently ongoing and will be incorporated into the final RP II/EA. For many projects, the action would involve a study, education, or land acquisition that does not have the potential to disturb cultural resources. For those projects that include construction, ground disturbance, or other related activities, if any culturally or historically important resources were identified during project preparations or predevelopment surveys, such areas would be avoided during construction. A complete review of all alternatives under Section 106 of the NHPA is ongoing and would be completed prior to any activities that would restrict consideration of measures to avoid, minimize, or mitigate any adverse effects on historic properties located in the project area. Alternatives would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.



Chapter 10

NEPA ANALYSIS

Sea Turtles

10.0 NEPA ANALYSIS—SEA TURTLES

This section provides the NEPA analysis for all of the non-E&D restoration alternatives considered in this plan for funding under the Sea Turtles Restoration Type.

The general affected environment for coastal Alabama described in Chapter 4 of this draft RP II/EA is applicable to this section. CEQ guidance states that agencies should "focus on significant environmental issues," and for issues that are other than significant, there should be "only enough discussion to show why more study is not warranted." After preliminary investigation, some resource areas under the Sea Turtles Restoration Type alternatives were determined to be either unaffected or minimally affected by the restoration actions being proposed for this Restoration Type. Accordingly, these resources are discussed briefly below. Only those resource areas for which potential, adverse impacts are expected are discussed in detail in this draft RP II/EA. Additionally, the NEPA analysis for the Sea Turtles alternatives looks at a further subset of the total resource areas and topics described in Chapter 4, Affected Environment, as part of the biological, physical, and socioeconomic environment for each restoration alternative. To avoid redundant or unnecessary information, resource areas and topics that are not expected to be affected by a proposed restoration alternative are not evaluated further under that a given project.

Resource areas not analyzed in detail for the Sea Turtles Restoration Type are identified below, with brief rationale for non-inclusion:

- **Noise:** All proposed projects under the Sea Turtles Restoration Type include some level of vehicle or vessel use for assessment or response activities. Use of vehicles and vessels would be short-term and result in negligible, adverse impacts on sea turtles from noise. There would be no long-term impacts from noise. Therefore this resource area was not carried forward for detailed analysis.
- **Habitats:** Some of the proposed projects under the Sea Turtles Restoration Type are conducting studies to inform restoration efforts. Neither CAST Habitat Usage Population and Dynamics or CAST Protection: Enhancement and Education, would have any impacts on Habitats. Development of the CAST Triage Center would have short-term, minor impacts on habitats within the project area. Although the site is highly disturbed and does not provide an abundance of habitat, impacts would result from vegetation clearing and construction activities, such as the building of the facility and the installation of water pipes underground, that could destroy habitat or modify its configuration. Once the underground pipes are installed, placement of the water intake would occur in accordance with permit requirements to minimize any impacts on in-water habitats. Once constructed, the CAST Triage Center would have no additional adverse impacts on habitats and would have beneficial impacts because of increased stranding response and treatment. Implementation of the CAST Conservation Program could have indirect, beneficial impacts on habitat because it may increase public education and outreach, which could translate to increased support for habitat conservation for imperiled coastal wildlife. Because there would be no to minor, short- and long-term, adverse impacts. Therefore, this topic was not carried forward for detailed analysis.
- **Marine and Estuarine Resources:** Proposed projects under the Sea Turtles Restoration Type would have no to negligible, short- and long-term, adverse impacts on marine and estuarine resources. Construction of the CAST Triage Center would have no effect on marine or estuarine fauna because the project area is located in a previously disturbed upland area, north of Cotton Bayou in Orange Beach, Alabama, that does not contain marine or estuarine habitats or fauna. This project would provide benefits to sea turtles as described under Rare and Protected Species

(Section 10.2.3). Infrastructure for water use at the facility would be addressed through four pipes located underground, up land. The water intake system would not affect marine and estuarine resources. Assessments related to Habitat Usage and Population Dynamics would have short-term, negligible impacts on marine or estuarine fauna from the underwater noise associated with the use of boats during the study. Underwater noise from boats could temporarily displace fish, crabs, and other mobile species. However, these impacts would be negligible given the existing volume of boat traffic in Alabama's coastal waters. The project would not result in long-term effects on marine and estuarine fauna or their habitats. The CAST Enhancement and Education project would have no effect on marine or estuarine fauna because it would consist of measures designed to enhance sea turtle populations through bycatch reduction, increased enforcement, and education. The project would not involve construction. The project would have short-term, negligible impacts on marine or estuarine fauna from the underwater noise associated with the use of boats during the enforcement activities. Underwater noise from boats could temporarily displace fish, crabs, and other mobile species. However, these impacts would be negligible given the existing volume of boat traffic in Alabama's coastal waters. Because these actions would have none to negligible, short- and long-term impacts, this resource area was not carried forward for detailed analysis.

- **Federally Managed Fisheries:** Projects proposed under the Sea Turtles Restoration Type would result in no destruction or adverse modification to FMP species or EFH overall, with potential short-term, negligible impacts from the CAST Triage Center from work related to establishing the water intake because work would occur up-land, not in water. Projects would either include all land-based components, or any impacts, such as those during construction of the CAST Triage Center, would be negligible and adverse from the implementation of BMPs and mitigation measures. Therefore, this resource area was not carried forward for detailed analysis.
- **Socioeconomics and Environmental Justice:** Implementation of proposed projects under the Sea Turtles Restoration Type would have no impact on economic activities in the short-or long-term. Therefore, this resource area was not carried forward for detailed analysis.
- **Infrastructure and Transportation:** None of the proposed projects evaluated in the draft RP II/EA under the Sea Turtles Restoration Type would create increased demands on area infrastructure that could not be accommodated by existing infrastructure or would affect traffic and transportation in the areas. Therefore, this topic was not carried forward for analysis.
- **Land and Marine Management:** For projects proposed under the Sea Turtles Restoration Type, no impacts on land and marine management are expected. The CAST Triage Center would occur on land currently being utilized for similar uses, and the type of land use would not change. Portion of the CAST Habitat Usage and Population Dynamics Project lie within a coastal area that may be regulated by the federal CZMA of 1972, which is implemented through the Alabama Coastal Area Management Program but the proposed actions would not have any impacts on this land use. The CAST Protection: Enhancement and Education project would be focused on outreach and education, and no effect to land or marine management is expected. As there would be no to negligible short- and long-term, adverse impacts. Therefore, this resource area was not carried forward for detailed analysis.
- **Tourism and Recreation:** Projects proposed under the Sea Turtles Restoration Type would have no to minor, short-term impacts, and long-term impacts to tourism and recreation. The CAST Conservation Program would continue existing activities that do not interfere with access to recreational sites or tourism. The CAST Triage Center would be built on an already disturbed site that is not used for recreation, and only minor renovations would occur. No impacts on public

access to the adjacent Gulf State Park would occur because of construction activities. As a result, no short- or long-term effects would occur on tourism and recreational resources. Any long-term impacts could be beneficial as the facility would be of interest to those visiting the areas and beneficial to tourism. The CAST Habitat Usage and Population Dynamics, consists of the coastal and nearshore waters of the Alabama coast, where a variety of both passive and active recreational uses currently exist. The capture of turtles at several sites along the Alabama coast, including inshore waters and the nearshore waters of the Gulf of Mexico, would result in short-term impacts on tourism and recreation as during such activities public access to areas where operations are occurring and use of open water areas for boat traffic may be limited. No long-term, adverse impacts would occur. The CAST Protection: Enhancement and Education project would address human behaviors through targeted outreach and education pertaining to nesting impacts and sea turtle harassment from lighting disorientations. Because project activities would be limited to targeted outreach and education, no short- or long-term adverse effects to tourism and recreation would occur. Because there would be no to minor, short-term impacts and no long-term impacts, this resource area was not carried forward for detailed analysis.

- **Aesthetics and Visual Resources:** None of the proposed projects under the Sea Turtles Restoration Type would alter the existing aesthetic or visual resources in the area long-term. There could be short-term, minor impacts during the construction of the CAST Triage Center from the presence of construction equipment, but these impacts would end once the construction is completed. Because there would be no to minor, short-term adverse impacts and no long-term adverse impacts, this resource area was not carried forward for detailed analysis.
- **Public Health and Safety:** None of the proposed projects under the Sea Turtles Restoration Type would affect public health and Safety. Conducting assessments and education to inform restoration, or the development of the CAST Triage Center, would not increase shoreline erosion, or create other health and safety concerns. Therefore this resource area was not carried forward for detailed analysis.
- **Fisheries and Aquaculture:** There are no short- or long-term adverse impacts on commercial fisheries or aquaculture operation in the area that would be affected from the projects proposed under the Sea Turtles Restoration Type. If TEDs for the skimmer trawl fisheries were purchased and distributed under the CAST Protection: Education and Enhancement project, impacts would be long term and beneficial. Therefore, no impacts on fisheries or aquaculture associated with this project are expected, and this resource area was not carried forward for detailed analysis.
- **Marine Transportation:** None of the alternatives under consideration in this draft RP II/EA for Sea Turtles would affect marine transportation; therefore, this topic was not carried forward for detailed analysis.

10.1 PHYSICAL RESOURCES

10.1.1 Geology and Substrates—Affected Environment

10.1.1.1 CAST Conservation Program

Geology

Offshore Alabama in the Gulf of Mexico contains Late Pleistocene and early Holocene geology. Major shelf features include sand ridges, mid-shelf linear shoals, and shelf-edge deltas (Mcbride, 1997). The

Gulf of Mexico also contains numerous Jurassic hydrocarbon fields and pools. These petroleum traps are basement highs, salt anticlines, faulted salt anticlines, and extensional faults that are all associated with salt movement (Mink et al., 1989). Reservoirs in the Gulf of Mexico contain continental and marine sandstone, limestone, and dolostones (Mink et al., 1989).

Substrates

Alabama experiences constant sorting by waves and large fluctuations in sea level, which cause uniform sand grains across most beaches in Alabama (Kopaska-Merkel and Rindsberg, 2005). Alabama's beach sand is composed almost entirely of quartz grains that have washed out from the ancient Appalachian Mountains (Encyclopedia of Alabama, 2009; Boone, 1973). Bon Secour and surrounding beaches contains soils that are generally very sandy and well drained and low in nutrients (USFWS, 2006b).

10.1.1.2 CAST Triage

Geology

The proposed location for the CAST Triage Center has slopes between zero and 5 percent (USDA-NRCS, 2015). The triage center is located near Cotton Bayou. Cotton Bayou is a part of an exposed Gulf beach, which is generally flat, but becomes steeper during the winter (Kopaska-Merkel and Rindsberg, 2005). Geology for the Cast Triage project is the same as that described for the Weeks Bay Land Acquisition East Gateway Tract.

Substrates

This project location contains only Lakeland sand (USDA-NRCS, 2015). Lakeland sand is excessively drained and rapid to very rapidly permeable (USDA-NRCS, 2013). Cotton Bayou is an exposed Gulf beach that is affected by season variations in soil characteristics. In the winter, particle sizes are larger and longshore bars move farther away from the coast. Certain areas of exposed beaches, such as Cotton Bayou, may become steeper in the winter because of sand particle movement (Kopaska-Merkel and Rindsberg, 2005).

10.1.1.3 CAST Habitat Usage and Population Dynamics

Geology and substrates for CAST Habitat Usage and Population Dynamics are the same as those described for the CAST Conservation Program.

10.1.1.4 CAST Protection: Enhancement and Education

Geology

Sea turtle nesting beaches in Alabama include Dauphin Island, East/West Fort Morgan, Gulf State Park, Laguna Key, Gulf Shores, and Orange Beach (including western tip of Perdido Key). Beaches in the BSNWR provide habitat for nearly half of the sea turtle nests in Alabama annually. The BSNWR is on landforms dating back from the late Pleistocene to early Holocene era. The area is also characterized by the Citronelle formation that was caused by the deposition of alluvial fans across the coastal areas (USFWS, 2006b).

Gulf State Park has been shaped by natural disturbances for thousands of years. The shoreline has moved farther into the Gulf and contains ridges of historical dunes. Big Lagoon State Park contains beaches and shallow bays (AGSP, 2016). The beaches in Fort Morgan do not exceed 5 percent slopes. Dauphin Island is a barrier island located south of Bayou La Batre.

Substrates

Substrates for CAST Protection: Enhancement and Education are the same as those described for the CAST Habitat Usage and Population Dynamics.

10.1.2 Geology and Substrates—Environmental Consequences

The general approach and background to the analysis of geology and substrates is the same as described in Section 8.1.2.

10.1.2.1 No Action Alternative

Under the no action alternative, projects related to the restoration of sea turtles would not occur. For the most part, if these projects were not implemented, there would be no short- or long-term impacts on geology and substrates. Specifically, should the triage center not be developed, the site may be used for another purpose. The continued operation of the site as is or development of the site for another purpose could have short- or long-term, minor, adverse impacts compared to the current condition depending on the level of intensity of that development.

10.1.2.2 CAST Conservation Program

No changes to the local area are anticipated to occur with this project, and therefore, no impacts on substrates, geologic hazards, or geology are expected.

10.1.2.3 CAST Triage

The CAST Triage Center is expected to be built where a water tower is currently located. The construction of the water tower previously disturbed the local site, and no additional impacts are expected to occur with this project. While ground disturbance for infrastructure, such as water pipes, would occur, it would occur on disturbed areas with minimal adverse impacts. During construction of the triage center, BMPs would be implemented to reduce and avoid erosion and permanent damage to the local geology. These BMPs may include sediment fencing, minimizing the use of large construction vehicles, and turning off vehicle engines when not in use.

10.1.2.4 CAST Habitat Usage and Population Dynamics

This project occurs in open water and therefore, no impacts associated with substrates, geologic hazards, or geology are expected.

10.1.2.5 CAST Protection: Enhancement and Education

No changes to the local area are anticipated to occur with this project, and therefore, no impacts on substrates, geologic hazards, or geology are expected.

10.1.3 Hydrology and Water Quality—Affected Environment

10.1.3.1 CAST Conservation Program

Hydrology

The CAST Conservation Program aims to protect sea turtle habitat along Alabama’s coastal beaches. These beaches include Dauphin Island, East/West Fort Morgan, Gulf State Park, and Laguna Cove. Nearshore waters that border these sites to the north include Perdido Bay, Little Lagoon, Bon Secour Bay, Mobile Bay, and the Mississippi Sound.

The hydrologic cycles of Alabama’s coastal beaches are largely driven by storms, waves, and currents since the tidal range in the north-central Gulf is very low. Dauphin Island is one of the Gulf’s microtidal barrier islands (Froede, 2007), meaning that it rests on a continuous sand shelf that is about 13 feet shallower than the surrounding Gulf (Morton, 2008). At 14 miles long, this island acts as a protective barrier for the coastline from storm surges (USGS, n.d.). Storm forces not only affect the shape of the island, but storms that breach the Gulf-facing beaches can crash on to the island and infiltrate the aquifer beneath it (Kidd, 1988). Groundwater is the sole water source on Dauphin Island because the excessive drainage capacity of the sandy substrate removes any potential for perennial streams to exist on the island. Because the aquifer is unconfined and so close to the overlying waters (with levels that are less than 5 feet above sea level), groundwater water quality issues exist in this region because of salt intrusion.

Perdido Bay is a shallow estuary with an average salinity of 15 parts per thousand (ADEM, 2010b). It is connected to the Gulf through the Perdido Pass and the east and west branches of the GIWW. Perdido Bay has a total surface area of about 50 square miles (ADEM, 2010b), but the collective watershed encompasses more than 1,250 square miles of coastal Alabama, including tributaries, lagoons, bayous, and land (Kirschenfeld et al., 2006). The main freshwater input to the estuarine bay is the Perdido River, which contributes approximately 70 percent of the freshwater (ADEM, 2010b). The bed of the Perdido River is sand and gravel, which allows for continual recharge from the underlying aquifer (Kirschenfeld et al., 2006). The tributaries within the Perdido Bay watershed receive their water from heavy precipitation and groundwater discharge. Perdido Bay is subject to rapid changes from rainfall, wind, and tides (Kirschenfeld et al., 2006).

Little Lagoon is an estuarine, brackish body of water that receives most of its water from precipitation, groundwater recharge, runoff, and overflow from the surrounding waterbodies of Lake Shelby and the Gulf of Mexico.

Bon Secour Bay is the sub-estuary of Mobile Bay and has three main watershed inputs: Skunk Bayou watershed, Bon Secour River watershed, and Oyster Bay watershed. These three watersheds and the mouth of Weeks Bay make up the coastline of Bon Secour Bay. The Bay comprises an area of approximately 43,670 acres (MBNEP, 2017b). The main surface water inputs to Bon Secour Bay include Bon Secour River, Weeks Bay, the GIWW, Oyster Bay, and the Skunk Bayou (MBNEP, 2017b). The Bay receives recharge from the unconfined Miocene-Pliocene and watercourse aquifers through the sand and gravel substrates that comprise its bottom (MBNEP, 2017b). Precipitation is the main source of recharge for the surface and groundwater in this region.

Mobile Bay is a relatively shallow estuary (Gesch, 2013). Primary freshwater inputs include the Mobile and Tensaw rivers, which make up approximately 95 percent of the freshwater flow (Modlin and Dardeau, 1987). The Gulf waters pass between the barrier island and the Mississippi Sound creating an estuarine profile. The Bay has an area of more than 1,900 square miles (Gesch, 2013). The hydrologic processes of the bay are influenced by storms, heavy rainfall, groundwater discharge, and runoff.

The Mississippi Sound is an estuary with a surface area of more than 800 square miles (Eleuterius, 1978). The sound is bordered on the south by a series of barrier islands, with Dauphin Island being the eastern most island. The Pascagoula and Pearl rivers are the main freshwater inputs into the estuary (Eleuterius, 1978). The Mississippi Sound is subject to the same hydrologic processes as Mobile Bay.

Water Quality

Both Mobile Bay and its sub-estuary, Bon Secour Bay, were listed on the ADEM 2016 303(d) list of impaired waters for pathogen pollution from urban runoff and storm sewers (ADEM, 2016a). Even though the bay is listed as impaired, the surface waters on the peninsula are not listed as impaired mainly because of the high permeability of the sands that allows a portion of the runoff to drain into the ground before reaching the surface waterbodies.

Perdido Bay is listed as impaired for pathogens (Enterococcus) from collection system failure and on-site wastewater systems. A TMDL was developed in 2010 to reduce Enterococci levels in Perdido Bay, but the waterbody has remained on the list in the years since (ADEM 2010b; 2012; 2014b; 2016a). Perdido Bay is also listed for mercury pollution from atmospheric deposition.

The Mississippi Sound is listed as impaired for pathogens (Enterococcus) from urban runoff/storm sewers and municipal inputs (ADEM, 2016a). The Gulf of Mexico is not listed as impaired.

For information on the water quality of Little Lagoon, see the water quality description for the Little Lagoon Living Shoreline project in Section 8.1.3.1.

Floodplains

The coastline of Alabama is designated as Zone VE. The inland area is designated predominately as Zone AE, with the area of Bon Secour Refuge and a small area in the Town of Dauphin Island designated as Zone X (FEMA, 2017).

Wetlands

A small strip of estuarine and marine wetland occurs where the coastline meets the Gulf along Dauphin Island and the Fort Morgan Peninsula. On the western end of the Fort Morgan Peninsula, an area in between the sandy coastal beach and Mobile Bay is designated as freshwater emergent wetland. The BSNWR encompasses land designated as freshwater forested/shrub wetland. Areas of estuarine and marine and freshwater forested/shrub wetlands exist around the nearshore waterbodies (USFWS, 2017b).

10.1.3.2 CAST Triage

Hydrology

The CAST Triage site is located in the City of Orange Beach adjacent to Cotton Bayou and within 2,000 feet of the beach. Cotton Bayou is part of the larger Lower Perdido Bay that forms the eastern boundary of Baldwin County and the Alabama/Florida border. The Cotton Bayou connects to the rest of Perdido Bay through the Perdido Pass and discharges into the Gulf of Mexico (Kirschenfeld et al., 2006).

Water Quality

Cotton Bayou is not listed on the ADEM's 303(d) list of impaired waters (ADEM, 2016a). Cotton Bayou Beach is one of the sites included in ADEM/Alabama Department of Public Health's Coastal Alabama Beach Monitoring Program and is monitored on a weekly basis for Enterococci levels (ADEM, 2017). Since January 2006, Cotton Bayou has only exceeded USEPA recommended levels of Enterococci three times, and each time the beach was resampled the next day and levels were normal.

The prominent water quality issue in Cotton Bayou is increased sediment loading from anthropogenic influences on the neighboring canal (ADCNR, 2014b). Sediment loading decreases tidal circulation in the bayou, which can lower dissolved oxygen levels, increase algal blooms, and decrease ambient water quality (ADCNR, 2014b).

Floodplains

Nearly the entire project area is designated as floodplain Zone AE, with a BFE of 8 feet (FEMA, 2017). A small portion of the site in the southeast corner along Highway 161 is designated as Zone X, Area of Minimal Flood Hazard.

Wetlands

The project area encompasses 0.5 acre of freshwater forested/shrub wetland (USFWS, 2017b). The remainder of the site is upland area.

10.1.3.3 CAST Habitat Usage and Population Dynamics

Hydrology

The CAST Habitat Usage and Population Dynamics project would occur along the coastal beaches and nearshore waters of the Alabama coast. Because this project would occupy the same space as the CAST Conservation Program, the hydrology is the same as described in the Section 10.1.3.1, CAST Conservation Program Hydrology and Water Quality—Affected Environment.

Water Quality

Water quality is the same as described in Section 10.1.3.1.

Floodplains

Floodplains are the same as described in Section 10.1.3.1.

Wetlands

Wetlands are the same as described in Section 10.1.3.1.

10.1.3.4 CAST Protection: Enhancement and Education

Hydrology

The CAST Protection: Enhancement and Education would be focused around Alabama coastal beaches that contain sea turtle nesting sites. Hydrology for Alabama coastal beaches is the same as described in Section 10.1.3.1, CAST Conservation Program Hydrology and Water Quality—Affected Environment.

Water Quality

Water quality of the project area are the same as those described in Section 10.1.3.1.

Floodplains

Floodplains in the project area are the same as those described in Section 10.1.3.1.

Wetlands

Wetlands are the same as those described in Section 10.1.3.1.

10.1.4 Hydrology and Water Quality—Environmental Consequences

The general approach and background to the analysis of hydrology and water quality is the same as described in Section 7.1.2.

10.1.4.1 No Action Alternative

Under the no action alternative, projects related to the restoration of sea turtles would not occur. For the most part, if these projects were not implemented, there would be no short- or long-term impacts on hydrology, water quality, floodplains or wetlands. Specifically, if the triage center is not developed, the site may be used for another purpose. The continued operation of the site as is or development of the site for another purpose could have short- or long-term, minor, adverse impacts on hydrology, water quality, floodplains or wetlands in comparison to the current condition.

10.1.4.2 CAST Conservation Program

Hydrology

This project would fund staff time, program equipment, education, turtle nest discovery, nest marking, and data collection. No infrastructure or other proposed improvements would be constructed. Given the lack of construction, no short-term impacts on hydrology are expected as a result of this project. Over the life of the project, volunteers would collect data annually between May and December along the coastal beaches. The data collection made by a few volunteers is not expected to have any long-term impacts on the hydrology of the area.

Water Quality

Given the lack of construction, no short-term impacts on water quality are expected as a result of this project. The data collection that would take place over the life of the project would not result in any long-term impacts on the water quality of the area.

Floodplains

With the lack of construction, no short-term impacts on floodplains are expected as a result of this project. The data collection that would take place over the life of the project would not result in any long-term impacts on floodplains.

Wetlands

With the lack of construction, no short-term impacts on wetlands are expected as a result of this project. The data collection that would take place over the life of the project would not result in any long-term impacts on wetlands in the project vicinity.

10.1.4.3 CAST Triage

Hydrology

This project would establish a facility for the initial treatment, release and/or transfer of injured/ill marine turtles on land that is already owned by the City of Orange Beach. Building the 40 foot by 60-foot commercial structure would involve excavating, grading and filling the 2,400 square foot area with concrete. These activities may result in increased runoff and soil compaction during the construction period, but because this project is occurring on already developed property, these impacts are expected to be minimal. This would have short-term, minor, adverse impacts on the hydrology of the site.

Over the long term, the installation of the triage center would result in minor, adverse impacts on hydrology by filling a part of the floodplain and reducing the drainage capacity of the substrate, resulting in minor increases in runoff into the Cotton Bayou.

Water Quality

The adjacent Cotton Bayou may experience increased turbidity during the construction period from increased sedimentation from nearby construction activities resulting in short-term, negligible, adverse impacts on the water quality because of the distance from Cotton Bayou. BMPs would be implemented to minimize erosion into the nearby waterbody. Appropriate BMPs to be used in Alabama to minimize erosion are outlined in the Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas (Alabama Soil and Water Conservation Society, 2003).

The development would also result in a small increase in runoff from the additional impervious surface added to the site and result in long-term, minor, adverse impacts on the water quality of Cotton Bayou.

BMPs would be implemented to reduce impacts, which could include incorporating low-impact development and forestry practices into the project design. Water discharge from the facility would result in long-term, negligible impacts on water quality; however, any permits required for water withdrawal would be obtained, and effluent from the facility would be of higher quality than the intake water. Any long-term impacts on water quality from the development or water intake would be minor and adverse.

Floodplains

Construction would take place within the 100-year floodplain and would fill a 2,400 square foot area of the floodplain with concrete, which would involve excavating, grading, and filling. Additionally, the proposed project would likely place four pipes underneath the roadway between Cotton Bayou and the project site. The pipes would likely be 3 to 4 inches in diameter, depending upon the terms of the permit, and they would be bored (horizontally drilled) in place. Given the small diameter size of the pipes, boring would result in the displacement of a small amount of floodplain soil. BMPs would be implemented to ensure the proper handling of any displaced soil. The displaced soil would not impede the overall functionality of the floodplain over the installation period of the pipes.

The project is expected to have short-term, minor, adverse impacts on the floodplain during the construction period as a result of compaction from grading, filling, and excavating. The necessary permits would be obtained, and BMPs would be implemented to minimize adverse impacts on the floodplain during this period. No long-term, adverse impacts are expected over the life of the project.

Wetlands

The construction of the commercial structure would occur outside the wetland area. The final location of the water intake and discharge pipes and their point of exchange with Cotton Bayou would be determined during the permitting process and informed by the regulatory process. Given the amount and location of the wetlands on the project site, it is unlikely that the installation of the pipes would occur in a wetland area. Therefore, there would be no short- or long-term impacts on wetlands from the implementation of this project. If some of the construction needed to take place in a designated wetland, the necessary permits would be obtained and regulations would be followed to ensure minimal adverse impacts on the wetland.

10.1.4.4 CAST Habitat Usage and Population Dynamics

Hydrology

This project would involve capturing, sampling, and tracking turtles along the Alabama coast and in nearshore waters. No short- or long-term impacts on hydrology would occur because of this project.

Water Quality

The landscape would not be altered, and construction equipment would not be used during the life of this project. No short- or long-term impacts on water quality would occur from the implementation of this project.

Floodplains

The floodplains would not be altered, and construction equipment would not be used during the life of this project. No short- or long-term impacts on floodplains would occur from the implementation of this project.

Wetlands

The wetlands would not be filled or altered in any manner, and construction equipment would not be used during the life of this project. No short- or long-term impacts on wetlands would occur from the implementation of this project.

10.1.4.5 CAST Protection: Enhancement and Education

Hydrology

This project would involve educating the public on appropriate sea turtle interaction and collecting data on past sea turtle nest vandalisms. No short- or long-term impacts on hydrology would occur because of this project.

Water Quality

No short- or long-term impacts on water quality would occur from educating the public or collecting nest vandalism data during this project.

Floodplains

No short- or long-term impacts on floodplains would occur from educating the public or collecting nest vandalism data during this project.

Wetlands

No short- or long-term impacts on wetlands would occur from educating the public or collecting nest vandalism data during this project.

10.1.5 Air Quality and Greenhouse Gases—Affected Environment

The affected environment for air quality and GHGs is discussed in Sections 4.1.3 and applies to all projects in the draft RP II/EA.

10.1.6 Air Quality and Greenhouse Gases—Environmental Consequences

Projects involving construction activities have the potential to produce air pollutants and GHGs. The following criteria were used to determine if an impact on air quality and GHG emissions would be significant: (1) increase ambient air pollution above any NAAQS; (2) contribute to an existing violation of any NAAQS; (3) interfere with or delay timely attainment of NAAQS; or (4) expose people to contaminated hazardous air pollutants.

10.1.6.1 No Action Alternative

Under the no action alternative, projects related to sea turtles would not occur. In the absence of these project activities, air emissions or GHGs would not be generated. There would be no short- or long-term impacts on air quality, and no GHGs would be produced.

10.1.6.2 CAST Conservation Program

Air Quality

This project would conduct nest discovery, marking, and monitoring of sea turtle hatchling activity. The project would also educate the public on how to minimize anthropogenic threats to sea turtles in the wild. Though no construction would occur during this project, it is anticipated motor vehicles would be used to reach survey sites and community events. The vehicles would emit hydrocarbons and criteria air pollutants such as CO and NO_x; however, these emissions would result in negligible, adverse impacts on air quality in the short term because of the limited use of motor vehicles during the transfer phase (4 to 6 months) of the project. However, the program would continue indefinitely, resulting in long-term, negligible, adverse impacts.

Greenhouse Gases

Motor vehicles used for sea turtle surveys and community events would emit small amounts of CO_2, methane, and NO_x. Because sea turtle conservation activities would be limited to targeted data collection and public education, GHG production is anticipated to be negligible.

10.1.6.3 CAST Triage

Air Quality

This project would construct a 40-foot by 60-foot commercial building containing a bath, cooler/freezer units, an office, and tanks to house marine turtles. Construction equipment used for the project would include excavators, dozers, loaders, trenchers, dump trucks and other forms of heavy equipment. This equipment would emit hydrocarbons and criteria air pollutants such as CO and NO_x. However, the impacts from these emissions would be minor and short-term because construction would only last 90 days and the project would be limited to approximately 3 acres of construction. No long-term impacts are anticipated.

Greenhouse Gases

Emissions from motorized equipment and electrical systems, both during and after the construction phase of the project, would produce GHGs. However, because of the small-scale and short duration of the construction portion of the project, the production of GHGs would be short-term and minor and would not require a detailed assessment. Emissions from the annual operation of the commercial building would have long-term impacts; however, these impacts are anticipated to be minor because of the relatively small amount of energy required to power the equipment in the 40 by 60-foot facility.

Emission reduction measures to mitigate short-term impacts could include the use of ultra-low sulfur diesel fuel in construction equipment, limiting unnecessary idling time of diesel-powered engines, controlling dust related to construction site activities, and covering loose materials. Emission reduction measures to mitigate long-term impacts could include the use of energy efficient equipment and regularly maintaining heating and cooling systems in the commercial building.

10.1.6.4 CAST Habitat Usage and Population Dynamics

Air Quality

This project would develop and implement a monitoring program to understand the distribution, movements, habitat use, vital and survival rates, genetic connectivity, and anthropogenic impacts on sea turtles in Alabama coastal waters. Though no construction would occur during this project, it is anticipated that motorized marine vessels would be used to track, sample, and capture sea turtles. The vessels would emit criteria air pollutants such as NO_x and SO_2; however, these emissions would result in short-term, negligible, adverse impacts on air quality because these vessels would be used intermittently over the course of 5 years. No long-term impacts are expected.

Greenhouse Gases

Marine vessels used for monitoring turtles would emit GHGs over the course of 5 years. Because these activities would be limited to targeted data collection of approximately 10 turtles per year, GHG production is anticipated to be negligible.

10.1.6.5 CAST Protection: Enhancement and Education

Air Quality

This project would purchase and distribute TEDs to skimmer trawl boats and take steps to reduce anthropogenic impacts on nesting turtles, such as nest vandalism and lighting harassment. The distribution of TEDs and enforcement activities would require the use of motorized equipment such as marine vessels, trucks, and all-terrain vehicles. Similar to the other CAST projects, these vehicles would emit CO, NO_x, and SO_2. However, these emissions would result in short-term, negligible, adverse impacts because of the small scale of the project and the limited use of motorized equipment. No long-term impacts to air quality are expected.

Greenhouse Gases

Because of the small scale of the project and the limited use of motorized equipment, GHG production is expected to be negligible.

10.2 BIOLOGICAL RESOURCES

10.2.1 Wildlife—Affected Environment

10.2.1.1 CAST Conservation Program

Mammals

The most common mammals on beaches or other coastal habitats where the CAST Conservation Program would continue to operate are coyotes, eastern cottontail, raccoon, red fox, white-tailed deer, bats, and opossum. Bottlenose dolphin and West Indian manatee could occur within any waters in the project area.

Reptiles

Sea turtles would be the primary reptiles within the CAST Conservation Program’s project area, including mostly loggerhead sea turtle and small numbers of Kemp’s ridley sea turtle. Although unlikely to be encountered, three other sea turtle species occur in Alabama waters (green, hawksbill, and leatherback). In areas where administrative project activities would occur, common snakes include but are not limited to rough greensnake, eastern ribbonsnake, ring-necked snake, glossy crayfish snake, eastern water snake, Mississippi green water snake, and cottonmouth. American alligator could occur within larger estuarine waterbodies. Other turtles that may be present include but are not limited to, common snapping turtle, eastern mud turtle, common box turtle, and southern painted turtle.

Amphibians

In and around nearby wetlands, numerous amphibians could occur including the following frogs and toads: green tree frog, squirrel tree frog, northern cricket frog, greenhouse frog, southern leopard frog, southern toad, Fowler’s toad, and eastern spadefoot. Several salamander species could also occur, but are unlikely because of the lack of freshwater in coastal habitats where CAST Conservation Program activities would occur.

Birds

The beaches where most CAST Conservation Program activities would occur are important habitat for numerous shorebird species including sandpipers (*Calidris* spp.), plovers (Wilson's, Snowy, Piping, and Pectoral), and turnstones, as well as various waterbirds such as gulls, terns, cormorants, and pelicans. The surrounding marshes and coastal ponds are important foraging sites for wading birds such as egrets and herons, willet, American avocet, black-necked stilt, greater yellowlegs, and clapper rail is reportedly common in the marshes surrounding the airport. Virginia Rail and fairly common (but secretive) here during the fall and winter. Yellow Rail is very rare in winter. Black Rail is very rare as well and is a potential year-round resident. This abundance of birdlife provides ample prey for an occasional peregrine falcon, and both osprey and bald eagle are common (Audubon, 2017).

10.2.1.2 CAST Triage

Mammals

Because the project area is already developed with little remaining habitat, suitable habitat for most mammals does not exist with the exception of the most common species such as mice and rats, bats, eastern cottontail, coyotes, armadillos and white-tailed deer.

Reptiles

Snakes that could occur at the site proposed for the triage center include ring-necked snake, black racer, eastern ribbonsnake, garter snake and eastern water snake. Lizards most likely to occur include eastern glass lizard, six-line racerunner, green anole, brown anole, broadhead skink, and ground skink. American alligator occur within nearby wetlands. Turtles on the property include but are not limited to common box turtle and several aquatic species that may occur within nearby freshwater wetlands surrounding Cotton Bayou, including common snapping turtle, chicken turtle, and pond slider.

Amphibians

In and around nearby wetlands, numerous amphibians could occur including but are not limited to the following frogs and toads: green tree frog, squirrel tree frog, northern cricket frog, greenhouse frog, southern leopard frog, southern toad, Fowler's toad, and eastern spadefoot. Several salamander species could also occur, but are unlikely because of the influence of saltwater on most coastal habitats.

Birds

Common passerines in the area surrounding the site proposed for the triage center include but are not limited to red-winged blackbird, barn swallow, European starling, house finch, mourning dove, northern parula, swamp sparrow, common yellowthroat, Carolina wren, and yellow-rumped warbler, American robin, and blue jay. Other less common passerines would use the property, especially during spring and fall migration. Shorebirds common within the project area include but are not limited to laughing gull, royal tern, black tern, least tern, Forster's tern, willet, and ring-billed gull. Wading birds frequenting the project area are great egret, little blue heron, great blue heron, and green heron. Waterfowl using the area most likely include common loon, greater scaup, bufflehead, goldeneye, and Canada goose. Raptors often observed from the property are osprey, bald eagle, red-tailed hawk, and Cooper's hawk. Other common seabirds include but are not limited to brown pelican, northern gannet, and double-crested cormorant (eBird.org, 2017).

10.2.1.3 CAST Habitat Usage and Population Dynamics

Mammals

Bottlenose dolphin and West Indian manatee could occur within any waters of the project area.

Reptiles

The project is focused on benefitting sea turtles in Alabama waters and on nesting beaches, which include primarily loggerhead sea turtles and small numbers of Kemp's ridley sea turtles. Green sea turtles nesting on Alabama beaches are very rare and they would more likely occur within marine and estuarine waters. Leatherback sea turtles are occasionally found in Alabama waters, but are not known to nest in the State. Hawksbill sea turtles could occur, but are unlikely within Alabama's waters. Estuarine habitats used by sea turtles could be used by other freshwater turtles, which include but are is limited to common snapping turtle, eastern mud turtle, and Florida softshell turtle.

Amphibians

Amphibian species are limited to freshwater habitat and thus would not occur within any habitats that sea turtles use.

Birds

The beach and dune habitats where sea turtles nest provides critical habitat to a variety of resident and migratory shorebirds. The mud flats and marshes of estuarine habitats that are used by sea turtles are important for many wading birds and seabirds that require undisturbed nesting and feeding areas. Seabirds such as Audubon's shearwater, black tern, band-rumped storm petrel, northern gannet, and magnificent frigatebird are also common within the estuarine and marine habitats where sea turtle capture and tagging would occur. The entire coastal region of Alabama, where this project would occur, is critical as a wintering area for several species of migratory songbirds such as Le Conte's, Henslow's, and Lincoln's sparrows, as well as wintering hummingbirds.

10.2.1.4 CAST Protection: Enhancement and Education

Mammals

The most common mammals on beaches or other coastal habitats where this program would be implemented are coyotes, eastern cottontail, raccoon, red fox, white-tailed deer, nutria, bats, and opossum. Bottlenose dolphin and West Indian manatee could occur within any waters in the project area.

Reptiles

Sea turtles that are targeted for conservation by this program include primarily loggerhead sea turtle, and small numbers of Kemp's ridley sea turtle. Other reptile species within the project area only occur only land, where project activities involve human education and enforcement. In these areas, common turtles would include but are not limited to common snapping turtle, common box turtle, and southern painted turtle. Common lizards include but are not limited to the green anole, six-lined racerunner, and ground skink.

Amphibians

Amphibian species are limited to freshwater habitat and thus would not occur within any habitats that sea turtles use. Within the coastal beach communities where human activities related to this project would occur, common frogs and toad include but are not limited to green tree frog, squirrel tree frog, northern cricket frog, greenhouse frog, southern leopard frog, southern toad, Fowler's toad, and eastern spadefoot. Several salamander species could also occur within the project area, although data on their presence and distribution are not available.

Birds

The beach and dune habitats where sea turtles nest provides critical habitat to a variety of resident and migratory shorebirds. The mud flats and marshes of estuarine habitats are important for many wading birds and seabirds that require undisturbed nesting and feeding areas. Seabirds such as Audubon's shearwater, black tern, band-rumped storm petrel, northern gannet, and magnificent frigatebird are also common within the estuarine and marine habitats where sea turtle capture and tagging would occur. The entire coastal region of Alabama, where this project would occur, is critical as a wintering area for several species of migratory songbirds such as Le Conte's, Henslow's, and Lincoln's sparrows, as well as wintering hummingbirds.

10.2.2 Wildlife—Environmental Consequences

10.2.2.1 No Action Alternative

Under the no action alternative, projects related to sea turtle management and conservation would not occur. Therefore, no additional short- or long-term impacts on wildlife would occur.

10.2.2.2 CAST Conservation Program

The management of the CAST Conservation Program by ACF and the program's continued monitoring of nesting sea turtles under the Share the Beach program would not cause a noticeable difference in project activity. Project activities would continue to involve volunteers conducting beach surveys for nesting sea turtles and performing outreach activities to educate the public about the conservation of sea turtles. These actions would have short-term, minor impacts on some species from increased human activity, which could temporarily disturb or displace some wildlife. Affected wildlife include those using coastal beaches and waters. For example, nighttime enforcement to protect nesting sea turtles could result in human presence affecting the habitat use of various shorebirds and small mammals. Other minor impacts could result from program staff and volunteers disturbing birds, alligators, manatees, or bottlenose dolphins during boat-based enforcement. However, the level of such impacts is minimal when compared to the combined impact of all human activity on the Alabama coastline. Any outreach associated with this project would provide an opportunity to increase public awareness of a charismatic species on Alabama beaches, which could ultimately increase public interest in conserving all wildlife in the region.

10.2.2.3 CAST Triage

The construction of a new facility at Orange Beach to treat injured sea turtles on previously developed land would result in some construction activities or other actions that would have short-term, adverse impacts on wildlife. Affected species would include common species that use the project area during the brief construction period, such as mice and rats, bats, eastern cottontail, coyotes, armadillos, white-tailed deer, green anole, and common box turtle. Once the facility is constructed, there would likely be long-term, minimal, adverse impacts on wildlife because of increased human disturbance relative to the site's current land use.

10.2.2.4 CAST Habitat Usage and Population Dynamics

This sea turtle monitoring project would involve actions to capture, tag, and track threatened and endangered sea turtles within the Alabama Gulf of Mexico and estuaries. The project would not modify any habitat and its activities would have minimal, adverse effects on wildlife species. Boat usage by the project could temporarily disturb estuarine and marine wildlife, including a large variety of birds, alligator, and West Indian manatee. These adverse disturbance-related impacts would be short term. Most affected species are mobile and would thus be able to avoid any impacts.

10.2.2.5 CAST Protection: Enhancement and Education

The Education and Enhancement phase of the CAST project would seek to enhance sea turtle nesting success on Alabama's beaches through increased education and enforcement, and implementing measures to reduce fisheries bycatch. The project would have short-term, minor, adverse impacts on some species because of increased human activity, which could disturb or displace some wildlife. Affected wildlife include those using coastal beaches and waters. For example, nighttime enforcement to protect nesting sea turtles could result in human presence affecting the habitat use of various shorebirds and small mammals. Other minor impacts could result from program staff and volunteers disturbing birds, alligators, manatees, or bottlenose dolphins during boat-based enforcement. However, the level of such impacts is minimal when compared to the combined impact of all human activity on the Alabama coastline. The education and enforcement components of this project would provide an opportunity to increase public awareness of wildlife on the Alabama coastline, which could ultimately produce long-term benefits for all species in the region. Furthermore, the implementation of TEDs on trawl nets would have long-term benefits on wildlife by reducing bycatch of other non-target species.

10.2.3 Rare and Protected Species—Affected Environment

10.2.3.1 CAST Conservation Program

ESA-listed species that are known to occur or may potentially occur within the area potentially affected by the CAST Conservation Program include:

- **Loggerhead sea turtle:** potentially present the project vicinity and high potential for females to nest on Alabama beaches
- **Kemp's ridley sea turtle:** potentially present in the project vicinity and low potential for females to nest on Alabama beaches
- **Green sea turtle:** potentially present in nearby Alabama coastal waters
- **Hawksbill sea turtle:** potentially present in nearby Alabama coastal waters
- **Leatherback sea turtle:** potentially present in nearby Alabama coastal waters
- **Alabama beach mouse:** potentially present in the project area
- **Perdido Key beach mouse:** potentially present in the project area
- **Piping plover:** potentially present during winter
- **Red knot:** potentially present in the project area during migration
- **Wood stork:** potentially present within shallow-water near the shoreline
- **Gulf sturgeon:** potentially present in the project area
- **West Indian manatee** – Potentially present in the project area

The CAST Conservation Program would occur on beaches with critical habitat designated for loggerhead sea turtle nesting (LOGG-T-AL-01, LOGG-T-AL-01, and LOGG-T-AL-03), and nearshore reproduction (LOGG-N-34). Critical habitat also exists on Alabama beaches for Alabama beach mouse (Units 1, 2, 3, 4, and 5), Perdido Key beach mouse (PKBM-1, PKBM-2), and wintering piping plover (Units 1, 2, and 3).

Protected marine mammals that could occur within marine and estuarine waters in the vicinity of where the CAST Conservation Program activities would occur include West Indian manatee and bottlenose dolphin.

10.2.3.2 CAST Triage

Rare species of highest conservation concern (SGCN P1) that could occur near the CAST Triage Center and associated sea turtle conservation activities include river frog, southern dusky salamander, Mississippi diamondback terrapin, Bewick's wren, and Henslow's sparrow. Rare species of high conservation concern (SGCN P2) that could occur within the project area include one-toed amphiuma, mimic glass lizard, southeastern five-lined skink, rainbow snake, eastern kingsnake, speckled kingsnake, eastern coral snake, eastern diamondback rattlesnake, alligator snapping turtle, least bittern, reddish egret, northern harrier, American kestrel, yellow rail, black rail, American oystercatcher, wood thrush, short-eared owl, worm-eating warbler, Swainson's warbler, Kentucky warbler, Bachman's sparrow, Nelson's sharp-tailed sparrow, and seaside sparrow.

ESA-listed species that are known to occur or may potentially occur within the CAST Triage project area include:

- **Loggerhead sea turtle:** potentially present in nearby Alabama coastal waters, with females nesting on Alabama beaches
- **Kemp's ridley sea turtle:** potentially present in nearby Alabama coastal waters and low potential for females to nest on Alabama beaches
- **Green sea turtle:** potentially present in nearby Alabama coastal waters
- **Hawksbill sea turtle:** potentially present in nearby Alabama coastal waters
- **Leatherback sea turtle:** potentially present in nearby Alabama coastal waters
- **Alabama beach mouse:** potentially present in the project vicinity, although unlikely in the project area
- **Piping plover:** potentially present in the project vicinity during the winter, although unlikely in the project area
- **Red knot:** potentially present in the project vicinity during migration, although unlikely in the project area
- **Wood stork:** potentially present within shallow-water near the shoreline of Cotton Bay, or flying overhead
- **Eastern indigo snake:** potentially present in the project vicinity, although unlikely; no known recent occurrences
- **Gopher tortoise:** potentially present in the project vicinity
- **West Indian manatee:** potentially present in nearby coastal waters

The project area for the CAST Triage Center does not contain designated critical habitat for any ESA-listed species.

Protected marine mammals that could occur within marine and estuarine waters in proximity to the CAST Triage Center, including Cotton Bay, include both West Indian manatee and bottlenose dolphin.

10.2.3.3 CAST Habitat Usage and Population Dynamics

This project would involve primarily nearshore and marine activities to study sea turtles, so there would be no SGCN species within the project area. However, because project activities such as staff travel and data analysis would occur on land, some terrestrial ESA-listed species are included here.

ESA-listed species that are known to occur or may potentially occur within the CAST Habitat Usage and Population Dynamics project area include:

- **Loggerhead sea turtle:** potentially present in the project vicinity, with females nesting on Alabama beaches
- **Kemp's ridley sea turtle** – Potentially present in Alabama coastal waters and low potential for females to nest on Alabama beaches

- **Green sea turtle** – Potentially present in nearby Alabama coastal waters
- **Hawksbill sea turtle** – Potentially present in nearby Alabama coastal waters
- **Leatherback sea turtle** – Potentially present in nearby Alabama coastal waters
- **Gulf sturgeon** – Potentially present in some coastal waters of the project area
- **West Indian manatee** – Potentially present some coastal waters of the project area

Within the waters where the CAST Habitat Usage and Population Dynamics project would occur, critical habitat is designated for nearshore reproduction by loggerhead sea turtle (LOGG-N-34). This encompasses waters directly off some of the highest density nesting beaches in Alabama, out to 1.6 kilometers (1 mile). In addition, critical habitat is designated for Gulf sturgeon, in Unit 8, within Mississippi Sound from Point aux Pins, Alabama, west to the Mississippi border.

Protected marine mammals that could occur within the marine and estuarine waters where sea turtles would be captured and tracked include both West Indian manatee and bottlenose dolphin.

10.2.3.4 CAST Protection: Enhancement and Education

Rare species of highest conservation concern (SGCN P1) that could occur near the CAST Protection: Enhancement and Education project area include Mississippi diamondback terrapin, snowy plover, and Wilson's plover. Rare species of high conservation concern (SGCN P2) that could occur near the CAST Protection: Enhancement and Education project area include rainbow snake, least bittern, reddish egret, northern harrier, American kestrel, yellow rail, black rail, American oystercatcher, Nelson's sharp-tailed sparrow, and seaside sparrow.

ESA-listed species that are known to occur or may potentially occur within the CAST Protection: Enhancement and Education project area include:

- **Loggerhead sea turtle:** potentially present in nearby Alabama coastal waters, with females nesting on Alabama beaches
- **Kemp's ridley sea turtle** – Potentially present in nearby Alabama coastal waters, with low potential for females to nest on Alabama beaches
- **Green sea turtle** – Potentially present in nearby Alabama coastal waters
- **Hawksbill sea turtle** – Potentially present in nearby Alabama coastal waters
- **Leatherback sea turtle** – Potentially present in nearby Alabama coastal waters
- **Gulf sturgeon** – Potentially present in nearby Alabama coastal waters
- **West Indian manatee** – Potentially present in nearby Alabama coastal waters

Critical habitat is designated for loggerhead sea turtle nesting (LOGG-T-AL-01, LOGG-T-AL-01, and LOGG-T-AL-03), Alabama beach mouse (Units 1, 2, 3, 4, and 5), and Perdido Key beach mouse (PKBM-1, PKBM-2) on the beaches where the CAST Protection: Enhancement and Education project activities would occur.

Protected marine mammals that could occur near coastal beaches and facilities where CAST education and conservation efforts would occur include West Indian manatee and bottlenose dolphin.

10.2.4 Rare and Protected Species—Environmental Consequences

The general approach and background to the analysis of rare and protected species is the same as described in Section 7.2.8. In some cases, based on coordination with resource agencies, the Trustees have made preliminary determinations that a proposed project *May Affect, but is Not Likely to Adversely Affect* certain ESA-listed species. The effects determinations and the respective listed species are described in this section. The Trustees are engaged in technical assistance with the appropriate agencies for ESA compliance, and the compliance status will be updated in the final plan.

10.2.4.1 No Action Alternative

Under the no action alternative, projects related to sea turtle management and conservation would not occur. Therefore, no additional short- or long-term impacts would occur to the majority of the rare and protected species within Baldwin or Mobile counties. However, the lack of action could lead to minor, adverse impacts on ESA-listed sea turtles because there would be less funding and coordination to perform the necessary tasks of monitoring nesting sea turtles, enforcing protective measures for sea turtles, treating sick or injured animals, or increasing public awareness about sea turtles.

10.2.4.2 CAST Conservation Program

The operation of the CAST Conservation Program would have minor, temporary effects on nesting sea turtles during nesting beach monitoring. Monitoring sea turtle nesting involves volunteers searching for new nests, marking them and protecting the nests and hatchlings from natural and human-related dangers. These activities could potentially disturb adult female loggerhead and Kemp's ridley sea turtles as they emerge from the water prior to nesting. Nest monitors could also cause some sea turtles to make false crawls, or abort their nesting attempt. However, false crawls are a common occurrence that also happen for other unknown reasons and nesting females usually emerge on subsequent nights to successfully lay their eggs. To minimize any potential adverse effects of nest monitoring on loggerhead or Kemp's ridley sea turtles, volunteers would follow the USFWS Alabama Sea Turtle Conservation Manual (USFWS, 2008a). The three additional species of sea turtle that could occur in Alabama's waters (green, hawksbill, and leatherback) would only experience beneficial effects from the conservation efforts of this project. Overall, this project would increase sea turtle conservation in Alabama and have a beneficial impact on all sea turtle species in the long term.

Monitoring sea turtle nests would be unlikely to adversely affect Alabama beach mice or Perdido Key beach mouse because their preferred dune habitat would not be affected. Both subspecies of beach mouse utilize primary and secondary (i.e., frontal) dunes and coastal scrub habitat, which is inland of the beaches where sea turtles nest. Any potential impacts would also be unlikely because both subspecies occur in very low numbers and with highly restricted ranges. However, on beaches where Alabama or Perdido Key beach mice are found, sea turtle nest monitors could cause increased stress or cause temporary displacement of individual beach mice to other nearby habitats, which could provide lower quality forage or greater competition. However, most individuals would likely return to the area following the disturbance and suffer no adverse effects.

ESA-listed birds, including piping plover, red knot, and wood stork, could also be affected by human disturbance during CAST Conservation Program activities. Birds could be displaced from foraging areas, although impacts would be temporary and the birds would suffer no further adverse effects. Impacts to wintering piping plover are very unlikely because most project activity would occur during the sea turtle nesting season, when piping plover would not occur.

The transfer and administration of the CAST Conservation Program *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species that could potentially occur in the project vicinity:

loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, Alabama beach mouse, Perdido key beach mouse, piping plover, red knot, and wood stork.

All project activities would occur on land, so there would be no effect on the above species of sea turtle that are not known to nest on Alabama beaches. Likewise, there would be no effect on any rare and protected fish or marine mammals.

Because of their unlikely occurrence in the project area, the administration of the CAST Conservation Program by ACF would have *No Effect* on the following ESA-listed species: Gulf sturgeon and West Indian manatee.

Critical habitat is designated for loggerhead sea turtle nesting on the beaches where the CAST Conservation Program would operate. Coastal Alabama waters also encompass portions of nearshore reproductive critical habitat for loggerhead sea turtle. The proposed project would only involve human presence on beaches, by project staff and volunteers that would be properly trained to monitor sea turtles. By implementing proper conservation measures, the CAST Conservation Program would have *No Effect* on designated critical habitat for loggerhead sea turtle.

Critical habitat also exists for Alabama beach mouse, Perdido Key beach mouse, and wintering piping plover. Because the project only includes occasional, temporary human presence on beaches, which would not alter the habitat's primary constituent elements, *No Effect* would occur to beach mouse critical habitat.

10.2.4.3 CAST Triage

The CAST Triage project *May Affect*, *but is Not Likely to Adversely Affect* the following ESA-listed species that could potentially occur in the project vicinity: loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, eastern indigo snake, and gopher tortoise.

Noise and disturbance from the use of heavy equipment and human presence during project construction of the triage center would have short-term, adverse impacts on nearby rare and protected species. However, the site provides minimal habitat for terrestrial ESA-listed species because it is already developed and disturbed. More valuable wildlife habitat exists on the adjacent undeveloped land within Gulf State Park, which is composed of maritime forest and coastal scrub habitats and could be occupied by gopher tortoise. Eastern indigo snake could also occur within nearby favorable habitat, although its status is uncertain following introduction efforts in Gulf State Park in 1978. Any adverse impacts to these species from the project would be short-term and any affected individuals would continue to utilize the project vicinity after the triage center is constructed. Thus, there would be no long-term, adverse impacts on wildlife because human disturbance would only slightly increase relative to the site's current land use.

This project would provide a location to treat, triage, release, and transfer injured/ill sea turtles, which would have long-term, moderate benefits to ESA-listed sea turtles, primarily loggerhead and occasional Kemp's ridley. The three other sea turtle species that could occur in Alabama's waters (green, hawksbill, and leatherback) would be treated occasionally and would only experience beneficial effects from the project. Such a program would allow more animals to be treated and released faster and with less stress on the animal from handling and long transports. Faster intervention, combined with shorter periods of captivity and minimized handling, would generally improve the outcomes for these injured sea turtles. Overall, this project would increase sea turtle conservation in Alabama and have a beneficial impact on all sea turtle species in the long term.

The construction and operation of a new sea turtle triage center at Orange Beach would have *No Effect* on the following ESA-listed species: West Indian manatee, Alabama beach mouse, piping plover, red knot, and wood stork.

All project activities would occur on land, so sea turtles in water and West Indian manatee would not be affected by the triage center construction. No suitable habitat for Alabama beach mouse occurs in proximity to the site. Also, piping plover and red knot would not be affected by the project because all project activity would occur inland and not in proximity to beaches, intertidal flats, or other shorebird habitat. Wood stork have not been documented in the vicinity of Cotton Bayou and typically use areas farther inland in Alabama, so the project would have *No Effect* on this wading bird.

10.2.4.4 CAST Habitat Usage and Population Dynamics

Sea turtle captures and tracking would have short-term, moderate impacts on individual turtles as a result of stress during capture and handling of turtles. However, no long-term, adverse effects would occur on individual turtles and the data collected from this project would be used to help further protect sea turtle species in the Gulf of Mexico. The goal of this project is to increase understanding of sea turtle population dynamics, which would have a long-term, beneficial impact on sea turtle species through the initiation of a coordinated monitoring program.

Short-term, minor, adverse impacts on rare and protected species could result from disturbance because of boats used during assessments, which may cause some animals to be stressed, to alter their behavior, or to flee the area. However, project activities would not create substantially greater boat traffic and potential impacts on ESA-listed species, state-protected species and species of conservation concern would be very minimal.

As part of a long-term monitoring program for sea turtles in coastal and nearshore waters of Alabama, the project would produce substantial long-term benefits to ESA-threatened and endangered sea turtle species. Overall, the CAST Habitat Usage and Population Dynamics project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, Gulf sturgeon, West Indian manatee, and Alabama red-bellied turtle.

All 5 sea turtle species listed above would experience short-term stress during capture, although no injury or mortality is expected from hand capture, dip netting, strike netting, or cast netting. Tangle nets and trawl nets could potentially cause sea turtle injury or mortality. All live sea turtles encountered in nets would be immediately removed by holding the anterior and posterior sections of the carapace and gently setting the turtle on a foam-padded section of the boat. Captured sea turtles would be processed for morphometric and tissue samples, and tagged on-board the vessel following approved procedures in the Sea Turtle Research Techniques Manual (NMFS SEFSC, 2008). Procedures would be organized to minimize the amount of time an animal spends out-of-water. The effects of capture and handling on live sea turtles are expected to dissipate within a day (Stabenau and Vietti, 2003). In addition, using nets to capture sea turtles would not adversely affect the physical or biological environment that provides habitat for other marine species. For example, nets would be set along the edge of, but not directly over top of sea grass habitat, which prevents damage to the vegetation. Net anchors would be placed on sand and researches would keep their boat motor propeller elevated so as not to scar the bottom or uproot algae and sea grass. In the long term, the information provided by this project would be used to help conserve sea turtles in the Gulf of Mexico.

A small number of fish (e.g., Gulf sturgeon) and other protected species (e.g., bottlenose dolphin) could possibly be captured in tangle nets, although the animals would still be allowed to swim and breathe, so little (< 5 percent) or no mortality is expected. Also, a larger mesh size (i.e., 6 or 8-inch mesh) would ensure that most fish will pass through the net without entanglement. The use of boats has the low possibility of affecting a very low number of West Indian manatees as a result of potential collision with project boats, although this risk would be minimized by the project staff's awareness of the risk. Also, the project's existing NMFS permit mandates that work areas with net deployment are regularly checked for marine mammals, and nets would not be deployed if marine mammals are observed.

Effects to this loggerhead sea turtle nearshore reproductive critical habitat and gulf sturgeon critical habitat are discountable because sea turtle captures would affect a very small area with have minimal, short-term impact. The primary constituent elements of these critical habitat units would be unaffected by the project; there would be no permanent alterations to the physical or biological elements that are essential for either species' survival or reproduction.

10.2.4.5 CAST Protection: Enhancement and Education

This project entails collaborative efforts among natural resources agency staff and the public, within developed areas or other habitats that are generally unsuitable for any rare and protected species. Very minor impacts on ESA-listed species that inhabit beach or nearshore habitats could result from disturbance by project staff as they work to educate the public about sea turtle biology and enforce protections for nesting sea turtles on Alabama beaches. However, project activities would not create an increased human presence on nesting beaches or increased boat traffic in project waters. Thus, there would be no noticeable impacts to any terrestrial or aquatic ESA-listed species, state-protected species, or other species of conservation concern.

The CAST Protection: Enhancement and Education project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, West Indian manatee, Gulf sturgeon, Alabama beach mouse, Perdido Key Beach mouse, gopher tortoise, piping plover, red knot, and wood stork.

The project's purpose is to improve the recovery of Alabama's sea turtles by improving the state's enforcement of sea turtle protections. Thus, over the long-term, the project would benefit sea turtles through increased efforts to reduce threats to nesting sea turtles, nests and hatchlings.

The project would have minimal effect on critical habitat for nesting loggerhead sea turtle, limited to minor, temporary disturbance from project staff during education and enforcement activities on beaches and inshore waters. The project *May Affect, but is Not Likely to Adversely Affect* this critical habitat because any disturbance would be short term and there would be no permanent alterations to the physical or biological primary constituent elements that are essential for loggerhead sea turtle survival and reproduction.

Critical Habitat for Alabama beach mouse (Units 1 – 5) and Perdido Key beach mouse (PKBM-1, PKBM-2) is also present in the project area. For the same reasons described above for loggerhead sea turtle critical habitat, the project *May Affect, but is Not Likely to Adversely Affect* Alabama beach mouse or Perdido Key beach mouse critical habitat.

10.3 SOCIOECONOMIC RESOURCES

10.3.1 Cultural Resources—Affected Environment

The affected environment for cultural resources for all projects considered in this draft RP II/EA is discussed in Section 4.3.2.

10.3.2 Cultural Resources—Environmental Consequences

For all projects in this draft RP II/EA, consultation with the Alabama State Historic Preservation Officer is currently ongoing and will be incorporated into the final RP II/EA. For many projects, the action would involve a study, education, or land acquisition that does not have the potential for disturbance of cultural resources. For those projects that include construction, ground disturbance, or other related activities, if any culturally or historically important resources are identified during project preparations or predevelopment surveys, such areas would be avoided during construction. A complete review of all alternatives under Section 106 of the NHPA is ongoing and would be completed prior to any activities that would restrict consideration of measures to avoid, minimize, or mitigate any adverse effects on historic properties located in the project area. Alternatives would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

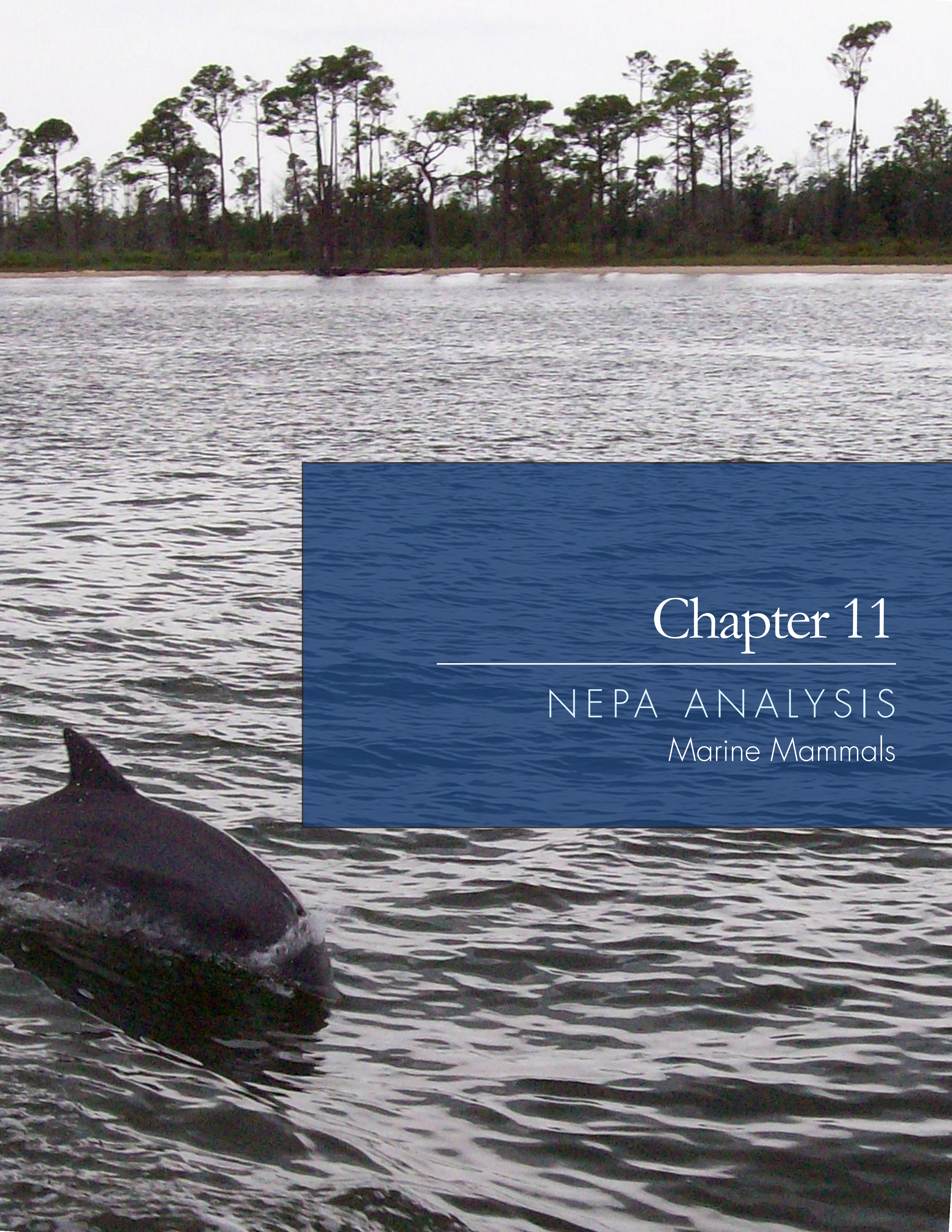
10.4 COMPARISON OF ALTERNATIVES

Table 10-1 provides a summary of the environmental consequences of the evaluated alternatives.

Table 10-1: Summary of Environmental Consequences for Sea Turtle Projects

	Geology and Substrates	Hydrology and Water Quality	Air Quality and Greenhouse Gasses	Wildlife	Rare and Protected Species	Cultural Resources
CAST Conservation Program	No impact.	No impact.	Short- and long-term, negligible impacts on air quality from motor vehicle usage by project staff and volunteers.	Short-term, minor impacts on some species from increased temporary human activity on beaches, which could temporarily disturb birds and other wildlife that inhabit sand beaches and dunes.	***May Affect, but is Not Likely to Adversely Affect*:** loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, Alabama beach mouse, Perdido key beach mouse, piping plover, red knot, wood stork ***No Effect* on:** Gulf sturgeon, West Indian manatee	Impacts unknown, pending consultation with the Alabama Historical Commission.
CAST Triage	No impact.	Short-term, minor and long-term impacts from increased runoff and soil compaction during construction.	Short-term, minor impacts from heavy equipment during construction. Long-term, minor impacts from emissions from energy use of triage center and equipment.	Short-term, minor impacts on numerous species during construction of the triage center. Minimal, long-term impacts from habitat conversion and increased human presence at the site.	***May Affect, but is Not Likely to Adversely Affect*:** loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, eastern indigo snake, gopher tortoise ***No Effect* on:** West Indian manatee, Alabama beach mouse, piping plover, red knot, wood stork	Same as described above for the CAST Conservation Program.

	Geology and Substrates	Hydrology and Water Quality	Air Quality and Greenhouse Gasses	Wildlife	Rare and Protected Species	Cultural Resources
CAST Habitat Usage and Education	No impact.	No impact.	Short- and long-term, negligible impacts on air quality from motor vehicle and boat use by project staff and volunteers.	Short-term, minor impacts to some species from disturbance by project boat use.	***May Affect, but is Not Likely to Adversely Affect*:** loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, Gulf sturgeon, West Indian manatee, Alabama red-bellied turtle	Same as described above for the CAST Conservation Program.
CAST Protection: Enhancement and Education	No impact.	No impact.	Short-term, negligible impacts on air quality from motor vehicle and boat use by project staff and volunteers. No long-term impact.	Short-term, minor impacts from disturbance by human activity boat use. Long-term benefits for all species in the region from increased education and enforcement.	***May Affect, but is Not Likely to Adversely Affect*:** loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, Gulf sturgeon, West Indian manatee, Alabama beach mouse, Perdido Key beach mouse, gopher tortoise, piping plover, red knot, wood stork	Same as described above for the CAST Conservation Program.



Chapter 11

NEPA ANALYSIS

Marine Mammals

11.0 NEPA ANALYSIS—MARINE MAMMALS

This section provides the NEPA analysis for all of the non-E&D restoration alternatives considered in this plan for funding under the Marine Mammals Restoration Type.

The general affected environment for coastal Alabama described in Chapter 4 of this draft RP II/EA is applicable to this section. CEQ guidance states that agencies should "focus on significant environmental issues," and for issues that are other than significant, there should be "only enough discussion to show why more study is not warranted." After preliminary investigation, some resource areas under the Marine Mammals Restoration Type alternatives were determined to be either unaffected or minimally affected by the restoration actions being proposed for this Restoration Type. Accordingly, these resources are discussed briefly below. Only those resource areas for which potential, adverse impacts are expected are discussed in detail in this draft RP II/EA. Additionally, the NEPA analysis for the Marine Mammals alternatives looks at a further subset of the total resource areas and topics described in Chapter 4, Affected Environment, as part of the biological, physical, and socioeconomic environment for each restoration alternative. To avoid redundant or unnecessary information, resource areas and topics that are not expected to be affected by a proposed restoration alternative are not evaluated further under that a given project.

Resource areas not analyzed in detail for the Marine Mammals Restoration Type are identified below, with brief rationale for non-inclusion:

- **Geology and Substrates:** Projects proposed under the Marine Mammals Restoration Type would not include any ground-disturbing activities or otherwise create changes to substrates, geologic hazards, or geology, and no impacts would occur. Therefore this resource area was not carried forward for detailed analysis.
- **Hydrology and Water Quality:** Projects proposed under the Marine Mammals Restoration Type would involve mainly assessments and education activities. The projects would involve agency staff and other data collection personnel conducting field surveys on estuarine and marine waterways, performing data analysis and public outreach, or responding to stranded marine mammals. The project activities that require of a motorized vessel would have some impacts on water quality, but these impacts are expected to be short-term and negligible because of the small-scale and short duration of this work. Therefore, this resource area was not carried forward for detailed analysis.
- **Noise:** All projects proposed under the Marine Mammals Restoration Type would include some level of vessel use for assessment and/or enforcement activities. Use of vessels would be short-term and result in negligible, adverse impacts on noise. There would be no long-term impacts on noise. Therefore this resource area was not carried forward for detailed analysis.
- **Marine and Estuarine Resources:** Projects proposed under the Marine Mammals Restoration Type would result in short-term, negligible impacts on marine and estuarine fauna from boat traffic, noise, and human presence during stranding response, assessment or enforcement activities. Potential impacts would include temporary disturbance of finfish, crabs, shrimp, or benthic invertebrates that may be present in the immediate vicinity of a marine mammal stranding. Conditions would quickly return to baseline upon completion in water activities. Impacts would be negligible given the existing volume of boat traffic in Alabama's coastal waters. These projects would not result in long-term effects on any marine and estuarine fauna, or their habitats. Because short-term impacts would be negligible and no long-term impacts would occur, this resource area was not carried forward for detailed analysis.

- **Federally Managed Fisheries:** Projects proposed under the Marine Mammals Restoration Type would result in no destruction or adverse modification to FMP species or EFH. These projects could result in short-term, minor, adverse impacts on FMP species because of disturbance from boat traffic, noise, and human presence during stranding response, assessment and enforcement activities within estuarine or marine habitat. However, the affected species are highly mobile and would easily move to adjacent suitable habitat. These projects would result in no destruction or adverse modification to FMP species or EFH because they would not require new infrastructure, with the Enhancing Capacity for ALMMSN using existing infrastructure at the DISL. Therefore, this resource area was not carried forward for detailed analysis.
- **Socioeconomics and Environmental Justice:** Projects proposed under the Marine Mammals Restoration Type would have no impact on economic activities in the short-or long-term. Therefore this resource area was not carried forward for detailed analysis.
- **Infrastructure and Transportation:** None of the projects proposed under the Marine Mammals Restoration Type would create increased demands on area infrastructure that could not be accommodated by existing infrastructure or would affect traffic and transportation in the areas. Therefore, this topic was not carried forward for analysis.
- **Land and Marine Management**: For proposed projects related to the Marine Mammals Restoration Type, up to short-term, minor impacts on land and marine management are expected. While these projects would involve in-water work for stranding response, assessment and enforcement, these activities would be compatible with uses occurring in the area. Use of the DISL for stranding response activities would continue an existing use and not introduce a new land use. As there would be no short- and long-term adverse impacts, this resource area was not carried forward for detailed analysis.
- **Tourism and Recreation:** Projects proposed under the Marine Mammals Restoration Type would have no short- or long-term impacts on tourism and recreation. The CAST Triage Center would use an already disturbed site where visitation does not regularly occur. Enhancing Capacity for ALMMSN would enhance the capacity of ALMMSN to better understand causes of marine mammal illness and death. The project would not involve activities with possible affects to tourism and recreational uses. The Alabama Estuarine Bottlenose Dolphin Protection: Education and Enhancement consists of open water within Mobile Bay and Perdido Bay. A wide array of both active and passive recreation opportunities is present in the area, ranging from hunting and fishing to boating and site seeing. Project activities would not create substantially greater boat traffic within open water areas, nor would access to waters be restricted; therefore, no short- or long-term, adverse impacts would occur. Because there would be no short- or long-term, adverse impacts and no long-term impacts, this resource area was not carried forward for detailed analysis.
- **Aesthetics and Visual Resources:** None of the proposed projects under the Marine Mammals Restoration Type would alter the existing aesthetic or visual resources in the area over the long term. Therefore, this resource area was not carried forward for detailed analysis.
- **Public Health and Safety:** None of the proposed projects under the Marine Mammals Restoration Type would affect public health and safety. Conducting stranding response, assessment, and enforcement would not increase shoreline erosion, or create other health and safety concerns. Therefore, this resource area was not carried forward for detailed analysis.
- **Fisheries and Aquaculture:** There are no commercial fisheries or aquaculture operations in the area that would be affected by the projects proposed under the Marine Mammals Restoration

Type. Therefore, no impacts on fisheries or aquaculture associated with this project are expected, and this resource topic was not carried forward for detailed analysis.

- **Marine Transportation:** None of the projects proposed under the Marine Mammals Restoration Type would affect marine transportation; therefore, this topic was not carried forward for detailed analysis.

11.1 PHYSICAL RESOURCES

11.1.1 Air Quality and Greenhouse Gases—Affected Environment

The affected environment for air quality and GHGs is discussed in Sections 4.1.3 and applies to all projects in the draft RP II/EA.

11.1.2 Air Quality and Greenhouse Gases—Environmental Consequences

The general approach and background to the analysis of air quality and GHGs is the same as described in Section 10.1.5

11.1.2.1 No Action Alternative

Under the no action alternative, projects related to marine mammal assessment, enhancement, and education would not occur. It is not expected that, in the absence of these projects, the activities would occur to generate air emissions or GHGs. There would be no additional short- or long-term impacts on air quality and no additional GHGs would be produced.

11.1.2.2 Enhancing Capacity for the Alabama Marine Mammal Stranding Network

Air Quality

This project would increase marine mammal survival through better understanding of causes of illness/mortality and early detection and intervention of anthropogenic and natural threats. This project would also increase data consistency and timeliness of data availability to managers to allow for rapid responses to emerging threats. Collection of data may include vehicles such as cars or boats that would be used for temporary periods of time and result in short- or long-term, negligible, adverse impacts on air quality because of small amount of criteria pollutants emitted.

Greenhouse Gases

Collection of data may include vehicles such as cars or boats that would be used for temporary periods of time. Because of the small-scale and short duration, predicted emissions would be short-term and minor and would not require a detailed assessment.

11.1.2.3 Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health

Air Quality

The project would involve photo-ID surveys, biopsy sampling, sample analyses, and data analyses. Four remote biopsy surveys and twelve photo-ID surveys of bottlenose dolphins would be conducted in Mobile Bay, Perdido Bay, and nearshore Gulf of Mexico, using marine vessels to obtain adequate seasonal sample sizes for analysis. No construction would occur. The vessels would emit criteria air pollutants such as NO_x and SO_2; however, these emissions would result in short-term, negligible, adverse impacts on air quality because these vessels would be used intermittently over the course of 4 years. No long-term impacts are expected.

Greenhouse Gases

Marine vessels used for dolphin surveys would emit GHGs over the course of 4 years. Because these activities are limited to intermittent data collection, GHG production is anticipated to be negligible.

11.1.2.4 Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education

Air Quality

This project would enhance state enforcement of the MMPA and education and outreach related to marine mammals in Alabama. Though this project would last 4 years, the bulk of marine training for law enforcement officers would occur in the second year with supplemental training occurring in years 3 and 4. It is likely motorized marine vessels would be used to train officers on harmful fisheries and marine mammal viewing practices. The vessels used for training would emit criteria air pollutants such as NO_x and SO_2; however, these emissions would result in short-term, negligible adverse impacts on air quality because these vessels would be used intermittently over short periods of time. Other project elements such as education, data collection, and data summaries would not have any short-term impacts. No long-term impacts are expected from any component of this project.

Greenhouse Gases

Because the activities associated with this project would be limited to periodically training law enforcement officers, GHG production is expected to be negligible.

11.2 BIOLOGICAL RESOURCES

11.2.1 Habitats—Affected Environment

11.2.1.1 Enhancing Capacity for the Alabama Marine Mammal Stranding Network

The primary coverage area of ALMMSN includes tidal, coastal, and nearshore waters of the state of Alabama, largely within the Mobile Bay watershed. Marine mammal strandings and associated response activities typically occur on beaches or other coastal habitats.

11.2.1.2 Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health

This project would involve data collection activities within Mobile Bay, Perdido Bay, and nearshore waters of the Gulf of Mexico. Terrestrial habitats within the project area are limited and most project activity would occur within developed areas such as agency office buildings and laboratories.

11.2.1.3 Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education

The proposed project would involve land- and boat-based public education about bottlenose dolphin conservation, as well as increased law enforcement to reduce illegal human impacts on dolphins. On land, project activities would occur within developed areas as project staff work to increase marine mammal protections. Other project activities would occur within marine habitats of any estuarine or nearshore waters of Alabama.

11.2.2 Habitats—Environmental Consequences

11.2.2.1 No Action Alternative

Under the no action alternative, projects related to the Alabama marine mammal conservation and recovery program would not occur. If these projects were not implemented, no short- or long-term impacts on habitat would occur because no human activities to conserve marine mammals would occur.

While no direct impacts would occur, indirect impacts would include not gaining the knowledge that the proposed marine mammal data collection and management activities would provide.

11.2.2.2 Enhancing Capacity for Alabama Marine Mammal Stranding Network

Enhancing the capacity for ALMMSN to respond to stranded animals could result in short-term, minor impacts on beaches and dunes, intertidal marshes and flats, or other coastal habitats where marine mammal strandings and associated response activities typically occur. All potential impacts would be temporary, resulting from boat traffic, noise, and human presence during stranding response, and conditions would quickly return to baseline upon completion of stranding response activities.

11.2.2.3 Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health

This project would involve data collection activities within Mobile Bay, Perdido Bay, and nearshore waters of the Gulf of Mexico. The project would have no direct or indirect impacts on terrestrial habitats but could have short-term, negligible impacts on beaches, intertidal marshes, and flats from the presence of survey watercraft in nearshore areas. All potential impacts would be temporary, resulting from boat traffic, noise, and human presence during surveys, and conditions would quickly return to baseline upon completion data collection activities. To avoid potential impacts on any SAV in the project area, researchers would seek to avoid the habitat and would otherwise keep their motor propeller elevated so as not to scar the bottom or uproot algae and sea grasses.

11.2.2.4 Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education

Short-term, minor impacts on terrestrial habitats (e.g., temporary disturbances to coastal and marine habitats, resulting from boat traffic, noise, and human presence) would occur as a result of the staff activities working outside the office, on land or water, to reduce injury to bottlenose dolphins related to human interaction such as illegal feeding, harassment and fisheries impacts. All potential impacts would be temporary, and habitats would quickly return to baseline conditions once project activities are completed. There would be no construction or other alteration of habitats; therefore, no long-term impacts on habitat are expected.

11.2.3 Wildlife—Affected Environment

11.2.3.1 Enhancing Capacity for the Alabama Marine Mammal Stranding Network

Mammals

The most common mammals on beaches or other coastal habitats where this program would be implemented include coyotes, eastern cottontail, raccoon, red fox, white-tailed deer, nutria, bats, and opossum. Bottlenose dolphin and West Indian manatee could occur in any waters in the project area.

Reptiles

Sea turtles that could occur within ALMMSN primarily include loggerhead sea turtle and small numbers of Kemp’s ridley sea turtle. Although unlikely to be encountered, green, hawksbill, and leatherback sea turtle species could also occur in Alabama waters.

Amphibians

In and around nearby wetlands, numerous amphibians could occur, including green tree frog, squirrel tree frog, northern cricket frog, greenhouse frog, southern leopard frog, southern toad, Fowler’s toad, and eastern spadefoot. Several salamander species could also occur but are unlikely because of the lack of fresh water in the project area. In addition, data on their presence and distribution are not available.

Birds

Dauphin Island, which hosts ALMMSN, is important habitat for numerous shorebird species, including sandpipers (*Calidris* spp.), plovers (Wilson's, snowy, piping, and pectoral), turnstones, and various waterbirds as well such as gulls, terns, cormorants, and pelicans. The surrounding marshes and coastal ponds are important foraging sites for wading birds such as egrets and herons, willet, American avocet, black-necked stilt, and greater yellowlegs; clapper rail is reportedly common in the marshes surrounding the airport. Virginia Rail is a fairly common (but secretive) species present during the fall and winter. Yellow Rail is very rare in winter. Black Rail is very rare and is a potential year-round resident. This abundance of birdlife provides ample prey for an occasional peregrine falcon, and both osprey and bald eagle are common (Audubon, 2017).

11.2.3.2 Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health

Mammals

Bottlenose dolphin and West Indian manatee are the only mammals that could occur within the project area, although overflights by bats are also possible.

Reptiles

The only reptiles in the project area, Mobile Bay, Perdido Bay, and other nearshore Gulf of Mexico waters are sea turtles. Loggerhead sea turtle are most common, and Kemp’s ridley could occur on occasion. Infrequent occurrences of green, hawksbill, or leatherback sea turtles could also occur.

Amphibians

No amphibian species would occur in the project area because amphibians are limited to freshwater habitat and do not occur in marine or estuarine habitats.

Birds

Common birds in the project area in Mobile Bay include numerous species of ducks, gulls, terns, pelicans, and shorebirds. Specific species include but are not limited to common loon, magnificent frigatebird, northern gannet, double-crested cormorant, brown pelican, ring-billed gull, laughing gull, herring gull, royal tern, Forster’s tern, Caspian tern, and osprey.

11.2.3.3 Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education

Mammals

Bottlenose dolphin and West Indian manatee are the only mammals that could occur within the project area, although overflights by bats are also possible.

Reptiles

Sea turtles that could occur within this project area include primarily loggerhead sea turtle and small numbers of Kemp’s ridley sea turtle. Although unlikely to be encountered, three other sea turtle species could also occur in Alabama waters (green, hawksbill, and leatherback).

Amphibians

In and around nearby wetlands, numerous amphibians could occur, including green tree frog, squirrel tree frog, northern cricket frog, greenhouse frog, southern leopard frog, southern toad, Fowler’s toad, and eastern spadefoot. Several salamander species could also occur, but are unlikely because of the lack of fresh water in the project area. Data on their presence and distribution are not available.

Birds

Birds using the project area would include seabirds, shorebirds, and raptors.

11.2.4 Wildlife—Environmental Consequences

11.2.4.1 No Action Alternative

Under the no action alternative, projects related to the restoration of marine mammals would not occur. If these projects were not implemented, there would be no short- or long-term, beneficial impacts on wildlife.

11.2.4.2 Enhancing Capacity for the Alabama Marine Mammal Stranding Network

Improving the capacity of the ALMMSN could result in short-term, minor impacts on terrestrial and aquatic wildlife. These impacts could result from disturbance by boat traffic, noise, and human presence during stranding response activities. However, the vast majority of affected species are highly mobile and would easily move to adjacent suitable habitat. In addition, the activities would be limited in duration and would not produce any noticeable increase in the overall high level of human activity in the project area. Thus, there would be no noticeable long-term impacts on wildlife.

11.2.4.3 Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health

This project would involve data collection and coordination and would not include any construction or other ground-disturbing activities. Vessel use would be minimal to collect remote biopsy and photo identify dolphin populations. Because of the scale and nature of this work, short-term, negligible impacts on some wildlife would occur, primarily to birds. The project would have short-term, minor impacts on waterfowl, seabirds, and some shorebirds as a result of boat engine noise and human disturbance. However, impacts would be temporary, and most affected birds would return to their normal behavior once project researchers were gone from the area.

11.2.4.4 Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education

The project would seek to reduce human impacts on bottlenose dolphins through assessment, education, and enforcement. The project could have short-term, minor impacts on some species because of increased human activity, which could disturb or displace some wildlife. Affected species potentially include all animals that inhabit Alabama's beaches, dunes, intertidal marshes, flats, and other coastal habitats. Temporary, adverse impacts on wildlife could result from program staff and volunteers disturbing birds, alligators, manatees, or bottlenose dolphins during boat-based activities. However, the level of such impacts would be minimal when compared to the combined impact of all human activity on the Alabama coastline. The increased vessel traffic from additional enforcement activities could result in increased disturbance of sea turtles, marine mammals, and other wildlife. The possibility of vessel strikes of sea turtles and marine wildlife from increased enforcement vessel activity also exists, but is likely extremely low. The education and enforcement components of this project would provide an opportunity to increase public awareness of wildlife on the Alabama coastline, which could ultimately produce long-term benefit for all species in the region.

11.2.5 Rare and Protected Species—Affected Environment

11.2.5.1 Enhancing Capacity for the Alabama Marine Mammal Stranding Network

Rare species of highest conservation concern (SGCN P1) that could occur near the ALMMSN project facility on Dauphin Island include Mississippi diamondback terrapin, snowy plover, and Wilson's plover. Rare species of high conservation concern (SGCN P2) that could occur near the ALMMSN project area include least bittern, reddish egret, reddish egret, yellow rail, black rail, American oystercatcher, and seaside sparrow.

ESA-listed species that are known to occur or may potentially occur within the ALMMSN project area include:

- **Loggerhead sea turtle:** potentially present in Alabama coastal waters and high potential for females to nest on Alabama beaches
- **Kemp's ridley sea turtle:** potentially present in Alabama coastal waters and low potential for females to nest on Alabama beaches
- **Green sea turtle:** potentially present in nearby Alabama coastal waters
- **Hawksbill sea turtle:** potentially present in nearby Alabama coastal waters
- **Leatherback sea turtle:** potentially present in nearby Alabama coastal waters
- **Gulf sturgeon:** potentially present in the project area
- **West Indian manatee:** potentially present in the project area
- **Alabama beach mouse:** potentially present in the project area
- **Alabama red-bellied turtle:** potentially present in the project area
- **Piping plover:** potentially present during the overwintering period
- **Red knot:** potentially present in the project area during winter.
- **Wood stork:** potentially present within shallow-water near the shoreline

On beaches where ALMMSN could potentially respond to strandings, critical habitat is designated for loggerhead sea turtle nesting (LOGG-T-AL-01, LOGG-T-AL-01, and LOGG-T-AL-03), as well as Alabama beach mouse (Units 1, 2, 3, 4, and 5) and wintering piping plover (Units AL-1, AL-2, and AL-3).

Protected marine mammals that could occur near the ALMMSN project facility on Dauphin Island include both West Indian manatee and bottlenose dolphin. Other marine mammal species that have stranded in the past and have the potential to strand in the future include the melon-headed whale, pygmy killer whale, rough-toothed dolphin, Risso's dolphin, and Atlantic spotted dolphin.

11.2.5.2 Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health

ESA-listed species that are known to occur or may potentially occur within the area potentially affected by the Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health project include:

- **Loggerhead sea turtle:** potentially present in Alabama coastal waters and high potential for females to nest on Alabama beaches
- **Kemp's ridley sea turtle:** potentially present in Alabama coastal waters and low potential for females to nest on Alabama beaches
- **Green sea turtle:** potentially present in nearby Alabama coastal waters
- **Hawksbill sea turtle:** potentially present in nearby Alabama coastal waters
- **Leatherback sea turtle:** potentially present in nearby Alabama coastal waters
- **Gulf sturgeon:** potentially present in waters within the project area
- **West Indian manatee:** potentially present in waters within the project area

- **Alabama red-bellied turtle:** potentially present in the project area within backwaters and margins of rivers, creeks, and lagoons in the Mobile Bay portion of the project area

Most project activities of the Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health project would occur within Mobile Bay and Perdido Bay, neither of which contain designated critical habitat for any ESA-listed species. However, researchers would seek to obtain 25 biopsy samples per year from nearshore waters, defined as more than 2 kilometers from the shoreline to the 20 meter contour line. This area encompasses portions of nearshore reproductive critical habitat for loggerhead sea turtle, unit LOGG-N-34, which extends from Mobile Bay Inlet to Little Lagoon Pass. This critical habitat includes waters adjacent to nesting beaches that are used by hatchlings to egress to the open-water environment, as well as by nesting females to transit between beach and open water during the nesting season. Nearshore biopsy sampling could potentially occur within designated critical habitat for Gulf sturgeon (Unit 8).

Protected marine mammals that could occur within the estuarine waters of Mobile Bay, Perdido Bay, and other nearshore coastal waters where dolphin surveys would occur include West Indian manatee and bottlenose dolphin.

11.2.5.3 Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education

Rare species of highest conservation concern (SGCN P1) that could occur near the Bottlenose Dolphin Protection: Enhancement and Education project area include Mississippi diamondback terrapin, snowy plover, and Wilson's plover. Rare species of high conservation concern (SGCN P2) that could occur near the project area include rainbow snake, least bittern, reddish egret, northern harrier, American kestrel, yellow rail, black rail, American oystercatcher, Nelson's sharp-tailed sparrow, and seaside sparrow.

ESA-listed species that are known to occur or may potentially occur within the vicinity of lands and waters where project activities would occur include:

- **Loggerhead sea turtle:** potentially present in Alabama coastal waters, with females nesting on Alabama beaches
- **Kemp's ridley sea turtle:** potentially present in Alabama coastal waters and low potential for females to nest on Alabama beaches
- **Green sea turtle:** potentially present in nearby Alabama coastal waters
- **Hawksbill sea turtle:** potentially present in nearby Alabama coastal waters
- **Leatherback sea turtle:** potentially present in nearby Alabama coastal waters
- **Gulf sturgeon:** potentially present in the project area
- **West Indian manatee:** potentially present in the project area
- **Alabama beach mouse:** potentially present in the project area
- **Perdido Key beach mouse:** potentially present in the project area
- **Gopher tortoise:** potentially present in the project area
- **Piping Plover:** potentially present in the project area during winter
- **Red knot:** potentially present in the project area during migration
- **Wood stork:** potentially present in the project area

No specific location is associated with this project, and most activity would occur within offices, trucks, and boats used by staff employed by NMFS and AMRD. However, field operations could potentially occur on lands or waters that contain critical habitat designated for Gulf sturgeon (Unit 8), loggerhead sea turtle nesting (LOGG-T-AL-01, LOGG-T-AL-01, and LOGG-T-AL-03), loggerhead sea turtle nearshore reproduction (LOGG-N-34), Alabama beach mouse (Units 1, 2, 3, 4, and 5), Perdido Key beach mouse (PKBM-1, PKBM-2), and wintering piping plover (AL-1, AL-2, and AL-3).

Protected marine mammals that could occur near the facilities or field locations where bottlenose dolphin education and conservation efforts would occur include both West Indian manatee and bottlenose dolphin.

11.2.6 Rare and Protected Species—Environmental Consequences

The general approach and background to the analysis of rare and protected species is the same as described in Section 7.2.8. In some cases, based on coordination with resource agencies, the Trustees have made preliminary determinations that a proposed project *May Affect, but is Not Likely to Adversely Affect* certain ESA-listed species. These effects determinations and the respective listed species are described in this section. The Trustees are engaged in technical assistance with the appropriate agencies for ESA compliance, and the compliance status will be updated in the final plan.

11.2.6.1 No Action Alternative

Under the no action alternative, projects related to the Alabama marine mammal conservation and recovery program would not occur. By not implementing the proposed projects, potential adverse impacts on rare and protected species would be limited to bottlenose dolphins, the protected marine mammal for which the projects are targeted to benefit. The adverse impacts would be long term and of moderate intensity because some bottlenose dolphins could suffer injury or mortality from human-caused impacts that could potentially be mitigated by the proposed projects. The no action alternative would have no effect on other marine and estuarine fauna discussed in this section.

11.2.6.2 Enhancing Capacity for the Alabama Marine Mammal Stranding Network

Short-term, minor impacts on sea turtles and other terrestrial ESA-listed species that use coastal and nearshore habitats would occur as a result of disturbance from ALMMSN staff responding to stranded marine mammals. Boat traffic, noise, and human presence during stranding response could result in temporary disturbance or displacement of some ESA-listed species if individuals are present near the marine mammal stranding locations. However, adverse impacts on any protected species would be unlikely. These activities would not create substantially greater human presence in project lands and waters, so potential impacts on ESA-listed species, state-protected species, or other species of conservation concern would be minimal. Potential impacts on sea turtle species, West Indian manatee, and other ESA-listed species would be negligible with the implementation of appropriate conservation measures.

As a result of the above impacts, the project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, West Indian manatee, Gulf sturgeon, Alabama red-bellied turtle, Alabama beach mouse, piping plover, red knot, and wood stork. Sea turtle species that potentially occur in Alabama waters, but do not nest on Alabama beaches (green, hawksbill, and leatherback), would not be affected because they would be extremely unlikely to occur near marine mammal stranding locations.

There would be no long-term, adverse impacts on protected marine mammals because the project's purpose is to improve the recovery of Alabama's bottlenose dolphin by improving the state's conservation programs. Over the long term, the project would benefit the bottlenose dolphin through increased effectiveness of treating and/or collecting data on stranded marine mammals. The West Indian manatee would not likely be adversely affected by the project activities because the increase in boat traffic would be minimal, and no project activities would contribute threats to the species.

Critical habitat within the project area would be limited to temporary disturbance from boat traffic, noise, and human presence as project staff respond to marine mammal strandings. The project would have *No Effect* on critical habitat for nesting loggerhead sea turtles, Alabama beach mice, or wintering piping plovers because any disturbance from marine mammal stranding response would be temporary. The project would not alter the physical or biological primary constituent elements that are essential for loggerhead sea turtle survival, reproduction, and ultimately, recovery. Activities would also occur during daylight hours, when nesting sea turtles usually do not emerge from water. The project's effects on Alabama beach mouse critical habitat would be negligible because stranding activities would not affect the primary constituent elements of their dune habitat. Piping plover habitat on beaches in the project are would be unaltered.

The project would directly benefit bottlenose dolphin and other cetaceans by enhancing the capacity of the ALMMSN to respond to stranded marine mammals. It would increase marine mammal survival and provide improved understanding of causes of illness/mortality, as well as early detection and intervention to address anthropogenic and natural threats. It would also benefit marine mammals in Alabama through increased data about bottlenose dolphins, which would allow managers to identify and respond quickly to emerging threats.

11.2.6.3 Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health

This project would involve data collection and coordination and would not include any construction or other ground-disturbing activities. The project would include staff activities within offices and on watercraft to collect remote biopsies and conduct photo identification surveys of bottlenose dolphins. The potential for impacts on sea turtles is extremely low because of their infrequent occurrence in Mobile Bay or Perdido Bay, especially of the four species besides loggerhead sea turtle. However, because they could infrequently occur within the project area, short-term, negligible impacts on all sea turtle species could occur.

Because of the scale and nature of this project, there would be no overall adverse effects on either species, and the project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, and West Indian manatee.

Direct impacts on sea turtles and West Indian manatees include possible collision or disturbance from boat traffic, noise, and human presence during dolphin population surveys or remote biopsy surveys. These stressors could cause some individuals to alter their behavior or to flee the area. Indirect impacts may include increased stress levels caused by project activities, which may reduce manatee or loggerhead sea turtle habitat use but would not ultimately reduce the survival or reproduction of individuals. The potential for direct impacts on sea turtle species other than loggerhead is extremely low because of their infrequent occurrence within Alabama's nearshore and coastal waters. Because of the limited duration of these potential impacts and the extremely low probability of direct impacts, there would be no overall adverse effect on sea turtles or manatees.

Because their preferred habitat does not overlap with the surface waters where project activities would occur, this project would have *No Effect* on the following ESA-listed species: Gulf sturgeon and Alabama red-bellied turtle.

In addition, because this project would only involve noninvasive, temporary activities using small watercraft, the proposed project *May Affect, but is Not Likely to Adversely Affect* the physical or biological features and primary constituent elements of loggerhead sea turtle nearshore reproductive critical habitat. Project activities would have *No Effect* on Gulf sturgeon critical habitat because its primary constituent elements would be unaffected by boat use.

11.2.6.4 Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education

Short-term, minor impacts on rare and protected species could occur as a result of disturbance from the work activities of project staff seeking to reduce injury to bottlenose dolphins related to human interaction such as illegal feeding, harassment and fisheries impacts. The activities of project staff while working outside the office, on land or water, could include temporary disturbances to individual animals, resulting from periodic truck and boat travel, as well as human presence, during project enforcement and education activities. These activities and their potential for disturbing ESA-listed species would occur infrequently and with a low intensity over an extensive action area; they would not create substantially greater human presence on coastal Alabama lands or waters. Potential impacts on ESA-listed species, state-protected species, or other species of conservation concern would be negligible.

As such, this project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: loggerhead sea turtle, Kemp’s ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, Gulf sturgeon, West Indian manatee, Alabama beach mouse, Perdido Key beach mouse, gopher tortoise, piping plover, red knot, and wood stork.

There would be minimal increase in human activity, which would not disturb, or otherwise injure bottlenose dolphins or West Indian manatees. Over the long-term, the project would benefit bottlenose dolphins through increased effectiveness of treating and/or collecting data on stranded marine mammals. West Indian manatees would not likely be adversely affected by the project activities because there would be minimal increase in boat traffic. There would be long-term, moderate, beneficial impacts on protected marine mammals because the project’s purpose is to improve the recovery of Alabama’s bottlenose dolphin population through assessment, education, and enforcement. This project will reduce injury and mortality to marine mammals directly related to fisheries interaction, human interaction, and illegal feeding and harassment, as well as reduce marine mammal takes through enhanced state enforcement.

Although the proposed project activities could potentially occur within critical habitat units that are designated for multiple ESA-listed species, they would be limited to periodic truck and boat travel, as well as human presence, during project enforcement and education activities. These activities and their potential for disturbing ESA-listed species would occur infrequently and with a low intensity over an extensive action area. Thus, the project activities *May Affect, but is Not Likely to Adversely Affect* designated critical habitat for loggerhead sea turtle nesting or nearshore reproduction, wintering piping plover, Gulf sturgeon, Alabama beach mouse, or Perdido Key beach mouse. Any project disturbance within a designated critical habitat unit would be temporary and there would be no permanent alterations to its physical or biological primary constituent elements.

11.3 SOCIOECONOMIC RESOURCES

11.3.1 Cultural Resources—Affected Environment

The affected environment for cultural resources for all projects considered in this draft RP II/EA is discussed in Section 4.3.2.

11.3.2 Cultural Resources—Environmental Consequences

For all projects in this RP II/EA, consultation with the Alabama State Historic Preservation Officer is currently ongoing and will be incorporated into the final RP II/EA. For many projects, the action would involve a study, education, or land acquisition that does not have the potential for disturbance of cultural resources. For those projects that include construction, ground disturbance, or other related activities, if any culturally or historically important resources are identified during project preparations or predevelopment surveys, such areas would be avoided during construction. A complete review of all alternatives under Section 106 of the NHPA is ongoing and would be completed prior to any activities that would restrict consideration of measures to avoid, minimize, or mitigate any adverse effects on historic properties located in the project area. Alternatives would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

11.4 COMPARISON OF ALTERNATIVES

Table 11-1 provides a summary of the environmental consequences of the evaluated alternatives.

Table 11-1: Summary of Environmental Consequences for Marine Mammal Projects

	Air Quality and Greenhouse Gasses	Habitats	Wildlife	Rare and Protected Species	Cultural Resources
Enhancing Capacity for ALMMSN	Short-term, negligible impacts on air quality from GHG emissions generated by boats use by project staff and volunteers. No short-term impacts from other project components. No long-term impacts.	Short-term, minor impacts on beaches and dunes, intertidal marshes and flats, or other coastal habitats where marine mammal strandings typically occur. No long-term impacts.	Short-term, minor impacts on coastal wildlife as a result of disturbance by boat use, noise, and human presence during stranding response activities. No long-term impacts.	***May Affect, but is Not Likely to Adversely Affect*:** loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, West Indian manatee, Gulf sturgeon, Alabama beach mouse, piping plover, red knot, wood stork, Alabama red-bellied turtle	Impacts unknown, pending consultation with the Alabama Historical Commission.
Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health	Same as described for the Enhancing Capacity for the ALMMSN project.	Short-term, negligible impacts on beaches, intertidal marshes and flats from survey watercraft in nearshore areas. No long-term impacts.	Short-term, negligible impacts on some wildlife, primarily birds, from boat use. No long-term impacts.	***May Affect, but is Not Likely to Adversely Affect*:** loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, West Indian manatee ***No Effect* on:** Gulf sturgeon, Alabama red-bellied turtle	Same as described for the Enhancing Capacity for the ALMMSN project.

	Air Quality and Greenhouse Gasses	Habitats	Wildlife	Rare and Protected Species	Cultural Resources
Alabama Estuarine Bottlenose Dolphin Protection: Enhancement and Education	Same as described for the Enhancing Capacity for the ALMMSN project.	Same as described for the Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health project.	Short-term, negligible impacts on some wildlife, primarily birds, from boat use and human activity. No long-term impacts.	***May Affect, but is Not Likely to Adversely Affect*****:** loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, Gulf sturgeon, West Indian manatee, Alabama beach mouse, Perdido Key beach mouse, gopher tortoise, piping plover, red knot, wood stork	Same as described for the Enhancing Capacity for the ALMMSN project.

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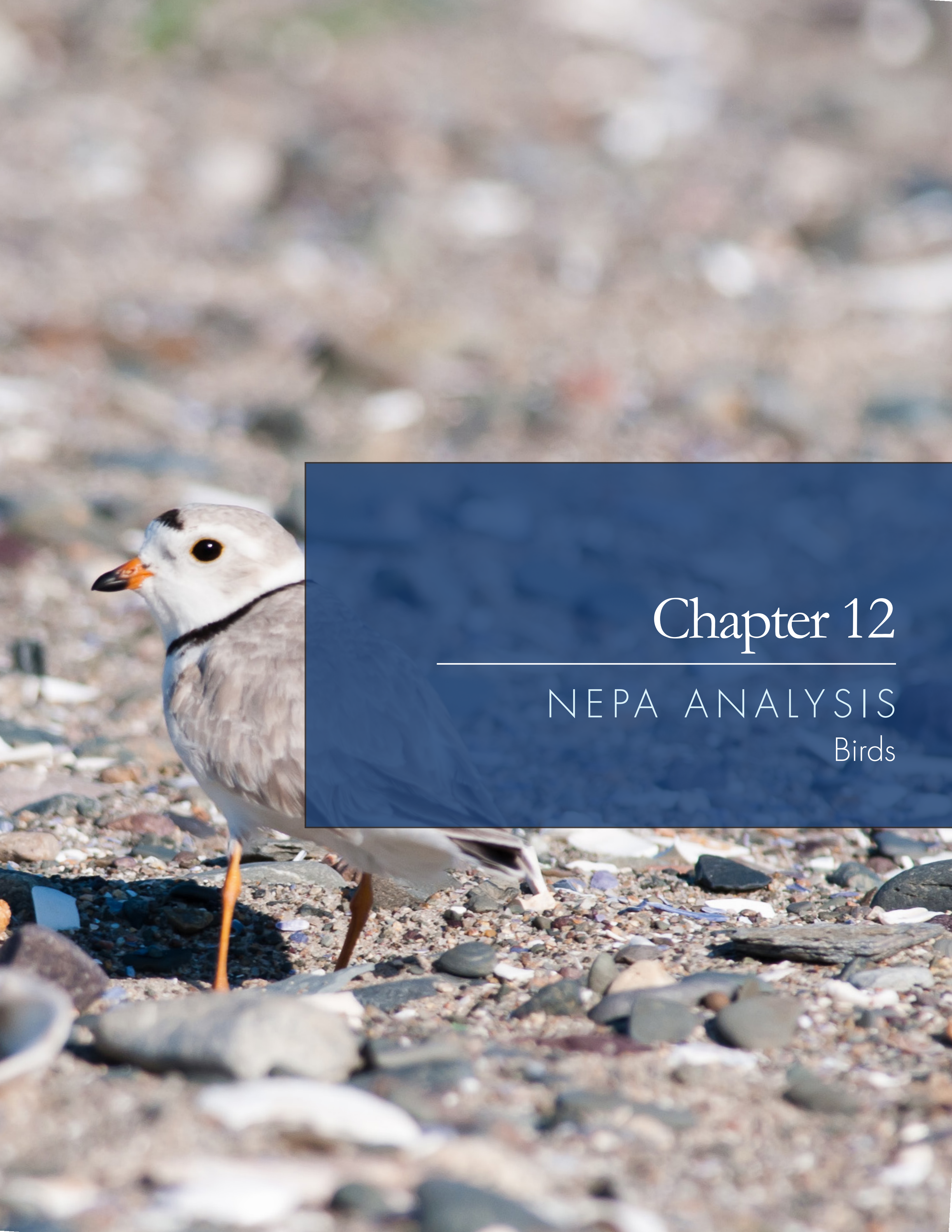

Chapter 12

NEPA ANALYSIS

Birds

12.0 NEPA ANALYSIS—BIRDS

This section provides the NEPA analysis for all of the non-E&D restoration alternatives considered in this plan for funding under the Birds Restoration Type.

The general affected environment for coastal Alabama described in Chapter 4 of this draft RP II/EA is applicable to this section. CEQ guidance states that agencies should "focus on significant environmental issues," and for issues that are other than significant, there should be "only enough discussion to show why more study is not warranted." After preliminary investigation, some resource areas under the Birds Restoration Type alternatives were determined to be either unaffected or minimally affected by the restoration actions being proposed for this Restoration Type. Accordingly, these resources are discussed briefly below. Only those resource areas for which potential, adverse impacts are expected are discussed in detail in this draft RP II/EA. Additionally, the NEPA analysis for the Birds alternatives looks at a further subset of the total resource areas and topics described in Chapter 4, Affected Environment, as part of the biological, physical, and socioeconomic environment for each restoration alternative. To avoid redundant or unnecessary information, resource areas and topics that are not expected to be affected by a proposed restoration alternative are not evaluated further under that a given project.

Resource areas not analyzed in detail for the Birds Restoration Type are identified below, with brief rationale for non-inclusion:

- **Geology and Substrates:** Projects proposed under the Birds Restoration Type would not include any ground-disturbing activities or otherwise create changes to substrates, geologic hazards, or geology, and no impacts would occur. Banding and use of transmitters on birds for tracking the population and habitat use would not include any ground-disturbing activities. Actions under this project are limited to the study and no construction would occur. Because no ground would be disturbed, there would not be any impact on substrates, geologic hazards, or geology. Therefore, this resource area was not carried forward for detailed analysis.
- **Hydrology and Water Quality:** Projects proposed under the Birds Restoration Type involve tracking wading bird to assess population and habitat trends. No short- or long-term impacts on hydrology, water quality, floodplains, or wetlands would occur because of this project. Therefore, this resource area was not carried forward for detailed analysis.
- **Air Quality:** Projects proposed under the Birds Restoration Type would include capturing, marking, and tagging adult female (or fledgling) birds in nesting colonies in Mobile Bay, Mississippi Sound, and Perdido Bay to determine seasonal movements, home ranges, nesting colonies, foraging distances, and habitat use. Some vessel use would occur, but it would be short term and temporary in nature, resulting in short-term, negligible, adverse impacts. Because these activities would be limited to data collection and analysis, no long-term, adverse impacts on air quality are anticipated. Therefore, this resource area was not carried forward for detailed analysis.
- **Noise:** Projects proposed under the Birds Restoration Type would include capturing, marking, and tagging adult female (or fledgling) birds in nesting colonies in Mobile Bay, Mississippi Sound, and Perdido Bay to determine seasonal movements, home ranges, nesting colonies, foraging distances, and habitat use. Some vessel use would occur, but it would be short term and temporary in nature, resulting in short-term, negligible, adverse impacts. Because these activities would be limited to data collection and analysis, no long-term, adverse impacts on noise production are anticipated. Therefore, this resource area was not carried forward for detailed analysis.

- **Habitats:** Projects proposed under the Birds Restoration Type would have no direct impacts on habitat because no construction or other disturbance to habitats would occur. Indirect, negligible impacts could occur because of temporary disturbance and related stress to wildlife that may alter nutrient cycling within wetland habitats. The projects would not result in any long-term, adverse impacts on habitats. However, data gathered by the projects could be used to prioritize important habitats used by colonial nesting wading birds, which could have long-term, beneficial impacts on key habitats if that information is used to promote future habitat protections. Therefore this resource area was not carried forward for detailed analysis.
- **Marine and Estuarine Resources:** Projects proposed under the Birds Restoration Type would have short-term, negligible, adverse and no long-term, adverse impacts on birds. These projects would consisting of tagging and tracking four species of colonial nesting wading birds at Mississippi Sound, Gaillard Island, and Perdido Bay. The projects would result in short-term, negligible, adverse impacts on marine and estuarine fauna from boat traffic, noise, and human presence during banding excursions or other activities that include site visits. Impacts would mainly consist of temporary displacement of mobile species such as fish and crabs, and conditions would quickly return to baseline. The projects would not result in long-term effects on marine and estuarine fauna or their habitats. Therefore, this resource area was not carried forward for detailed analysis.
- **Federally Managed Fisheries:** Projects proposed under the Birds Restoration Type would not destroy or modify FMP species or EFH. Colonial nesting wading bird tracking and habitat use assessment could result in short-term, minor, adverse impacts on FMP species because of disturbance from boat traffic, noise, and human presence during banding and other sampling or monitoring activities that include site visits. However, the affected species are highly mobile and would easily move to adjacent suitable habitat, returning once sampling activities are complete. All impacts would be temporary, and conditions would quickly return to baseline. Therefore, this resource area was not carried forward for detailed analysis.
- **Socioeconomics and Environmental Justice:** Projects proposed under the Birds Restoration Type may result in very small, short-term, beneficial economic impacts on local employment during the assessment period. In the long term, there would be no economic impact as a result of these assessments. Therefore this resource area was not carried forward for detailed analysis.
- **Infrastructure and Transportation:** None of the alternatives evaluated in this draft RP II/EA for Birds funding would create increased demands on area infrastructure that could not be accommodated by existing infrastructure or would affect traffic and transportation in the areas. Therefore, this topic was not carried forward for detailed analysis.
- **Land and Marine Management:** For projects proposed under the Birds Restoration Type, no impacts on land and marine management are expected. The projects would involve habitat assessment for two or four species of colonial-nesting wading birds (tricolored herons, little blue herons, cattle egrets, and white ibis) found in Mobile Bay, Mississippi Sound, and Perdido Bay, Alabama. A combination of satellite transmitters and color leg-banding is proposed for the project. Potential implementation tools include trapping and marking birds with VHF and satellite transmitters. No infrastructure would be implemented. Banding permits and state/federal scientific permits would be required to capture, handle, and track birds. State permitting would be subject to the rules and procedures of ADCNR. As a result, no short- or long-term, adverse impacts on land or marine management would occur; therefore, this resource area was not carried forward for detailed analysis.

- **Tourism and Recreation:** Projects proposed under the Birds Restoration Type would have no short- or long-term impacts on tourism and recreation. The projects would involve habitat assessment for two or four species of colonial-nesting wading birds (tricolored herons, little blue herons, cattle egrets, and white ibis) found in Mobile Bay, Mississippi Sound, and Perdido Bay, Alabama. A combination of satellite transmitters and color leg-banding is proposed for the project. Potential implementation tools include trapping and marking birds with VHF and satellite transmitters. As a result, no short- or long-term, adverse impacts on tourism and recreational use would occur; therefore, this resource area was not carried forward for detailed analysis.
- **Aesthetics and Visual Resources:** None of the alternatives proposed under the Birds Restoration Type would alter existing aesthetic or visual resources in the area in the long term. The projects would involve habitat assessment for two or four species of colonial-nesting wading birds (tricolored herons, little blue herons, cattle egrets, and white ibis) found in Mobile Bay, Mississippi Sound, and Perdido Bay, Alabama. A combination of satellite transmitters and color leg-banding is proposed for the project. Potential implementation tools include trapping and marking birds with VHF and satellite transmitters. As a result, no impacts on aesthetics and visual resources would occur; therefore, this resource area was not carried forward for detailed analysis.
- **Public Health and Safety:** Projects proposed under the Birds Restoration Type would not affect public health and safety. Conducting assessments would not increase shoreline erosion or create other health and safety concerns. Therefore this resource area was not carried forward for detailed analysis.
- **Fisheries and Aquaculture:** There are no commercial fisheries or aquaculture operations in the area that would be affected by the alternatives proposed under the Birds Restoration Type. Therefore, no impacts on fisheries or aquaculture are expected, and this resource topic was not carried forward for detailed analysis.
- **Marine Transportation:** None of the proposed projects under the Birds Restoration Type would affect marine transportation; therefore, this topic was not carried forward for detailed analysis.

12.1 BIOLOGICAL RESOURCES

12.1.1 Wildlife—Affected Environment

12.1.1.1 Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species

Mammals

The most common mammals on beaches or other coastal habitats where this program would be implemented are coyotes, eastern cottontail, raccoon, red fox, white-tailed deer, nutria, bats, and opossum. Bottlenose dolphin and West Indian manatee could occur in any waters in the project area.

Reptiles

Sea turtles that could occur within the estuaries where colonial nesting wading bird colonies occur include loggerhead sea turtle and small numbers of Kemp's ridley sea turtle. Although unlikely to be encountered, three other sea turtle species can occur in Alabama waters (green, hawksbill, and leatherback). Other reptiles tolerant of brackish water could occur in proximity to estuarine wading bird nest colonies, such as Gulf saltmarsh snake and Mississippi diamondback terrapin.

Amphibians

Amphibian species are limited to freshwater habitat and thus would not likely occur within any coastal habitats used by colonial nesting wading birds.

Birds

Birds using the project area would include the wide diversity of seabirds, shorebirds, and raptors that are found across the Alabama coastline.

12.1.1.2 Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species

Wildlife in the project area would be the same as described for the Colonial Nesting Wading Bird Tracking Habitat Use and Assessment—Four Species.

12.1.2 Wildlife—Environmental Consequences

12.1.2.1 No Action Alternative

Under the no action alternative, projects focused on studying colonial nesting wading birds in coastal Alabama would not occur. If these projects were not implemented, no short- or long-term, adverse impacts on wildlife would occur. Beneficial impacts from the proposed projects would not be realized.

12.1.2.2 Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species

The proposed study of colonial nesting wading birds would have temporary, minor, adverse impacts on wildlife occurring near nest colonies because of vehicular noise and human disturbance. These impacts would be short-term and most affected wildlife would return to their normal behavior once project workers were gone from the area. The project would involve fairly intensive disturbance to colonial nesting wading birds, as a result of researchers entering colonies and capturing adult birds. Human disturbance has been documented as a potential problem for colonial nesting wading birds and the proposed activities could have repeated, temporary minor to moderate impacts on the targeted species. Bird capture, handling, and banding would lead to some level of unintended injury or mortality no matter how experienced the handlers or the degree of care taken to prevent harm. Short-term disturbances would result from vehicles, boats, and human presence, which could cause the birds to fly from their nests, potentially resulting in nest abandonment or depredation by gulls or crows. However, those conducting assessments would be acutely aware of the potentially harmful effects of their work and would limit activities to small segments of a colony. Those conducting assessments would be careful to take precautions that are known to reduce or ameliorate adverse effects of human intrusion, including limiting the number of visits and their duration, minimizing physical contact with birds and moving slowly while in the presence of colonies. The responses of individual species and populations to investigator disturbance would vary by species and time of year, and some species would habituate to regular human intrusion. The project would produce long-term, moderate benefits to colonial nesting wading birds by providing data to evaluate the competing hypothesis regarding their declines. Monitoring of adult and juvenile survival rates and understanding movement among breeding colonies would also improve understanding of population status and viability. Furthermore, results from this project will assist decision-makers on potential bird habitat restoration priorities and opportunities for a large suite of avian species within the State of Alabama.

12.1.2.3 Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species

Impacts on wildlife for the Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species would be similar to those described for the Four Species option. However, the potential for adverse impacts resulting from capture and handling would be reduced by focusing on two rather than four species. Long-term, beneficial impacts resulting from an improved understanding of colonial nesting wading birds would still result from this project, although perhaps to a somewhat lesser degree because of the focus on fewer species.

12.1.3 Rare and Protected Species—Affected Environment

12.1.3.1 Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species

ESA-listed species that are known to occur or may potentially occur within the area potentially affected by the Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species project include:

- **Loggerhead sea turtle:** potentially present in Alabama coastal waters and high potential for females to nest on Alabama beaches
- **Kemp's ridley sea turtle:** potentially present in Alabama coastal waters and low potential for females to nest on Alabama beaches
- **Green sea turtle:** potentially present in nearby Alabama coastal waters
- **Hawksbill sea turtle:** potentially present in nearby Alabama coastal waters
- **Leatherback sea turtle:** potentially present in nearby Alabama coastal waters
- **Gulf sturgeon:** potentially present in waters within the project area
- **West Indian manatee:** potentially present in waters within the project area
- **Alabama red-bellied turtle:** potentially present in the project area within backwaters and margins of rivers, creeks, and lagoons in the Mobile Bay portion of the project area
- **Piping plover:** potentially present during winter
- **Red knot:** potentially present in the project area during its migration
- **Wood stork:** potentially present within shallow-water near the shoreline

Protected marine mammals that could occur near colonial wading bird habitat on the Alabama Gulf Coast include both West Indian manatee and bottlenose dolphin.

12.1.3.2 Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species

Special-status species are the same as those described for the Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species.

12.1.4 Rare and Protected Species—Environmental Consequences

The general approach and background to the analysis of rare and protected species is the same as described in Section 7.2.8. In some cases, based on coordination with resource agencies, the Trustees have made preliminary determinations that a proposed project *May Affect, but is Not Likely to Adversely Affect* certain ESA-listed species. These effects determinations and the respective listed species are described in this section. The Trustees are engaged in technical assistance with the appropriate agencies for ESA compliance, and the compliance status will be updated in the final plan.

12.1.4.1 No Action Alternative

Under the no action alternative, projects to study colonial nesting wading birds (tricolored heron, little blue heron, cattle egret, or white ibis) would not occur unless they were funded through other means.

This lack of action would result in no short- or long-term, adverse impacts on any rare and protected species because no human activities or other human disturbances associated with this project would occur.

12.1.4.2 Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species

Colonial nesting wading bird tracking and habitat use assessment could result in short-term, minor, adverse impacts on rare and protected species because of disturbance from boat traffic, noise, and human presence during banding and other sampling or monitoring activities that include site visits via boat. These stressors could cause some animals to alter their behavior, or to flee the area.

This project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, Gulf sturgeon, West Indian manatee, piping plover, red knot, and wood stork.

No ESA-listed species would experience the above-described impacts to a degree that would cause adverse effect on the species. Most listed species are highly mobile and would avoid the area during project activity. Any sea turtles or manatees occurring in the project area would likely be traversing the area because it does not contain a high abundance of seagrass beds or SAV suitable for foraging. Similarly, the action area does not contain suitable habitat for the Alabama red-belly turtle, which prefers backwater, brackish riverine habitat in large rivers flowing into Mobile Bay. Sea turtles could be affected through their avoidance of the project site during data collection activities and related noise, but these effects will be temporary and insignificant, given the project's limited human presence. Gulf sturgeon would not be affected by the limited amount of boat use required to track tagged birds habitat. Based on this information, any effects of this project will be minimal.

This project would have *No Effect* on the following ESA-listed species: Alabama red-bellied turtle.

12.1.4.3 Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species

Impacts would be similar to those described for Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species.

12.2 SOCIOECOMONIC RESOURCES

12.2.1 Cultural Resources—Affected Environment

The affected environment for cultural resources for all projects considered in this draft RP II/EA is discussed in Section 4.3.2.

12.2.2 Cultural Resources—Environmental Consequences

For all projects in this RP II/EA, consultation with the Alabama State Historic Preservation Officer is currently ongoing and will be incorporated into the final RP II/EA. For many projects, the action would involve a study, education, or land acquisition that does not have the potential for disturbance of cultural resources. For those projects that include construction, ground disturbance, or other related activities, if any culturally or historically important resources are identified during project preparations or predevelopment surveys, such areas would be avoided during construction. A complete review of all alternatives under Section 106 of the NHPA is ongoing and would be completed prior to any activities that would restrict consideration of measures to avoid, minimize, or mitigate any adverse effects on historic properties located in the project area. Alternatives would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

12.3 COMPARISON OF ALTERNATIVES

Table 12-1 provides a summary of the environmental consequences of the evaluated alternatives.

Table 12-1: Summary of Environmental Consequences for Bird Projects

	Wildlife	Rare and Protected Species	Cultural Resources
Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Four Species	Short-term, moderate impacts on some species, especially birds, from temporary human activity within wading bird nesting colonies. Long-term benefits to colonial nesting wading birds from the collection of data to inform future restoration projects. No long-term impacts on other wildlife.	***May Affect, but is Not Likely to Adversely Affect*****:** loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, Gulf sturgeon, West Indian manatee, piping plover, red knot, wood stork ***No Effect* on:** Alabama red-bellied turtle	Impacts unknown, pending consultation with the Alabama Historical Commission.
Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species	Similar, although somewhat less than as described above for the Four Species option.	Same as described above for the Four Species option.	Same as described above for the Four Species option.

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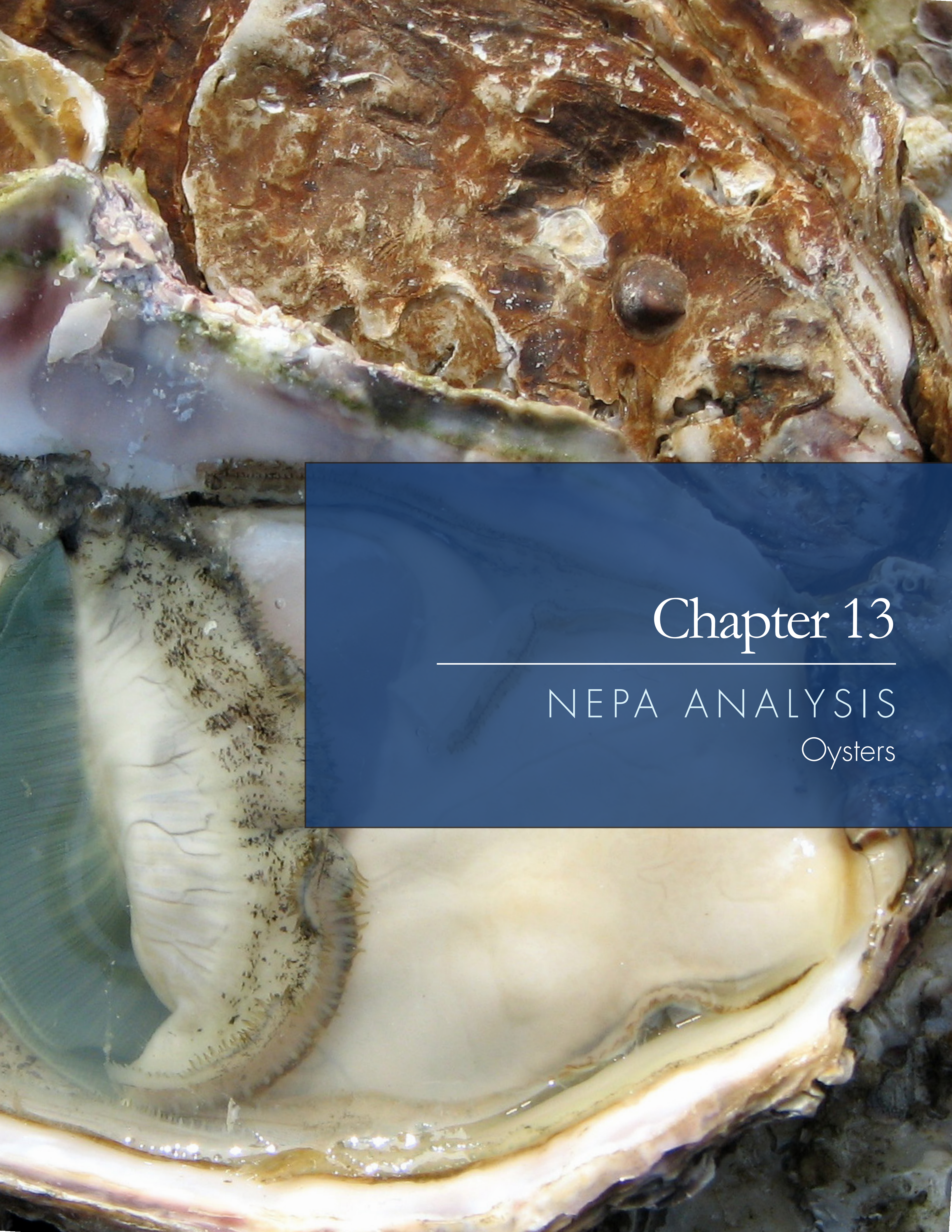


Chapter 13

NEPA ANALYSIS

Oysters

13.0 NEPA ANALYSIS–OYSTERS

This section provides the NEPA analysis for all non-E&D restoration alternatives considered in this plan for funding under the Oysters Restoration Type.

The general affected environment for coastal Alabama described in Chapter 4 of this draft RP II/EA is applicable to this section. CEQ guidance states that agencies should "focus on significant environmental issues," and for issues that are other than significant, there should be "only enough discussion to show why more study is not warranted." After preliminary investigation, some resource areas under the Oysters Restoration Type alternatives were determined to be either unaffected or minimally affected by the restoration actions being proposed for this Restoration Type. Accordingly, these resources are discussed briefly below. Only those resource areas for which potential, adverse impacts are expected are discussed in detail in this draft RP II/EA. Additionally, the NEPA analysis for the Oysters alternatives looks at a further subset of the total resource areas and topics described in Chapter 4, Affected Environment, as part of the biological, physical, and socioeconomic environment for each restoration alternative. To avoid redundant or unnecessary information, resource areas and topics that are not expected to be affected by a proposed restoration alternative are not evaluated further under a given project.

Resource areas not analyzed in detail for the Oysters Restoration Type are identified below, with a brief rationale for non-inclusion:

- **Noise:** Projects proposed under the Oysters Restoration Type would include various uses of vessels for assessments, piling installation, and cultch placement, with vessel use occurring for 1 to 8 months. The noise generated from the operation of vessels and other equipment would attract attention and contribute to the soundscape in local areas. However, the severity of impacts would depend to a large degree on the actual project site, distance to sensitive receptors (e.g., recreational users or wildlife), and the level of ambient noise. Vessel use would be short term and temporary in nature, resulting in short-term, minor, adverse impacts. In all cases, the noise would cease once equipment use is complete, and no long-term, adverse impacts are expected under any of the alternatives. Although this resource area was not carried forward for detailed analysis, noise impacts are described on a case-by-case basis as appropriate within each retained resource area.
- **Socioeconomics and Environmental Justice:** Projects proposed under the Oysters Restoration Type may result in very small, short-term, beneficial economic impacts on local employment during any construction or operation period. Although implementation of projects related to Oysters may cause small a temporary disruptions in recreation use during the implementation of the activity, these impacts would be short term, adverse, and negligible. In the long term, these project would have no economic impact; therefore, this resource area was not carried forward for detailed analysis.
- **Infrastructure and Transportation:** None of the alternatives evaluated in this draft RP II/EA for funding under the Oysters Restoration Type would create increased demands on area infrastructure that could not be accommodated by existing infrastructure or would affect traffic and transportation in the areas. Therefore, this topic was not carried forward for detailed analysis.
- **Tourism and Recreation:** Projects proposed under the Oysters Restoration Type would have no to negligible, short-term, adverse impacts and no long-term, adverse impacts on tourism and recreation. For project locations where no recreational use current occurs at the site (Oyster

Cultch Relief and Reef Configuration, Oyster Hatchery at Claude Peteet Mariculture Center–High Spat Production with Study, and Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study), there would be no short- or long-term impacts. In areas where use currently does occur, there could be short-term disruptions to existing boating use while project implementation is occurring, but any disruption is expected to be short term, negligible, and adverse. Therefore, this resource area was not carried forward for detailed analysis.

- **Public Health and Safety:** None of the proposed projects under the Oysters Restoration Type would affect public health and safety. Implementation of these projects would not increase shoreline erosion or create other health and safety concerns. Projects that include the deployment of cultch could cause a temporary disruption to recreational boating, but these operations would follow standards in place for these operations to minimize disruptions to short-term, negligible impacts. Cultching could also occur in non-harvestable waters as designated by the Alabama Department of Health, but restrictions would be in place to minimize and public health issues. For the Oyster Cultch Relief and Reef Configuration project, deployment of different types of cultch material in various configurations to facilitate positive settlement and growth of oysters would benefit the health and safety for the nearby communities because reefs dissipate wave and storm energy and ultimately prevent erosion of the shoreline and surrounding estuarine wetland systems. Flood control would also be improved. Long-term, beneficial impacts would occur. No short-term, adverse impacts are expected. Therefore this resource area was not carried forward for detailed analysis.
- **Fisheries and Aquaculture:** There are no commercial fisheries or aquaculture operations in the area that would be affected by the projects proposed under the Oysters Restoration Type. Short-term, adverse impacts would be none to negligible. For all of the projects analyzed under the Oysters Restoration Type, upon competition of the projects, overall water quality in Mobile Bay would improve. In the short term, water quality may decrease as a result of project implementation actions, but these changes would be short term, negligible, and adverse. Therefore, no impacts on fisheries or aquaculture associated with these projects are expected, and this resource area was not carried forward for detailed analysis.
- **Marine Transportation:** None of the alternatives under consideration in this draft RP II/EA for funding under the Oysters Restoration Type would adversely affect marine transportation. For the Oyster Grow-out and Restoration Reef Replacement project, signage would be used as a BMP to reduce impacts on marine transportation; therefore, this topic was not carried forward for detailed analysis.

13.1 PHYSICAL RESOURCES

13.1.1 Geology and Substrates—Affected Environment

13.1.1.1 Oyster Cultch Relief and Reef Configuration

Geology and Substrates

Geology and substrates for the Oyster Reefs for the Claude Peteet Mariculture Center are the same as those described for CAST Protection: Enhancement and Education.

13.1.1.2 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

The affected environment for geology and substrates is the same as described for the Oyster Hatchery at Claude Peteet Mariculture Center–High Spat Production with Study.

13.1.1.3 Oyster Grow-Out and Restoration Reef Placement

Geology

This project is located in the Mississippi Sound, including Portersville Bay and Grand Bay and Bon Secour Bay. Bon Secour Bay is located in Mobile Bay. Geology for the Oyster Hatchery at Claude Peteet Mariculture Center project is the same as described for the Oyster Cultch Relief and Reef Configuration.

Upper Mobile Bay is confined by steep topography that opens up into lower Mobile Bay and the Mississippi Sound. This low-gradient shoreline area contains geology that has been influenced by channel branching during falling sea levels (Greene et al., 2007).

Substrates

Mobile Bay and the Mississippi Sound contain silty clays and clay. In water depths less than 2 meters, clean quartz sands occur. Grain size decreases and sorting increases downbay and toward the southeast (Ryan and Goodell, 1972).

The Bon Secour watershed empties into the Bon Secour Bay and contains three types of soils. The soils include Lakewood-St. Lucie-Leon, which are poorly drained and often associated with wetland habitats; Marlboro-Faceville-Greenville Association, which are often well drained and have good agricultural potential; and the Norfolk-Klej-Goldsboro Association, which are the most dominant through the watershed and are well drained. Rivers draining into the Mississippi Sound all contain high sediment loads, including Pearl, Pascagoula, and Alabama rivers (Hadley et al., 2012). The Mississippi Sound contains a significant amount of coarse material such as oyster shell, which is often used for reef creation. During reef creation, the oyster shells often fall onto the bottom of the Mississippi Sound and become covered by finer material over time (Gillam, 2016).

13.1.2 Geology and Substrates—Environmental Consequences

The general approach and background to the analysis of geology and substrates is the same as described in Section 8.1.2.

13.1.2.1 No Action Alternative

Under the no action alternative, projects related to the restoration of oysters would not occur, and there would be no impacts on substrates, geologic hazards, or geology.

13.1.2.2 Oyster Cultch Relief and Reef Configuration

AMRD is proposing to investigate the merit of deploying different types of cultch material in various configurations to facilitate positive settlement and growth of oysters on selected reef areas in Mobile Bay, Alabama. Multiple oyster furrows are expected to be placed on the floor of Mobile Bay in areas with existing or degraded oyster reefs. Oyster reefs would be placed on top of existing substrates. During reef configuration it is possible that there may be minor impacts on existing reefs, such as particles breaking off. These broken particles would add coarse material into the existing substrates on the floor of the bay. However, no impacts on existing geology or substrates are expected.

13.1.2.3 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

The Claude Peteet Mariculture Center is a research center stationed in Mobile Bay. Development would include a 500-square-foot concrete pad with a covering. The creation of an oyster hatchery within the boundary of the existing hatchery is not expected to affect substrates, geologic hazards, or geology because it would involve placing new tanks within an already developed site. This project would also include spat on shell placement on existing reefs or newly clutched reefs, and cultching activities to enhance reefs. These activities would occur on top of the existing substrates causing long-term, minor, adverse impacts from placing cultch where no hard substrate currently exists.

13.1.2.4 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

Impacts would be the same as described for the Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.1.2.5 Oyster Grow-Out and Restoration Reef Placement

The anticipated oyster grow-out areas would be located in Grand Bay, Portersville Bay, and Bon Secour Bay. These sites would be developed using off-bottom oyster techniques; specifically, grow-out units would be suspended in the middle of the water column above the sediment. The oyster grow-out areas are anticipated to be “off-bottom” reefs and thus would not affect substrates, geologic hazards, or geology. Placement of material from the oyster grow-out areas on restoration reefs would not affect geology or substrates because oysters would be placed on existing hard substrate; however, pile driving would be used that could result in short-term, minor, adverse impacts on substrates, but would not influence the overall geology or substrates of the bay. Each site would be approximately 0.5 acre and would require between 12 and 20 pilings. Installation of the pilings would result in short-term, moderate impacts from activities that disturb soils and cause sediment to suspend in the water. In-water construction BMPs would be implemented to localize and ameliorate any adverse impacts.

13.1.3 Hydrology and Water Quality—Affected Environment

13.1.3.1 Oyster Cultch Relief and Reef Configuration

Hydrology

Two reefs located in Mobile Bay have been tentatively selected for pre-monitoring surveys for the Oyster Cultch Relief and Reef Configuration project, including a 36-acre reef approximately 1 mile north-northeast of the mouth of East Fowl River, and Denton Reef, which is located approximately 3 miles southeast of the mouth of East Fowl River. The hydrology for Mobile Bay is the same as described in Section 10.1.3.1, CAST Conservation Program Hydrology and Water Quality—Affected Environment.

Water Quality

The water quality for Mobile Bay is the same as described in Section 10.1.3.1.

Floodplains

The floodplains for Mobile Bay are the same as described in Section 10.1.3.1.

Wetlands

The wetlands for Mobile Bay are the same as described in Section 10.1.3.1.

13.1.3.2 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

Hydrology

The Oyster Hatchery at Claude Peteet Mariculture Center project would construct an oyster hatchery at the existing Claude Peteet Mariculture Center. The center is located approximately halfway between Bon Secour Bay (to the west) and Wolf Bay (to the east) along the GIWW, which creates the southern border of the site (ADCNR, 2014c).

The GIWW is a navigable canal that runs from northern Florida to southern Texas (USACE, n.d.). Within Alabama, the GIWW runs from the Alabama/Florida state line through Perdido Bay, Mobile Bay, and parts of the Mississippi sounds to the Alabama/Mississippi state line (USACE, n.d.). The canal at the project area is 12 feet deep and 125 feet wide (USACE, 2013) and contains brackish water that is suitable for recreation, fish and wildlife habitat, and shellfish fishing (USACE, n.d.). This section of the GIWW receives its water from Wolf Bay and discharges into Bon Secour Bay, subjecting the canal to the same hydrologic processes as these two bodies of water.

Wolf Bay is an estuary with inputs from freshwater sub-basins, municipalities (Gulf Shores and Orange Beach), and the Gulf (Baldwin County Commission & Highway Department, 2013). Hydrologic processes are driven by precipitation, tides, currents, runoff and groundwater recharge. Wolf Bay is designated as an "Outstanding Alabama Water" from the GIWW to Moccasin Bayou and is used for swimming, fish and wildlife habitat, and shellfish harvesting (Baldwin County Commission & Highway Department, 2013). Wolf Bay is connected to Bon Secour Bay by way of the GIWW. For more information on the hydrology of Bon Secour Bay, please see the CAST Conservation Program project, above.

Water Quality

The GIWW is not currently listed as impaired under Section 303(d). The canal was last listed in 2002 for organic enrichment/dissolved oxygen from urban runoff/storm sewers and natural sources (ADEM, 2002). Although the waterway is not impaired, there is speculation that the canal has resulted in saltwater intrusion to the underlying aquifer, degrading the water quality of this groundwater resource (Murgulet and Tick, 2007). Wolf Bay is also not listed as impaired (ADEM, 2016a). Bon Secour Bay is listed as impaired for pathogens (Enterococcus) from on-site wastewater systems and urban runoff/storm sewers (ADEM, 2016a).

Floodplains

The floodplains within the project area are designated as Zone X, which has minimal flood risk.

Wetlands

The project site does not contain any wetlands. All of the ponds on the site are lined and do not infiltrate into the surrounding soil or water table.

13.1.3.3 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

The affected environment for hydrology and water quality is the same as for Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.1.3.4 Oyster Grow-Out and Restoration Reef Placement

Hydrology

The Oyster Grow-Out and Restoration Reef Placement project is located in Portersville Bay and Grand Bay within eastern Mississippi Sound and in Bon Secour Bay within Mobile Bay. The hydrology for these areas is the same as described in Section 10.1.3.1, CAST Conservation Program Hydrology and Water Quality—Affected Environment.

Water Quality

The water quality for these areas is the same as described in Section 10.1.3.1.

Floodplains

The floodplains for these areas are the same as those described in Section 10.1.3.1.

Wetlands

The wetlands for these areas are the same as those described in Section 10.1.3.1.

13.1.4 Hydrology and Water Quality—Environmental Consequences

The general approach and background to the analysis of hydrology and water quality is the same as described in Section 7.1.2.

13.1.4.1 No Action Alternative

Under the no action alternative, projects related to the restoration of oysters would not occur. If these projects were not implemented, there would be no short- or long-term impacts and no impacts on hydrology, water quality, floodplains or wetlands.

13.1.4.2 Oyster Cultch Relief and Reef Configuration

Hydrology

Construction of the Oyster Cultch Relief and Reef Configuration project is expected to take 1 month. It is anticipated that the cultch would be transported by push boat and barge to the site and deploy the material off the deck using skid steers, excavator shovels, or high-pressure water hoses. The construction process would not result in any short-term impacts on the hydrology of Mobile Bay. This project would not involve establishing aboveground structures that would alter hydrologic regimes and would have no long-term impacts on hydrology.

Water Quality

The construction process may result in short-term impacts on turbidity and water quality, within Mobile Bay from the disruption of bed sediments. Deployment of oyster cultch is an approved activity by the USACE under a Nationwide Permit and all in-water construction would adhere to permit requirements. Over the long term, this project would establish an oyster cultch within Mobile Bay. Oysters are native to the area and act as filter feeders, removing suspended sediments and nutrients from the waterbodies in which they exist. The establishment of an oyster cultch in Mobile Bay would result in long-term, beneficial impacts on water quality.

Floodplains

No floodplains are included within the project boundaries; therefore, floodplains would not be affected.

Wetlands

No wetlands are included within the project boundaries; therefore, wetlands would not be affected.

13.1.4.3 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

Hydrology

The Claude Peteet Mariculture Center resides on a 45-acre plot in Mobile Bay and is equipped with a water supply, outdoor ponds, and waterfront access. The oyster hatchery would use the existing, on-site structures. New construction would include a new greenhouse facility to house the oyster hatchery tanks and equipment. Because it is a greenhouse with settlement tanks placed inside rather than a solid, permanent structure, no ground-disturbing activities or filling would occur and hydrology at the Claude Peteet Mariculture Center site would not be affected. Additionally, an existing concrete pad would be expanded by an additional 500 square feet and a roof would be created over it, creating a 5,750-square-foot greenhouse. The construction of the pad enlargement would involve building a frame and filling it with concrete. There would be no grading activities and no short-term impacts on the hydrology are expected.

In the long term, the footprint of the 5,750-square-foot greenhouse would result in less ground area to infiltrate rainfall and would mildly increase runoff at the site. The expansion of the concrete pad and the addition of a roof would cover a 500-square-foot area and would increase runoff at the site from rainfall off the roof and the expansion of impervious surfaces at the site. The new construction at the site would result in long-term, minor, adverse impacts on hydrology.

This project would also include spat on shell placement on existing reefs or newly clutched reefs and cultching activities to enhance reefs. These activities would not change hydrology in the short- or long-term and would not result in adverse impacts.

Water Quality

During construction of the greenhouse and concrete pad, no grading activities would occur. The use of construction equipment would involve implementing BMPs (as outlined in the Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas [Alabama Soil and Water Conservation Society, 2003]) that would limit the amount of erosion and siltation from the equipment. As a result, no short-term impacts on water quality would occur.

The hatchery tanks would be located inside the greenhouse, and all waste from the tanks would be contained and disposed of properly. Nutrients are not expected to be released from the site into nearby water sources, and water quality would not be degraded as a result of the hatchery. The new construction may mildly increase siltation in the nearby Intracoastal Waterway, but not enough to degrade the water quality of the waterway. This project would also include spat on shell placement on existing reefs or newly cultched reefs, and cultching activities to enhance reefs could have short-term, minor, adverse impacts from increases in turbidity while the placement is occurring. Once these activities finish, the turbidity would cease. The 500-square-foot expansion of the concrete pad on the site would result in increased stormwater runoff, but the increase and resulting reduction in coastal water quality would be minimal.

Oysters are filter feeders that remove floating sediment and nutrients from the water column, improving the water quality of the bay. The establishment of an oyster hatchery would result in long-term, beneficial effects on water quality.

Floodplains

All new construction would take place outside the 100-year floodplain. The new construction is not large enough to raise the BFE or increase flood risk in any capacity. Any in-water work would not occur in the floodplain. No short- or long-term impacts on floodplains would occur as a result of this project.

Wetlands

All new construction would take place on upland areas, and cultching activities would not occur in wetlands. There would be no short- or long-term impacts on wetlands.

13.1.4.4 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

Impacts would be the same as those described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study because all construction and implementation activities would be similar.

13.1.4.5 Oyster Grow-Out and Restoration Reef Placement

Hydrology

The anticipated oyster grow-out areas would be located in Grand Bay, Portersville Bay, and Bon Secour Bay. All construction would be completed via barges. There would be no activity that would alter the hydrology of the area. No short-term impacts on hydrology would occur because of this project.

The restoration of oysters to Grand Bay, Portersville Bay and Bon Secour Bay would not alter the hydrology of these waterbodies, resulting in no long-term impacts on hydrology.

Water Quality

This project would involve installing off-bottom oyster grow-out sites that are suspended in the middle of the water column above the sediment via pilings. Each site would be approximately 0.5 acre and would require between 12 and 20 pilings. Installing the pilings would result in short-term, moderate impacts on water quality from the increased suspended sediment from bed-disturbing activities. In-water construction BMPs would be implemented to localize and ameliorate any adverse impacts.

After 1 year, the cultch, live oysters, and spat on shells would be relayed from the grow-out sites to existing reefs, living shorelines, and intertidal areas located in waters classified as Conditionally Approved for oyster harvesting by the Alabama Department of Public Health. Moving oysters from the grow-out sites to natural areas would not affect water quality because the grow-out sites would be off-bottom and there would be no disruption to floor sediments that could increase turbidity. Establishment of multiple oyster grow-out areas in Mobile Bay and the Mississippi Sound would provide habitat for oysters that are endemic to the area. These mollusks act as filter feeders, removing suspended sediments and nutrients from the waterbodies in which they exist. The establishment of an oyster cultch in the Mississippi Sound and Bon Secour Bay would result in long-term, beneficial impacts on water quality.

Floodplains

This project would not involve building any structures on floodplains; therefore, no short-term impacts on floodplains would occur.

Placing oysters on living shorelines and in intertidal areas would improve the water quality of the area and ultimately the health of the floodplain. Long-term, beneficial effects on the floodplain would occur as a result of this project.

Wetlands

This project would not involve building any structures on wetlands; therefore, no short-term impacts on wetlands would occur.

Placing oysters in wetlands would assist wetlands in removing excess nutrients from inflow and outflow. This would ultimately improve the health and overall functionality of the wetlands. Long-term, beneficial effects on wetlands would occur as a result of the restoration of oysters to the area.

13.1.5 Air Quality—Affected Environment

The affected environment for air quality and GHGs is discussed in Sections 4.1.3 and applies to all projects in the draft RP II/EA.

13.1.6 Air Quality—Environmental Consequences

The general approach and background to the analysis of air quality and GHGs is the same as described in Section 10.1.6.

13.1.6.1 No Action Alternative

Under the no action alternative, projects related to oyster restoration would not occur. If these activities did not occur, there would not be additional generation of air emissions or GHGs. There would be no short- or long-term impacts on air quality, and no GHGs would be produced.

13.1.6.2 Oyster Cultch Relief and Reef Configuration

Air Quality

The construction phase of the project would include the deployment of oyster shell, limestone rock, and fossilized oyster shell in three experimental configurations, including mounding, elongated furrows, and control plots using typical cultch broadcasting methods. This would be completed in approximately 1 month with a push boat and barge. This equipment would emit hydrocarbons and criteria air pollutants such as CO and NO_x. However, the impacts from these emissions would be minor and short-term because of the scope and scale of the project. No long-term impacts are anticipated.

Greenhouse Gases

Engine exhaust from construction equipment would produce GHGs. However, because of the small scale and short duration of the construction portion of the project, the production of GHGs would be short term and minor and would not require a detailed assessment.

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

13.1.6.3 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

Air Quality

This project would construct an oyster hatchery and greenhouse at the Claude Peteet Mariculture Center in less than a year. Construction equipment would be used to develop these facilities. This equipment would emit hydrocarbons and criteria air pollutants such as CO and NO_x. The impacts from these emissions would be short-term, minor, and adverse because of the scope, scale, and duration of construction. The oyster spat produced in the hatchery, as well as cultch material, would be deployed using barges in Mobile Bay and the Mississippi Sound. It is anticipated that the freight mileage would be minimal and spread out over the course of 4 years. The impacts from these pollutant emissions would be minor and adverse during deployments.

Greenhouse Gases

Emissions from motorized equipment and electrical equipment, both during and after the construction phase of the project, would produce GHGs. However, because of the small scale and short duration of the construction portion of the project, GHG production would be short term and minor and would not require a detailed assessment. Emissions from the annual operation of the oyster hatchery and greenhouse would have long-term impacts; however, these impacts are anticipated to be minor.

Emission reduction measures to mitigate for short-term impacts could include the use of ultra-low sulfur diesel fuel in construction equipment, limiting unnecessary idling time of diesel-powered engines, controlling dust related to construction site activities, and covering loose materials. Emission reduction measures to mitigate long-term impacts could include the use of energy efficient equipment and regular maintenance of heating and cooling systems in the oyster hatchery and greenhouse.

13.1.6.4 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

Impacts would be the same as those described for the Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study because the construction and operation required would be relatively the same.

13.1.6.5 Oyster Grow-Out and Restoration Reef Placement

Air Quality

This project would install pilings to support suspended oyster baskets. The project would also use vessels to place live oysters on existing reef sites, including existing complementary living shoreline sites. Marine vessels (e.g., barges) would emit hydrocarbons and criteria air pollutants such as CO and NO_x during the 6-month construction period. Monitoring would be conducted for approximately 5 years, and periodic maintenance may be necessary following severe weather events or other situations that would disturb the grow-out sites. The impacts from these emissions would be short term, minor, and adverse because of the scope, scale, and duration of the project.

Greenhouse Gases

Engine exhaust from construction equipment would produce GHGs. However, because of the small-scale and short duration of the construction portion of the project, GHG production would be short term and minor and would not require a detailed assessment.

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

13.2 BIOLOGICAL ENVIRONMENT

13.2.1 Habitats—Affected Environment

13.2.1.1 Oyster Cultch Relief and Reef Configuration

For the purposes of this project, two sites have been tentatively selected for pre-monitoring surveys, including a 36-acre reef approximately 1 mile north-northeast of the mouth of East Fowl River as well as Denton Reef (70 acres) located approximately 3 miles southeast of the mouth of East Fowl River. The sites consist of submerged soft bottom marine/estuarine habitat.

13.2.1.2 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

The action area for the proposed project consists of the Claude Peteet Mariculture Center in Gulf Shores, Alabama and the AMRD office at Dauphin Island, Alabama. Both of these sites are previously developed, lack vegetation, and do not provide suitable habitat for most wildlife species.

13.2.1.3 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

The affected environment for habitats is the same as described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.2.1.4 Oyster Grow-out and Restoration Reef Placement

The proposed project would create up to three off-bottom oyster grow-out sites in Portersville Bay, Grand Bay, and Bon Secour Bay. Oyster grow-out sites would be located in shallow water near the shoreline, on unvegetated soft bottom estuarine habitats.

13.2.2 Habitats—Environmental Consequences

13.2.2.1 No Action Alternative

Under the no action alternative, no projects focused on oyster restoration would occur. As a result, there would be no short- or long-term impacts on habitat because no additional human activities to conserve or restore oyster reefs would occur. The benefits provided by these restoration projects would not be realized under the no action alternative.

13.2.2.2 Oyster Cultch Relief and Reef Configuration

Implementation of the project would result in short-term, minor impacts on submerged soft bottom estuarine habitat from a temporary increase in turbidity and underwater noise and activity during cultch deployment. Turbidity would return to baseline levels following cultch placement. The project would result in long-term, beneficial impacts on oyster reef habitat because cultch placement would expand oyster reef habitat in Mobile Bay.

13.2.2.3 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

The construction of a new greenhouse structure to house an oyster hatchery at the existing Claude Peteet Mariculture Center would occur on previously developed land and would result in no destruction or adverse modification to native wildlife habitat. The expansion of an existing concrete pad with a new roof structure for four new settlement tanks at the AMRD office on Dauphin Island would also not result in any habitat loss. Short-term, minor, adverse impacts on wildlife would result from noise and construction activity related to the building of the facility, and some nearby animals could be stressed, alter their behavior, or flee the area. Pre-construction surveys would be completed to document the potential species affected, and mitigation measures would be employed to minimize impacts during construction, such as avoiding disturbance to adjacent habitat areas and limiting construction during critical life stages such as nesting and rearing young. Once the facility is completed, there would be long-term, minor impacts on wildlife as a result of human activity and the project area would convert no additional land to human development. No wetland habitats would be affected. The project would result in long-term, beneficial impacts on oyster reef habitat because oyster spat produced at the hatchery would be used to restore oyster reefs and expand oyster populations in Alabama waters. If interior and exterior lighting of the new greenhouse is included, the impact on rare and protected species, including birds and sea turtles, would be long term and would result in a permanent increase in coastal light pollution. This impact would be mitigated by incorporating dark-sky compliance in lighting design.

13.2.2.4 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

Impacts would be the same as those discussed under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.2.2.5 Oyster Grow-Out and Restoration Reef Placement

Implementation of the project would result in short-term, minor, adverse impacts on unvegetated soft bottom estuarine habitats in Portersville Bay, Grand Bay, and Bon Secour Bay. Potential impacts would be temporary, including increased noise, vibration, turbidity, and visual disturbances associated with pile driving for the construction of grow-out sites. The project would result in long-term, beneficial impacts on oyster reef habitat because oysters placed at the sites would enhance spat production, potentially increasing oyster abundance and recruitment in Alabama waters.

13.2.3 Wildlife—Affected Environment

13.2.3.1 Oyster Cultch Relief and Reef Configuration

Mammals

Bottlenose dolphin and West Indian manatee are the only mammals that could occur within the project area, although overflights by bats are also possible.

Reptiles

The only reptiles within the project area, within the Mississippi Sound and Bon Secour Bay, are sea turtles. Loggerhead sea turtle would be most common and Kemp's ridley could occur on occasion. Infrequent occurrences of green, hawksbill, or leatherback could also occur.

Amphibians

Amphibian species are limited to freshwater habitat and thus would not occur within the project area.

Birds

Many species of birds, including waterfowl and other water-dependent species such as pelagic seabirds, raptors, colonial waterbirds, and marsh dwelling birds, spend all or a portion of their life cycle within Mobile Bay in proximity to the project area. Some passerine species could occur during overflights, but would otherwise not be found in the project area.

13.2.3.2 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

Mammals

The most common mammals near the Claude Peteet Mariculture Center include common species adapted to human environments, like coyotes, eastern cottontail, raccoon, red fox, white-tailed deer, nutria, bats, and opossum.

Reptiles

Snakes that could occur at the Claude Peteet Mariculture Center include ring-necked snake, cottonmouth, black racer, eastern ribbonsnake, garter snake, and eastern water snake. Lizards most likely to occur include eastern glass lizard, six-line racerunner, green anole, brown anole, broadhead skink, and ground skink. American alligator occur within nearby wetlands. Turtles on the property include but are not limited to common box turtle and several aquatic species that may occur within the adjacent Portage Creek (GIWW), including common snapping turtle, eastern chicken turtle, and pond slider. The eastern diamondback terrapin, a SGCN Priority 1 species, could occur within the project area.

Amphibians

In wetlands and forested areas in proximity to the Claude Peteet Mariculture Center, numerous amphibians could occur, including the following frogs and toads: green tree frog, squirrel tree frog, northern cricket frog, southern leopard frog, Fowler's toad, and eastern spadefoot. Several salamander species could also occur in these areas. Some species, such as southern toad and greenhouse frog could be found on lawn edges and around buildings.

Birds

Common birds within the project area in Mobile Bay include numerous ducks, gulls, terns, pelicans, and shorebirds. Common species include but are not limited to common loon, magnificent frigatebird, northern gannet, double-crested cormorant, brown pelican, ring-billed gull, laughing gull, herring gull, royal tern, Forster's tern, Caspian tern, and osprey.

13.2.3.3 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

The affected environment for wildlife is the same as for Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.2.3.4 Oyster Grow-out and Restoration Reef Placement

Mammals

Bottlenose dolphin and West Indian manatee are the only mammals that could occur within the project area, although overflights by bats are also possible.

Reptiles

The only reptiles within the project area, within the Mississippi Sound and Bon Secour Bay, are sea turtles and American alligator. Loggerhead sea turtle would be most common, and Kemp's ridley would occur on occasion. Infrequent occurrences of green, hawksbill, or leatherback could also occur.

Amphibians

Amphibian species are limited to freshwater habitat and thus would not occur within any habitats used by oysters.

Birds

Common birds in proximity to the shoreline areas where grow-out sites would be located include numerous shorebirds, ducks, gulls, terns, and pelicans. Common species include but are not limited to common loon, magnificent frigatebird, northern gannet, double-crested cormorant, brown pelican, ring-billed gull, laughing gull, herring gull, royal tern, Forster's tern, Caspian tern, and osprey.

13.2.4 Wildlife—Environmental Consequences

13.2.4.1 No Action Alternative

Under the no action alternative, projects related to the restoration of oysters would not occur and there would be no adverse impact on wildlife. If the proposed projects are not implemented, there would be long-term, moderate, adverse impacts on oyster reefs in coastal Alabama from continued erosion and sedimentation, drought, predation, and harvesting.

13.2.4.2 Oyster Cultch Relief and Reef Configuration

Impacts of this project on wildlife would be short term and minor, associated with the temporary increases in water traffic from the transportation of workers and equipment and from the deployment of oyster cultch material. Storage of cultch would occur at already existing cultch storage area or in already disturbed areas near where the cultch would be deployed; there would be no impacts on habitats from cultch storage. Placement of cultch material in lower Mobile Bay would involve using haul trucks, barges, and other large equipment that could cause temporary disturbance and displacement of nearby wildlife, primarily birds. However, most affected species are mobile and would likely avoid the area for the duration of project activities, avoiding injury or mortality. Habitat conditions would return to baseline levels following cultch placement. The project would result in long-term, beneficial impacts on wildlife within the project area because it would provide a better understanding of the substrate and configurations necessary to carry out future oyster restoration projects in Alabama's estuaries. The creation of future oyster reef habitat would provide important habitat to a wide diversity of wildlife. This project would have long-term benefits on water quality from the increased filter feeding by oysters, which would benefit marine mammals and sea turtles.

13.2.4.3 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

The construction of an oyster hatchery and new greenhouse building to contain it would result in short-term, minor, adverse impacts on wildlife. Although the greenhouse would be built on a small area of previously disturbed, non-native, open habitat, its construction would result in temporary, adverse impacts on all wildlife inhabiting the property, as well as some adjacent lands. Impacts on wildlife would primarily result from noise and disturbance related to temporary, increased human activity. Disturbed areas would be reclaimed with native vegetation, where possible, to reduce erosion and provide a long-term benefit to wildlife. Also, impacts would be minimized by using BMPs for reducing disturbance to wildlife, such as performing pre-construction wildlife surveys, avoiding critical habitat area, and limiting construction during critical life stages such as nesting and rearing young.

Additionally, the expansion of an existing concrete pad with a new roof structure for four new settlement tanks at the AMRD office on Dauphin Island would have similar temporary, adverse impacts on wildlife as described above during construction. Most wildlife would vacate the area during construction, but return after construction is finished. If interior and exterior lighting of the new greenhouse is included, the impact on rare and protected species, including birds and sea turtles, would be long term and would result in a permanent increase in coastal light pollution. This impact would be mitigated by incorporating dark-sky compliance in lighting design.

13.2.4.4 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

Impacts on wildlife would be the same as those described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.2.4.5 Oyster Grow-out and Restoration Reef Placement

The development of three oyster grow-out sites in Grand Bay, Portersville Bay, and Bon Secour Bay would result in short-term, minor, adverse impacts on wildlife. Storage of cultch would occur at already existing cultch storage area or in already disturbed areas near where the cultch would be deployed; there would be no impacts on habitats from cultch storage. Temporary disturbance to birds, including primarily shorebirds or wading birds, would occur during the construction of three grow-out areas, which could decrease bird foraging or cause them stress because of displacement. Other passerines and American alligator could also be affected. Affected animals would likely avoid the area during construction, but once completed, impacts would be minimal. Daily human activity to grow oysters at the sites would have long-term, minor effects on birds. However, these activities would occur on a regular, predictable daily schedule, which would allow some birds to habituate to humans at the grow-out sites and therefore, experience no adverse impact.

13.2.5 Marine and Estuarine Fauna—Affected Environment

13.2.5.1 Oyster Cultch Relief and Reef Configuration

The project would be located in western Mobile Bay near the mouth of East Fowl River in unvegetated soft bottom estuarine habitat. Marine and estuarine fauna that could occur within the project area include the following:

- **Finfish:** southern flounder, mullet, southern kingfish, Atlantic croaker, spot, weakfish, speckled seatrout, red drum, black drum, Gulf toadfish, blennies, and gobies
- **Shellfish:** oysters, white shrimp, brown shrimp, pink shrimp, grass shrimp, blue crabs, marsh crabs, mud crabs, fiddler crabs, and bent mussels
- **Benthic Organisms and Other Invertebrates:** polychaetes, amphipods, copepods, isopods, and barnacles.

13.2.5.2 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

This project would be located at the Claude Peteet Mariculture Center in Gulf Shores, Alabama and the AMRD office at Dauphin Island, Alabama. All proposed construction would occur in upland areas. No marine or estuarine habitats or fauna are located within the project area.

13.2.5.3 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

The affected environment for marine and estuarine fauna is the same as for Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.2.5.4 Oyster Grow-out and Restoration Reef Placement

This project would create up to three off-bottom oyster grow-out sites within nearshore waters in Portersville Bay, Grand Bay, and Bon Secour Bay. Sites would be located in marine or estuarine unvegetated soft bottom habitat. Oysters would be deployed in nearby restoration reefs or living shoreline projects. Marine and estuarine fauna that could occur within the project area include the following:

- **Finfish:** southern flounder, mullet, southern kingfish, Atlantic croaker, spot, weakfish, speckled seatrout, red drum, black drum, sheepshead, sea bream, pinfish, Gulf toadfish, blennies, and gobies
- **Shellfish:** oysters, white shrimp, brown shrimp, pink shrimp, grass shrimp, blue crabs, marsh crabs, mud crabs, fiddler crabs, coquina clams, stout tagelus, and bent mussels
- **Benthic Organisms and Other Invertebrates:** jellyfish, polychaetes, amphipods, copepods, isopods, and barnacles

13.2.6 Marine and Estuarine Fauna—Environmental Consequences

13.2.6.1 No Action Alternative

Under the no action alternative, projects related to the restoration of oysters would not occur. If these projects were not implemented, oyster reefs in Alabama would remain in their current condition, and there would be no short- or long-term benefits to oysters and other marine or estuarine fauna associated with oyster reef habitats. Therefore, the no action alternative would have no effect on marine and estuarine fauna.

13.2.6.2 Oyster Cultch Relief and Reef Configuration

Implementation of the project would result in short-term, minor, adverse impacts on marine and estuarine fauna within the project area. Potential impacts could include injury or mortality of less mobile benthic species from burial during cultch deployment. Mobile species such as finfish, crabs, and shrimp would likely avoid the area for the duration of in-water work, avoiding injury or mortality. A temporary increase in underwater noise and activity during project cultch deployment and a temporary increase in turbidity would also contribute to temporary disturbance or displacement of marine and estuarine fauna. Turbidity would return to baseline levels following cultch placement. The project would result in long-term, beneficial impacts on marine and estuarine fauna because it would create oyster reef habitat, which benefits oysters, but also provides important habitat for many other marine and estuarine species, including finfish, crabs, shrimp, mussels, and encrusting organisms.

13.2.6.3 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

The project would have no effect on marine and estuarine fauna from construction activities in the short term because all proposed construction would occur in upland areas. This project would also include spat on shell placement on existing reefs or newly clutched reefs, and cultching activities to enhance reefs. Impacts from these activities would be the same as those described in Section 13.2.6.2 related to the temporary disturbance and turbidity related to cultching activities resulting in short-term, minor, adverse impacts.

The project would result in long-term, beneficial impacts on marine and estuarine fauna because oyster spat produced at the hatchery would be used to restore oyster reef habitat and expand oyster populations in Alabama waters. This would also benefit other marine and estuarine species such as crabs, gobies, blennies, and gulf toadfish that are associated with oyster reef habitat.

13.2.6.4 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

Impacts would be the same as those described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.2.6.5 Oyster Grow-out and Restoration Reef Placement

Implementation of the project would result in short-term, minor, adverse impacts on marine and estuarine fauna within the footprint of the grow-out sites and oyster restoration sites. Potential impacts would include noise, vibration, temporary increases in turbidity, and visual disturbances associated with pile driving for the construction of grow-out sites, boat traffic, and human presence. Pile driving could result in injury or mortality of less mobile benthic species. Mobile species such as finfish, crabs, and shrimp would likely avoid the area for the duration of in-water work, avoiding injury or mortality. The project would result in long-term, beneficial impacts on marine and estuarine fauna because oysters placed at the sites would enhance spat production, potentially increasing oyster abundance and recruitment in Alabama waters. This would also benefit other marine and estuarine species such as crabs, gobies, blennies, and gulf toadfish that are associated with oyster reef habitat.

Care would be taken to not place the grow-out areas over existing oyster reef. The project requires an assessment of EFH by NOAA Fisheries Habitat Conservation Division because sand/mud bottom and water column habitat would be affected. The benefits of the project would likely outweigh the impacts.

13.2.7 Rare and Protected Species—Affected Environment

13.2.7.1 Oyster Cultch Relief and Reef Configuration

This project would involve activities within estuarine habitat where oyster restoration would be studied. No SGCN species are in the project area, apart from the marine species also listed under the ESA.

ESA-listed species that are known to occur or may potentially occur within the waters of Mobile Bay where oyster cultch would be deployed include:

- **Loggerhead sea turtle:** potentially present in the project vicinity
- **Kemp's ridley sea turtle:** potentially present the project vicinity
- **Green sea turtle:** potentially present in nearby Alabama coastal waters

- **Hawksbill sea turtle:** potentially present in nearby Alabama coastal waters
- **Leatherback sea turtle:** potentially present in nearby Alabama coastal waters
- **West Indian manatee:** potentially present in waters within the project area
- **Alabama red-bellied turtle:** potentially present in the project area within backwaters and margins of rivers, creeks, and lagoons in the Mobile Bay portion of the project area

Protected marine mammals that could occur near this oyster reef restoration project include both West Indian manatee and bottlenose dolphin.

13.2.7.2 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

ESA-listed species that are known to occur or may potentially occur within the project area include:

- **Loggerhead sea turtle:** potentially present in the project vicinity
- **Kemp's ridley sea turtle:** potentially present the project vicinity
- **Green sea turtle:** potentially present in nearby Alabama coastal waters
- **Hawksbill sea turtle:** potentially present in nearby Alabama coastal waters
- **Leatherback sea turtle:** potentially present in nearby Alabama coastal waters
- **Gulf sturgeon:** potentially present in the project area
- **West Indian manatee:** potentially present in waters within the project area
- **Alabama beach mouse**: potentially present in the project area
- **Alabama red-bellied turtle:** potentially present in the project area within backwaters and margins of rivers, creeks, and lagoons in the Mobile Bay portion of the project area
- **Gopher tortoise:** potentially present in the project area
- **Eastern indigo snake:** potentially present in the project vicinity, although unlikely; no known recent occurrences
- **Piping plover:** potentially present during winter
- **Red knot:** potentially present in the project area during migration
- **Wood stork:** potentially present within shallow-water near the shoreline

Protected marine mammals that could occur within waters near this hatchery-based oyster propagation and restoration include both West Indian manatee and bottlenose dolphin.

13.2.7.3 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

The affected environment for rare and protected species is the same as for Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.2.7.4 Oyster Grow-out and Restoration Reef Placement

This project would involve activities within estuarine habitat where oyster. No SGCN species are within the project area, apart from the marine species also listed under the ESA.

ESA-listed species that are known to occur or may potentially occur within the project area include:

- **Loggerhead sea turtle:** potentially present in the project vicinity

- **Kemp's ridley sea turtle:** potentially present the project vicinity
- **Green sea turtle:** potentially present in nearby Alabama coastal waters
- **Hawksbill sea turtle:** potentially present in nearby Alabama coastal waters
- **Leatherback sea turtle:** potentially present in nearby Alabama coastal waters
- **West Indian manatee:** potentially present in the project area
- **Gulf Sturgeon:** potentially present in the project area
- **Piping plover:** potentially present in the project vicinity on unvegetated beaches, mud flats, and sand flats during winter
- **Red knot:** potentially present in the project area during migration
- **Wood stork:** potentially present in the project area
- **Gulf sturgeon:** potentially present in the project area
- **West Indian manatee:** potentially present in the project area

The project area is near waters that are designated critical habitat for Gulf sturgeon, and nearby beaches and mud or sand flats contain designated critical habitat for wintering piping plover. Gulf sturgeon Critical Habitat Unit 8 encompasses the western portion of Grand Bay in Mobile County, Alabama. The action area contains one grow-out site within water designated as critical habitat for Gulf sturgeon. Some nearby beaches and mud or sand flats also contain designated critical habitat for wintering piping plover, and critical habitat for wintering piping plover includes Units 1, 2, and 3, located at Isles aux Herbes (Coffee Island), Dauphin Island, and Fort Morgan.

Protected marine mammals that could occur near this oyster reef grow-out project include both West Indian manatee and bottlenose dolphin.

13.2.8 Rare and Protected Species—Environmental Consequences

The general approach and background to the analysis of rare and protected species is the same as described in Section 7.2.8. In some cases, based on coordination with resource agencies, the Trustees have made preliminary determinations that a proposed project *May Affect, but is Not Likely to Adversely Affect* certain ESA-listed species. The effects determinations and the respective listed species are described in this section. The Trustees are engaged in technical assistance with the appropriate agencies for ESA compliance, and the compliance status will be updated in the final plan.

13.2.8.1 No Action Alternative

Under the no action alternative, projects related to the restoration of oysters would not occur. If these projects were not implemented, oyster reefs in Alabama would remain in their current condition and there would be no short- or long-term impacts on any rare and protected species. Therefore, the no action alternative would have no effect on marine and estuarine fauna.

13.2.8.2 Oyster Cultch Relief and Reef Configuration

This oyster restoration project would result in short-term, minor, adverse impacts on some rare and protected species because of temporary disturbance from increased water turbidity and increased underwater noise and human activity during oyster cultch deployment. Any temporary, adverse impacts on state-protected species, species of conservation concern (SGCN1 and SGCN2), and ESA-listed species would be minor.

Noise generated by boats and construction equipment during and immediately after cultch deployment could result in temporary disturbances to ESA-listed species that may be present in the project area. However, these all listed species would likely avoid the area during construction and therefore are unlikely to be directly affected by the proposed project actions. The proposed project would permanently convert a small amount of unvegetated soft-bottom estuarine habitat to hard-bottom oyster reef habitat. This is not anticipated to adversely affect any ESA-listed species because the area does not provide high quality foraging habitat for any listed species. If any species are present in the action area during cultch deployment, some individuals could be struck by cultch material as it is being placed. Also, hand dredging, cane pole sounding, and/or SCUBA quadrat sampling during site selection and pre- and post-deployment monitoring could result in similar temporary disturbances to protected species.

No ESA-listed species would experience the above-described impacts to a degree that would cause an adverse effect on the species. The project area does not provide suitable habitat, and because all listed species are highly mobile, they would avoid the area during project activity. Any sea turtles or manatees occurring in the project area would likely be traversing the area because it does not contain any seagrass beds or SAV suitable for foraging. Similarly, the area does not contain suitable habitat for the Alabama red-belly turtle, which prefers backwater, brackish riverine habitat in large rivers flowing into Mobile Bay. Sea turtles may be affected through their avoidance of the site because of construction activities and related noise, but these effects would be temporary and insignificant given the project's short construction time and the ubiquitous presence of the species' preferred prey (e.g., sponges, algae, crabs, jellyfish, and mollusks) in the surrounding area. Effects to Gulf sturgeon from avoiding the site are also discountable because (1) they are not likely to be present in cultch areas during cultch placement; (2) any presence in cultch areas would be brief and during migration; and (3) no suitable foraging habitat exists. The substrate in these areas, pre- and post-project, is hard bottom. Gulf sturgeon are suction feeders that extract prey from soft, sandy bottoms. Based on this information, any effects of this project on sea turtles and Gulf sturgeon would be minimal. Overall, the proposed project is not likely to adversely affect any ESA-listed species.

This project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: loggerhead sea turtle, Kemp's ridley sea turtle, Green sea turtle, hawksbill sea turtle, leatherback sea turtle, Gulf sturgeon, and West Indian manatee.

This project would have *No Effect* on the following ESA-listed species: Alabama red-bellied turtle.

The project would have *No Effect* on any critical habitat designated for ESA-listed species because no critical habitat exists in the project area. The project would occur at least approximately 10 miles from the nearest piping plover wintering critical habitat on Dauphin Island. The primary constituent elements essential for the conservation of wintering piping plovers are found on intertidal beaches and flats, which are not present in proximity to the proposed project.

The project is not located within Gulf sturgeon critical habitat. However, underwater noise, vibration, and temporary increases in turbidity during cultch deployment could result in short term, direct or indirect, adverse impacts on potential Gulf sturgeon habitat in Mobile Bay, although this is unlikely. The primary constituent elements essential of Gulf sturgeon critical habitat include areas with abundant prey items, such as amphipods, lancelets, polychaetes, gastropods, ghost shrimp, isopods, mollusks and/or crustaceans, within estuarine and marine habitats and substrates for sub-adult and adult life stages. Given the fish's life cycle with respect to the project location, substrate type, and timing, the proposed cultch deployment by this project would not affect Gulf sturgeon.

13.2.8.3 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

The construction of an oyster hatchery at the existing Claude Peteet Mariculture Center would occur on previously developed land and would result in no destruction or adverse modification to habitat important to rare and protected species. Short-term, minor, adverse impacts on rare and protected species could result from noise and construction activity related to the building of a greenhouse facility to house the oyster hatchery equipment, as some animals could be stressed, alter their behavior, or flee the area. Pre-constructions surveys would be completed to document the potential species affected, and mitigation measures would be employed to minimize impacts during construction, such as avoiding important habitat areas and limiting construction during critical life stages such as nesting and rearing young. Once the facility is completed, if interior and exterior lighting of the new greenhouse is included, the impact on rare and protected species, including birds and sea turtles, would be long term and would result in a permanent increase in coastal light pollution. This impact would be mitigated by incorporating dark-sky compliance in lighting design.

The proposed transport and outplanting of oyster spat via boats or barges may have the potential to affect ESA-listed sea turtles, Gulf sturgeon, and West Indian manatee. Bottlenose dolphin, protected under the MMPA, could also be affected by these activities, which would mostly occur in Mobile Bay. Direct impacts could occur from possible collision or disturbance from boats during the transport of oyster spat, although most individuals would flee the area. Indirect impacts may include increased stress levels or energy expenditure by disturbed animals. However, this temporary impact would not ultimately reduce the survival or reproduction of individual animals. The three ESA-listed birds in coastal Alabama could also be affected if their habitat is disturbed by passing project boats, although this is unlikely because of the large number of other recreational boats and the infrequent occurrence of these species.

This project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: loggerhead sea turtle, Kemp’s ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, Gulf sturgeon, West Indian manatee, gopher tortoise, eastern indigo snake, piping plover, red knot, and wood stork.

This project would not involve any activity on beaches or dunes; thus, there would be *No Effect* on the following ESA-listed species: Alabama beach mouse.

13.2.8.4 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

Impacts would be similar to those described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.2.8.5 Oyster Grow-out and Restoration Reef Placement

Implementation of the project would result in short-term, minor impacts on some ESA-listed species that could occur within the project vicinity, including all sea turtle species, Gulf sturgeon, West Indian manatee, piping plover, red knot, and wood stork. Potential impacts would include noise, vibration, temporary increases in turbidity, and visual disturbances associated with pile driving and boat and vehicle traffic during construction of grow-out sites and placement of the cultch, as well as human presence for the 5-year project duration. Most species would likely avoid the area during construction, but any individuals that are displaced because of noise would likely return to the area upon completion of construction activities, or use other suitable habitats nearby. Oyster grow-out sites or placement would not be located in seagrass beds or SAV habitats, but noise associated with construction activities could temporarily disturb sea turtles or manatees that may be foraging in nearby habitats, Gulf sturgeon could be similarly disturbed by noise and turbidity during construction, if present in the action area.

The project *May Affect, but is Not Likely to Adversely Affect* the following ESA-listed species: loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, awksbill sea turtle, leatherback sea turtle, West Indian manatee, Gulf sturgeon, piping plover, red knot, and wood stork.

Noise from project construction, especially driving 12 to 20 pilings, could adversely affect bottlenose dolphins because it would be detectable for miles, which would potentially interfere with dolphin communication, echolocation and breeding. The impacts are expected to be limited by the intermittent and temporary nature of pile driver noise and the animal's ability to adjust vocalization amplitude and frequency. Mitigation measures, such as using a vibratory hammer that produces non-impulsive sound, would reduce the impact of pile driver noise on bottlenose dolphin or other marine mammals.

One grow-out site, located on the west side of Point aux Pins, is within Gulf sturgeon critical habitat. However, the site selected is not likely to provide suitable habitat for the species because of its proximity to the shoreline. During construction, underwater noise, vibration, and temporary increases in turbidity during pile driving could result in short-term, direct or indirect, adverse impacts on Gulf sturgeon critical habitat. Measures to reduce the effects of the vibrations from pile driving would be used to minimize impacts, and no construction would occur between May 1 and September 30. The substrate in the proposed Point aux Pins grow-out site is soft, with a muddy bottom, which is not ideal foraging habitat for Gulf sturgeon that as suction feeders, extract prey from soft, sandy bottoms. The construction of the grow-out sites would not alter the substrate to a degree that would potentially influence Gulf sturgeon foraging. Furthermore, the small size of the project and the limited number of supporting pilings would not affect the movement of any Gulf sturgeon that potentially use the area. In the long term, the oyster grow-out project would improve water quality through the filter feeding activity of oysters. Therefore, this project *May Affect, but is Not Likely to Adversely Affect* the primary constituent elements of Gulf sturgeon critical habitat.

13.2.9 Federally Managed Fisheries—Affected Environment

13.2.9.1 Oyster Cultch Relief and Reef Configuration

This project would investigate the merit of deploying different types of cultch material in various configurations to facilitate oyster restoration within nearshore waters of Mobile Bay. One or more life stages of every managed species listed in Table 4-3 could occur within the project area. Mobile Bay also contains EFH for shrimp, red drum, reef fishes, coastal migratory pelagics, and for the neonate and juvenile life stages of the highly migratory species described above as potentially present within the project area.

13.2.9.2 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

This project would construct an oyster hatchery at the existing Claude Peteet Mariculture Center in Gulf Shores. Because the project would occur on land, no managed fish species or EFH would occur within the project area.

13.2.9.3 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

The affected environment for Federally Managed Fisheries is the same as for Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.2.9.4 Oyster Grow-out and Restoration Reef Placement

This project is focused on establishing a protected oyster-growing project in the Mississippi Sound and Bon Secour Bay. One or more life stages of every managed species listed in Table 4-3 could occur within the project area. The project area also encompasses EFH for red drum, shrimp, reef fishes, coastal migratory pelagics, and for the neonate and juvenile life stages of the highly migratory species described above as potentially present within the project area.

13.2.10 Federally Managed Fisheries—Environmental Consequences

13.2.10.1 No Action Alternative

Under the no action alternative, projects related to the restoration and enhancement of Alabama's oyster populations would not occur. The no action alternative would have no effect on FMP species or EFH because no construction or other in-water work would occur. However, long-term, beneficial impacts associated with the restoration and enhancement of oyster reef habitat, which provides important nursery habitat for many FMP species and their prey, would not be realized.

13.2.10.2 Oyster Cultch Relief and Reef Configuration

The construction of the project would result in short-term, minor, adverse impacts on FMP species and EFH. Temporary disturbance would result from an increase in water turbidity and increased underwater noise and human activity during oyster cultch deployment, which could contribute to temporary disturbance or displacement of marine and estuarine fauna. Potential impacts could include injury or mortality of less mobile benthic species during cultch deployment. However, the affected FMP species are mobile and would likely avoid the area for the duration of in-water work, avoiding injury or mortality. Turbidity and noise levels would return to baseline levels following cultch placement.

The project would result in long-term, beneficial impacts on FMP species and EFH because it would create oyster reef habitat, which provides important nursery habitat for many FMP species and their prey.

13.2.10.3 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production

The construction of an oyster hatchery at an existing mariculture center would occur on previously developed land and would result in no destruction or adverse modification to FMP species or EFH. Potential impacts from the project would be limited to the possibility of increased soil erosion from the site. However, these impacts would be minimized by using BMPs for erosion control and stormwater management.

13.2.10.4 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production

Impacts would be similar to those described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.2.10.5 Oyster Grow-out and Restoration Reef Placement

This oyster restoration project would result in short-term, minor, adverse impacts on FMP species and EFH. Temporary disturbance would result from an increase in water turbidity and increased underwater noise and human activity during oyster grow-out site management, which could contribute to temporary disturbance or displacement of nearshore marine and estuarine fauna. Potential impacts could include injury or mortality of less mobile benthic species during site construction. However, the affected FMP species are mobile and would likely avoid the area for the duration of in-water work, avoiding injury or mortality. Turbidity and noise levels would return to baseline levels following the installation of the grow-out sites.

The project would result in long-term, beneficial impacts on FMP species and EFH because it would grow oysters, which provide important habitat for many FMP species and their prey.

13.3 SOCIOECONOMIC RESOURCES

13.3.1 Cultural Resources—Affected Environment

The affected environment for cultural resources for all projects considered in this draft RP II/EA is discussed in Section 4.3.2.

13.3.2 Cultural Resources—Environmental Consequences

For all projects in this RP II/EA, consultation with the Alabama State Historic Preservation Officer is currently ongoing and will be incorporated into the final RP II/EA. For many projects, the action would involve a study, education, or land acquisition that does not have the potential for disturbance of cultural resources. For those projects that include construction, ground disturbance, or other related activities, if any culturally or historically important resources are identified during project preparations or predevelopment surveys, such areas would be avoided during construction. A complete review of all alternatives under Section 106 of the NHPA is ongoing and would be completed prior to any activities that would restrict consideration of measures to avoid, minimize, or mitigate any adverse effects on historic properties located in the project area. Alternatives would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

13.3.3 Land and Marine Management—Affected Environment

13.3.3.1 Oyster Cultch Relief and Reef Configuration

The project area is on state-owned water bottom in Mobile Bay and does not include any land. Two reefs located in Mobile Bay have been tentatively selected for pre-monitoring surveys, including a 36-acre reef approximately 1 mile north-northeast of the mouth of East Fowl River, and Denton Reef, which is located approximately 3 miles southeast of the mouth of East Fowl River. AMRD manages the project area reefs.

13.3.3.2 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

The project site is composed of the 45-acre Claude Peteet Mariculture Center, which AMRD manages on a non-zoned parcel within the City of Gulf Shores (City of Gulf Shores, 2017).

13.3.3.3 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

The affected environment for land and marine management is the same as for Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.3.3.4 Oyster Grow-out and Restoration Reef Placement

The project area is on state-owned water bottom in the Mississippi Sound and Bon Secour Bay. The project area does not include any land. The project would use vessels to place live oysters on existing reef sites, including existing complementary living shoreline sites in Mobile Bay and Mississippi Sound. AMRD manages project area reefs.

13.3.4 Land and Marine Management—Environmental Consequences

13.3.4.1 No Action Alternative

Under the no action alternative, projects related to the restoration of oysters would not occur. No short- or long-term impacts, either beneficial or adverse, would occur to Land and Marine Management.

13.3.4.2 Oyster Cultch Relief and Reef Configuration

The project area is on state-owned water bottom in Mobile Bay. The project area does not include any land. AMRD manages project area reefs. Reef monitoring surveys would not affect land and marine management. No adverse impacts are anticipated.

13.3.4.3 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production

Proposed construction activities would occur to the existing facility, the 45-acre Claude Peteet Mariculture Center, which AMRD manages on a non-zoned parcel within the City of Gulf Shores. An existing concrete pad at the AMRD office on Dauphin Island would be expanded to approximately 20 by 25 feet to allow for four settlement tanks, and a roof structure would be constructed over the pad. Even with the addition of these new elements, the land use of the area would remain unchanged by this project. Cultching activities would be planned to not interfere with marine uses, and there would be no impacts from these activities, short- or long-term. No adverse effects on land and marine management would occur.

13.3.4.4 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production

Impacts would be the same as described under Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.3.4.5 Oyster Grow-out and Restoration Reef Placement

The project area is on state-owned water bottom in the Mississippi Sound and Bon Secour Bay. The project area does not include any land. The project involves constructing oyster grow-out areas in Mississippi Sound and Bon Secour Bay and then using vessels to place live oysters on existing reef sites including existing complementary living shoreline sites in Mobile Bay and Mississippi Sound. The grow-out sites or placement would not be located in areas designated for marine transport; however, they may be in located in areas used for commercial and recreational fishing. Signage would be installed around the grow-out sites to mark the location, navigational warnings would be broadcast, and all activities would be conducted in accordance with applicable permits, resulting in short- and long-term, negligible impacts on marine transportation. AMRD manages project-area reefs. Reef monitoring surveys would not affect land and marine management.

13.3.5 Aesthetics and Visual Resources—Affected Environment

13.3.5.1 Oyster Cultch Relief and Reef Configuration

Project activities would be conducted in open water where active commercial shipping and recreation present a visual aesthetic typical of the wider Gulf Coast landscape of open waters and coastline.

13.3.5.2 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

The project site comprises AMRD‘s 45-acre Claude Peteet Mariculture Center. The site is located in an urbanized setting that includes other structures and facilities.

13.3.5.3 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

The affected environment for aesthetic and visual resources is the same as described for the Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.3.5.4 Oyster Grow-out and Restoration Reef Placement

Project activities would be conducted in open water where active commercial shipping and recreation present a visual aesthetic typical of the wider Gulf Coast landscape of open waters and coastline.

13.3.6 Aesthetics and Visual Resources—Environmental Consequences

The general approach and background to the analysis of aesthetic and visual resources is the same as described in Section 7.3.8.

13.3.6.1 No Action Alternative

Under the no action alternative, projects related to the restoration of oysters would not occur. No short- or long-term impacts, either beneficial or adverse, on aesthetics and visual resources would occur.

13.3.6.2 Oyster Cultch Relief and Reef Configuration

Short-term, minor, adverse impacts would occur. Placement of cultch material in the proposed project area in lower Mobile Bay would involve using material haul trucks, barges, and other large equipment that would contribute to temporary visual impacts in the viewshed of the proposed project during the proposed plantings. Transporting and storing cultch materials associated with the proposed project would not contribute to impacts on visual resources because these activities would be consistent with commercial activities that are already occurring within the area, and this project would represent a small increase to these activities. The cultch placement process would be localized and short term and result in minor, adverse impacts. The viewshed would change, temporarily, but this change would not dramatically alter views in a way that would detract from other activities in the area.

Following placement of the cultch material, there would be no long-term visual impacts because the deposited cultch material would be under the water surface. While maintenance and monitoring vessels would be used, this would not have any effect because oyster harvest activities are already occurring in the area and marine traffic is part of the existing visual landscape. No other long-term impacts on visual aesthetics and visual resources from operation of the restored oyster reef would result.

13.3.6.3 Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study

Short-term, minor, adverse impacts would occur. The project would include building improvements to AMRD‘s 45-acre Claude Peteet Mariculture Center. The project would include the addition of a fourth settlement tank and roof structure on an existing concrete pad at the AMRD office on Dauphin Island, which serves as a remote setting facility. The current 50 by 20-foot concrete pad would be expanded to 70 by 25 feet, and a simple roof structure would be constructed to cover the 70 by 25-foot structure and protect the three existing settlement tanks and the proposed new settlement tank.

The project site is located in an urbanized setting that includes other structures and facilities. Impacts would primarily be related to the presence of construction personnel, equipment (e.g., fences, stockpiles), vehicles, and unfinished buildings or structures visible to the public. Construction activities could, temporarily, detract from the overall visual environment at the site. There would be short-term, minor, adverse aesthetic and visual impacts from the use of construction equipment in and around the project area that would be consistent with other general construction-related activities occurring in the area. No long-term effects are anticipated because the building improvements, including those proposed at the AMRD office on Dauphin Island, would fit within the visual context of the surrounding built environment.

13.3.6.4 Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study

Impacts on aesthetics and visual resources would be the same as those described for the Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.

13.3.6.5 Oyster Grow-Out and Restoration Reef Placement

Short-term, minor, adverse impacts would occur. Placement of up to three protected oyster gardening program grow-out areas in Grand Bay, Portersville Bay, and Bon Secour Bay would involve using material haul trucks, barges, and other large equipment that would contribute to temporary visual impacts in the viewshed of the proposed project during these activities. Placing oysters on existing reef sites, including existing complementary living shoreline sites in Mobile Bay and Mississippi Sound and cultched sites, would involve installing 12 to 20, 12-inch diameter pilings to which wire or rope would be connected for attaching the oyster baskets (cages) that would be suspended into the water column.

Transporting and storing these oyster gardening grow-out materials would not contribute to impacts on visual resources because these activities would be consistent with activities that are already occurring within the area, and this project would represent a small increase to these activities. Placing materials into the water column would be localized and would result in short-term, minor, adverse impacts. The viewshed would change temporarily, but this change would not dramatically alter views in a way that would detract from other activities in the area.

Following placement of the oyster gardening grow-out material, there would be no long-term visual impacts because the deposited material would be under the water surface. While transport vessels would be used, they would not affect aesthetics and visual resources because oyster harvest activities are already occurring in the area, and marine traffic is part of the existing visual landscape. No other long-term impacts on aesthetics and visual resources would result from implementation of the project.

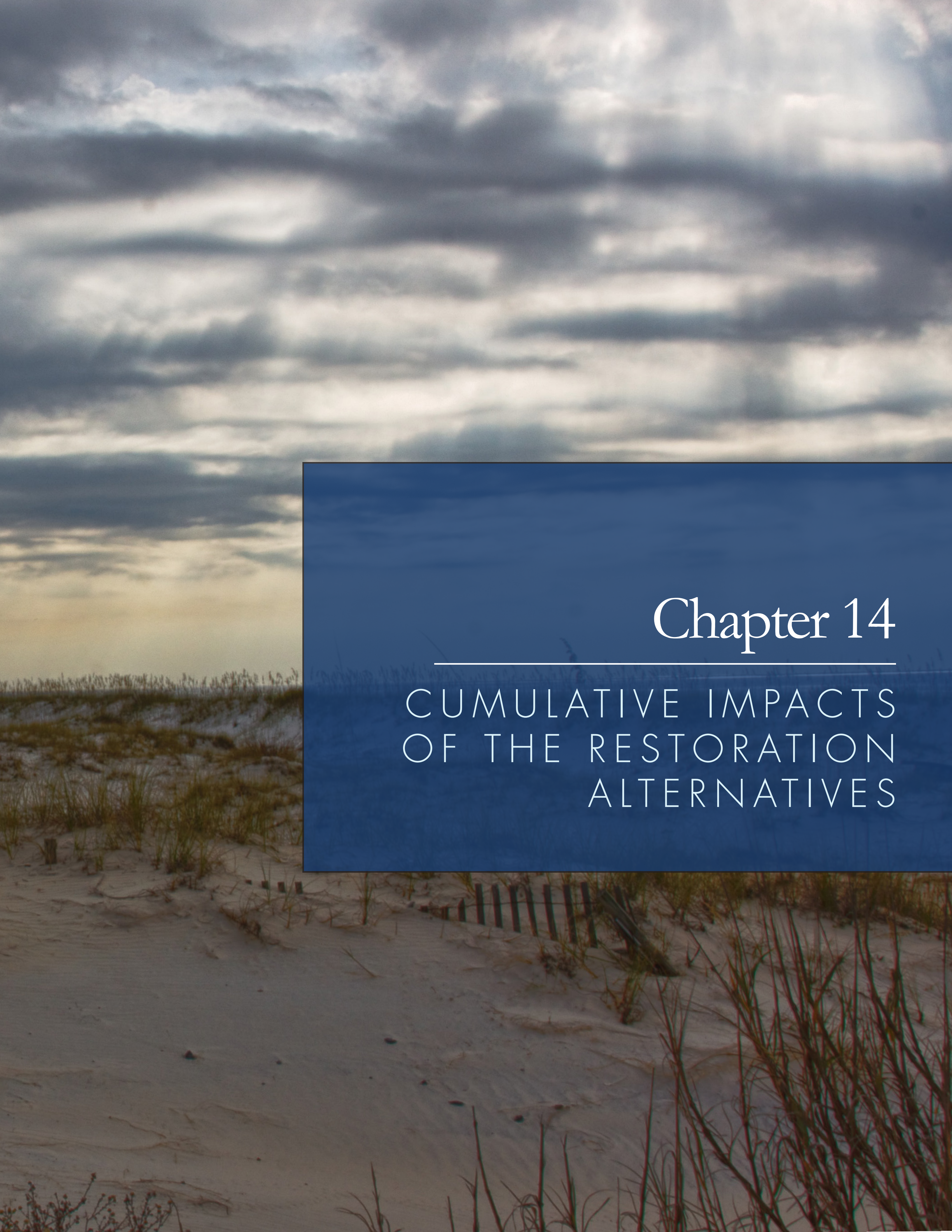
13.4 COMPARISON OF ALTERNATIVES

Table 13-1 provides a summary of the environmental consequences of the evaluated alternatives.

Table 13-1: Summary of Environmental Consequences for Oyster Projects

Project	Geology and Substrates	Hydrology and Water Quality	Air Quality	Habitats	Wildlife	Marine and Estuarine Fauna	Rare and Protected Species	Federally Managed Fisheries	Cultural Resources	Land and Marine Management	Aesthetics and Visual Resources
Oyster Cultch Relief and Reef Configuration	No adverse impact.	Short-term impacts on turbidity, and water quality from the disruption of bed sediments. No effect on hydrologic regimes. Long-term, beneficial impacts on water quality. No effect on floodplains or wetlands.	Short-term, minor impacts. No long-term impacts are anticipated.	Short-term, minor impacts on estuarine habitat because of temporary increases in turbidity and underwater noise during cultch deployment. Beneficial long-term impacts on oyster reef habitat.	Short-term, minor impacts from temporary increases in boat traffic to transport workers and equipment, and from the deployment of cultch material. Long-term benefits on aquatic wildlife because of improved water quality from oyster restoration.	Short-term, minor impacts during cultch deployment, including injury or mortality of less mobile benthic species, increased turbidity and underwater noise. Long-term, beneficial impacts on marine and estuarine fauna because it would create oyster reef habitat that is important to many marine and estuarine species.	***May Affect, but is Not Likely to Adversely Affect*:** loggerhead sea turtle, Kemp's ridley sea turtle, Green sea turtle, hawksbill sea turtle, leatherback sea turtle, Gulf sturgeon, West Indian manatee ***No Effect* on:** Alabama red-bellied turtle	Short-term, minor, adverse impacts on FMP species and EFH from disturbance and turbidity during cultch placement, although most species would avoid the project area for the duration of in-water work. Long-term benefits from the restoration of oyster reefs.	Impacts unknown, pending consultation with the Alabama Historical Commission.	Short- and long-term, negligible, adverse impacts related to small disruptions to marine transportation from activities.	Short-term, minor impacts during cultch deployment. No long-term visual impacts because the deposited cultch material would be under the water surface.
Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study	No adverse impact.	No short-term impacts on hydrology, floodplains, or wetlands. The establishment of oyster grow-out areas in Mobile Bay and the Mississippi Sound would result in long-term, beneficial impacts on water quality.	Short-term, minor, impacts from construction equipment and barge emissions. Minor long-term impacts from annual operation of the oyster hatchery and greenhouse.	Short-term, minor impacts on wildlife habitat from construction activity to build the facility. Minor long-term impacts on wildlife as a result of human activity at the hatchery. No wetland habitats would be affected. Long-term, beneficial impacts on oyster reef habitat because oyster spat produced at the hatchery would be	Short-term, minor, adverse impacts on some species during construction because of noise and disturbance from human activity. No long-term impacts because construction sites are existing buildings and human activity would not noticeably increase.	No short-term impacts. Long-term beneficial impacts because produced oyster spat would be used for oyster restoration, which would benefit other marine and estuarine species.	***May Affect, but is Not Likely to Adversely Affect*:** loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, Gulf sturgeon, West Indian manatee, gopher tortoise, eastern indigo snake, piping plover, red knot, wood stork ***No Effect* on:** Alabama beach mouse	No destruction or adverse modification to FMP species or EFH. Potential impacts limited to the possibility of increased soil erosion from the site, which would be avoided or minimized by using BMPs.	Same as described above for the CAST Conservation Program.	No adverse impacts, as the land use of the project area would remain unchanged.	Short-term, minor impacts from construction-related activities. No long-term effects because the site's appearance would not noticeably change.

Project	Geology and Substrates	Hydrology and Water Quality	Air Quality	Habitats	Wildlife	Marine and Estuarine Fauna	Rare and Protected Species	Federally Managed Fisheries	Cultural Resources	Land and Marine Management	Aesthetics and Visual Resources
				used for restoration.							
Oyster Hatchery at Claude Peteet Mariculture Center—Low Spat Production without Study	No adverse impact.	Same as described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.	Same as described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.	Same as described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.	Same as described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.	Same as described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.	Same as described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.	Same as described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.	Same as described above for Oyster Cultch Relief and Reef Configuration.	No adverse impacts, as the land use of the project area would remain unchanged.	Same as described under Oyster Hatchery at Claude Peteet Mariculture Center—High Spat Production with Study.
Oyster Grow-out and Restoration Reef Placement	No adverse impact.	No short-term impacts on hydrology, floodplains, or wetlands. Establishment of oyster grow-out areas would have long-term beneficial impacts on water quality.	Short-term, minor, adverse impacts from construction equipment. Long-term, negligible impacts.	Short-term, minor, adverse impacts on unvegetated soft bottom estuarine habitats. Beneficial long-term impacts on oyster reef habitat.	Short-term, minor, adverse impacts because of temporary disturbance to birds, including primarily shorebirds or wading birds. Long-term, minor, impacts on birds and other shoreline fauna from daily human activity at grow-out sites.	Short-term, minor, adverse impacts on marine and estuarine fauna within the footprint of the grow-out sites and oyster restoration sites. Long-term, beneficial impacts on marine and estuarine fauna because oysters placed at the sites would enhance spat production, potentially increasing oyster abundance and recruitment in Alabama waters.	***May Affect, but is Not Likely to Adversely Affect*****:** loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, West Indian manatee, Gulf sturgeon, piping plover, red knot, wood stork	Short-term, minor, adverse impacts from human activity, noise disturbance and turbidity during grow-out site construction. Most species would avoid the project area for the duration of in-water work. Long-term benefits from the restoration of oyster reefs.	Same as described above for Oyster Cultch Relief and Reef Configuration.	Short- and long-term, negligible impacts on marine transportation.	Short-term, minor impacts during placement. No long-term visual impacts because the placed material would be under the water surface.



Chapter 14

CUMULATIVE IMPACTS OF THE RESTORATION ALTERNATIVES

14.0 CUMULATIVE IMPACTS OF THE RESTORATION ALTERNATIVE(S)

14.1 POTENTIAL CUMULATIVE IMPACTS

Section 6.6 and Appendix 6B of the Final PDARP/PEIS are incorporated by reference into the following cumulative impacts analysis, including the methodologies for assessing cumulative impacts, identification of affected resources, and the cumulative impacts scenario.

To effectively consider the potential cumulative impacts, the AL TIG identified past, present, and reasonably foreseeable future actions along the Alabama coast near the proposed project areas. Table 14-1 identifies the cumulative action scenario for this draft RP II/EA.

Chapters 7–13 include an environmental consequences analysis for each of the proposed alternatives/projects. Many of the resources analyzed would only have negligible to minor, adverse effects. Resources with negligible to minor effects are not be included in the cumulative impacts analysis to appropriately narrow the scope of the environmental analysis to the issues that would have an influence on the decision-making process or deserve attention from an environmental perspective (CEQ, 1997). The resources excluded from this cumulative impacts analysis based on their negligible to minor, adverse effects are listed below:

- Physical Environment: geology and substrates; hydrology; air quality and GHG emissions; noise
- Biological Environments: habitats; protected species; living coastal and marine resources
- Human Uses and Socioeconomics: socioeconomics and environmental justice; cultural resources; infrastructure; land and marine management; tourism and recreational; fisheries and aquaculture; land and marine transportation; and public health and safety

The following resources were analyzed in detail for environmental consequences that could result from implementation of the proposed alternatives/projects:

- Physical Environment: water quality (moderate impacts are expected only under the Oyster Grow-out and Restoration Reef Placement)
- Human Uses and Socioeconomics: aesthetic and visual resources (moderate impacts are expected only under the Little Lagoon Living Shoreline project)

Table 14-1: Cumulative Action Scenario

Category	Action Description	Key Resource Areas with Potential to Contribute to Cumulative Impacts
Restoration Related to the Spill (DWH Early Restoration, AL TIG Restoration Plan I, Restore Act Bucket 2, GEBF, North American Wetlands Conservation Fund, National Academy of Sciences)	Non-NRDA projects will leverage other funding sources where available to achieve habitat restoration. These programs seek to restore habitat, water quality, and living coastal and marine resources though coastal Alabama and in the greater Gulf Coast region. Projects currently funded would improve bird populations, oyster populations, dune habitat, marsh habitat, and coastal resiliency through shoreline protection, habitat protection, hydrologic restoration (NOAA), and acquisition, sea turtle populations. During early restoration and through the RP I/EIS, the following projects were selected for implementation under the NRDA process: ▪ DWH Phase I Early Restoration Plan – Dune Restoration Project ▪ DWH Phase I Early Restoration Plan – Marsh Island (Portersville Bay) Restoration Project ▪ DWH Phase II Early Restoration Plan – Enhanced Management of Avian Breeding Habitat Injured by Response in the Florida Panhandle, Alabama, and Mississippi – $4,658,118 (across three states) ▪ DWH Phase II Early Restoration Plan – Improving Habitat Injured by the Spill Response: Restoring the Night Sky ▪ DWH Phase III Early Restoration Plan – Alabama Swift Tract Living Shoreline - $5,000,080 ▪ DWH Phase III Early Restoration Plan – Gulf State Park Enhancement Project ▪ DWH Phase III Early Restoration Plan – Alabama Oyster Cultch Restoration – $3,239,485 ▪ DWH Phase IV Early Restoration Plan – Osprey Restoration in Alabama	Water Quality Aesthetic and Visual Resources

Category	Action Description	Key Resource Areas with Potential to Contribute to Cumulative Impacts
	▪ DWH Phase IV Early Restoration Plan – BSNWR Trail Enhancement – $545,110 ▪ DWH Phase IV Early Restoration Plan P-Point aux Pins Living Shoreline – $2,300,000 ▪ DWH Alabama RP I/EIS – Nine projects to address lost recreational use in Baldwin and Mobile counties	
Resource Stewardship: Oyster Restoration	Efforts have occurred and are underway to restore oyster reefs along the Alabama coast from a variety of sources besides restoration efforts related to the spill, including ongoing efforts by the State of Alabama and other entities (e.g., TNC). For example, TNC used American Recovery and Reinvestment Act grant funds and NFWF funds to create living shoreline oyster projects along eroding shorelines in Mobile Bay, Bon Secour Bay, and Portersville Bay. In August 2016, ACF received a grant from NFWF to establish an oyster shell recycling program for local restaurants. Oyster shells that are collected through this program will go back into Alabama waters through both cultching activities and through the Mobile Bay Oyster Gardening Program to help more oysters grow, provide habitat, limit erosion, and improve water quality. These and similar programs are contributing to oyster restoration in the state. Oyster restoration projects in Alabama are occurring through the Auburn University Marine Extension & Research Center, including oyster gardening.	Water Quality
Resource Stewardship: Marsh and Shoreline Restoration	Outside the NRDA process, various marsh and shoreline restoration efforts include: ▪ Boggy Point Living Shoreline Project ▪ Coffee Island Living Shoreline Study ▪ TNC Swift Tract Living Shoreline ▪ Helen Wood Park Living Shoreline ▪ Marsh Restoration in Oyster Bay	Water Quality

Category	Action Description	Key Resource Areas with Potential to Contribute to Cumulative Impacts
Resource Stewardship: Land Acquisition	Land acquisition is currently occurring outside DWH restoration including the Forever Wild program that purchases land for conservation and recreational purposes, which is managed by ADCNR. This program has secured more than 255,000 acres of land in Alabama for public use and created more than 220 miles of recreational trails within 22 new recreation areas and nature preserves, while providing additions to 10 state parks and 16 wildlife management areas. Additionally, local land trusts such as WBF, Pelican Point Conservancy, and Alabama Coastal Heritage Trust continue to purchase and manage properties throughout Mobile and Baldwin counties.	Water Quality Aesthetic and Visual Resources
Restoration Programs through Other State Agencies	Section 384 of the Energy Policy Act of 2005 (Public Law 109-58) establishes the Coastal Impact Assistance Program, which authorizes funds to be distributed to Outer Continental Shelf oil and gas producing states for the conservation, protection, and preservation of coastal areas, including wetlands. ADCNR was designated as the lead agency for development and implementation of the Coastal Impact Assistance Program. A list of completed and in progress Coastal Impact Assistance Program projects can be found here: http://www.outdooralabama.com/sites/default/files/images/file/Status%20of%20CIAP%20Grants%20rev4.pdf	Water Quality Aesthetic and Visual Resources
Dredge Material Disposal	Ship channels leading to the Port of Mobile as well as the GIWW are routinely dredged to maintain designated depths to facilitate waterborne cargo transportation. Dredged materials are either beneficially used as part of another project or deposited in a designated disposal location.	Water Quality Aesthetic and Visual Resources

Category	Action Description	Key Resource Areas with Potential to Contribute to Cumulative Impacts
Coastal Development and Land Use	The Alabama coastal area is rapidly developing and will continue to be developed. Known projects include: Amber Isle Development, Phoenix West II Condominium, and Gulf State Park Master Plan.	Water Quality Aesthetic and Visual Resources
Beach Nourishment	Alabama beach nourishment projects (Orange Beach, Gulf State Park, and Gulf Shores Beach) are a collaborative effort between ADCNR and local municipalities. These projects aim to restore beaches that have suffered a loss from storms and/or erosion to historical conditions by placing sand from offshore borrow sites via dredge and pipe.	Water Quality Aesthetic and Visual Resources
Fisheries and Aquaculture	Commercial fisheries in Alabama include a variety of seafood, including shrimp, blue crabs, oysters, red snapper, vermillion snapper, Spanish mackerel, flounder, menhaden, mullet, and sharks. The port of Bayou La Batre is known as the "Seafood Capital of Alabama," because the port city receives $30 million annually in seafood landings. Bon Secour of Gulf Shores is another important port for seafood. ADCNR manages commercial fisheries in state-owned waters. GMFMC manages fisheries in the Gulf of Mexico's Exclusive Economic Zone (Commercial Fishing, 2017).	Water Quality
Marine Transportation	The Port of Mobile is an active shipping port with 41 berths that ship 28.7 million tons a year (Port of Alabama, 2017)	Water Quality

14.2 CUMULATIVE IMPACT ANALYSIS (STEP 4)

The following section describes 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 actions identified above. 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. 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. Effects may come together in several ways 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 adverse impact or beneficial effect 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 effect 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 alternatives (X). Although each potential proposed alternative may not be implemented through this draft RP II/EA, all are included in the analysis of the proposed alternative at this time. If not selected under this draft RP II/EA, many of the alternatives are actively seeking funding from multiple sources and could be implemented through other sources at some time and should be considered in the cumulative impact scenario. The below analysis when considering the impact of the proposed alternatives will refer to it as the “range of proposed projects in this draft RP II/EA.”
- Impacts on 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. The potential cumulative impacts also consider the cumulative impact analysis from the Final PDARP/PEIS (Section 6.6), as noted below.

14.2.1 Hydrology and Water Quality

The range of proposed alternatives in this RP II/EA would have short-term, minor to moderate, adverse impacts on hydrology and water quality in Baldwin and Mobile counties. Overall, the impacts would be minor. Short-term impacts would result from projects with construction elements, such as the Little Lagoon Living Shoreline project, which would increase water turbidity during construction; the placement of erosion and sediment control structures under Nutrient Reduction projects; and construction of the CAST Triage Center. The Oyster Grow-Out and Restoration Reef Placement is expected to have short-term, moderate, adverse impacts on water quality as a result of the disturbance from the installation of pilings, with the remaining oyster projects having short-term, adverse impacts during construction. Long-term, adverse impacts would be minor for some projects such as the CAST Triage Center, from an increase in runoff from the development. However, overall long-term effects would be beneficial (discussed further below).

Projects where the actions involve only land acquisition and conservation, education, enforcement, or assessment activities are not expected to have short- or long-term, adverse impacts. This includes many of the habitat projects under Wetlands, Coastal and Nearshore Habitat, Sea Turtle, Marine Mammal, and Bird projects. Long-term, beneficial impacts are expected on lands under conservation as area waterbodies would be protected against degradation from development. Long-term benefits would also occur from any erosion and sediment control structures (such as those proposed under Nutrient Reduction projects) or living shoreline construction under the range of alternatives.

All of the actions identified in Table 14-1 have the potential to affect hydrology and water quality. Short-term, adverse impacts from these actions would occur during construction. Implementation of other restoration projects, oyster restoration, marsh and shoreline restoration, beach nourishment, and coastal development and land use impacts are expected to cause short-term water quality impacts because construction would occur in or around the water and are expected to increase turbidity during construction. These impacts are expected to be short term and minor, and the hydrological qualities of the site are expected to return to pre-construction or improved conditions soon after the activities cease. For projects that include some type of construction along the shoreline, all projects would be constructed in accordance with state water quality requirements, and water quality conditions are expected to return to baseline levels shortly after construction, which would result in short-term, minor impacts on water quality and hydrology, including wetlands and floodplains.

The intensity of the long-term impacts on hydrology and water quality varies between the cumulative actions. Projects related to large-scale development (e.g., condominium development) cause long-term hydrological or water quality impacts that are minor to moderate because of increases in impervious surfaces, which result in increased storm water runoff and affect surface water, wetlands, and water quality. Other long-term, adverse impacts on water quality would occur from the continued use of marine transportation in an active shipping channel and recreational boats. Restoration projects occurring in or near the water (DWH restoration projects, marsh restoration, and conservation through land acquisition) would have long-term benefits because the purpose of these projects is to restore and enhance these areas.

When the range of proposed alternatives in this draft RP II/EA is analyzed in combination with other past, present, and reasonably foreseeable future actions, short- and long-term, minor to moderate, adverse cumulative impacts on hydrology and water quality would likely occur. However, they would not contribute substantially to adverse cumulative impacts because the moderate impacts would be related to large-scale development projects in the area. The range of alternatives in this draft RP II/EA, when carried out in conjunction with other environmental restoration efforts has the potential to result in long-term, beneficial cumulative impacts on water quality and hydrology.

The Final PDARP/PEIS found that implementation of projects in the Restoration Types analyzed in this RP II/EA is consistent with the goals of the selected alternative and is not expected to contribute substantially to short-term or long-term, adverse cumulative impacts on physical resources when analyzed in combination with other past, present, and reasonably foreseeable future actions. This site-specific analysis for water quality and hydrology is consistent with that finding.

14.2.2 Aesthetic and Visual Resources

Overall, impacts on aesthetic and visual resources would be minor. For projects related to Wetlands, Coastal, and Nearshore Habitats, no adverse impacts on aesthetics or visual character would occur. The proposed projects would involve land acquisition and no specific on-site construction is proposed. Long-term, beneficial effects are expected as the result of preserving the undeveloped character of the landscape.

For the Little Lagoon Living Shoreline project, short-term, minor to moderate, adverse impacts would occur. During placement of structures on the shoreline, there would be short-term, minor to moderate, adverse aesthetic and visual impacts for recreational boaters and fishermen from the use of construction equipment in and around the project area that would change the visual nature of the site from its current condition; however, the shoreline area is anticipated to increase in size as a result of restoration activities with long-term, beneficial effects.

For Nutrient Reduction (Nonpoint Source) projects, short-term, minor, adverse impacts would occur during construction from the temporary presence and use of construction equipment and the disrupted and disturbed state of the site before the completion of each project feature. Long-term, beneficial effects are expected as the result of enhanced habitat in areas where such improvements would be publicly visible.

For Sea Turtle, Marine Mammal and Bird projects, no short- or long-term, adverse impacts on aesthetic or visual resources are expected because these projects focus on studies, education, and enforcement.

For Oyster projects, short-term, negligible to minor impacts would occur during cultch placement, construction, or side-scanning activities, which would cease shortly after the construction action. No long-term impacts are expected from these activities.

All of the actions identified in Table 14-1 have the potential to affect aesthetics and visual quality. For all projects, similar to the range of alternatives analyzed in this draft RP II/EA, there would be short-term impacts for projects that include construction with impacts ranging from minor for projects with a construction period of a few months to a year (as is anticipated for oyster restoration, marsh restoration, and beach nourishment) to moderate for projects with a longer time frame (such as coastal development). Long-term effects on aesthetic and visual resources would be mostly beneficial because restoration and land acquisition projects of various types would improve the visual qualities of areas. Projects that change the visual character of an area such as coastal development and dredging would have long-term, minor to moderate, adverse impacts.

When the range of proposed alternatives in this draft RP II/EA is analyzed in combination with other past, present, and reasonably foreseeable future actions, there would be short-term, minor, adverse, cumulative impacts on aesthetics and visual resources because most of the projects involve a construction process that would change the visual character during construction, but would cease once construction is completed. However, the range of alternatives in the draft RP II/EA would not contribute substantially to adverse cumulative impacts because many projects do not have a construction component, or the construction is small in scale compared to other projects in the area. The range of alternatives in this draft RP II/EA, when carried out in conjunction with other projects along the Alabama coast has the potential to result in long-term, beneficial cumulative impacts from enhancing the visual environment through land acquisition, conservation, and restoration.

The Final PDARP/PEIS found that implementation of in the Restoration Types analyzed in this draft RP II/EA is consistent with the goals of the selected alternative and is not expected to contribute substantially to short-term or long-term, adverse cumulative impacts on aesthetics and visual resources when analyzed in combination with other past, present, and reasonably foreseeable future actions. This site-specific analysis for aesthetics and visual resources is consistent with that finding.

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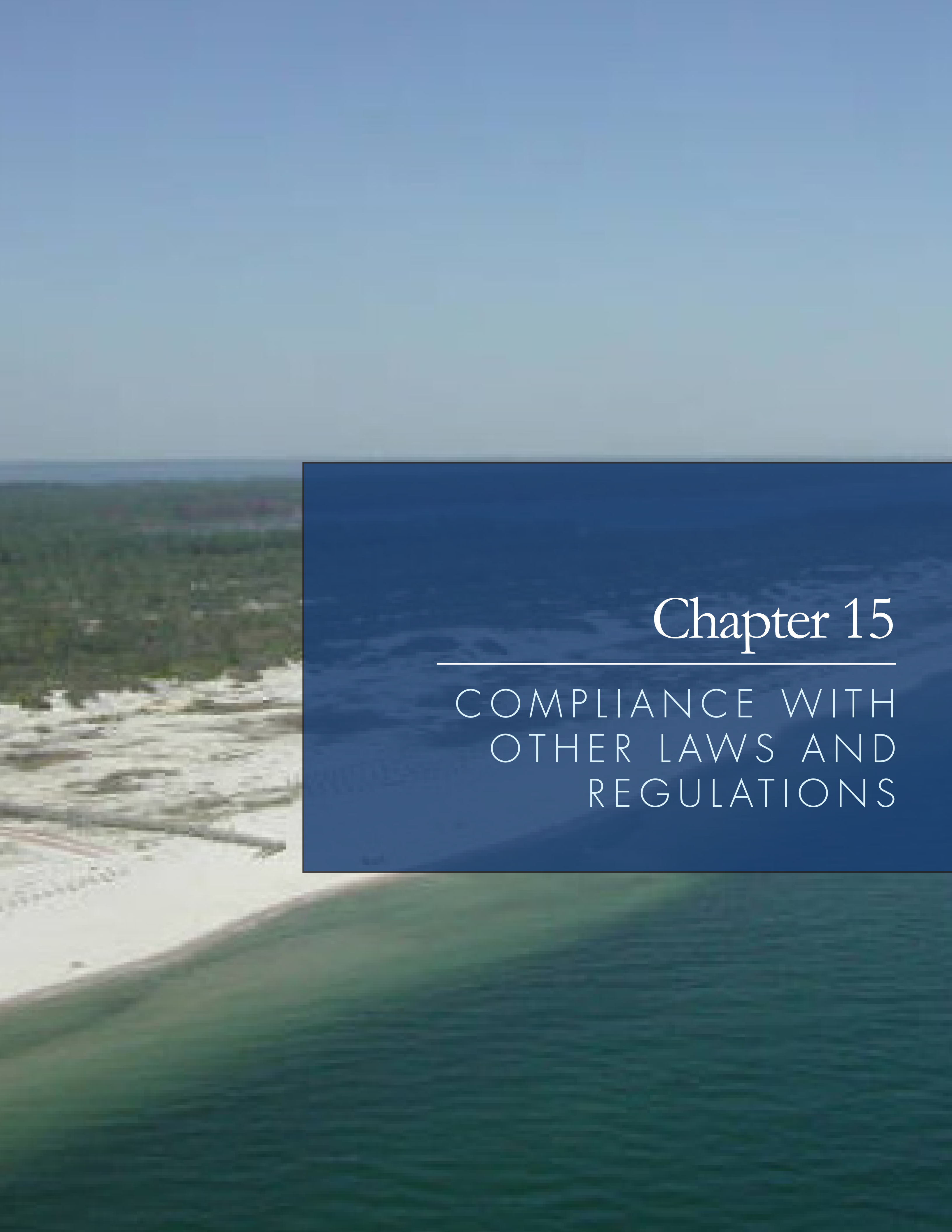


Chapter 15

COMPLIANCE WITH OTHER LAWS AND REGULATIONS

15.0 COMPLIANCE WITH OTHER LAWS AND REGULATIONS

Chapters 3–13 of this document provide detailed information and OPA and NEPA analyses for each proposed restoration alternatives, its expected environmental consequences, and its consistency with the Final PDARP/PEIS. In addition, coordination and reviews to ensure compliance with a variety of other legal authorities potentially applicable to the selected alternatives have begun. While compliance reviews are complete for some of the projects, others remain in progress. Progress to date suggests that all the selected alternatives will be able to meet permitting and other environmental compliance requirements and that all alternatives will be implemented in accordance with all applicable laws and regulations. Compliances status will be presented in the final RP II/EA. Federal environmental compliance responsibilities and procedures will follow the Trustee Council SOP, which are laid out in Section 9.4.6 of the SOP document. Following this SOP, the Implementing Trustees for each alternative would ensure that the status of environmental compliance (e.g., completed versus in progress) is tracked through the Restoration Portal. The Implementing Trustees would keep a record of compliance documents (e.g., ESA biological opinions, USACE permits) and ensure that they are submitted for inclusion in the Administrative Record.

15.1 ADDITIONAL FEDERAL LAWS

Additional federal laws may apply to the preferred alternatives considered in this draft RP II/EA. Legal authorities applicable to restoration alternative development were fully described in the context of the DWH restoration planning in the Final PDARP/PEIS, Section 6.9, Compliance with Other Applicable Authorities, and Appendix 6.D, Other Laws and Executive Orders. That material is incorporated by reference here. Examples of applicable laws or executive orders include, but are not necessarily limited to those listed below. Additional detail on each of these laws or executive orders can be found in Chapter 6 of the Final PDARP/PEIS.

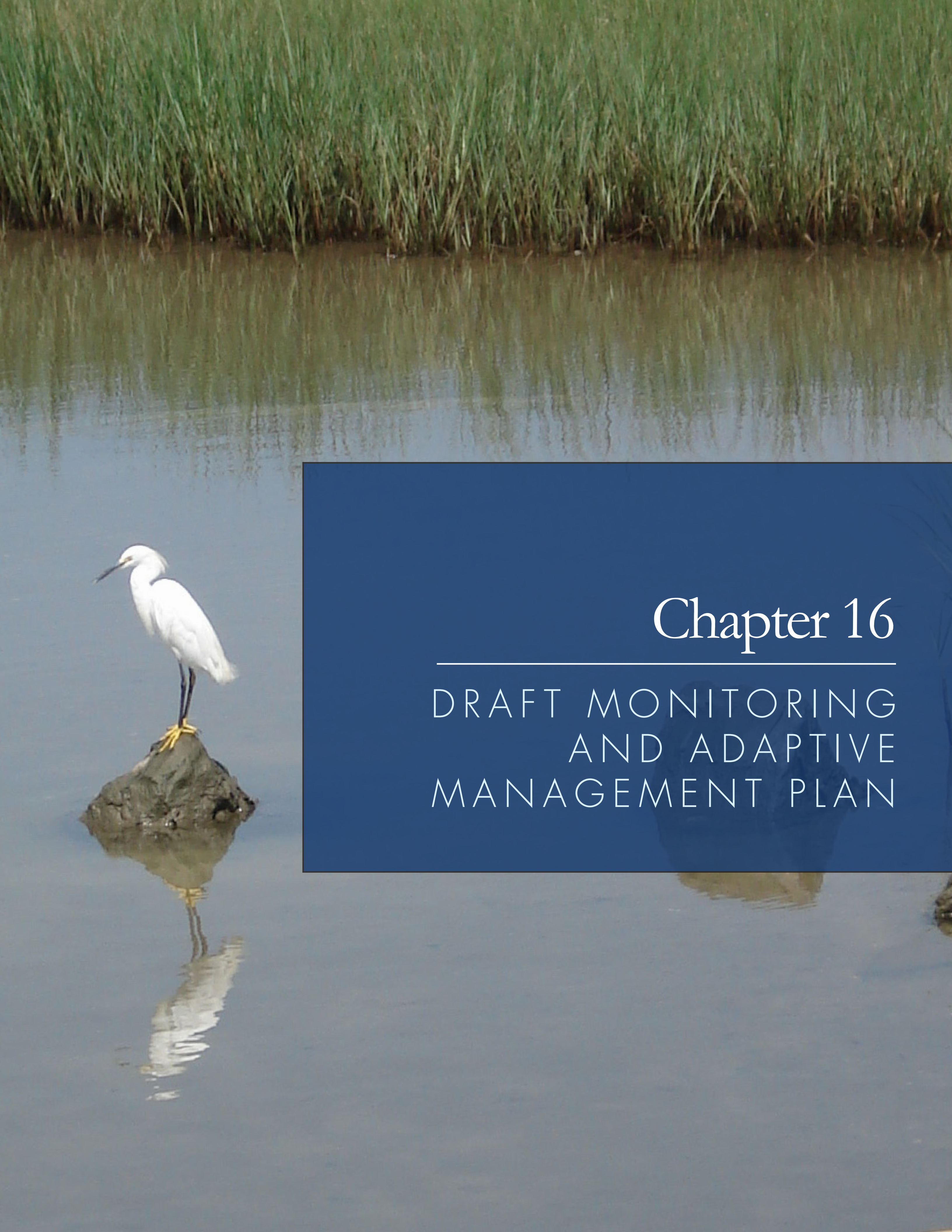
- ESA (16 U.S.C. §§1531 et seq.)
- Magnuson-Stevens Act (16 U.S.C. §§1801 et seq.)
- MMPA (16 U.S.C. §§1361 et seq.)
- CZMA (16 U.S.C. §§1451 et seq.)
- NHPA (16 U.S.C. §§470 et seq.)
- Coastal Barrier Resources Act (16 U.S.C. §§3501 et seq.)
- Migratory Bird Treaty Act (16 U.S.C. §§703 et seq.)
- Bald and Golden Eagle Protection Act (16 U.S.C. §§668 et seq.)
- Clean Air Act (42 U.S.C. §§7401 et seq.)
- Federal Water Pollution Control Act (Clean Water Act, 33 U.S.C. §§1251 et seq.) and/or Rivers and Harbors Act (33 U.S.C. §§401 et seq.)
- Marine Protection, Research and Sanctuaries Act
- Estuary Protection Act
- Archaeological Resource Protection Act
- National Marine Sanctuaries Act
- Farmland Protection Policy Act

- Executive Order 11988, Floodplain Management (now as augmented by Executive Order 13690, January 30, 2015)
- Executive Order 11990, Protection of Wetlands
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- Executive Order 12962, Recreational Fisheries
- Executive Order 13112, Safeguarding the Nation from the Impacts of Invasive Species
- Executive Order 13175, Consultation and Coordination with Indian Tribal Governments
- Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds
- Executive Order 13693, Planning for Federal Sustainability in the Next Decade

15.2 COMPLIANCE WITH STATE AND LOCAL LAWS AND OTHER FEDERAL REGULATIONS

Additional state laws may apply to the proposed preferred alternatives considered in this draft RP II/EA. Potentially applicable state laws may include but may not be limited to:

- ADEM Division 8 Coastal Program Rules
- ADEM Division 6 Volume 1 Water Quality Program (National Pollutant Discharge Elimination System)



Chapter 16

DRAFT MONITORING AND ADAPTIVE MANAGEMENT PLAN

16.0 DRAFT MONITORING AND ADAPATIVE MANAGEMENT PLANS

MAM implementation was identified as one of the programmatic goals in the Final PDARP/PEIS. The DWH NRDA MAM Framework provides a flexible, science-based approach to effectively and efficiently implement restoration over several decades to provide long-term benefits to the resources and services injured by the DWH oil spill. The draft project MAM plans, included in Appendix G, identify the monitoring needed to evaluate progress toward meeting project objectives and to support adaptive management of the restoration project. The plans identify key sources of uncertainty, incorporate monitoring data needs and decision points that address these uncertainties, and establish a decision-making process for making adjustments, if needed. MAM plans are living documents and will be updated as needed to reflect changing conditions and/or new information. For example, a MAM plan may need to be revised if the project design changes, if initial data analysis indicates that the sampling design is inadequate, or if any uncertainties are resolved or new uncertainties are identified during project implementation and monitoring. Any significant future revisions to MAM plans will be made publicly available through the Restoration Portal.

MAM are major responsibilities for the AL TIG. As described in the Final PDARP/PEIS (Section 7.5.1), TIGs are responsible for both resource- and project-level MAM activities. The AL TIG has developed and will implement MAM plans for all restoration projects consistent with guidance provided by the Trustee Council. Data generated through monitoring will provide the basis for annual project reporting that keeps the public fully informed about project progress and for adaptive management and corrective action decisions. Monitoring data will also be applied to improve the likelihood of success and benefits of future projects.

All of the projects in this draft RP II/EA, with the exception of projects that are solely for E&D activities, have an associated MAM plan, which is provided in Appendix G.

Many of the projects in this draft RP II/EA will be implemented in partnership with entities that have deep expertise in their fields; this collaborative approach will leverage and expand existing efforts and increase confidence in outcomes and approaches for future restoration work.

The content of each MAM plan depends on the type of project, the level of uncertainty, and the proposed activities.

Some of the projects in this draft RP II/EA propose to conduct activities associated with data gathering to fill critical information gaps that will reduce uncertainties and support the AL TIG in future work to develop and implement restoration projects successfully. Because the primary objective of these projects is to gain new knowledge, the associated MAM plans may or may not contain performance criteria or corrective actions. The AL TIG does not expect to conduct project-level adaptive management for these projects, but they are an integral component to the AL TIG's commitment to adaptive management at the program/resource level because the completion of these project will provide important knowledge that will inform future restoration actions.

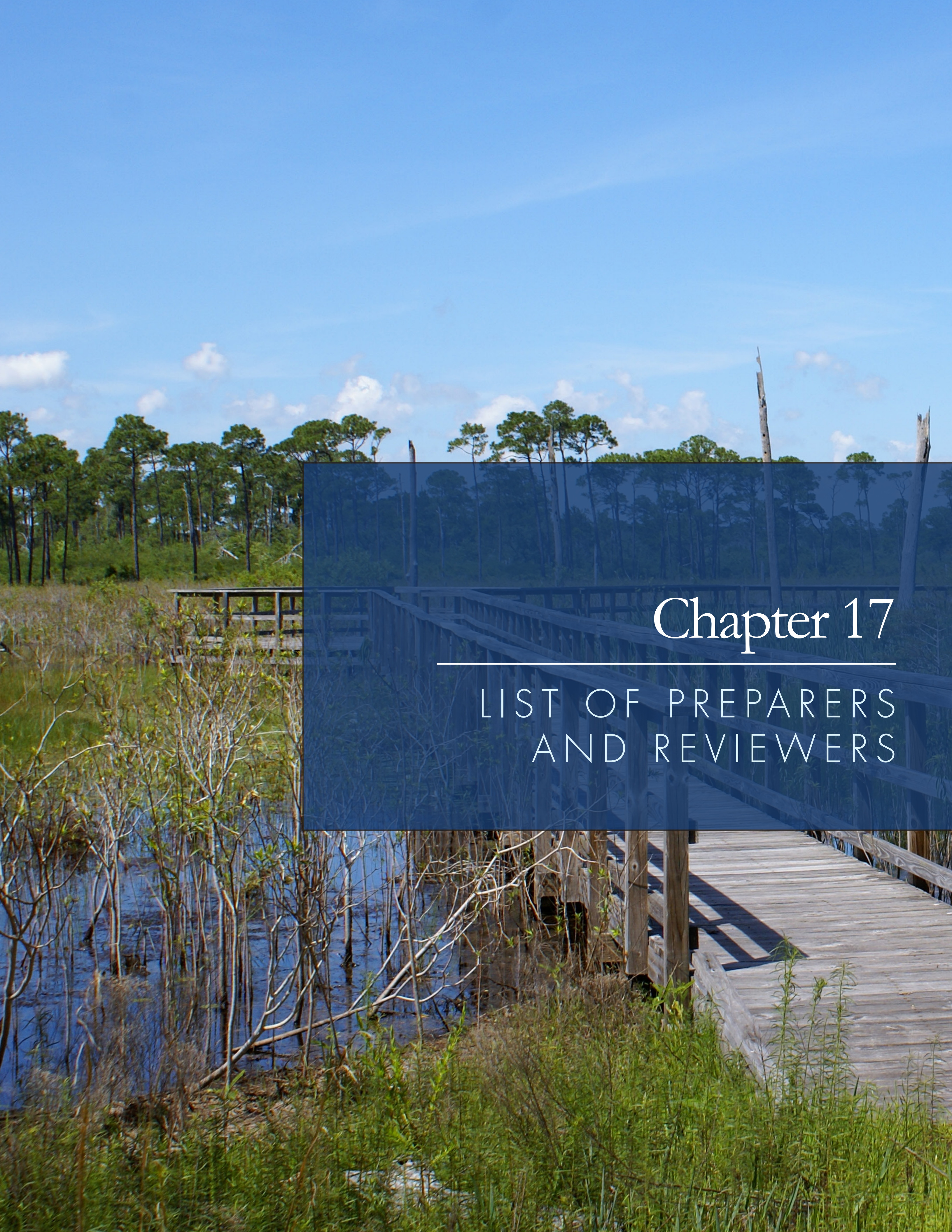
The MAM plans have three primary purposes:

1. The first purpose is to identify how restoration managers will measure and track progress toward achieving restoration goals and objectives. This work is accomplished via monitoring specific parameters that, individually and collectively, help the AL TIG understand the extent to which a project is achieving its restoration objectives.
2. The second purpose is to increase the likelihood of successful implementation through identification, before a project begins, of potential corrective actions that could be undertaken if

a project does not proceed as expected. This is accomplished by conceptually outlining the reasons why a project might fail to meet its objectives and responses by the AL TIG that could be undertaken to correct these problems. The focus is on restoration planning uncertainties for the project and how these uncertainties may be best addressed through project design and implementation decisions.

3. The third purpose is to capture, in a systematic way, lessons learned or new information acquired that can be incorporated into future project selection, design, and implementation. The evaluation section of each plan contains basic questions that the AL TIG will answer to help understand whether a project achieved its objectives and the unanticipated issues that were encountered during implementation and how such issues were addressed. Such information will provide insights for future project development. This section will be updated with additional information as monitoring methods are determined for each project. In the future, the AL TIG will work to identify ways to evaluate the overall success of the DWH restoration work by incorporating feedback from project-level evaluations into a larger resource-level framework to understand how projects could be expected to contribute collectively to restoration of injured resources and improved ecosystem conditions and functions along the Alabama coast.

The Monitoring and Adaptive Management Procedures and Guidelines Manual Version 1.0 provides detailed information regarding the importance and use of adaptive management.



Chapter 17

LIST OF PREPARERS AND REVIEWERS

17.0 LIST OF PREPARERS AND REVIEWERS

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NOAA/Earth Resources Technology, Inc.	Estelle Wilson	Marine Habitat Restoration Specialist

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NOAA	Corinna Mc Mackin	Attorney-Advisor
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USDOI	Robin Renn	USDOI DWH NEPA Coordinator
USDOI	Brian Spears	Biologist

Chapter 18

LIST OF REPOSITORIES

18.0 LIST OF REPOSITORIES

Library	Address	City	Zip
Dauphin Island Sea Laboratory, Admin Building	101 Bienville Boulevard	Dauphin Island	36528
Thomas B. Norton Public Library	221 West 19th Avenue	Gulf Shores	36542
Alabama Department of Conservation and Natural Resources, State Lands Division, Coastal Section Office	31115 5 Rivers Boulevard	Spanish Fort	36527
Weeks Bay National Estuarine Research Reserve	11300 US Highway 98	Fairhope	36532
Mobile Public Library, West Regional Library	5555 Grelot Road	Mobile	36609

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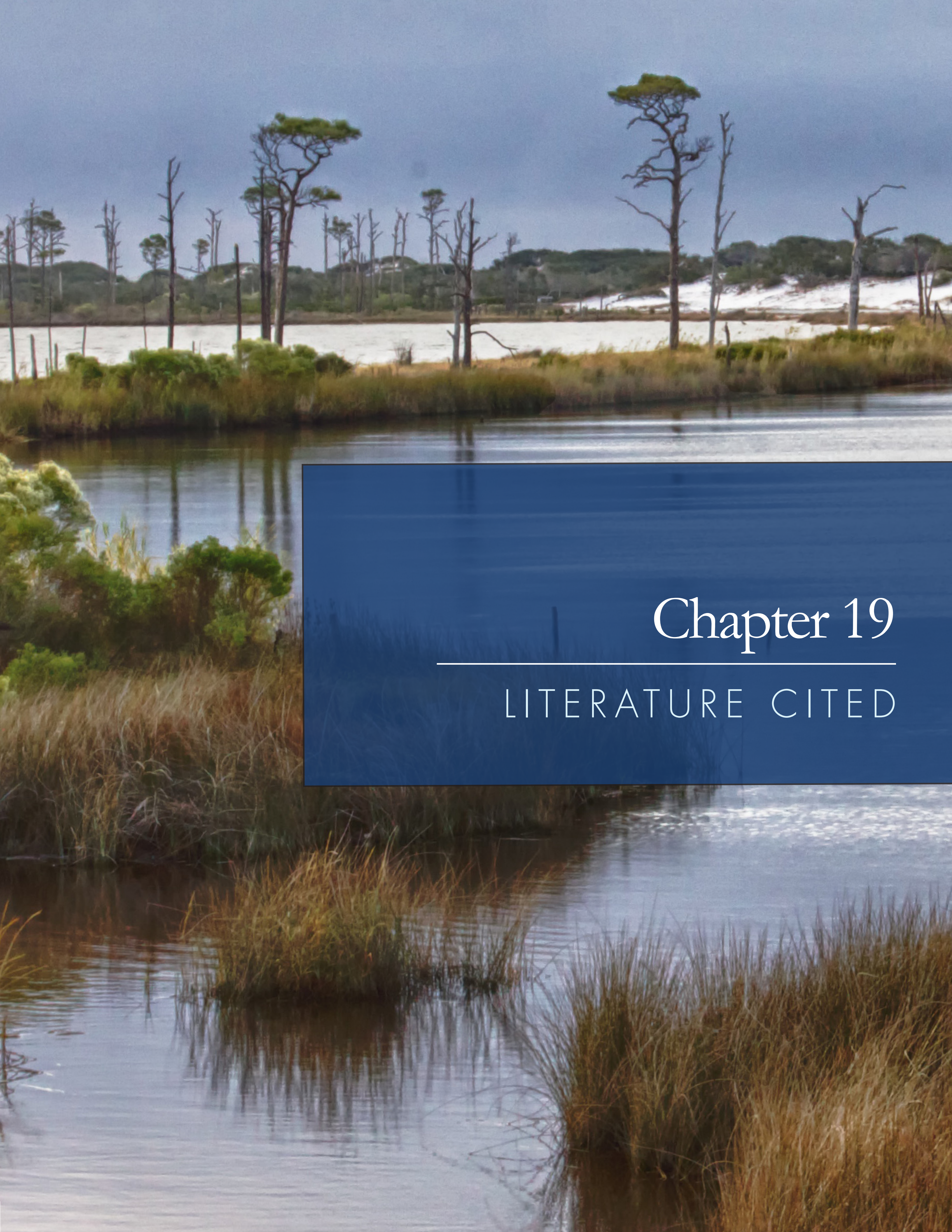

Chapter 19

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