



OPEN OCEAN TRUSTEE IMPLEMENTATION GROUP

Draft Restoration Plan 1 and
Environmental Assessment:
Birds and Sturgeon

OCTOBER 2018



Executive Summary

On April 20, 2010, the DWH mobile drilling unit exploded, resulting in a massive release of oil from the BP Exploration and Production Inc. (BP) Macondo well, causing loss of life and extensive natural resource injuries. 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 on natural resource services.

As part of a 2016 settlement, BP agreed to pay a total of \$8.1 billion in natural resource damages (inclusive of Early Restoration funding) over a 15-year period, and up to an additional \$700 million for adaptive management or to address injuries to natural resources that are presently unknown but may come to light in the future. The settlement allocated a specific sum for restoration within specific Restoration Areas and Restoration Types.

The purpose of restoration, as discussed in this document and detailed in the 2016 *Deepwater Horizon* Oil Spill: Final Programmatic Damage Assessment and Restoration Plan/Programmatic Environmental Impact Statement (PDARP/PEIS),¹ is to make the environment and the public whole for injuries resulting from the DWH oil spill by implementing restoration actions that return injured natural resources and services to baseline conditions and compensate for interim losses, in accordance with the Oil Pollution Act of 1990 (OPA) and associated natural resource damage assessment (NRDA) regulations. The PDARP/PEIS also sets forth the process for subsequent DWH restoration planning to select specific projects for implementation, based on the post-settlement DWH Trustee governance structure. The PDARP/PEIS established a distributed governance structure that assigned a Trustee Implementation Group (TIG) for each of the eight designated Restoration Areas, including the Open Ocean Restoration Area. Each TIG makes all restoration decisions for the funding allocated to its Restoration Area.

The Open Ocean Trustee Implementation Group (Open Ocean TIG) has prepared this Draft Restoration Plan 1 and Environmental Assessment (RP/EA) to address a subset of the injuries to natural resources in the Open Ocean Restoration Area² as a result of the *Deepwater Horizon* (DWH) oil spill.³ The Open

¹ The PDARP/PEIS and Record of Decision (ROD) can be found at <http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan/>.

² The Open Ocean TIG addresses a wide range of resources that make use of the open ocean, including water column and ocean bottom fish and invertebrates, sea turtles, birds, marine mammals, sturgeon, and deep-sea coral reefs. Many species that spend part of their lives in the Gulf of Mexico also migrate to other places—as far away as Canada and the Mediterranean Sea. The Open Ocean Restoration Area will address species throughout their life stages and geographic range, potentially undertaking restoration activity in offshore, coastal and inland areas, in some cases outside of the Gulf of Mexico (if/as restoration needs require).

³ The development of a second Open Ocean TIG RP/EA is underway, which will address other Restoration Types that fall under the Open Ocean Restoration Area.

Ocean TIG is responsible for restoring natural resources and their services within the Open Ocean Restoration Area that were injured by the DWH oil spill.

In the PDARP/PEIS, the DWH Trustees developed a set of Restoration Types for inclusion in programmatic alternatives, consistent with the desire to seek a diverse set of projects providing benefits to a broad array of injured resources and services. Ultimately, this process resulted in the inclusion of 13 Restoration Types in the five major Restoration Goals evaluated for restoration.⁴ The project alternatives evaluated in this RP/EA are consistent with the restoration approaches described for the Birds and Sturgeon Restoration Types, as described in Sections 5.5.12 and 5.5.7 of the PDARP/PEIS:

- Restore and conserve bird nesting and foraging habitat; establish or re-establish breeding colonies; and prevent incidental bird mortality (Birds); and
- Restore sturgeon spawning habitat; reduce nutrient loads to coast watersheds; and protect and conserve marine, coastal, estuarine and riparian habitats (Sturgeon).

Trustees must consider a reasonable range of restoration alternatives before selecting their preferred alternative(s) (OPA § 990.53). The Open Ocean TIG reviewed more than 1,600 restoration project ideas proposed by individual members of the public, non-governmental organizations, and state, federal, and local agencies – ultimately identifying six project alternatives for evaluation in this document, summarized below.

1) Restoration of Common Loons in Minnesota, USA

The objectives of this proposed alternative are to reduce mortality and increase reproductive success of common loons at breeding, nesting, and migration staging locations in Minnesota by focusing on restoration activities that include: 1) acquisition and/or easements of lakeshore loon nesting habitat; 2) enhancing loon productivity by providing artificial nesting platforms in targeted lakes and engaging Minnesota lake associations in loon conservation activities; and 3) reducing loon exposure to lead-based fishing tackle. The estimated cost of this alternative is \$7,520,000.

2) Restoration of American White Pelicans on the Upper Mississippi River

This proposed alternative would create ten acres of new nesting habitat within the Upper Mississippi River National Wildlife and Fish Refuge (NWFR); Clinton County, IA, and Carroll County, IL. Dredge spoil generated through maintenance dredging of navigation channels would be utilized to create river islands or enhance existing islands. The newly created islands would be managed by the USFWS as part of Upper Mississippi River NWFR. Additional protection measures that may be

⁴ PDARP/PEIS major Restoration Goals include: 1) Restore and conserve habitat; 2) Restore water quality; 3) Replenish and protect living coastal and marine resources; 4) Provide and enhance recreational opportunities; and 5) Provide for monitoring, adaptive management, and administrative oversight to support restoration implementation. Restoration Types include: 1) Wetlands, Coastal and Nearshore Habitats; 2) Habitat Projects on Federally Managed Lands; 3) Nutrient Reduction; 4) Water Quality; 5) Fish and Water Column Invertebrates; 6) Sturgeon; 7) Submerged Aquatic Vegetation; 8) Oysters; 9) Sea Turtles; 10) Marine Mammals; 11) Birds; 12) Mesophotic and Deep Benthic Communities; and 13) Provide and Enhance Recreational Opportunities.

implemented include: shoreline protection, vegetation plantings, mammalian predator management, and seasonal public closures. The estimated cost of this alternative is \$6,000,000.

3) Restoration of Black Terns in North and South Dakota

This proposed alternative would protect palustrine emergent wetland habitat and adjacent upland grassland habitat to enhance and improve breeding site selection (i.e., occupancy) and foraging conditions for black terns in more than 30 counties in North and South Dakota located in the Prairie Pothole Region (PPR) using a decision-support tool specific to black terns. Conservation easement agreements would be implemented on a voluntary basis with participating landowners as part of ongoing USFWS conservation programs in North and South Dakota. The estimated cost of this alternative is \$6,250,000.

4) Restoration of Black Terns in the Upper Midwest

This proposed alternative would restore palustrine and lacustrine marsh habitat and enhance nesting conditions for black terns at eight priority colonies identified primarily on public lands [USFWS National Wildlife Refuges (NWRs) and state Wildlife Management Areas (WMAs)] in the Upper Midwest through site-dependent combinations of several potential management actions (e.g., vegetation control, water level management, installation of floating artificial nest platforms, and/or development of a stewardship program to enhance landowner awareness and support in beneficial habitat management). The estimated cost of this alternative is \$1,400,000.

5) Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems

This proposed alternative would: 1) identify and characterize the potential spawning habitat in the Pearl and Pascagoula River systems; 2) describe habitat accessibility and patterns of habitat use during spawning periods; 3) determine the river of origin for juvenile sturgeon; and 4) synthesize the data needed to evaluate and prioritize spawning habitat restoration projects such as in-stream barrier removal, spawning reef creation, or riparian restoration. The estimated cost of this alternative is \$2,150,000.

6) Riparian and Coastal Conservation to Restore Spawning and Juvenile Habitat for Gulf Sturgeon

This proposed alternative would restore Gulf sturgeon and supporting sturgeon habitat through increased spawning success and juvenile survival by improving the quality of riparian habitats and receiving waters in cooperation with willing private and public landowners through technical and financial assistance. USEPA and USDA standard best practices would be utilized, focused on riparian and wetland restoration and storm water control on agriculture, forest, and urban lands to benefit sturgeon habitat. Priority may be focused on particular sturgeon subpopulations or life-stage habitats and on particular watersheds. The estimated cost of this alternative is up to \$7,000,000.

A summary of the anticipated environmental consequences of these projects is provided in Table ES-1. Based on information and analyses presented in this document, the Trustees are proposing three project alternatives for implementation, at a total estimated cost of \$15,920,000 (see Table ES-2). One of the preferred alternatives (Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of

Juvenile Sturgeon in the Pearl and Pascagoula River Systems) is limited to planning and field data collection activities only, while the other two preferred alternatives (Restoration of Common Loons in Minnesota and Restoration of Black Terns in North Dakota and South Dakota) include project program execution.

Table ES-1 Summary of Environmental Consequences for Alternatives Considered in this RP/EA

Project	Geology and Substrates	Hydrology and Water Quality	Habitats	Wildlife Species	Protected Species	Cultural Resources	Land Management	Tourism and Recreation
Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems	NE	NE	NE	NE	NE	NE	NE	NE
Restoration of Common Loons in Minnesota	s/l	s	+/s	+	+	NE	NE	+/s
Restoration of Black Terns in North and South Dakota	NE	NE	+	+	+	NE	NE	+/NE
Restoration of American White Pelican on the Upper Mississippi River	+/s/l	+/s/l	+s/l	+s	+	NE	NE	+/s
Restoration of Black Terns in the Upper Midwest	s	+/s	+/s/l	+s	+/s/l	NE	NE	NE
Riparian and Coastal Conservation to Restore Spawning and Juvenile Habitat for Gulf Sturgeon	NE	+/s	+/s	+/s	+/s	NE	NE	s
No Action	S	S	S	S	S	NE	S	S

Notes: Impacts to air quality, noise, environmental justice, infrastructure, marine transportation, fisheries and aquaculture, public health and safety, aesthetics and visual resources are not anticipated.

- + Beneficial effect
- NE No effect
- s Short-term minor adverse effect
- S Short-term moderate adverse effect
- S** Short-term major adverse effect
- l Long-term minor adverse effect
- L Long-term moderate adverse effect
- L** Long-term major adverse effect

Table ES-2 Alternatives Considered in this RP/EA

Alternative	Project Costs
<u>Birds</u>	
Restoration of Common Loons in Minnesota	Preferred \$7,520,000
Restoration of Black Terns in North Dakota and South Dakota	Preferred \$6,250,000
Restoration of American White Pelicans on the Upper Mississippi River	- \$6,000,000
Restoration of Black Terns in the Upper Midwest	- \$1,400,000
<u>Sturgeon</u>	
Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems	Preferred \$2,150,000
Riparian and Coastal Conservation to Restore Spawning and Juvenile Habitat for Gulf Sturgeon	- \$7,000,000
Sum (Preferred)	\$15,920,000

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

- Online: <http://www.gulfspillrestoration.noaa.gov/restoration-areas/open-ocean>
- 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, email address, etc.) may be made publicly available.

The Open Ocean TIG will hold two public webinars to facilitate the public review and comment process for this Draft RP/EA. Webinar dates and times are specified in the *Federal Register* notice announcing release of this document as well as on the DWH Trustee Council website.

After the close of the public comment period, the Open Ocean TIG will consider all input received during the public comment period and then finalize the RP/EA. If appropriate, DOI will prepare a Finding of No Significant Impact (FONSI). A summary of comments received and the Open Ocean TIG’s responses will be included in the Final RP/EA.

Overall, this RP/EA is intended to provide the public with information and analysis needed to enable meaningful review and comment on the Open Ocean TIG’s proposal to implement projects addressing injuries to the Birds and Sturgeon Restoration Types. Ultimately, this RP/EA and the corresponding opportunity for the public to review and comment on the document are intended to guide the Open Ocean TIG’s selection of projects for implementation that best meet its purpose and need, as summarized above and described in more detail in subsequent sections of this document.

List of Abbreviations/Acronyms

ADCNR	State of Alabama’s Department of Conservation and Natural Resources
AIS	Aquatic Invasive Species
AWPE	American White Pelican
BLM	Bureau of Land Management
BMP	Best Management Practice
BP	BP Exploration and Production Inc.
CCP/EA	Comprehensive Conservation Plan and Environmental Assessment
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPRA	State of Louisiana’s Coastal Protection and Restoration Authority
CZMA	Coastal Zone Management Act
DGCA	Dakota Grassland Conservation Area
DOC	U.S. Department of Commerce
DOD	U.S. Department of Defense
DOI	U.S. Department of the Interior
DWH	Deepwater Horizon
E&D	Engineering and Design
EA	Environmental Assessment
ESA	Endangered Species Act
FDEP	State of Florida’s Department of Environmental Protection
FONSI	Finding of No Significant Impact
FWC	State of Florida’s Fish and Wildlife Conservation Commission
GOM	Gulf of Mexico
GSA	Geological Survey of Alabama
HAPET	USFWS Habitat and Population Team
HUC	Hydrologic Unit Codes

IBA	Important Bird Area
LDEQ	State of Louisiana’s Department of Environmental Quality
LDNR	State of Louisiana’s Department of Natural Resources
LDWF	State of Louisiana’s Department of Wildlife and Fisheries
LOSCO	State of Louisiana’s Oil Spill Coordinator’s Office
MAM	Monitoring and Adaptive Management
MDEQ	State of Mississippi’s Department of Environmental Quality
MDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MSP	Minnesota State Parks
NEPA	National Environmental Policy Act of 1969
NFWF GEBF	National Fish and Wildlife Foundation Gulf Environmental Benefit Fund
NGO	Non-Governmental Organization
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRDA	Natural Resource Damage Assessment
NWFR	USFWS National Wildlife and Fish Refuge
NWR	USFWS National Wildlife Refuge
NWRS	USFWS National Wildlife Refuge System
OO TIG	Open Ocean Trustee Implementation Group
OPA	Oil Pollution Act of 1990
PDARP/PEIS	2016 Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan/Programmatic Environmental Impact Statement
PPR	Prairie Pothole Region
RESTORE	Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act
ROD	Record of Decision

RP/EA	Restoration Plan and Environmental Assessment
SOP	Standard Operating Procedure
TIG	Trustee Implementation Group
TCEQ	State of Texas' Commission on Environmental Quality
TGLO	State of Texas' General Land Office
TPWD	State of Texas' Parks and Wildlife Department
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WMA	Wildlife Management Area
WMD	Wetland Management District

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Chapter 1: Introduction

The Open Ocean Trustee Implementation Group (Open Ocean TIG) has prepared this Draft Restoration Plan 1 and Environmental Assessment (RP/EA) to address injury to natural resources in the Open Ocean Restoration Area⁵ as a result of the *Deepwater Horizon* (DWH) oil spill. The Open Ocean TIG is responsible for restoring natural resources and their services within the Open Ocean Restoration Area that were injured by the DWH oil spill. This RP/EA proposes three alternatives preferred for implementation from the “Birds” and “Sturgeon” Restoration Types at a total estimated cost of \$15,920,000. The development of a second restoration plan also is underway, which addresses other Restoration Types that fall under the Open Ocean Restoration Area.⁶

The purpose of restoration, as discussed in this document and detailed in the 2016 *Deepwater Horizon* Oil spill: Final Programmatic Damage Assessment and Restoration Plan/Programmatic Environmental Impact Statement (PDARP/PEIS)⁷, is to make the environment and the public whole for injuries resulting from the DWH oil spill by implementing restoration actions that return injured natural resources and services to baseline conditions and compensate for interim losses, in accordance with the Oil Pollution Act of 1990 (OPA) and associated natural resource damage assessment (NRDA) regulations. The PDARP/PEIS also sets forth the process for subsequent DWH restoration planning to select specific projects for implementation, based on the post-settlement DWH Trustee governance structure. The PDARP/PEIS established a distributed governance structure that assigned a Trustee Implementation Group (TIG) for each of the eight designated Restoration Areas, including the Open Ocean Restoration Area. Each TIG makes all restoration decisions for the funding allocated to its Restoration Area. This process and governance structure is described in Chapter 7 of the PDARP/PEIS. Standard operating procedures (SOP) for administration, implementation, and long-term management of restoration under the Final PDARP/PEIS are codified in the document Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill (Trustee Council SOP).⁸

⁵ The Open Ocean TIG addresses a wide range of resources that make use of the open ocean, including water column and ocean bottom fish and invertebrates, sea turtles, birds, marine mammals, sturgeon, and mesophotic and deep benthic communities. Many species that spend part of their lives in the Gulf of Mexico also migrate to other places—as far away as Canada and the Mediterranean Sea. The Open Ocean Restoration Area will address species throughout their life stages and geographic range, potentially undertaking restoration activity in offshore, coastal and inland areas, in some cases outside of the Gulf of Mexico (if/as restoration needs require).

⁶ The OOTIG has initiated drafting of its second post-settlement draft restoration plan, which will propose projects to address natural resource injuries caused by the *Deepwater Horizon* oil spill for the following restoration types: Sea Turtles, Marine Mammals, Fish and Water Column Invertebrates and Mesophotic and Deep Benthic Communities. Additional RP/EA(s) may be developed by the OOTIG in the future.

⁷ The PDARP/PEIS and Record of Decision (ROD) can be found at <http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan/>.

⁸ The Trustee Council SOP is available through the NOAA Restoration Portal, at the link below: <http://www.gulfspillrestoration.noaa.gov/sites/default/files/wp-content/uploads/DWH-SOPs.pdf>.

1.1 Authorities and Regulations

1.1.1 Oil Pollution Act Compliance

As an oil pollution incident, the DWH oil spill is subject to the provisions of the Oil Pollution Act (OPA). 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. Under the authority of OPA, a council of federal and state trustees was established to assess natural resource injuries resulting from the incident and to work to make the environment and public whole for those injuries.

The DWH Trustees are the government entities authorized under OPA to act as trustees on behalf of the public to assess the natural resource injuries resulting from the DWH oil spill and develop and implement a restoration plan to compensate for those injuries. Collectively, these trustees make up the DWH Trustee Council. The TIGs comprise different trustees depending on the Restoration Area they represent. The following federal and state agencies are the designated Trustees under OPA for the DWH oil spill:

- U.S. Department of the Interior (DOI), represented by the U.S. Fish and Wildlife Service (USFWS), the National Park Service (NPS), and the Bureau of Land Management (BLM)
- National Oceanic and Atmospheric Administration (NOAA), on behalf of the U.S. Department of Commerce (DOC)
- U.S. Department of Agriculture (USDA)
- U.S. Department of Defense (DOD)⁹
- U.S. Environmental Protection Agency (EPA)
- The State of Alabama's Department of Conservation and Natural Resources (ADCNR) and Geological Survey of Alabama (GSA)
- The State of Florida's Department of Environmental Protection (FDEP) and Fish and Wildlife Conservation Commission (FWC)
- The State of Louisiana's Coastal Protection and Restoration Authority (CPRA) Department of Natural Resources (LDNR); Department of Environmental Quality (LDEQ); Oil Spill Coordinator's Office (LOSCO); and Department of Wildlife and Fisheries (LDWF)
- The State of Mississippi's Department of Environmental Quality (MDEQ)
- The State of Texas' Parks and Wildlife Department (TPWD), General Land Office (TGLO), and Commission on Environmental Quality (TCEQ)

⁹ Although a trustee under OPA by virtue of the proximity of its facilities to the DWH Oil Spill, DOD is not a member of the Trustee Council and does not participate in DWH Trustee decision-making.

The Open Ocean TIG is comprised of the four federal DWH Trustees: DOI, NOAA, EPA, and USDA. As described in OPA NRDA regulations (15 CFR Part 990)¹⁰, the NRDA process consists of three phases: (1) Pre-assessment; (2) Assessment and Restoration Planning; and (3) Restoration Implementation. The DWH Trustees are currently in the Restoration Implementation phase of the NRDA.

As part of the initiation of restoration implementation for the Open Ocean TIG, this RP/EA identifies a reasonable range of alternatives to begin addressing DWH-caused injuries to the Sturgeon and Bird Restoration Types, evaluates them under applicable OPA criteria, and identifies a subset of alternatives that are preferred at this time by the Open Ocean TIG for implementation.

Restoration activities under OPA are intended to return injured natural resources and services to their baseline condition (primary restoration) and to compensate the public for interim losses from the time of the incident until the time resources and services recover to baseline conditions (compensatory restoration). To meet these goals, the restoration activities must produce benefits that are related to or have a nexus (connection) to natural resource injuries and service losses resulting from the spill.

1.1.2 National Environmental Policy Act Compliance

Under the OPA regulations, federal trustees must comply with the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality's (CEQ) NEPA implementing regulations, 40 CFR Parts 1500-1508, when proposing restoration projects. NEPA requires federal agencies to consider the potential environmental impacts of planned actions. NEPA provides a mandate and framework for federal agencies to determine if their proposed actions have significant environmental effects and related social and economic effects, consider these effects when choosing between alternative approaches, and inform and involve the public in the environmental analysis and decision-making process.

In this document, the Open Ocean TIG addresses these requirements by tiering from environmental analyses conducted in the PDARP/PEIS, evaluating existing analyses, incorporating by reference relevant analyses from existing project environmental assessments (EAs) and conservation plans, and preparing environmental consequences analyses for projects as appropriate. Doing so cuts down on redundancy, focuses on issues of significance and shows the interconnection of the proposed alternatives with existing programs and regional efforts to address resource issues at an ecosystem level. All material incorporated or which is otherwise used to support the NEPA analysis is publicly available. See Chapter 4 for more information on tiering and incorporation by reference under NEPA and how they apply to this RP/EA.

1.1.2.1 Lead and Cooperating Agencies

CEQ NEPA implementing regulations require a federal agency to serve as lead agency to supervise the NEPA analysis when more than one federal agency is involved in the same action (40 CFR § 1501.5(a)). DOI serves as the lead federal agency responsible for NEPA compliance for this RP/EA, ensuring its compliance with the CEQ's NEPA implementing regulations and DOI NEPA implementing procedures (43

¹⁰ The OPA NRDA regulations can be found at https://darrp.noaa.gov/sites/default/files/OPA_CFR-1999-title15-vol3-part990.pdf

CFR § 46). Each of the other co-Trustees on the Open Ocean TIG is participating as a cooperating agency pursuant to NEPA (40 CFR § 1508.5).

1.1.2.2 Intent to Adopt the RP/EA NEPA Analysis by Cooperating Agencies

As federal agencies, each cooperating agency on the Open Ocean TIG intends to adopt the NEPA analysis in this RP/EA. In accordance with 40 CFR § 1506.3 (a), each of the three federal cooperating agencies participating on the Open Ocean TIG will review the RP/EA for adequacy in meeting the standards set forth in its own NEPA implementing procedures. Each agency will then make a decision whether to adopt the analysis to inform its own federal decision-making and fulfill its responsibilities under NEPA. More information about OPA and NEPA, as well as their application to DWH oil spill restoration planning, can be found in Chapters 5 and 6 of the PDARP/PEIS.

1.2 Background and Summary of Settlement, Relationship to PDARP/PEIS

This section briefly summarizes the background and chronology of important events affecting the DWH Trustees restoration planning and implementation and describes the relationship of this RP/EA to the PDARP/PEIS.

1.2.1 Background and Summary of Settlement

On April 20, 2010, the DWH mobile drilling unit exploded, resulting in a massive release of oil from the BP Exploration and Production Inc. (BP) Macondo well, causing loss of life and extensive natural resource injuries. 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 on natural resource services.

On April 20, 2011, BP agreed to provide up to \$1 billion toward Early Restoration projects in the Gulf of Mexico, representing a preliminary step toward the restoration of injured natural resources. 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.

In February 2016, the DWH Trustee Council issued the Final PDARP/PEIS detailing a specific proposed plan to fund and implement restoration projects over the next 15 years. In March 2016 the Trustees published a Notice of Availability of a Record of Decision (ROD) for the final PDARP/PEIS. Based on the DWH Trustees' injury determination established in the PDARP/PEIS, the ROD set forth the basis for the DWH Trustees' decision to select Alternative A: Comprehensive Integrated Ecosystem Alternative. In April 2016, the United States District Court for the Eastern District of Louisiana entered a Consent Decree resolving civil claims by the DWH oil spill trustees (DWH Trustees) against BP Exploration and Production Inc. arising out of the DWH oil spill.¹¹

¹¹ See *United States v. BPXP et al.*, Civ. No. 10-4536, centralized in MDL 2179, *In re: Oil Spill by the Oil Rig "Deepwater Horizon" in the Gulf of Mexico, on April 20, 2010* (E.D. La.)

As part of the settlement, BP agreed to pay a total of \$8.1 billion in natural resource damages (inclusive of Early Restoration funding) over a 15-year period, and up to an additional \$700 million for adaptive management or to address injuries to natural resources that are presently unknown but may come to light in the future. The settlement allocated a specific sum for restoration within specific Restoration Areas and Restoration Types. Table 1-1 provides the final settlement allocation for the Open Ocean Restoration Area.

Table 1-1 Allocation of *Deepwater Horizon* Settlement Funds for the Open Ocean Restoration Area by Restoration Type

Restoration Goal	Restoration Type	Allocated During Early Restoration	Additional Open Ocean Settlement Funds	Total Restoration Funding
Replenish and Protect Living Coastal and Marine Resources	Fish and Water Column Invertebrates	\$20,000,000	\$380,000,000	\$400,000,000
	Sturgeon	\$0	\$15,000,000	\$15,000,000
	Sea Turtles	\$0	\$55,000,000	\$55,000,000
	Marine Mammals	\$0	\$55,000,000	\$55,000,000
	Birds	\$0	\$70,000,000	\$70,000,000
	Mesophotic and Deep Benthic Communities	\$0	\$273,300,000	\$273,000,000
Provide & Enhance Recreational Opportunities	N/A	\$22,397,916	\$0	\$22,397,916
Monitoring & Adaptive Management	N/A	\$0	\$200,000,000	\$200,000,000
Administrative Oversight and Comprehensive Planning	N/A	\$0	\$150,000,000	\$150,000,000
Total NRD Funding for Open Ocean:		\$42,397,916	\$1,198,300,000	\$1,240,697,916

1.2.2 Relationship of this RP/EA to the PDARP/PEIS

As a programmatic restoration plan, the 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). As the PDARP/PEIS analysis shows, the injuries caused by the spill cannot be fully described at the level of a single species, a single habitat type, or a single region. The Trustees found that the extensive injuries to multiple habitats, species, ecological functions, and geographic regions affected by the spill establish the need for comprehensive restoration planning on a landscape and ecosystem scale that recognizes and strengthens existing connectivity among habitats, resources, and natural resource services in the Gulf of Mexico.

The Trustees considered this ecosystem context in deciding how best to restore for the vast array of resources and services injured by this spill. The PDARP/PEIS employs a comprehensive, integrated ecosystem approach to best address these ecosystem-level injuries, looking for synergies and building

on previous and current planning efforts across Gulf Restoration Programs to maximize benefits to injured resources.

In the PDARP/PEIS, the DWH Trustees developed a set of Restoration Types for inclusion in programmatic alternatives, consistent with the desire to seek a diverse set of projects providing benefits to a broad array of injured resources and services. Ultimately, this process resulted in the inclusion of 13 Restoration Types in the five major Restoration Goals evaluated for restoration (Table 1-2). The alternatives included in this RP/EA (see Table 1-3 in Section 1.4.1) are consistent with the restoration approaches described for the Birds and Sturgeon Restoration Types, as described in Sections 5.5.12 and 5.5.7 of the PDARP/PEIS.

Table 1-2 The Trustee Programmatic Restoration Goals and Associated Restoration Types Identified in the Final PDARP/PEIS

Trustee Programmatic Restoration Goals	Restoration Type
Restore and Conserve Habitat	Wetlands, Coastal, and Nearshore Habitats Habitat Projects on Federally Managed Lands
Restore Water Quality	Nutrient Reduction (nonpoint source) Water Quality
Replenish and Protect Living Coastal & Marine Resources	Fish and Water Column Invertebrates Sturgeon Submerged Aquatic Vegetation Oysters Sea Turtles Marine Mammals Birds Mesophotic and Deep Benthic Communities
Provide and Enhance Recreational Opportunities	Provide and Enhance Recreational Opportunities
Provide for Monitoring, Adaptive Management and Administrative Oversight	N/A

1.3 Purpose and Need

The Open Ocean TIG has undertaken this restoration planning effort to meet the purpose of contributing to the restoration of those natural resources and services injured in the Open Ocean Restoration Area as a result of the DWH oil spill. Restoration activities are needed to restore or replace habitats, species, and services to their baseline condition (primary restoration) and to compensate the public for interim losses from the time natural resources are injured until they recover to baseline conditions (compensatory restoration).

As described in Section 1.2 above, this RP/EA is consistent with the Final PDARP/PEIS and its purpose and need falls within the scope of the purpose and need identified in the Final PDARP/PEIS. More specifically, the alternatives identified and evaluated in this RP/EA address the programmatic restoration goal of replenishing and protecting living coastal and marine resources for Birds and Sturgeon Restoration Types.

1.4 Proposed Action: Implementation of the Open Ocean TIG Restoration Plan 1/Environmental Assessment: Birds and Sturgeon

To meet the above stated purpose and need, the Open Ocean TIG proposes to implement the three alternatives identified as ‘Preferred’ in Table 1-3, with Restoration Type funds allocated to the Open Ocean TIG consistent with the following restoration approaches outlined in the PDARP/PEIS:

- Restore and conserve bird nesting and foraging habitat; Establish or re-establish breeding colonies; and Prevent incidental bird mortality (Birds); and
- Restore sturgeon spawning habitat; Reduce nutrient loads to coast watersheds; and Protect and conserve marine, coastal, estuarine and riparian habitats (Sturgeon).

As described in more detail in later sections of this document, one of the preferred alternatives (Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems) is limited to planning and field data collection activities only, while the other two preferred alternatives (Restoration of Common Loons in Minnesota and Restoration of Black Terns in North Dakota and South Dakota) include project program execution.

Table 1-3 Alternatives Considered by Restoration Type and Associated Project Cost

Alternative		Project Costs
<u>Birds</u>		
Restoration of Common Loons in Minnesota	Preferred	\$7,520,000
Restoration of Black Terns in North Dakota and South Dakota	Preferred	\$6,250,000
Restoration of American White Pelicans on the Upper Mississippi River		\$6,000,000
Restoration of Black Terns in the Upper Midwest		\$1,400,000
<u>Sturgeon</u>		
Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems	Preferred	\$2,150,000
Riparian and Coastal Conservation to Restore Spawning and Juvenile Habitat for Gulf Sturgeon		\$7,000,000
	Sum (Preferred)	\$15,920,000

1.4.1 Reasonable Range of Alternatives

Trustees must consider a reasonable range of restoration alternatives before selecting their preferred alternative(s) (OPA § 990.53). Chapter 2 of this RP/EA summarizes the screening process used to

develop a reasonable range of alternatives, which is consistent with the DWH Trustees' selected programmatic alternative in the Final PDARP/PEIS, the Consent Decree and OPA. Table 1-3 identifies the six alternatives that comprise the reasonable range for this RP/EA and are analyzed under both OPA and NEPA.

1.4.2 No Action

Under the No Action alternative, none of the action alternatives described in this RP/EA would be implemented at this time. The No Action alternative, inclusion of which is a NEPA requirement, provides a benchmark enabling decision makers to compare the magnitude of environmental effects of the action alternatives (40 CFR § 1502.14(d)). In Chapter 4, the No Action alternative is described and analyzed for each action alternative, and then summarized for each Restoration Type.

1.4.3 Severability

Preferred alternatives identified in this RP/EA are independent of each other and may be selected independently by the Open Ocean TIG. A decision not to select one or more of the alternatives does not affect the Open Ocean TIG's selection of any remaining alternatives. Projects not included in the reasonable range of alternatives for this draft RP/EA, or not selected for implementation in the final RP/EA may continue to be considered for inclusion in future restoration plans by the Open Ocean TIG.

1.5 Coordination with Other Gulf Restoration Programs

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

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

1.6 Public Participation

Public input is an integral part of NEPA, OPA, and the DWH oil spill restoration planning effort. On October 1, 2010, the DWH Trustees published the Notice of Intent to Conduct Restoration Planning (75 FR 60800). Since then, the DWH Trustees have sought restoration project ideas from the public through a variety of means. In addition, the Trustees conducted an extensive public outreach process as part of PDARP/PEIS development efforts; that process and associated public comments are described more fully in Chapter 8 of the PDARP/PEIS. The Trustees also solicited public review and comment on several draft DWH restoration plan/environmental reviews, and held numerous public meetings. Public participation opportunities associated with this RP/EA are identified below.

1.6.1 Public Involvement in this RP/EA

Restoration project submissions potentially relevant to the Open Ocean TIG and other DWH restoration planning activities have been collected since the internet-based DWH project portal was opened in 2010. On March 31, 2017, the Open Ocean TIG began soliciting restoration project ideas for the six Restoration Types identified in the Open Ocean Restoration Area: 1) Birds; 2) Sturgeon; 3) Sea Turtles; 4) Marine Mammals; 5) Fish and Water Column Invertebrates; and 6) Mesophotic and Deep Benthic Communities. The Open Ocean TIG continued the collection of project ideas relevant to these Open Ocean Restoration Types through May 15, 2017. The Open Ocean TIG held a public webinar on April 27, 2017 to provide information about the restoration planning process, the request for project ideas, and next steps for the Open Ocean Restoration Area.

The Open Ocean TIG reviewed more than 1,600 restoration project ideas proposed by the public, non-governmental organizations (NGOs), and state, federal, and local agencies. The Open Ocean TIG project screening process is described in more detail in Chapter 2.

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

- Online: <http://www.gulfspillrestoration.noaa.gov/restoration-areas/open-ocean>
- 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, email address, etc.) may be made publicly available.

The Open Ocean TIG will hold two public webinars to facilitate the public review and comment process for this Draft RP/EA. Webinar dates and times are specified in the *Federal Register* notice announcing release of this document as well as on the DWH Trustee Council website.

1.6.2 Next Steps

As noted above, the Open Ocean TIG will accept public comments and host public webinars to facilitate the public review and comment process for the actions proposed in this Draft RP/EA. This information is also specified in the *Federal Register* notice announcing the release of this document. After the close of the public comment period, the Open Ocean TIG will consider all input received during the public comment period and then finalize the RP/EA. If appropriate, DOI will prepare a Finding of No Significant Impact (FONSI). A summary of comments received and the Open Ocean TIG's responses will be included in the Final RP/EA.

1.6.3 Administrative Record

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

found at <http://www.doi.gov/deepwaterhorizon/adminrecord>. This administrative record site is also used by the Open Ocean TIG for DWH restoration planning.

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

1.7 Decision to be Made

This RP/EA is intended to provide the public with information and analysis needed to enable meaningful review and comment on the Open Ocean TIG's proposal to implement projects addressing injuries to the Birds and Sturgeon Restoration Types (see Section 1.2.2). Ultimately, this RP/EA and the corresponding opportunity for the public to review and comment on the document are intended to guide the Open Ocean TIG's selection of projects for implementation that best meet its purpose and need as described in Section 1.3 above.

1.8 Document Organization

Chapter 1 (Introduction): Introductory information and context for this document;

Chapter 2 (Restoration Planning Process): Background on the NRDA restoration planning process, summary of injuries to resources resulting from the *DWH* oil spill that the Open Ocean TIG intends to address in this RP/EA, screening of a suite of restoration projects to address those injuries, coordination with other restoration planning efforts and development of a reasonable range of alternatives;

Chapter 3 (OPA Evaluation of Alternatives): OPA criteria-based evaluation of the reasonable range of alternatives for NRDA restoration identified in this RP/EA, rationale for preferred restoration alternatives;

Chapter 4 (NEPA Analysis of Alternatives and Compliance with Other Laws): Discussion of the affected environment and the environmental impacts that could result from implementation of the reasonable range of alternatives for NRDA restoration identified in this RP/EA, basis for supplementary NEPA analysis, and compliance with federal and state environmental protection laws that may apply to the proposed preferred alternatives;

Chapter 5 (Draft Monitoring and Adaptive Management Plans): Includes draft plans for preferred restoration alternatives identified by the Trustees that involve more than E&D/planning activities;

Appendix A: Literature Cited

Appendix B: List of Preparers: Identification of individuals who substantively contributed to the development of this document

Appendix C: Monitoring and Adaptive Management Template

Appendix D: Impact Thresholds Used in for the Analysis of Environmental Consequences, as Presented in the Final PDARP/PEIS

Chapter 2: 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 need to produce benefits that are related to or have a nexus (connection) to natural resource injuries and service losses resulting from a spill. The 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 to be used by trustees to evaluate projects designed to compensate the public for injuries caused by oil spills. Under the OPA regulations (15 CFR § 990.53), the Open Ocean TIG developed a screening process to identify the reasonable range of alternatives evaluated in this plan.

This chapter of the RP/EA describes the screening process used by the Open Ocean TIG to identify the reasonable range of alternatives for Birds and Sturgeon included in this RP/EA. 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 & Record of Decision

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 to the Gulf's natural resources, a comprehensive, integrated ecosystem restoration approach for restoration implementation was proposed. On March 29, 2016, in accordance with OPA and NEPA, the DWH Trustees published a Notice of Availability (NOA) of a Record of Decision for the Final PDARP/PEIS in the Federal Register (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. Additional, summary information about the Final PDARP/PEIS and the relationship of this document to it can be found in Section 1.2.2.¹²

2.2 Summary of Injuries Addressed in the RP/EA

Chapter 4 of the Final PDARP/PEIS summarizes the injury assessment, which documented the nature, degree, and extent of injuries from the DWH Oil Spill to both natural resources and the services they provide. Restoration projects identified in this RP/EA and in future Open Ocean TIG restoration plans are designed to address injuries to restoration types in the Open Ocean Restoration Area resulting from the

¹² The Final PDARP/PEIS in its entirety can be found at <http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan>.

Incident. This first OO TIG RP/EA proposes alternatives for the following Restoration Types described in the Final PDARP/PEIS: Birds and Sturgeon. This section summarizes the most relevant information from Chapter 4 of the Final PDARP/PEIS injury assessment and establishes the nexus for restoration planning for these two resource types.

2.2.1 Replenish and Protect Living Coastal and Marine Resources

For the quantified portion of bird mortality, the Trustees estimated a spill-related injury of between 56,100 to 102,400 lost birds. This was composed of between 51,600 and 84,500 birds that died as a direct result of the DWH oil spill, as well as lost reproduction stemming from these mortalities that ranged between 4,600 and 17,900 fledglings. Due to a variety of factors that likely led to underestimation of mortality, the quantified portion of true injury is likely closer to the upper range of the estimates. Ninety-three different bird species associated with oil-affected habitats showed documented injury resulting from the DWH oil spill. Species showing particularly high injury included brown and white pelicans, laughing gulls, Audubon's shearwaters, northern gannets, clapper rails, black skimmers, white ibis, double-crested cormorants, common loons, and several species of terns. In addition, as a result of the immense area affected by the spill, the diversity of habitats involved, and the prolonged nature of the event, there were a number of bird injuries that were not detected or estimated using quantified portions of the Trustees' assessment approach. Overall, the magnitude of the injury and the number of species affected makes the DWH oil spill an unprecedented human-caused injury to birds of the region (Final PDARP/PEIS Sections 4.7.5.3 and 4.7.5.4).

This Open Ocean TIG RP/EA prioritizes project ideas for a subset of bird species that were injured in the greatest numbers by the spill for which: 1) DWH restoration projects have not yet been undertaken (either through Early Restoration or post-settlement restoration planning to date); and 2) that align more closely with the broad geographic scope of the Open Ocean restoration area. These species include common loons, American white pelicans and black terns. At least several thousand individuals of these species were lost due to DWH-caused mortality or lost productivity (Final PDARP/PEIS Sections 4.7.5.3). These species breed and spend substantial time outside of the Gulf of Mexico.¹³

This RP/EA also addresses Gulf sturgeon. The Gulf sturgeon is an anadromous fish that migrates from salt water into large coastal rivers to spawn. The USFWS and National Marine Fisheries Service (NOAA Fisheries) designated the Gulf sturgeon to be a threatened species in 1991 under the Endangered Species Act of 1973, as amended. In the NRDA assessment for Gulf sturgeon provided in the PDARP/PEIS, the Trustees integrated field and laboratory approaches to determine exposure and injuries of the threatened Gulf sturgeon in shallow unvegetated habitats. Between 1,100 and 3,600 Gulf sturgeon were estimated to be exposed to DWH oil in the nearshore areas of the northern Gulf of Mexico in fall 2010. This represents a large proportion of the populations from six of the eight natal rivers systems. Although a direct kill of Gulf sturgeon from the oil was not observed, the Trustees found evidence of physiological injury. This evidence includes exposure biomarkers for DNA damage and

¹³ See Sections 2.5 and 3.5 of this document for more life history information for these species. See also the Strategic Framework for Bird Restoration Activities (June 2017) developed by the DWH Trustees at http://www.gulfspillrestoration.noaa.gov/sites/default/files/wp-content/uploads/Birds_Strategic_Framework_06.23.17.pdf.

immune suppression for Gulf sturgeon exposed to the oil (Final PDARP/PEIS Section 4.6.7.6). Given the listed status and existing threats to Gulf sturgeon populations, this species will likely be very slow to recover from additional stressors, such as an oil spill (Final PDARP/PEIS Section 4.6.7.5).

2.3 Screening for Reasonable Range of Alternatives

In developing a reasonable range of alternatives suitable for addressing the injuries caused by the Incident, the Open Ocean TIG reviewed the Trustee programmatic restoration goals and Restoration Type specific goals specified in the Final PDARP/PEIS (see Sections 1.2, 1.3 and 1.4 of this RP/EA) as well as screening factors in the OPA regulations (15 CFR § 990.54), input from the public, the current and future availability of funds under the DWH NRDA settlement payment schedule, projects already funded or proposed to be funded by other DWH TIGs or other DWH restoration funding sources (e.g., NFWF GEBF and RESTORE Act) and projects already funded or proposed to be funded by other sources. Consistent with Section 9.4.1.4 of the Trustee Council SOP, the Open Ocean TIG considered project ideas submitted by the public as well as those submitted by non-governmental organizations, and state, federal, and local agencies. Additional information about the screening process applied by the Open Ocean TIG to generate a reasonable range of alternatives for this RP/EA is provided in the subsections below.

2.3.1 Phasing of Projects

The Final PDARP/PEIS provides the structure for TIGs to implement projects that are ready to proceed to construction (e.g., habitat creation or enhancement) or program execution (e.g., purchase of land easements or initiation of an education program) as well as to phase proposed restoration projects across multiple restoration plans. For example, a TIG may propose funding a planning phase (e.g., collection/analysis of data critical to the restoration planning process, conducting a feasibility study, or undertaking engineering and design (E&D) work) in one restoration plan, allowing TIGs to develop projects to the extent needed to fully consider a subsequent, separate construction or program execution phase of those projects in a future restoration plan. For this RP/EA, the Open Ocean TIG considered both “planning” phase and “construction/program implementation” phase projects.

2.3.2 Open Ocean TIG Screening Process

On March 31, 2017, the Open Ocean TIG began soliciting restoration project ideas for the six Restoration Types identified in the Open Ocean Restoration Area: Birds, Sturgeon, Sea Turtles, Marine Mammals, Fish and Water Column Invertebrates, and Mesophotic and Deep Benthic Communities. As stated in the request for project ideas, the OO TIG is responsible for restoration for wide-ranging and migratory species at important points during their life cycles and geographic ranges, including inland, coastal, and offshore areas. Some open ocean species are highly migratory so some restoration outside of the Gulf of Mexico is anticipated.

The Open Ocean TIG reviewed the Final PDARP/PEIS Programmatic Trustee Goals and developed a set of selection criteria for identifying project ideas to develop a reasonable range of alternatives for restoration in this RP/EA. The OO TIG has prioritized two Restoration Types described in the Final PDARP/PEIS for inclusion in this RP/EA: Birds and Sturgeon.

The project screening process developed by the Open Ocean TIG for the purpose of preparing the RP/EA included ideas submitted by the public via the DWH NRDA project submission portal.¹⁴ Project submissions to the Portal began in 2010. On March 31, 2017, the Open Ocean TIG requested public submission of ideas through May 15, 2017 to inform our restoration planning. The Open Ocean TIG held a public webinar on April 27, 2017, to provide information about the restoration planning process, the request for project ideas, and next steps for the Open Ocean Restoration Area.

The Open Ocean TIG reviewed more than 1,600 restoration project ideas proposed by individual members of the public, non-governmental organizations, and state, federal, and local agencies. The Open Ocean TIG project screening process is illustrated below. Project review and screening took place through the stages and application of criteria identified in Table 2-1 below.

2.3.2.1 Initial Screening

In the initial stage of screening, the OO TIG removed project ideas that were already funded, required to meet other legal obligations, duplicated other project ideas or provided insufficient information for evaluation.

2.3.2.2 Consistency with Final PDARP/PEIS and the Restoration Type Focuses of this RP/EA

The OPA regulations allow trustees to establish additional incident-specific evaluation and selection factors to use in developing a reasonable range of alternatives and restoration projects (15 CFR § 990.54). The DWH Trustees determined that preferred alternatives and subsequent restoration plans and projects must also be consistent with the Trustee programmatic restoration goals outlined in Section 5.3.1 of the Final PDARP/PEIS, Programmatic Trustee Goals, and with the Restoration Types described in Section 5.5, Alternative A: Comprehensive Integrated Ecosystem Restoration (Preferred Alternative).

Initially, the Open Ocean TIG screened project ideas based on the extent to which the project idea met the goals of one or more Restoration Types identified for the Open Ocean Restoration Area (Birds, Sturgeon, Sea Turtles, Marine Mammals, Fish and Water Column Invertebrates, and Mesophotic and Deep Benthic Communities). Project ideas needed to be consistent with at least one of these Restoration Types in order to be considered beyond this stage of the screening process.

¹⁴ This portal can be accessed at <http://www.gulfspillrestoration.noaa.gov/restoration/give-us-your-ideas>.

Table 2-1 Overview of Screening Stages and Criteria/Factors Applied by the Open Ocean TIG

Stage of Screening	Criteria/Factors Considered
Initial Screening	Project ideas were removed if projects: <ul style="list-style-type: none"> • Had insufficient information for evaluation • Are already required by local, state, or federal law • Have already been funded • Duplicated other project ideas
Consistency with Final PDARP/PEIS Programmatic Goals	Project idea is consistent with one or more of the PDARP Programmatic Goals
Consistency with Final PDARP/PEIS Restoration Types	Project objectives are consistent with at least one of the Restoration Types identified in the Final PDARP/PEIS.
Consistency with Final PDARP/PEIS Restoration Types that are the subject of this RP/EA	Project objectives are consistent with at least one of the two Restoration Types addressed in this RP/EA: Birds and Sturgeon.
Consistency with Strategic Framework (Birds)	Project idea is consistent with the appropriate strategic framework (Birds)
Evaluation based on OPA factors	Project ideas were evaluated against the screening factors defined in OPA: <ul style="list-style-type: none"> • The cost to carry out the alternative. • 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. • The likelihood of success of each alternative. • The extent to which each alternative will prevent future injury as a result of the incident and avoid collateral injury as a result of implementing the alternative. • The extent to which each alternative benefits more than one natural resource and/or service. • The effect of each alternative on public health and safety.
Evaluation based on additional OO TIG criteria	Project ideas were evaluated against additional criteria determined by the OO TIG for use in Bird and Sturgeon project screening: <ul style="list-style-type: none"> • Project complies with applicable laws and regulations • Project supports existing regional or local conservation efforts or plans • The extent to which project is capable of providing long-term, sustainable ecological or public benefits without continuous funding into the future • Project is time critical • Project offers opportunities for external funding and/or collaboration

Because this first RP/EA is limited to two Restoration Types (i.e., Birds and Sturgeon), project objectives needed to be consistent with at least one of these two Restoration Types to proceed further in the

screening process.¹⁵ As specified in the Final PDARP/PEIS, Trustee goals for the Bird Restoration Type include:¹⁶

- Restoring lost birds by facilitating additional production and/or reduced mortality of injured bird species;
- Restoring or protecting habitats on which injured birds rely; and
- Restoring injured birds by species where actions would provide the greatest benefits within geographic ranges that include the Gulf of Mexico.

Trustee goals for the Sturgeon Restoration Type include:¹⁷

- Restoring and protecting Gulf sturgeon through improving access to spawning areas; and
- Increasing the reproductive success of Gulf sturgeon.

2.3.2.3 Consistency with Strategic Framework (Birds)

The DWH Regionwide TIG authorized the development of a set of strategic frameworks for oysters, birds, marine mammals, and sea turtles to provide context for prioritization, sequencing, and selection of projects within future Trustee Implementation Group (TIG) restoration plans. In June, 2017 the DWH Trustees released the document “Strategic Framework for Bird Restoration Activities” to the public.¹⁸ This document includes: 1) a brief summary of the information in the PDARP/PEIS related to birds, including an overview of the injury, restoration goals, restoration approaches and techniques, and monitoring considerations; 2) biological and ecological information, including geographic distribution, life history, and key threats; 3) an overview of other recent and ongoing conservation, restoration, management, and monitoring activities related to birds in the northern Gulf of Mexico; and 4) considerations for the prioritization, sequencing, and selection of restoration projects to benefit birds, including additional information on restoration approaches and techniques, potential project concepts, and monitoring needs. As part of this stage of the screening process, the Trustees removed bird restoration project ideas from further consideration that were found to be inconsistent with the restoration goals, approaches and techniques prioritized in this document.

2.3.2.4 Consistency with OPA and Additional Open Ocean TIG Criteria

The Open Ocean TIG reviewed individual project ideas that made it through the previous screening stages against screening factors established in the OPA regulations (15 CFR § 990.54(a)), which govern the NRDA process, as well as additional specific factors identified by the Open Ocean TIG not yet applied in the screening process.

¹⁵ As noted in Chapter 1 of this document, the OOTIG has initiated drafting of its second post-settlement draft restoration plan, which will propose projects to address natural resource injuries caused by the Deepwater Horizon oil spill for the following restoration types: Sea Turtles, Marine Mammals, Fish and Water Column Invertebrates and Mesophotic and Deep Benthic Communities. Additional RP/EA(s) may be developed by the OOTIG in the future.

¹⁶ See Section 5.5.12.1 of the Final PDARP/PEIS.

¹⁷ See Section 5.5.7.1 of the Final PDARP/PEIS.

¹⁸ See http://www.gulfspillrestoration.noaa.gov/sites/default/files/wp-content/uploads/Birds_Strategic_Framework_06.23.17.pdf.

The OPA factors include:

- The cost to carry out the alternative;
- The extent to which each alternative is expected to meet the goals and objectives of returning the injured natural resources and services to baseline and/or compensating for interim losses;
- The likelihood of success of each alternative [based on both technical and organizational feasibility];
- The extent to which each alternative will prevent future injury as a result of the incident and avoid collateral injury as a result of implementing the alternative;
- The extent to which each alternative benefits more than one natural resources and/or service; and
- The effect of each alternative on public health and safety.

The additional criteria identified by the Open Ocean TIG for use in the Bird and Sturgeon project screening process and applied at this screening stage:

- Whether or not the alternative complies with all applicable laws and regulations;
- The extent to which each alternative supports existing regional or local conservation efforts or plans;
- The extent to which each alternative is sustainable and would produce long-term benefits without the assistance of continuous funding into the future;
- The extent to which each alternative is time critical; and
- The extent to which each alternative offers opportunities for collaboration and/or leveraged external funding sources.

Common reasons project ideas were removed from consideration at this stage included (but were not limited to):

- The project would cause significant collateral damage or would cause future injury to natural resources;
- Similar projects or methodologies had been previously implemented with limited or no success;
- The project would result in significant negative effects on human health and safety or any ongoing or anticipated remedial actions; or
- The anticipated benefits of project activities will take an unreasonable amount of time to come to fruition.

2.4 Alternatives Not Considered for Further Evaluation in this Plan

The reasonable range of alternatives considered for this RP/EA was selected from project ideas that made it through the screening steps outlined above. Project ideas that were screened out are not considered further in this RP/EA. In some cases, project ideas met or 'almost' met screening criteria, but: 1) need further technical development; 2) did not align as closely with the initial priorities of the OO TIG; or 3) may be funded through other DWH settlement funding mechanisms. For example:

- Restoration of Northern gannets is an initial priority of the OO TIG because of the large number of gannets injured by the spill and because there are currently no DWH projects focused on gannet restoration; however, there are project design and scale uncertainties that need to be

further addressed before the Trustees believe it is appropriate to consider a gannet restoration project.

- The OO TIG also considered including a project idea addressing the threat of monofilament fishing line entanglement along the Gulf coast through coordinated statewide efforts, identifying hotspots, increasing signage and/or receptacles, and outreach efforts to increase public awareness. However, since this is more of a near-shore concern, it would not likely focus on restoring the subset of bird species initially prioritized by the OO TIG.
- The OO TIG considered including a feasibility study for providing pelican nesting habitat in Minnesota Lake, but coordination with natural resource agencies in Minnesota revealed concerns about sediment sourcing, fill placement, and additional challenges to project implementation. The concerns substantially reduced the likelihood of successfully implementing the project after an investment in the feasibility study was made. Therefore, the feasibility study for this project was not evaluated further in this document.
- Some large-scale sturgeon tagging projects were considered by the OO TIG; however, these may relate more closely to the Monitoring and Adaptive Management Restoration Goal and may therefore be addressed as part of planning efforts related to that goal.

Overall, the OO TIG is continuing to explore the most cost-effective restoration strategies and techniques that yield measurable benefits to birds and sturgeon. Project ideas not included in the reasonable range of alternatives for this RP/EA may be evaluated and potentially selected in a future restoration plan.

2.5 Reasonable Range of Restoration Alternatives Considered

From the process described above, the Open Ocean TIG developed a reasonable range of alternatives for further consideration and evaluation. Summaries of each project alternative considered in this RP/EA are provided in the following subsections of this chapter. OPA and NEPA evaluations of these alternatives are provided in Chapters 3 and 4 of this document, respectively.

2.5.1 Birds

Screening project ideas within the Birds Restoration Type resulted in the identification of four bird restoration projects, summarized below, for the reasonable range of alternatives.

2.5.1.1 Restoration of Common Loons in Minnesota, USA

The objectives of this proposed alternative are to reduce mortality and increase reproductive success of common loons at breeding, nesting, and migration staging locations in Minnesota by focusing on restoration activities that include: 1) acquisition and/or easements of lakeshore loon nesting habitat; 2) enhancing loon productivity by providing artificial nesting platforms in targeted lakes and engaging Minnesota lake associations in loon conservation activities; and 3) reducing loon exposure to lead-based fishing tackle. The estimated cost of this alternative is \$7,520,000.

2.5.1.2 Restoration of American White Pelicans on the Upper Mississippi River

This proposed alternative would create ten acres of new nesting habitat within the Upper Mississippi River National Wildlife and Fish Refuge (NWFR; Clinton County, IA, and Carroll County, IL). Dredge spoil generated through maintenance dredging of navigation channels would be utilized to create river islands or enhance existing islands. The newly created islands would be managed by the USFWS as part

of Upper Mississippi River NWFR. Additional protection measures that may be implemented include: shoreline protection, vegetation plantings, mammalian predator management, and seasonal public closures. The estimated cost of this alternative is \$6,000,000.

2.5.1.3 Restoration of Black Terns in North and South Dakota

This proposed alternative would protect palustrine emergent wetland habitat and adjacent upland grassland habitat to enhance and improve breeding site selection (i.e., occupancy) and foraging conditions for black terns in more than 30 counties in North and South Dakota located in the Prairie Pothole Region (PPR) using a decision-support tool specific to black terns. Conservation easement agreements would be implemented on a voluntary basis with participating landowners as part of ongoing USFWS conservation programs in North and South Dakota. The estimated cost of this alternative is \$6,250,000.

2.5.1.4 Restoration of Black Terns in the Upper Midwest

This proposed alternative would restore palustrine and lacustrine marsh habitat and enhance nesting conditions for black terns at eight priority colonies identified primarily on public lands (USFWS National Wildlife Refuges (NWRs) and state Wildlife Management Areas (WMAs)) in the Upper Midwest through site-dependent combinations of several potential management actions (e.g., vegetation control, water level management, installation of floating artificial nest platforms, and/or development of a stewardship program to enhance landowner awareness and support in beneficial habitat management). The estimated cost of this alternative is \$1,400,000.

2.5.2 Gulf Sturgeon

Screening project ideas within the Sturgeon Restoration Type resulted in the identification of two Gulf sturgeon restoration projects, summarized below, for the reasonable range of alternatives.

2.5.2.1 Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems

This proposed alternative would: 1) identify and characterize the potential spawning habitat in the Pearl and Pascagoula River systems; 2) describe habitat accessibility and patterns of habitat use during spawning periods; 3) determine the river of origin for juvenile sturgeon; and 4) synthesize the data needed to evaluate and prioritize spawning habitat restoration projects such as in-stream barrier removal, spawning reef creation, or riparian restoration. The estimated cost of this alternative is \$2,150,000.

2.5.2.2 Riparian and Coastal Conservation to Restore Spawning and Juvenile Habitat for Gulf Sturgeon

This proposed alternative would restore Gulf sturgeon and supporting sturgeon habitat through increased spawning success and juvenile survival by improving the quality of riparian habitats and receiving waters in cooperation with willing private and public landowners through technical and financial assistance. USEPA and USDA standard best practices would be utilized, focused on riparian and wetland restoration and storm water control on agriculture, forest, and urban lands to benefit sturgeon habitat. Priority may be focused on particular sturgeon subpopulations or life-stage habitats and on particular watersheds. The estimated cost of this alternative is up to \$7,000,000.

Chapter 3: OPA Evaluation of Alternatives

This chapter provides project information and an OPA analysis of each alternative within the reasonable range of alternatives considered in this document (see Section 2.5).¹⁹ Each alternative-specific section begins with a general description of the project and relevant background information, including cost, followed by a discussion of the project's consistency with OPA project evaluation criteria and a description of planned monitoring.

As described in Chapter 2, the reasonable range of alternatives evaluated in this document includes one "phased" restoration alternative. This "phasing" approach allows the TIG to evaluate undertaking a planning phase (e.g., collection/analysis of data critical to the restoration planning process, conducting a feasibility study, or undertaking engineering and design work) in one restoration plan, facilitating development of potentially promising projects to the extent needed to fully consider construction/program implementation in a future restoration plan. The phased alternative is:

- Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems

The other five restoration alternatives included in the reasonable range of alternatives considered in this document already have an implementable design, and selection by the Trustees would result in project construction/program execution (after completing all regulatory compliance and permitting requirements).

3.1 Summary of OPA Evaluation Criteria

According to the NRDA regulations under OPA, trustees are responsible for identifying a reasonable range of alternatives (15 CFR § 990.53(a)(2)) that can be evaluated according to the OPA evaluation standards (15 CFR § 990.54). Chapter 2 describes the screening and identification of a reasonable range of alternatives for evaluation under OPA. Once a reasonable range of alternatives is developed, the OPA NRDA regulations (15 CFR § 990.54) require trustees to identify preferred restoration alternatives based on certain criteria. These criteria are:

- The cost to carry out the alternative;
- 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 (the ability of the restoration project to provide comparable resources and services; that is, the nexus between the project and the injury);
- The likelihood of success of each alternative;
- The extent to which each alternative will prevent future injury as a result of the incident, and avoid collateral injury as a result of implementing the alternative;

¹⁹ The terms "project" and "alternative" are used interchangeably in this chapter.

- The extent to which each alternative benefits more than one natural resource and/or service; and
- The effect of each alternative on public health and safety.

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

3.2 Monitoring Requirements

When developing a restoration plan trustees establish restoration objectives that are specific to the natural resource injuries (15 CFR § 990.55(b)(2)). These objectives should clearly specify the desired project outcome, and the performance criteria by which successful restoration under OPA will be determined (15 CFR § 990.55(b)(2)). The requirements for the monitoring component of a restoration plan are further described in 15 CFR § 990.55(b)(3).

Monitoring, Adaptive Management, and Administrative Oversight was identified as one of the Trustee programmatic restoration goals in the Final PDARP/PEIS. As described in Chapter 5, Appendix E of the Final PDARP/PEIS, the Trustee Council has committed to a monitoring and adaptive management (MAM) Framework to support restoration activities by incorporating best available science into project planning and design, identifying and reducing key uncertainties, tracking and evaluating progress toward restoration goals, determining the need for corrective actions, and supporting compliance monitoring. The DWH NRDA MAM Framework provides a flexible, science-based approach to effectively and efficiently implement restoration over several decades that provides long-term benefits to the resources and services injured by the Incident.

At a project level, MAM plans identify the monitoring needed to evaluate progress toward meeting site-specific objectives and to support corrective action and adaptive management of the restoration project where applicable. MAM plans must be consistent with the requirements and guidelines set forth in the Final PDARP/PEIS and the Trustee Council SOP, as well as the Trustees MAM Manual. MAM plans include descriptive information regarding monitoring goals, objectives, parameter details (e.g. methodology and timing/frequency), potential corrective actions, and monitoring schedules. They are intended to be living documents and would be updated as needed to reflect changing conditions and/or to incorporate new information. For example, the 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 future revisions to individual project MAM plans as well as updates and additional details concerning the status of monitoring activities would be made publicly available through the Trustee Council Restoration Portal (<http://www.restoration.noaa.gov/dwh/storymap/>).

MAM plans relevant to this RP/EA are included in Chapter 5 of this document. MAM plans are developed for alternatives that the Trustees identify as preferred – there is no need to develop MAM plans for projects that are not proposed for implementation. A MAM plan would be developed for any of the alternatives that are not preferred if later selected for implementation. In addition, consistent with Section 10 of the Trustee Council SOP (revised November 15, 2016), a MAM plan is not required for a project proposed only for engineering and design or other types of planning activities. A MAM plan would be developed in the future if restoration actions subsequently are selected for implementation in a future restoration plan.

3.3 Project Costs

For “phased” projects, estimated costs include planning, data collection and analysis, feasibility studies, design engineering and/or other activities needed to facilitate development of an implementable project design, for potential consideration by the Trustees for implementation in future restoration plans. For other projects, estimated costs reflect all costs associated with implementing the project alternative, potentially including but not limited to revising/finalizing engineering and design, permitting, construction monitoring, trustee oversight, contingencies, etc. These cost estimates reflect the most current designs and information available to the OO TIG at the time of drafting this restoration plan.

3.4 Best Practices

The federal agencies provide project design and implementation guidance as part of the environmental compliance process as well as for certain voluntary/incentive based programs. Best practices generally include design criteria, Best Management Practices (BMPs), lessons learned, expert advice, tips from the field, and more. Trustees and their partners use appropriate best practices to avoid or minimize impacts to natural resources, including protected species and their habitats. Specific project designs for all project types must consider the potential impacts on these resources and include BMPs and other mitigation measures to avoid adversely affecting sensitive natural resources. Therefore, collateral injury to other natural resources and impacts to public health and safety for each alternative are expected to be minimal, and BMPs would be used during implementation for all techniques to avoid or minimize any collateral injury or risk to public health and safety. BMPs required in the permit, consultations, voluntary program, or environmental reviews would be followed. Additionally, BMPs described in Appendix 6.A of the Final PDARP/PEIS would be followed, as appropriate, to reduce or eliminate impacts to the environment.

3.5 OPA Evaluation of Bird Restoration Alternatives

The OO TIG screening process resulted in the identification of four bird project alternatives and a No Action alternative to be evaluated in this RP/EA (see Chapter 2). A description of each bird restoration alternative followed by the Trustees’ OPA evaluation (see Section 3.1 for a list of OPA evaluation criteria) is provided in the following sections of this document.

3.5.1 Restoration of Common Loons in Minnesota

The objectives of this alternative are to reduce mortality and increase reproductive success of common loons at breeding, nesting, and migration staging locations in Minnesota by focusing on: 1) acquisition and/or easements of lakeshore loon nesting habitat; 2) enhancing loon productivity by providing artificial nesting platforms in targeted lakes and engaging Minnesota lake associations in loon conservation activities; and/or 3) reducing loon exposure to lead-based fishing tackle. The estimated cost of this alternative is \$7,520,000.

3.5.1.1 Project Description

Common loons nest in the northern United States (e.g., Minnesota, Wisconsin, Maine, Alaska) and Canada, primarily on lakes in coniferous forests. Recent migration data identify the GOM as the primary wintering area for common loons within the Mississippi Flyway.²⁰ Among juvenile loons radio-marked in Minnesota, 94% occupied nearshore areas, lagoons, bays, and offshore areas of the Gulf of Mexico during their first winter (Kenow 2014).

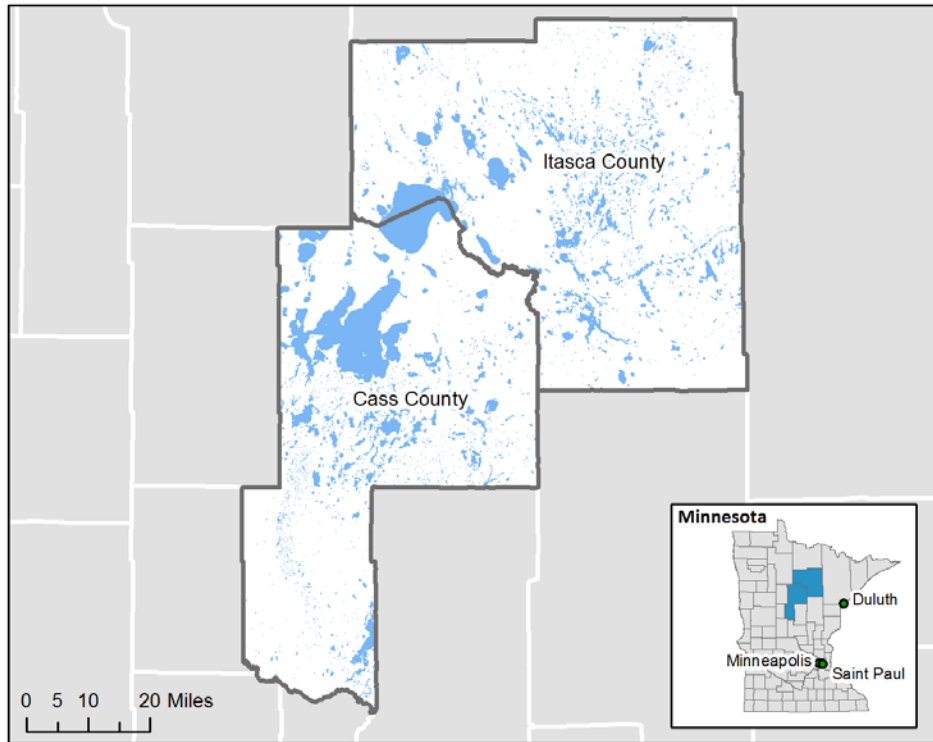
Modeling data indicate that loon reproductive success is driven by habitat quantity and quality, as well as adult survival rates. Although loons are not protected under the Endangered Species Act and do not have a formal Recovery Plan, the USFWS has long been dedicated to loon conservation, and in 2007 commissioned “Status Assessment and Conservation Plan for the loon in North America” (Evers 2007). Consistent with that document, the Trustees propose to restore resources for common loons by employing techniques known to minimize threats to loon survival and reproduction (i.e., loss of lake shore nesting habitat, lead poisoning due to incidental ingestion of lead fishing tackle, and premature mortality caused by local, natural and/or anthropogenic factors) at lakes in Minnesota, as described below.

- **Acquisition of lakeshore loon nesting habitat.**

Lakeshore development continues to degrade loon nesting habitat. Habitat degradation and loss from shoreline development is commonly cited as a major contributor to declines in local breeding populations and reduced reproductive success (McIntyre 1988). Shoreline development adversely affects habitat quality by (1) modifying and/or removing vegetation and substrate material, (2) enhancing predator densities, (3) increasing the overall presence of human activity, and (4) decreasing water quality. In order to facilitate direct protection and ensure future availability of nest sites and supporting habitat the Trustees propose to partner with the state of Minnesota to purchase the counties’ interest in School Trust Lands to acquire foraging and nesting habitat on shoreline parcels in Cass and Itasca Counties (see Figure 3-1 for a generalized map of waterbody locations in these counties). School Trust Lands are public lands set aside in 1858 to provide a continual source of funding for public schools, through iron mining, timber harvesting, and other revenue generating activities (MDNR website 2018). It is the Trustees’ current understanding that several different School Trust parcels are potentially available. The selected School Trust Lands parcels would be transferred to the state of Minnesota to manage for preservation, conservation and land protection. As part of that process, acquired parcels would be subject to permanent conservation easements. Advisory signage would be installed on acquired parcels used by nesting loons to advise the public of any access restrictions that could be imposed during loon breeding season.

²⁰ See DWH Oil Spill NRDA ‘Strategic Framework for Bird Restoration Activities’, June 2017.

Figure 3-1 Waterbody Location in Cass and Itasca Counties, MN



- **Habitat Enhancement**

The Trustees propose to enhance loon productivity by installing artificial nest platforms in targeted lakes and by recruiting MN lake associations in loon conservation activities. Studies (e.g., Kenow et al. 2013) indicate that the installation and management of artificial nest platforms helps mitigate the effects of nesting habitat loss resulting from shoreline development, nesting failure due to fluctuating water levels, and shoreline-based nest predation. Artificial nesting platforms would be placed along targeted lakeshores in lakes managed and/or owned by the state of Minnesota, and where a “lake association” has agreed to manage platforms according to the state of Minnesota guidelines.

Minnesota has more than 500 lake associations (Ibrahim et al. 2017) committed to the preservation and protection of lakes throughout the state. Collectively, lake associations in MN donate approximately \$6.25 million dollars and 1.2 million volunteer hours annually to lake conservation activities, including aquatic invasive species surveys, water quality testing, and community education and outreach (Ibrahim et al. 2017). The Trustees propose to engage established lake associations in order to create a “Loon-friendly Lake Association” registry program dedicated to loon conservation and monitoring. The goal of this habitat enhancement activity is to increase loon productivity by 5% on registry lakes.

Approximately 40 lake associations per year would be recruited for voluntary enrollment into the registry. Each lake association would:

- Develop a loon conservation plan. With technical assistance from the state of Minnesota, each lake association would develop a loon conservation plan to enhance loon productivity, including but not limited to, optimal location of artificial nest platforms and placement of loon nesting buoys (four buoys around each nest, about 20 feet from each corner) to decrease nest site disturbance.
- Monitor loon activity. Lake association volunteers would be trained in loon survey data collection. Data collected would include loon presence/absence, pairs present, nest location, nest fate (e.g., number of chicks hatched, nest predated, etc.), number of chicks fledged and fall staging numbers. These citizen-based, data collection activities would augment data collected in support of project monitoring and adaptive management strategies.
- Sponsor loon friendly public outreach/educational events. Lake associations would sponsor spring and summer public outreach and/or educational events that promote loon conservation. Activity examples include, but are not necessarily limited to: nontoxic fishing tackle exchanges; kids fishing contests using nontoxic jigs and sinkers; media events; and/or providing loon-friendly management tips in lake association newsletters (e.g., native plants/ habitat enhancements).
- **Reduction in exposure to lead-based fishing tackle.**

Ingestion of lead fishing tackle has been found to be the cause of death in 10% to 20% of MN loons turned in by private citizens annually, and has been identified as the leading cause of mortality in adult common loons (Sidor et al. 2003, Strom et al. 2009). Because loons are a long lived species (i.e., 20-30 years), do not breed until their sixth or seventh year, and have a low fecundity rate of 0.53 chicks fledged/territorial pair/year on average (Evers et al. 2010), adult survivorship is critical to population viability. Studies (e.g., Grade et al. 2018) indicate that replacing lead fishing sinkers and jigs weighing less than approximately 28 grams with non-toxic alternatives would provide immediate benefits to loon populations. The Trustees anticipate increasing adult loon survival rates by funding intervention projects that promote the use of alternatives to lead fishing jigs and sinkers in MN.

From 2001 to 2010, the Minnesota Pollution Control Agency (MPCA), designed and carried out numerous proactive educational and assistance initiatives to encourage MN anglers, retailers, tackle manufactures, nonprofit associations and schools to use environmentally friendly non-lead fishing tackle. The design and projected outputs of this project would be based on the ten years of direct experience of MPCA and would inform estimates of the number of lead tackle exchanges, quantities of lead fishing tackle recovered, retail interest in point of purchase displays, and estimates of contacts with anglers and lake associations. Key project activities include:

- Develop detailed project work-plan, including tasks, scheduling, deliverables, outputs and partners;
- Update information on manufacturers and canvas data on new materials, research on retail prices and availability, research on angling groups, lake associations and school districts;
- Develop communication outreach material including web pages, graphic design, project branding, packaging, printing services, social media and other marketing approaches;

- Initiate angler outreach. Produce approximately 50 annual high profile/public facing lead tackle exchanges. Targeted outreach to under-represented audiences such as ethnically diverse anglers, youth and women outdoor enthusiasts. Educational opportunities with Conservation Officers, future anglers and youth leaders;
- Engage retailers. One hundred “points of purchase” environmentally friendly non-lead fishing tackle displays would be developed and agreements entered into with both retailers and Minnesota State Parks (MSP); and
- Engage future anglers/future leaders. Engage youth in classrooms and outside school settings. Minnesota’s Teach a Kid to fish activities would be leveraged. The program would align with state educational standards in science and other related subjects to reach K-12 students at 150 schools.

The Trustees expect the acquisition of lakeshore loon nesting habitat, habitat enhancement, and reduction in exposure to lead based fishing tackle efforts to be a three year project. Activities proposed within the first year of project implementation would include, but would not be limited to: establish an on-site FWS project coordinator to guide project implementation and coordinate project partners; develop a priority list of School Trust parcels for acquisition; conduct site visits to assess conservation needs of parcels; develop a list of lakes potentially suitable for territorial loon occupancy but lacking in secure nesting habitat; conduct site visits to identify lakes that would benefit from the addition of artificial nest platforms to increase breeding habitat; and monitor restoration project results.

3.5.1.2 OPA Evaluation

Trustee analysis indicates that at least several hundred common loons were lost due to the DWH spill.²¹ As indicated in the DWH Trustee document “Strategic Framework for Bird Restoration Activities” (2017), common loons nest in the northern United States (e.g., Minnesota, Wisconsin, Maine and Alaska) and Canada, primarily on lakes in coniferous forests. Recent migration data identify the Gulf of Mexico (GOM) as the primary wintering area for common loons within the Mississippi Flyway. Habitat loss and alteration and human disturbance in nesting areas are primary threats to common loons. Other primary threats include human disturbance (particularly from water-based recreational activities) and toxicosis from ingested lead fishing equipment (e.g., sinkers, jigheads). Project components and geographic location directly address these critical threats to common loons that winter in the GOM. This project is consistent with programmatic and Restoration Type-specific goals and has a clear nexus to injury given its potential to reduce mortality and increase reproductive success of common loons. The project employs commonly utilized techniques for minimizing threats to loon survival and reproduction that have a high likelihood of success.

As described in more detail in Chapter 4 of this document, any adverse impacts to the environment associated with this project are anticipated to be minor (see Section 4.4.1.3). Likewise, the Trustees do not anticipate impacts to public health and safety. The use of alternatives to lead fishing jigs and sinkers and programs to inform the public of fishing tackle entanglement are likely to benefit multiple bird species. Acquisition and/or easements of lakeshore loon nesting habitat also is likely to benefit other

²¹ See Table 4.7-3 in the Final PDARP/EIS.

biota that make use of such habitat. Construction of nesting platforms and lead fishing jigs/sinker replacement and fishing tackle entanglement public education programs are relatively low cost methods for increasing reproductive success and reducing mortality of loons. Protecting existing loon nesting sites through habitat acquisition/easements generally is more costly, but also more certain to generate benefits (by preventing the loss of existing loon nests) and the only option available in areas where nesting platforms are unlikely to successfully attract breeding loons.

3.5.2 Restoration of Black Terns in North and South Dakota

This alternative would protect palustrine emergent wetland habitat and adjacent upland grassland habitat to enhance and improve breeding site selection (i.e., occupancy) and foraging conditions for black terns in more than 30 counties in North and South Dakota of the Prairie Pothole Region (PPR). The estimated cost of this alternative is \$6,250,000.

3.5.2.1 Project Description

The North American black tern breeds in freshwater wetlands throughout the northern U.S. and southern Canada. Once a common summer resident in wetlands of the northern PPR, breeding populations of black terns have experienced considerable declines over the past century (Heath et al. 2009). These declines are most likely attributed to extensive loss and degradation of wetland habitats in this region (Dahl 1990, 2014; see also Niemuth et al. 2012, Doherty et al. 2013, Niemuth et al. 2013, Walker et al. 2013, Niemuth et al. 2014).

The primary objective is to protect approximately 2,000 wetland acres and 1,000 grassland acres on private lands in the northern PPR with willing landowners. Based on USFWS experience working in this region (described in more detail below) the Trustees anticipate that sufficient habitat acreage will be available from willing landowners to meet project objectives, and that it will likely take three to five years to complete the project. Based on previous surveys of occupied wetlands, the Trustees estimate that at least approximately 1,000 individual black terns would be present on project wetlands when habitat conditions are optimum (see Niemuth et al. 2010, Naugle et al. 2000). While optimal conditions would not be present on every wetland in every year, over time wetland habitat on conservation easements are expected to exhibit the full-cycle of hydrology conditions necessary to periodically support breeding and/or foraging black terns. In addition to black terns, breeding habitat benefits would accrue to other wetland-dependent avian species injured by the DWH spill (see Niemuth 2005).

All habitat protection actions would be implemented on a voluntary basis with participating landowners as part of ongoing USFWS conservation programs in the Dakotas. There are currently over 1,200 private landowners on waiting lists to have their property evaluated for additional UFSWS wetland and grassland conservation easements in the Dakotas. In recent years, the USFWS has been partnering with hundreds of private landowners in the Dakotas to acquire voluntary conservation easements. However, landowner interest continues to exceed program capacity (i.e., availability of funds). The funds identified for black tern conservation would help meet this landowner interest, and also focus on a slightly different class of wetlands than that typically conserved for ducks to optimize benefits to black terns.

The USFWS has been working in partnership with private landowners to acquire voluntary wetland and grassland conservation easements in the U.S. portion of the PPR for over 50 years. All USFWS conservation easements in the PPR are administered by Wetland Management District (WMD) offices as

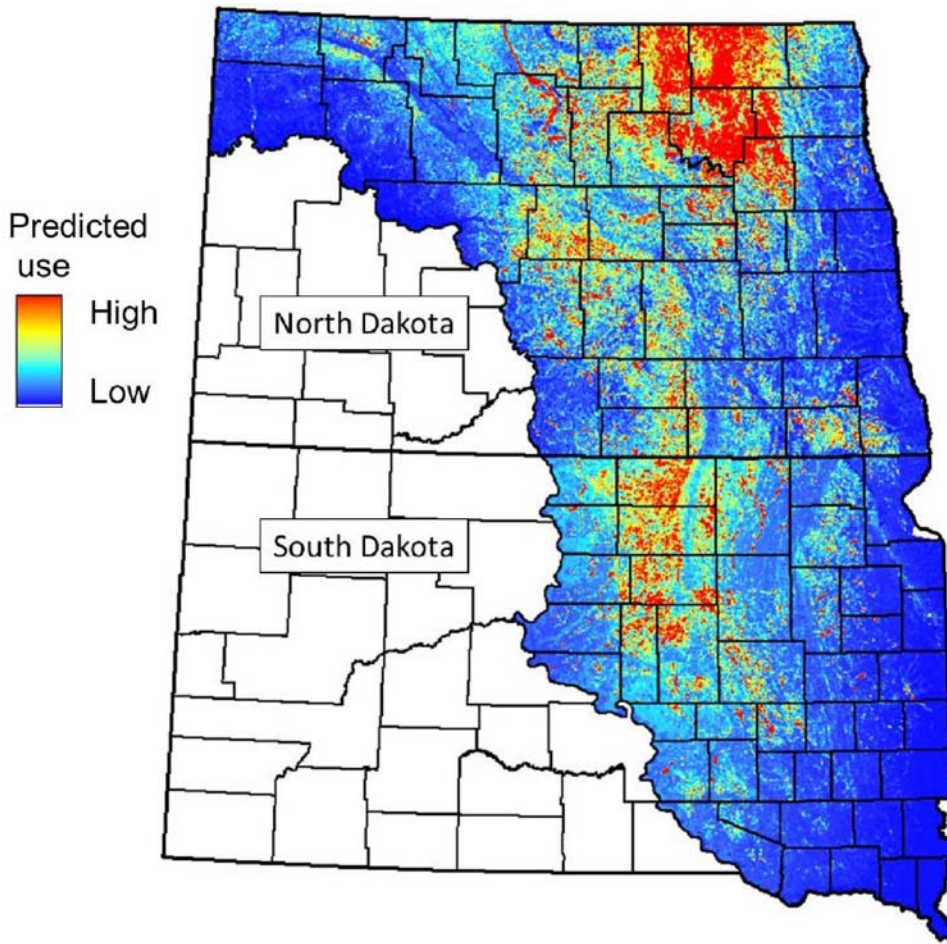
part of the USFWS National Wildlife Refuge System (NWRS). In addition, over the past 30 years the USFWS's Partners for Fish and Wildlife Program (PFW) has partnered with over 10,000 landowners in the PPR to complete habitat restoration and enhancement projects. To help guide this collective conservation effort, the USFWS Habitat and Population Team (HAPET) has developed a suite of spatially explicit decision support tools to strategically target these efforts to achieve the highest conservation outcome, especially for breeding ducks. More recently, HAPET has also developed a suite of decision support tools for other avian species, including black terns (Niemuth 2005). The Trustees would use the HAPET black tern decision support tool to identify priority tracts of wetland and grassland habitats to protect, thereby helping to restore black terns. See Figure 3-2 for an example map of the predicted use of landscapes by black tern in portions of North and South Dakota based on HAPET analysis. The Trustees anticipate that habitat protected as part of this project would be subject to voluntary, permanent USFWS conservation easements administered as part of the NWRS.

3.5.2.2 OPA Evaluation

Trustee analysis indicates that at least several hundred black terns were lost due to the DWH spill. Black terns are one of several species that nest across several ecological regions, but primarily in wetland areas (e.g., freshwater prairie wetlands, lakes, rivers) in the Prairie Pothole Region of the upper Midwestern United States and Canada. This region was once part of the largest grassland-wetland ecosystems on the Earth, consisting of over seven million acres of wetlands supporting nesting and migratory waterbirds. A number of anthropogenic activities, namely conversion of grassland and wetland to row crop agriculture, have drastically reduced the availability of these habitats (Ringelman et al. 2005). The geographic location and components of this project directly address critical threats to black terns that winter in the GOM. This project is consistent with programmatic and Restoration Type-specific goals and has a clear nexus to injury given its potential to reduce mortality and increase reproductive success of black terns. The project would leverage existing USFWS conservation/restoration programs specifically to restore black terns to implement this project.

The use of existing programs to meet this objective is a cost efficient approach that takes advantage of existing expertise, program infrastructure and contacts to implement projects in a manner that is highly likely to achieve success. As described in more detail in Chapter 4 of this document, this project is not expected to have any adverse impacts on the environment or cause collateral injury to other resources (see Section 4.4.2.3). The Trustees do not anticipate impacts to public health and safety given the nature of the project (i.e., land acquisition) and best practices already in place for this existing program. Although targeted at black terns, it is likely that project benefits will accrue to other bird species and biota that make use of conserved/restored habitat.

Figure 3-2 Example of HAPET Predicted Use of Landscapes by Black Tern



3.5.3 Restoration of American White Pelicans on the Upper Mississippi River

This alternative would create a total of ten acres of new nesting habitat within the Upper Mississippi River National Wildlife and Fish Refuge (NWFR; Clinton County, IA, and Carroll County, IL). Dredge spoil generated through maintenance dredging of navigation channels would be utilized to create river islands or enhance existing islands. The newly created islands would be managed by the USFWS as part of Upper Mississippi River NWFR. The estimated cost of this alternative is \$6,000,000.

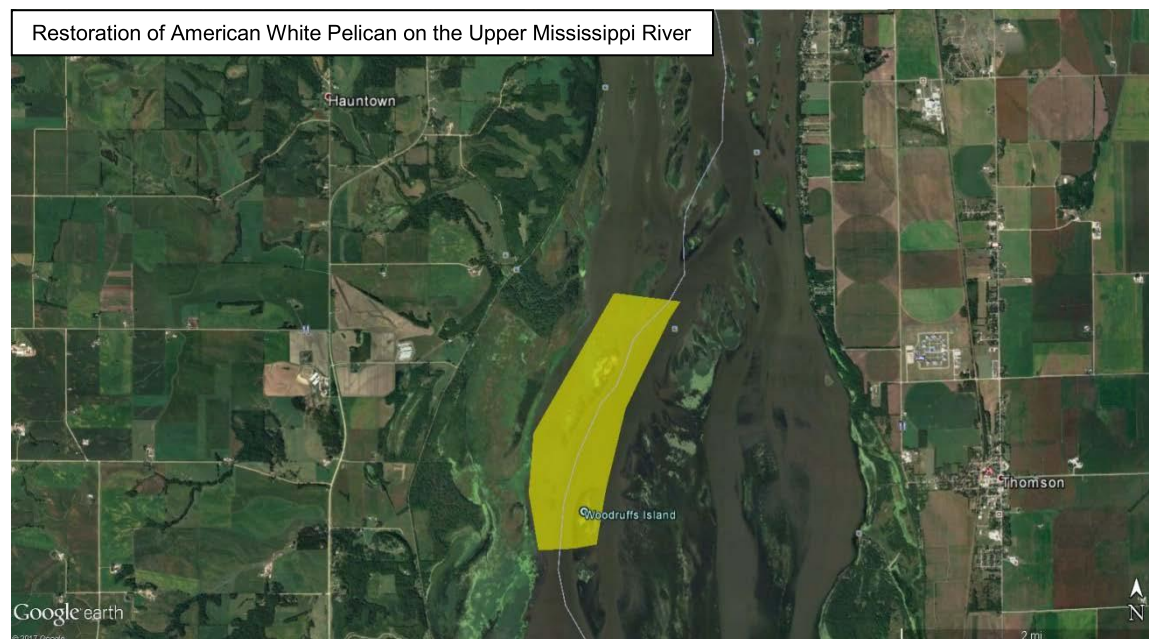
3.5.3.1 Project Description

American White Pelicans (AWPE) are colonial ground-nesters, and their breeding range includes the Upper Mississippi River. American white pelican populations that breed in the upper Midwest also winter in the Gulf of Mexico. This project would enhance AWPE nesting opportunities by providing additional nesting habitat in targeted established nesting areas within their breeding range.

The availability of suitable nesting habitat in the upper Mississippi River is a limiting factor for AWPE. This project would create 10 acres of new nesting habitat within the Upper Mississippi River National Wildlife and Fish Refuge (NWFR; Clinton County, IA, and Carroll County, IL – see Figure 3-3). The USFWS proposes working with the US Army Corps of Engineers (USACE), Rock Island District, to utilize dredge spoil generated through maintenance dredging of navigation channels to create river islands or enhance

existing islands. The newly created islands would be managed by the USFWS as part of Upper Mississippi River NWFR. Additional protection measures that may be implemented on a case-by-case basis include: shoreline protection, vegetation plantings, mammalian predator management, and seasonal public closures. Nesting double-crested cormorants typically co-locate with nesting American white pelicans – as a result it is anticipated that this project would also benefit nesting double-crested cormorants.

Figure 3-3 American White Pelicans on the Upper Mississippi River Project Location



To implement this project, the USFWS would partner with Iowa Department of Natural Resources, Illinois Department of Natural Resources, and USACE. Project implementation would be anticipated to begin approximately one year after project approval and take one to five years to complete (depending on dredging schedules), with post-construction monitoring conducted for a minimum of five years.

3.5.3.2 OPA Evaluation

Trustee analysis indicates that at least several thousand American White Pelicans were lost due to the DWH spill. As previously described in Section 3.5.1.2 of this document, the majority of American White Pelicans that winter in the GOM nest in the Midwestern United States. Habitat loss and alteration, human disturbance, and predation on breeding grounds are the primary threats to American White Pelicans that winter in the GOM. The approach and location of the underlying restoration project directly address these critical threats, and the project is consistent with programmatic and Restoration Type-specific goals and has a clear nexus to injury given its potential to enhance American White Pelican productivity by providing additional nesting habitat.

The project would leverage existing USFWS –USACE partnership programs specifically to restore AWPE. USACE dredges sand from the Upper Mississippi River to maintain a nine-foot deep navigation channel for commercial barge traffic. Dredge sand is available for use for a variety of purposes, including the creation of islands. USFWS has worked with USACE for over 25 years to use this material for the construction of islands in the Mississippi River. While Trustee use of this existing partnership program to meet this restoration objective is a cost efficient approach that takes advantage of existing expertise,

program infrastructure, and contacts in a manner that is highly likely to result in successful implementation, currently available information is not sufficient to estimate the approximate magnitude of benefits likely to be generated by the new habitat and assess the potential need for shoreline protection, ongoing predator management, and/or other complementary actions to maximize project success. As described in more detail in Chapter 4 of this document, any adverse impacts to the environment associated with this project are anticipated to be minor (see Section 4.4.3.3). The Trustees do not anticipate impacts to public health and safety given experience with and best practices already in place for this existing program (e.g., turbidity control within the fill placement area and appropriate warning signage within their work area and along the sediment conveyance corridor). Although targeted at AWPE, it is likely that project benefits will accrue to double-crested cormorants and potentially other bird species and biota that make use of conserved/restored habitat.

3.5.4 Restoration of Black Terns in the Upper Midwest

This alternative would restore palustrine and lacustrine marsh habitat and enhance nesting conditions for black terns at eight priority colonies identified primarily on public lands (USFWS National Wildlife Refuges and state Wildlife Management Areas) in the Upper Midwest through a variety of potential management actions. The estimated cost of this alternative is \$1,400,000.

3.5.4.1 Project Description

The North American black tern breeds in freshwater wetlands throughout the northern U.S. and southern Canada. Once a common summer resident in wetlands of the northern Prairie Pothole Region (PPR), breeding populations of black terns have experienced considerable declines over the past century (Heath et al. 2009). These declines are most likely attributed to extensive loss and degradation of wetland habitats in the PPR (Dahl 1990, 2014; see also Niemuth et al. 2012, Doherty et al. 2013, Niemuth et al. 2013, Walker et al. 2013, Niemuth et al. 2014).

This project would restore palustrine and lacustrine marsh habitat and enhance nesting conditions for black terns at eight priority colonies identified primarily on public lands (USFWS National Wildlife Refuges and state Wildlife Management Areas) in the Upper Midwest. This project would include management actions such as: removal and control of narrow-leaved and hybridized cattail (*Typha* spp.) and common reed (*Phragmites australis*) to provide appropriate interspersion of water and emergent vegetation, prevent encroachment of woody vegetation around wetlands, water level management, installation of floating artificial nest platforms, and development of a stewardship program to enhance landowner awareness and support in beneficial habitat management.

3.5.4.2 OPA Evaluation

Trustee analysis indicates that at least several hundred black terns were lost due to the DWH spill. As described in Section 3.5.3.2, black terns are one of several species that nest across several ecological regions, but primarily in wetland areas (e.g., freshwater prairie wetlands, lakes, rivers) in the Prairie Pothole Region of the upper Midwestern United States and Canada. A number of anthropogenic activities, including conversion of grassland and wetland to row crop agriculture, have drastically reduced the availability of these habitats in the PPR (Ringelman et al. 2005). The geographic location and components of this project directly address critical threats to black terns that winter in the GOM. This project is consistent with programmatic and Restoration Type-specific goals and has a clear nexus to injury given its potential to reduce mortality and increase reproductive success of black terns.

The likelihood that the project would be successfully implemented is high given Trustee experience implementing similar actions in the Upper Midwest and other areas of the country. The potential magnitude and timing of breeding and/or reduced mortality benefits to black terns is more difficult to anticipate based on currently available project information. As described in more detail in Chapter 4 of this document, any adverse impacts to the environment associated with this project are anticipated to be minor (see Section 4.4.4.3). The Trustees do not anticipate impacts to public health and safety given project characteristics and Trustee experience with similar projects. Although targeted at black terns, it is likely that project benefits will accrue to other bird species and biota that make use of restored habitat.

3.6 OPA Evaluation of Sturgeon Restoration Alternatives

The OO TIG screening process resulted in the identification of two sturgeon project alternatives and a No Action alternative to be evaluated in this RP/EA (see Chapter 2). The Gulf sturgeon is a threatened species and listed under the Endangered Species Act of 1973. A description of each sturgeon restoration alternative followed by the Trustees' OPA evaluation is provided in the following sections of this document.

3.6.1 Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems

This alternative would: 1) identify and characterize the potential spawning habitat in the Pearl and Pascagoula River systems; 2) describe habitat accessibility and patterns of habitat use during spawning periods; 3) determine the river of origin for juvenile sturgeon in each system; and 4) synthesize the data needed to evaluate and prioritize spawning habitat restoration projects such as in-stream barrier removal, spawning reef creation, or riparian restoration. The estimated cost of this alternative is \$2,150,000.

3.6.1.1 Project Description

Effective Gulf sturgeon restoration requires a better understanding of habitat use, an ability to identify and prioritize habitats most in need of restoration, and a framework for monitoring the results of habitat restoration in an adaptive management context. Information on the location and extent of essential spawning habitat, patterns of accessibility and use of this habitat by adult Gulf sturgeon, and origins of juvenile sturgeon is extremely limited for the Pearl and Pascagoula River systems, where populations are believed to comprise only a few hundred individuals (see Figure 3-4 for a map of the project location). This critical information deficit impedes the Trustees' ability to identify and assign priority to restoration projects that target spawning habitat like barrier removal or spawning habitat enhancement.

Potential opportunities have been identified that target spawning habitat barriers or enhancement of spawning habitat. These include, but are not limited to, the Pearl River system low-head dams (i.e., sills) and the Pearl River dam that may impede access to upstream reaches that may contain the requisite hard-bottom substrates suitable for Gulf sturgeon spawning, as well as habitat enhancement opportunities associated with land use compatibility with sturgeon spawning habitat (e.g., agricultural BMPs targeting sedimentation and erosion or nutrient reduction). Removal of barriers and water and sediment quality have been longstanding priorities for Gulf sturgeon restoration, yet the Trustees cannot predict the outcomes of these projects, nor rank the relative importance of various restoration

designs based on currently available information. Furthermore, it is unknown where adult fish will go to spawn once a barrier is removed. Identifying essential spawning habitat in the Pearl and Pascagoula River systems is not only important to restoration decision making, but this information is essential to guiding species recovery within these basins. Filling these knowledge gaps is essential to Gulf sturgeon restoration planning and implementation, and is essential to species recovery as described in the Gulf Sturgeon Recovery Plan.

Figure 3-4 Map of Project Area Highlighting Reaches Targeted for Spawning Habitat Mapping (Yellow) that Encompass Roughly 1,500 Stream Kilometers in Both the Pearl and Pascagoula River Systems



The importance of focused efforts in the Pearl and Pascagoula River systems to Gulf sturgeon recovery cannot be overstated; the two populations are genetically distinct from those to the east, appear to occupy different estuarine and marine habitats, exhibit unique behaviors and seasonal migratory patterns, and face different threats. Moreover, the current status and abundance of both populations is uncertain. Given the high priority assigned to spawning habitat restoration, this project represents a fundamental first step toward achieving the overarching goal of improving the status of Gulf sturgeon in habitats most likely to have been affected by the *Deepwater Horizon* Oil Spill.

Objective 1 (Years 1 and 2): Mapping Potential Spawning Habitat

Gulf sturgeon spawn exclusively over hard, rocky substrates such as cobble, boulder, and bedrock outcrops. These substrates are easily distinguished in side scan sonar imagery from the soft, sandy bottoms that predominate in Coastal Plain river systems. The Trustees would map and characterize potential sturgeon spawning habitat throughout the Pearl and Pascagoula River systems using side scan sonar habitat mapping. This approach would involve sonar surveys, sonar data processing, habitat classification and mapping, and field ground-truthing. The end-products would be full-channel, complete- census maps of benthic substrates throughout both river systems that identify and quantify all potential areas of spawning habitat for Gulf sturgeon. Beyond providing the template for investigating patterns of habitat use, these maps would document the baseline, pre-restoration condition of potential spawning habitat needed to monitor change over time following restoration.

Objective 2 (Years 2-4): Telemetry Monitoring of Adult Habitat Access and Use

Upon mapping potential spawning habitat, passive telemetry and temperature arrays would be strategically deployed to bracket areas of spawning habitat to investigate patterns of adult fish access and utilization of these habitats. The arrays would include an estimated 30 receivers and 10 temperature monitoring devices per river system. A pair of telemetry receivers would be deployed above and below each sill in the Pearl system to describe passage and relate this behavior to conditions at each site. An estimated 30 adult sturgeon would be fitted with internal, acoustic transmitters in each system. During handling, the sex of each adult fish would be determined and tissue samples (i.e., fin clip and fin spine samples) would be obtained for genetic and isotopic microchemistry. The results of genetic and isotopic analyses would provide additional insights into parentage and adult spawning site fidelity.

In the Pearl River system, telemetry data would be analyzed to develop a model relating passage to discharge, and conduct a comparative analysis of fish passage at both sills over the historical flow record that exists for both streams. Telemetry analysis in both systems would yield map layers identifying reaches of river that are frequented by adult sturgeon during the spawning season. This information would critically inform future assessments that identify and rank potential restoration projects such as riparian reforestation, channel stabilization, and/or spawning reef creation.

Objective 3 (Years 2-4): River Origins

Mapping spawning habitat and monitoring use of this habitat by adults is important but not sufficient to determine the importance of a given spawning area to the production of juvenile sturgeon. To do so, the Trustees would examine trace element and strontium isotope microchemistry of juvenile sturgeon fin spines. Recent research on the Choctawhatchee River system has established these techniques are viable for Gulf sturgeon and that strontium isotopes are useful for examining regions of occupancy within a river. Studies would compare water samples from the Pearl and Bogue Chitto River drainages, and from the Pascagoula River drainage to create water chemistry maps for each watershed, and build upon preliminary research conducted by the Mississippi State University. This work has revealed differences in both trace elements (e.g., strontium, barium, zinc) and strontium isotopes between the Upper Pearl and Bogue Chitto Rivers, indicating an ability to separate fish from natal rivers and reaches of rivers. Fin spines collected from juvenile sturgeon in each river would be analyzed, and chemical signatures evaluated relative to water chemistry patterns to estimate river and region of river (i.e., reach) of natal origin. Research would compare relationships between diet, water chemistry, and elemental signatures in Atlantic sturgeon, a closely related subspecies of Gulf sturgeon, to improve the Trustees' understanding of patterns observed in wild fish. This information, in concert with telemetry

and habitat data will help to elucidate where the successful recruitment of juvenile sturgeon is occurring within the two study systems.

Objective 4 (Years 3-4): Synthesis

Differences in habitat accessibility, availability of spawning habitat, and production of juvenile sturgeon would be evaluated to provide recommendations regarding anticipated outcomes of removal of one or both sills in the Pearl River system. Furthermore, this knowledge would help to refine the prioritization of barrier removal projects relative to alternative approaches that aim to protect, restore, or enhance spawning habitats in this system. Finally, information generated by this project would generally inform restoration strategies in the Pearl and Pascagoula River systems that aim to employ habitat protection, restoration, or enhancement techniques.

3.6.1.2 OPA Evaluation

Trustee analysis indicates between 1,100 and 3,600 Gulf sturgeon were exposed to DWH oil in the nearshore areas of the northern Gulf of Mexico, representing a large proportion of the populations from six of the eight river systems occupied by Gulf sturgeon. This species' exposure to oil likely resulted in genotoxicity and immunosuppression. This project is consistent with programmatic and Restoration Type-specific goals and has a clear nexus to injury given its potential to generate critical information needed to evaluate and prioritize spawning habitat restoration projects. The project is highly likely to be implemented successfully, given Trustees experience and expertise with identified study methods. Approximately 30 adult sturgeon would be fitted with internal, acoustic transmitters in each system and tissue samples (i.e., fin clip and fin spine samples) would be obtained for genetic and isotopic microchemistry. Similar methods have been utilized as part of previous Gulf sturgeon studies, and the Trustees believe associated risks to Gulf sturgeon are low. As described in more detail in Chapter 4 of this document, this project is not anticipated to have any adverse impacts on the environment (see Section 4.3). The Trustees do not anticipate impacts to public health and safety given the nature of the project. It is unlikely that the project will benefit other, non-sturgeon species.

3.6.2 Riparian and Coastal Conservation to Restore Spawning and Juvenile Habitat for Gulf Sturgeon

This alternative would restore Gulf sturgeon through increased spawning and juvenile survival by improving the quality of riparian habitats and receiving waters in areas that are in or substantively impact Gulf sturgeon critical habitat (see Figure 3-5) through technical and financial assistance to willing private and public landowners, potentially including (but not necessarily limited to) riparian and wetland restoration and storm water control on agriculture, forest, and urban lands to benefit sturgeon habitat. The estimated cost of this alternative is up to \$7,000,000.

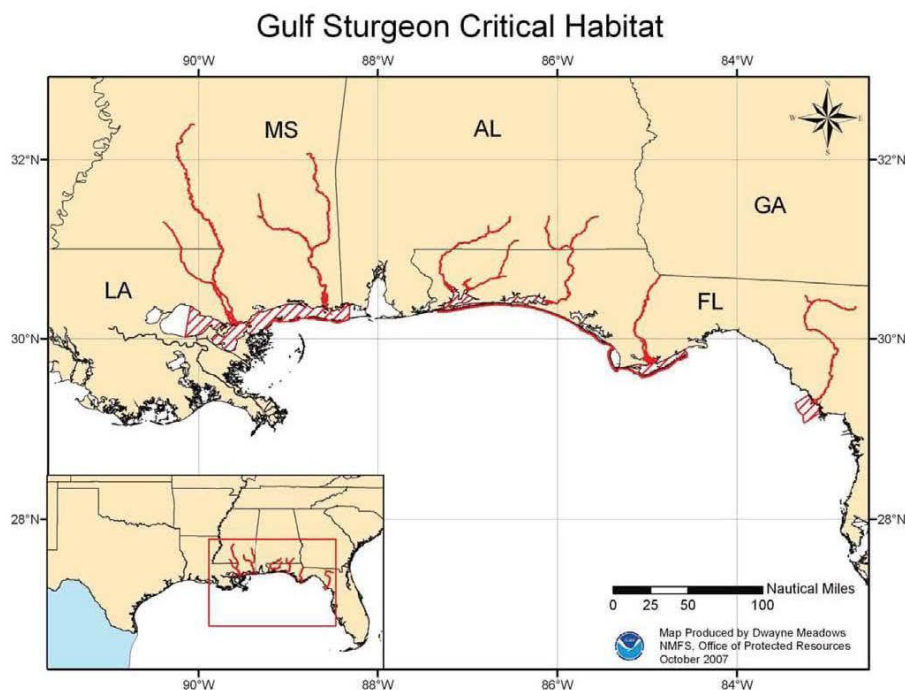
3.6.2.1 Project Description

Gulf sturgeon spawning and juvenile survival are dependent on a continuum of substrate and water quality from stream headwaters to coastal estuaries. Sediment, nutrients, and pollutants from urban storm water, agriculture, and forestry can impair streams and estuaries upon which sturgeon depend. This project would restore Gulf sturgeon through increased spawning and juvenile survival by improving the quality of riparian habitats and receiving waters associated with Gulf sturgeon critical habitat, accomplished via technical and financial assistance to implement restoration activities with willing private and public landowners. Eligible landowners may range from forested upland headwaters

through farms and ranches to the cities lining their coastal estuary habitat. This project would implement standard best practices of USEPA and USDA along that habitat continuum. It would include riparian and wetland restoration and storm water control on agriculture, forest, and urban lands to benefit sturgeon habitat. Priority may be focused on particular sturgeon subpopulations or life-stage habitats and on particular Hydrologic Unit Code (HUC) 12 watersheds. Such actions are anticipated to lead to improvements in water and habitat quality, increased spawning, and enhanced juvenile survival. Practices expected to be implemented as part of this project (and commonly applied by USEPA and USDA) potentially include, but are not limited to:

- Riparian Forest Buffer;
- Filter Strip;
- Riparian Herbaceous Cover;
- Water and Sediment Control Basin;
- Stormwater Runoff Control;
- Critical Area Planting;
- Access Control;
- Grassed Waterway;
- Urban Forestry; and
- Bioswale.

Figure 3-5 Gulf Sturgeon Critical Habitat



There would be four project phases: 1) outreach to potential partners; 2) selection of priority parcels; 3) site-specific conservation planning and implementation; and 4) post-implementation monitoring. The Trustees expect that the project would be completed approximately three years after project initiation.

3.6.2.2 OPA Evaluation

As noted in Section 3.6.1.2, Trustee analysis indicates between 1,100 and 3,600 Gulf sturgeon were exposed to DWH oil in the nearshore areas of the northern Gulf of Mexico, representing a large proportion of the populations from six of the eight river systems occupied by Gulf sturgeon. This species' exposure to oil likely resulted in genotoxicity and immunosuppression. This project is consistent with programmatic and Restoration Type-specific goals and has a clear nexus to injury given its potential to benefit habitats relied on by Gulf sturgeon. The potential magnitude and timing of benefits to Gulf sturgeon (i.e., increased spawning and juvenile survival) realized by improving the quality of riparian habitats and receiving waters is more difficult to anticipate based on currently available project information. The project is highly likely to be implemented successfully, given Trustees experience and expertise with the types of restoration activities that would be undertaken. As described in more detail in Chapter 4 of this document, any adverse impacts to the environment associated with this project are anticipated to be minor and short term (see Section 4.4.5.3). The Trustees do not anticipate impacts to public health and safety given Trustee experience with these types of restoration activities and use of best practices. Other biota that rely on restored riparian habitats and/or receiving waters also could benefit from this project.

3.7 Natural Recovery/No Action

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 OO TIG to accelerate the recovery of Birds and Sturgeon in the Open Ocean Restoration Area using DWH NRDA funding at this time. The OO TIG 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 DWH Trustees rejected this alternative from further OPA evaluation within the Final PDARP/PEIS. Based on this determination, incorporating that analysis by reference, the OO TIG did not evaluate natural recovery as a viable alternative under OPA. Natural recovery is not considered further in this RP/EA.²²

3.8 OPA Evaluation Conclusions

The OO TIG conducted an OPA evaluation of each of the six project alternatives included in the reasonable range of alternatives for this RP/EA:

- Restoration of Common Loons in Minnesota;
- Restoration of Black Terns in North and South Dakota;

²² 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 4.

- Restoration of American White Pelicans on the Upper Mississippi River;
- Restoration of Black Terns in the Upper Midwest;
- Characterizing Gulf sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems the Pearl and Pascagoula River Systems; and
- Riparian and Coastal Conservation to Restore Spawning and Juvenile Habitat for Gulf Sturgeon

As described in relevant sections of this Chapter, all six project alternatives are consistent with programmatic and Restoration Type-specific goals, have a clear nexus to injury and are not anticipated to adversely impact public health and safety.

One project alternative (Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems) is intended to generate critical information needed to design, evaluate and prioritize future restoration activities for Gulf sturgeon. This project would not directly restore sturgeon; rather, it would provide information needed to effectively do so in the future. This project is very likely to be successfully implemented. Additional, summary OPA evaluation information is provided below.

- Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems the Pearl and Pascagoula River Systems - Although this project would involve fitting transmitters on Gulf sturgeon and taking tissue (fin clip and fin spine) samples, similar methods have been utilized as part of previous Gulf sturgeon studies, and the Trustees believe associated risks to Gulf sturgeon are low (Baremore and Rosati 2014, Nelson et al. 2013, USFWS 2012, Hondorp et al. 2015). In the judgment of the Trustees this project would not adversely impact the environment or otherwise cause collateral injury. The Trustees believe estimated project costs are reasonable based on their experience conducting similar studies and the presence of critical information gaps that need to be addressed to reasonably conduct restoration planning for Gulf sturgeon.

The remaining five project alternatives considered in this document would directly restore resources. With respect to all potential bird projects evaluated in this RP/EA, project approaches and geographic locations appropriately target key threats to breeding areas, which are outside of the GOM for these particular bird species. Additional, summary OPA evaluation information is provided below.

- Restoration of Common Loons in Minnesota - The project employs commonly utilized techniques for minimizing threats to loon survival and reproduction that have a high likelihood of success. The use of alternatives to lead fishing jigs and sinkers and programs to inform the public of fishing tackle entanglement are likely to benefit multiple bird species. Acquisition and/or easements of lakeshore loon nesting habitat also is likely to benefit other biota that make use of such habitat. Construction of nesting platforms and lead fishing jigs/sinker replacement and fishing tackle entanglement public education programs are relatively low cost methods for increasing reproductive success and reducing mortality of loons. Protecting existing loon nesting sites through habitat acquisition/easements generally is more costly, but also more certain to generate benefits (by preventing the loss of existing loon nests) and the only option available in areas where nesting platforms are unlikely to successfully attract breeding loons.
- Restoration of Black Terns in North and South Dakota - Trustee use of existing programs to meet this objective is a cost efficient approach that takes advantage of existing expertise, program

infrastructure and contacts to implement projects in a manner that is highly likely to achieve success. Although targeted at black terns, it is likely that project benefits would accrue to other bird species and biota that make use of conserved habitat.

- Restoration of American White Pelicans on the Upper Mississippi River – While Trustee use of this existing partnership program to meet this restoration objective is a cost efficient approach that takes advantage of existing expertise, program infrastructure, and contacts in a manner that is highly likely to result in successful implementation, currently available information is not sufficient to estimate the approximate magnitude of benefits and assess the potential need for shoreline protection, ongoing predator management, and/or other complementary actions to maximize project success. Although targeted at AWPE, it is likely that project benefits would accrue to double-crested cormorants and potentially other bird species and biota that make use of conserved/restored habitat.
- Restoration of Black Terns in the Upper Midwest - The likelihood that the project would be successfully implemented is high given Trustee experience implementing similar actions in the Upper Midwest and other areas of the country. The potential magnitude and timing of breeding and/or reduced mortality benefits to black terns is more difficult to anticipate based on currently available project information. Although targeted at black terns, it is likely that project benefits would accrue to other bird species and biota that make use of restored habitat.
- Riparian and Coastal Conservation to Restore Spawning and Juvenile Habitat for Gulf Sturgeon - The project is highly likely to be implemented successfully, given Trustees experience and expertise with the types of restoration activities that would be undertaken. The potential magnitude and timing of benefits to Gulf sturgeon (i.e., increased spawning and juvenile survival) realized by improving the quality of riparian habitats and receiving waters is more difficult to anticipate based on currently available information. Other biota that rely on restored riparian habitats and/or receiving waters also could benefit from this project.

Based on the OPA evaluations summarized above, and information and analysis presented in the entirety of this document, the Trustees propose to proceed with implementation of three of the project alternatives considered in this document (identified as ‘Preferred’ in Table 3-1). At this time the Trustees do not intend to proceed further with the other three project alternatives.

Table 3-1 Preferred and Non-Preferred Restoration Alternatives

Alternative	Project Costs	
<u>Birds</u>		
Restoration of Common Loons in Minnesota	Preferred	\$7,520,000
Restoration of Black Terns in North Dakota and South Dakota	Preferred	\$6,250,000
Restoration of American White Pelicans on the Upper Mississippi River	-	\$6,000,000
Restoration of Black Terns in the Upper Midwest	-	\$1,400,000
<u>Sturgeon</u>		
Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems	Preferred	\$2,150,000
Riparian and Coastal Conservation to Restore Spawning and Juvenile Habitat for Gulf Sturgeon	-	\$7,000,000
	Sum (Preferred)	\$15,920,000

Chapter 4: Environmental Assessment

4.1 Overview of NEPA Approach

This chapter describes the anticipated environmental impacts of the proposed action (implementation of the preferred alternatives) and the alternatives not preferred for implementation at this time.¹ The NEPA analysis presented in this chapter is consistent with the PDARP/PEIS and tiers where applicable. Resources analyzed and impacts definitions (minor, moderate, major) align with the PDARP/PEIS (Appendix D to this RP/EA).² The PDARP/PEIS is incorporated by reference.

In some cases an alternative may qualify under one or more of the lead agency's categorical exclusions (40 CFR § 1508.4) but cannot be utilized for cooperating agency purposes in this restoration planning process. In this case a brief description of impacts is included.³

Incorporation by reference of relevant information from existing plans, studies or other material is used in this analysis to streamline the NEPA process and to present a concise document that briefly provides sufficient evidence and analysis for determining whether to prepare an environmental impact statement or finding of no significant impact, and to aid the Open Ocean TIG's compliance with NEPA (40 CFR § 1506.3, 40 CFR § 1508.9). Agencies should "focus on significant environmental issues" and for other than significant issues there should be "only enough discussion to show why more study is not warranted" (40 CFR §§ 1502.1 and 1502.2). All source documents relied upon for the NEPA analyses are available to the public and links are provided in the discussion of the environmental consequences where applicable.

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, etc.) and 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

¹ The terms "project" and "alternative" are used interchangeably in this chapter.

² Physical Resources: Geology and Substrates, Hydrology and Water Quality, Air Quality, Noise; Biological Resources: Habitats, Wildlife Species (Including Birds), Marine and Estuarine Fauna (Fish, Shellfish, Benthic Organisms), Protected Species; Socioeconomic Resources: Socioeconomics and Environmental Justice, Cultural Resources, Infrastructure, Land and Marine Management, Tourism and Recreational Use, Fisheries and Aquaculture, Marine Transportation, Aesthetics and Visual Resources, Public Health and Safety, including Flood and Shoreline Protection.

³ It should be noted, that when no extraordinary circumstances apply, some of the proposed activities may qualify for categorical exclusions under DOI/USFWS NEPA implementing procedures (516 DM 2 Appendices 1 and 2, and 516 DM 6 Appendix 2). Categorical exclusions are classes of actions which do not individually or cumulatively have a significant effect on the human environment. Categorical exclusions are not the equivalent of statutory exemptions. Some examples are non-destructive data collection; activities which are educational, informational advisory or consultative; some types of land acquisition; and routine financial transactions including such things as financial assistance. The NEPA analysis reflects the expected impacts proportional to the scope of the activities.

like high visitation or wildlife breeding/rearing, etc.). Intensity is also described in terms of whether the impact would be beneficial or adverse.

4.2 Resources Not Analyzed in Detail in this RP/EA

To avoid redundant or unnecessary information, projects addressed in this RP/EA were reviewed to determine whether some resources either would not be affected or would have minimal, short-term impacts that are common to all alternatives. Impacts of plan alternatives to several resource areas are described below, and then are not described or analyzed further in this chapter. Those resources, along with the rationale for grouping the analysis of impacts to the resources in this section, are as follows.

4.2.1 Physical Resources

4.2.1.1 Air Quality and Greenhouse Gas Emissions

The U.S. Environmental Protection Agency (EPA) defines ambient air in 40 C.F.R. Part 50 as “that portion of the atmosphere, external to buildings, to which the general public has access.” In compliance with the 1970 Clean Air Act (CAA) and the 1977 and 1990 Clean Air Act Amendments (CAAA), EPA has promulgated National Ambient Air Quality Standards (NAAQS). The NAAQS include primary standards which set limits to protect public health, including the health of “sensitive” populations such as asthmatics, children, and the elderly. To date, EPA has issued NAAQS for seven criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO₂), particles with a diameter less than or equal to a nominal 10 microns (PM₁₀), particles with a diameter less than or equal to a nominal 2.5 microns (PM_{2.5}), ozone (O₃), nitrogen dioxide (NO₂), and lead (Pb). Individual states may promulgate their own ambient air quality standards for these “criteria” pollutants, provided that they are at least as stringent as the federal standards. None of the projects are located in a county currently listed on EPA’s nonattainment counties for any criteria pollutant (EPA 2018).

Greenhouse gases (GHGs) are chemical compounds found in the earth’s atmosphere that absorb and trap infrared radiation as heat. Global atmospheric GHG concentrations are a product of continuous emission (release) and removal (storage) of GHGs over time. In the natural environment, this release and storage is largely cyclical. Human activities such as deforestation, soil disturbance, and burning of fossil fuels disrupt the natural cycle by increasing the GHG emission rate over the storage rate, which results in a net increase of GHGs in the atmosphere. The principal GHGs emitted into the atmosphere through human activities are CO₂, methane, nitrous oxide, and fluorinated gases, such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

Chapter 6 of the PDARP/PEIS found that short-term, minor to moderate impacts to air quality may occur during construction associated with projects falling under the Habitat Projects on Federally Managed Lands restoration type. Past project-specific NEPA evaluations of *Deepwater Horizon* restoration projects similar to those proposed in this plan found that project impacts would be consistent with the PDARP/PEIS findings. For example, detailed evaluations of a proposed trail enhancement project at Bon Secour National Wildlife Refuge as well as a project that would restore osprey habitat that were evaluated in the Phase IV Early Restoration RP/EA found that these projects would result in minor short-

term adverse impacts to air quality and GHG emissions from the use of construction equipment, but impacts would be localized and last only during the construction period.⁴

Plan alternatives are either not anticipated to affect air quality (e.g., data gathering), or would result in minor, temporary emissions from construction equipment, as found in air quality analyses of similar activities for other DWH restoration activities, as discussed above. The American White Pelican on the Upper Mississippi River Project (island building project) would require the most heavy construction equipment, but this would be located in a rural area and equipment would be utilized over a short duration. Impacts to air quality would be expected to be localized and occur only during active construction activities. Engine exhaust from construction equipment and other vehicles would contribute to an increase in criteria pollutants,⁵ GHGs, and other air pollutants. However, because of the small scale and short duration of the construction portion of the applicable alternatives, predicted emissions would be minor and short term, and would not require a detailed assessment. These activities are not expected to cause an exceedance of the NAAQS.

4.2.1.2 Noise

Proposed alternatives would not affect noise receptors (e.g., data gathering), would not change current uses impacting ambient noise, or would result in minor, temporary noise from small equipment (e.g., installing nesting platforms, removal of unwanted vegetation or conducting monitoring activities). Noise would conclude once the construction is completed. Long-term noise impacts are not anticipated.

4.2.2 Socioeconomic Resources

4.2.2.1 Environmental Justice

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

⁴ Please refer to evaluations of the Osprey Restoration in Coastal Alabama (Chapter 9) and Bon Secour National Wildlife Refuge Trail Enhancement project (Chapter 8) of the Deepwater Horizon Oil Spill Final Phase IV Early Restoration Plan and Environmental Assessments, September 2015.

<http://www.gulfspillrestoration.noaa.gov/sites/default/files/wp-content/uploads/Final-Phase-IV-ERP-EA.pdf>

⁵ The Clean Air Act requires EPA to set [National Ambient Air Quality Standards \(NAAQS\)](#) for six common air pollutants (also known as "[criteria air pollutants](#)"). These pollutants (carbon monoxide, lead, ground-level ozone, particulate matter, nitrogen dioxide, and sulfur dioxide) are found all over the U.S. They can harm your health and the environment, and cause property damage. Sections 108 and 109 of the [Clean Air Act \(CAA\)](#) govern the establishment, review, and revision, as appropriate, of the National Ambient Air Quality Standards (NAAQS) for each [criteria air pollutant](#) to provide protection for the nation's public health and the environment.

(<https://www.epa.gov/criteria-air-pollutants#self>)

preparation of environmental and socioeconomic analyses of projects or programs that are proposed, funded, or licensed by Federal agencies. None of the alternatives evaluated in this RP/EA would create a disproportionately high and adverse effect on minority or low-income populations.

4.2.2.2. Infrastructure

None of the alternatives evaluated in this RP/EA would employ the type of activities (facilities construction, traffic closures or congestion, etc.) or durations that would impact capacity of public services or utilities, 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.

4.2.2.3 Marine Transportation

For the American White Pelican on the Upper Mississippi River Project (island building project), islands would be created outside of the current navigation channel and therefore would not affect marine transportation.⁶ The other alternatives under consideration in this RP/EA would not affect marine transportation due to their locations and scope; therefore, this topic was not carried forward for detailed analysis.

4.2.2.4 Fisheries and Aquaculture

Proposed Bird Restoration Type alternatives would restore and protect natural habitat, functions, and processes, primarily associated with lake and prairie pothole habitats. Gulf sturgeon projects would benefit riverine spawning habitat for Gulf sturgeon. As a result, the overall habitat of the areas would improve, benefiting the surrounding fisheries and aquaculture. Short-term impacts associated with the Gulf sturgeon project would be negligible, as little ground-work or species disturbance would occur. Long-term, beneficial impacts on fisheries and aquaculture are expected. Therefore this resource area was not carried forward for detailed analysis.

4.2.2.5 Public Health and Safety, Including Flood and Shoreline Protection

Based on the scope and nature of the proposed alternatives, impacts to public health or safety are not anticipated. Construction activities for the American white pelican upper Mississippi River project are implemented by USACE regularly and adhere to all safety requirements.

4.2.2.6 Aesthetics and Visual Resources

Proposed restoration activities would primarily restore or preserve natural landscapes (e.g. island building, revegetation, land acquisition through easements) and/or are located on private lands. No facilities or tower construction, large scale land clearing or other related activities are proposed. Adverse impacts to aesthetics and visual resources are not anticipated.

⁶ A map of the Pool 13 section of the Mississippi River channel can be accessed here: [https://www.fws.gov/uploadedFiles/lower_pool_13\(1\).pdf](https://www.fws.gov/uploadedFiles/lower_pool_13(1).pdf)

4.3 Summary of Resources Analyzed in this RP/EA

Resources analyzed in this chapter in greater detail, where appropriate for each project, include:

- **Physical Resources** – Geology and Substrates; Hydrology and Water Quality
- **Biological Resources** – Habitats, Wildlife Species, Marine and Estuarine Fauna (marine and estuarine fish, shellfish, and benthic organisms), Protected Species
- **Socioeconomic Resources** – Socioeconomics, Land and Marine Management, Tourism and Recreation Use, Cultural Resources

This chapter addresses direct, indirect, and cumulative impacts of proposed alternatives. Section 6.6 and Appendix 6B of the PDARP/PEIS are incorporated by reference into the cumulative impacts analysis, including the methodologies for assessing cumulative impacts, identification of any affected resources, and the cumulative impacts scenario.

4.4 Planning Alternative

As discussed in Chapter 6 of the PDARP/PEIS, a TIG may propose funding a planning phase (e.g., initial engineering, design, and compliance) in one plan for a conceptual project, or for studies needed to maximize restoration planning efforts. This would allow the TIG to develop information needed leading to sufficient project information to develop a more detailed analysis in a subsequent restoration plan, or for use in the restoration planning process. The Open Ocean TIG proposes one project in the reasonable range of alternatives fitting that category (Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems). After review, the Open Ocean TIG determined that this project falls within the range of impacts described in Section 6.4.14 of the PDARP/PEIS, providing the NEPA analysis for this alternative, and is summarized below and incorporated by reference.

4.4.1 Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems (Preferred Alternative)

This alternative would: 1) identify and characterize the potential spawning habitat in the Pearl and Pascagoula River systems; 2) describe habitat accessibility and patterns of habitat use during spawning periods; 3) determine the river of origin for juvenile sturgeon in each system; and 4) synthesize the data needed to evaluate and prioritize spawning habitat restoration projects such as in-stream barrier removal, spawning reef creation, or riparian restoration. This project would involve the scientific collection (capture, handling, and release) of live Gulf sturgeon from the Pascagoula and Pearl River systems (freshwater only).

4.4.2 NEPA Review of Planning Alternative

Consistent with the impacts considered in the PDARP/PEIS, this project would include minimally intrusive field activities. Some data collection may also require federal and state permits, for example when collecting field data related to threatened and endangered species.

Environmental consequences that may occur as a result of these actions are consistent with similar considerations evaluated in other programmatic restoration plans (e.g., the PDARP/PEIS). In particular, the PDARP/PEIS recognizes that project planning, feasibility studies, design engineering studies, and

permitting activities are intended to support the development of projects to propose in more detail in subsequent restoration plans. Preliminary planning phases can increase the effectiveness and efficiency of habitat restoration. Some preliminary phases of project planning would cause direct, short-term, minor impacts through associated fieldwork. Temporary impacts to the biological and physical environment also could include short-term, temporary disturbance of habitats and species; and minor disturbance to terrestrial, estuarine, and marine environments. As stated above, the Gulf sturgeon project would involve the scientific collection (capture, handling, and release) of live Gulf sturgeon from the Pascagoula and Pearl River systems (freshwater only). USFWS adheres to existing federal permits for sturgeon field activities. State permits (Mississippi and Louisiana) are also required to conduct such activities, and would be obtained and provided to USFWS prior to the capture of any sturgeon.

4.4.2.1 No Action

Under the No Action alternative, this study would not be implemented and no data would be gathered to help ensure effective, focused restoration.

4.5 Construction and Acquisition Alternatives

These alternatives involve land acquisition, minor to moderate construction activities, or both. Some contain educational stewardship components. As they have different impacts on different resources (e.g. lakes in residential areas vs prairie potholes) and are not related geographically, they are analyzed separately below.

- Restoration of Common Loons in Minnesota (Preferred Alternative);
- Restoration of Black Terns in North Dakota and South Dakota (Preferred Alternative) ;
- Restoration of American White Pelicans on the Upper Mississippi River;
- Restoration of Black Terns in the Upper Midwest; and
- Riparian and Coastal Conservation to Restore Spawning and Juvenile Habitat for Gulf Sturgeon.

4.5.1 Restoration of Common Loons in Minnesota (Preferred Alternative)

This proposal takes advantage of a robust common loon conservation ethic and history of financial and citizen-based support in the upper Midwest. Currently there are many ongoing loon restoration efforts in Minnesota. The Open Ocean TIG's goal is to collaborate closely with and support those existing efforts where practicable. The following descriptions of proposed project activities condense and focus the project scope as described in Chapter 3 to actions relative to the NEPA analysis under three main components. None of the activities involve handling of loons or other wildlife, or modifications to critical habitat. All activities discussed below and any habitat management would be done in accordance with existing state management plans, strategies, and policies.

- **Acquisition of lakeshore loon nesting habitat** – The lead implementing trustee would partner with the State of Minnesota to purchase School Trust Lands to protect foraging and nesting habitat on shoreline parcels in Cass and Itasca Counties (Figure 3-1). School Trust Lands are public lands set aside in 1858 to provide a continual source of funding for public schools, through iron mining, timber harvesting, and other revenue generating activities (MDNR website

2018).⁷ The selected School Trust Lands parcels would be transferred to the State of Minnesota, where they would be managed for preservation, conservation and land protection consistent with other state lands of this type using conservation easements. Advisory signage would be installed in acquired parcels used by nesting loons to advise the public of any access restrictions that could be imposed during loon breeding season.

- **Habitat enhancement** – The lead implementing trustee would partner with the State of Minnesota to provide the placement of artificial nest platforms and recruit and support MN lake associations in loon conservation activities.
 - a. Loon breeding habitat would be enhanced, by providing artificial nest platforms in targeted lakes within suitable loon breeding areas. Activities would include establishment of priorities, identification of lakes, meetings with landowners, nesting platform construction and installation, and applications for state permits. Loon territories are 15 to 100 (or more) acres for each breeding pair, so nesting platforms would be widespread and would not be concentrated in small areas. The implementing trustee would work collaboratively with lake associations to determine the optimal location of artificial nest platforms and placement of loon nesting buoys (four buoys around each nest, about 20 feet from each corner) to decrease nest site disturbance. Signs may be affixed to the nest platforms warning boaters.
- **Reduction in exposure to lead-based fishing tackle** – The implementing trustee would partner with the State of Minnesota to increase adult loon survival rates by funding:
 - a. Research on retail prices and availability, angling groups, lake associations, and school districts;
 - b. Communication outreach materials development;
 - c. Angler outreach and lead tackle exchanges;
 - d. Retailer engagement for environmentally friendly non-lead fishing tackle displays;
 - e. Future angler/future leader engagement for youths.

4.5.1.1 Resources Analyzed for this Alternative

Table 4-1 identifies how potentially affected resources are analyzed in this RP/EA for this alternative. In particular, it identifies whether resources were addressed in Section 4.2 (Resources Not Analyzed in Detail in this RP/EA), as well as resources that do not require additional analysis for this alternative because they are unaffected by it, or the impacts would be so minor that a more detailed NEPA analysis is not needed. It also identifies resources that will be analyzed in detail.

⁷ https://www.dnr.state.mn.us/aboutdnr/school_lands/index.html

Table 4-1 NEPA Assessment of Resources for this Alternative

Potentially Affected Resource	Location of Analysis in Chapter 4
Physical Resources	
Geology and Substrates	Section 4.5.1.3
Hydrology and Water Quality	Section 4.5.1.3
Air Quality and Greenhouse Gas Emissions	Section 4.2
Noise	Section 4.2
Biological Resources	
Habitats	Section 4.5.1.3
Wildlife Species (including birds)	Section 4.5.1.3
Marine and Estuarine Fauna (fish, shellfish, benthic organisms)	Due to the geographic location, this project would not affect marine or estuarine fauna. When applicable, migratory bird species, as well as freshwater fish, shellfish, and benthic organisms are addressed in the wildlife discussion of the Biological Resources section.
Protected Species	Section 4.5.1.3
Socioeconomic Resources	
Socioeconomics	Restoration and monitoring activities for this alternative would be located on public lands and in communities where lake associations volunteer as partners. No jobs would be created or lost because of the implementation of this alternative. Restoration and monitoring work would be performed by the State of Minnesota and local lake association volunteers.
Environmental Justice	Section 4.2
Cultural Resources	Section 4.5.1.3
Infrastructure	Section 4.2
Land and Marine Management	Section 4.5.1.3
Tourism and Recreational Use	Section 4.5.1.3
Fisheries and Aquaculture	Section 4.2
Marine Transportation	Section 4.2
Aesthetics and Visual Resources	Section 4.2
Public Health and Safety, Including Flood and Shoreline Protection	Section 4.2

Note: Resource does not require additional analysis for this alternative because it is unaffected by the alternative, or the impacts would be so minor that a more detailed NEPA analysis is not needed.

Only those resource areas for which potential, adverse impacts are expected are discussed in detail in this draft RP/EA. The Open Ocean TIG analyzed the following resources in more detail below:

- **Physical Resources:** Geology and Substrates
- **Biological Resources:** Habitats, Wildlife Species, Protected Species
- **Socioeconomic Resources:** Cultural Resources, Land and Marine Management, Tourism and Recreation Use

4.5.1.2 Affected Environment

In Minnesota, common loons breed on lakes across the northern two-thirds of the state, and there are more loons in Minnesota than all other states combined (excluding Alaska) (Paruk et al. 2013). Loon populations in the Great Lakes region have suffered the greatest loss in historical range as breeding populations are now extirpated in Illinois, Indiana, Iowa, and Ohio and restricted to the northern portions of Minnesota, Wisconsin and Michigan (Evers 2004). Loons spend winters on the open ocean, and then return to interior lakes in the northern US and Canada to breed in the summer.

Figure 4-1 **Cass County, MN Lakes (MN Pollution Control Agency)**



Source: MN Pollution Control Agency.

Minnesota loons migrate from both the mid-Atlantic region and the Gulf of Mexico and have high nesting site fidelity (Evers 2004). Loons actively feed at fall migration staging areas, such as at Lakes Winnibigoshish and Mille Lacs in Minnesota (Evers 2004). Loon breeding and nesting habitat is characterized by the USFWS as lakes greater than 60 acres with clear water, an abundance of small fish, numerous small islands, and an irregular shoreline that creates coves, but they are also found within a wide variety of freshwater aquatic habitats (USFWS 2004). Loons nest close to the water's edge and prefer small islands, floating bog mats, and marshy hummocks (Evers 2004). The quality of loon breeding habitat is impacted by shoreline development through vegetative and substrate modification or removal

and by the overall presence of human activity, and densities of loon predators like raccoons, gulls, and corvids are generally correlated with an increase in shoreline development (Evers 2004).

4.5.1.2.1 *Physical Resources*

Minnesota is known for its landscape of lakes, with over 11,800 lakes greater than 10 acres in size (Paruk et al. 2013). Located at the edge of the Laurentide Ice Sheet, Minnesota's landscape was shaped by multiple subsequent glacial lobes extending throughout the state. The glaciers deposited glacial till throughout much of the area currently used by loons, and carved the ground into low hills, swales, eskers and drumlins (Lusardi 1997) that left depressions for lakes. The Rice Lake NWR and Mille Lacs NWR Comprehensive Conservation Plan and Environmental Assessment (USFWS 2007a) provides information on the typical physical habitat of loons in Minnesota. The physical resources of this area are characterized by "rolling to flat lake plains, beach ridges and ground moraines," "glacial moraines, rolling hills and small short rivers and large lakes," or an "ice-molded landscape with irregular ground moraines" (USFWS 2007a).

4.5.1.2.2 *Biological Resources*

Common loons in Minnesota are located within the Boreal Hardwood Transition conservation region, characterized by coniferous and northern hardwood forests, nutrient-poor soils, and numerous clear lakes, bogs, and river systems with coastal estuaries, river impoundments, large shallow lakes, and natural wild rice lakes important to many breeding and migrating waterfowl and other waterbirds. To the south of the Boreal conservation region, loons are also found within the Prairie Hardwood Transition conservation region, characterized by early succession forest, oak savanna, and numerous pothole-type wetlands and shallow lakes making the region especially valuable to breeding and migrating waterfowl and waterbirds (UMRGLR JV 2007). Regional inland lakes and wetlands also have wide ranging importance, such as those found in the Boreal Hardwood Transition, considered a core continental breeding area for common loon and yellow rail (Wires et al. 2010). Conservation threats to loons in the region include shoreline development, heavy metal contaminants such as mercury and lead, acidification of lakes, human disturbance, and entanglement in fishing gear (Wires et al. 2010).

4.5.1.2.3 *Socioeconomic Resources*

The affected environment for the proposed alternative is located on largely rural public lands that experience some level of lake recreation and local tourism, as occurs at hundreds of public water access points throughout Minnesota (MDNR Public Water Access Maps). As an example, the Mud-Goose Wildlife Management Area located in Cass County, MN, lists wildlife watching, photography, hunting, trapping, boating, fishing, and hiking as potential recreational activities. Historic and cultural resources⁸ can be found throughout Minnesota as the earliest evidence of inhabitation by humans is dated to the Woodland Tradition (ca. 500 B.C. - A.D. 1650), which is characterized by pottery, ritual human burials, the bow-and-arrow, and semi-permanent settlements (Schultz 2004).

⁸ The National Park Service categorizes these resources as archeological resources, cultural landscapes, ethnographic resources, historic and prehistoric structures, and museum collections.

Common loons are important culturally in North America. According to the Minnesota Loon Report (Kovach et al 2016),⁹“The Common Loon, prominent and charismatic, is highly valued by the general public.” From the Cornell Lab of Ornithology, *Spirit of the North: The Common Loon* (Read 2008):

Since ancient times, the loon has featured prominently in Native American mythology. In Sioux and Lakota legends it plays a role in recreating the post-diluvian world. An Ojibwa tale credits the loon’s voice as the inspiration for Native American flutes. And from Alaska, a Tsimshian story describes how a loon restores a blind man’s sight, for which it is rewarded with the gift of the beautiful necklace of white feathers adorning its neck.

4.5.1.3 Environmental Consequences

As noted in Section 4.1, in the absence of “significant environmental issues,” the following resource areas are analyzed in “only enough discussion to show why more study is not warranted” (40 CFR §§ 1502.1 and 1502.2). Because land acquisition and activities related to reduction in exposure to lead-based fishing tackle have no ground disturbing or active habitat management activities associated with them, and the environmental impacts would be only beneficial, the analysis below focuses on habitat management activities that could be implemented.

4.5.1.3.1 Physical Resources

Ground disturbance would occur only during the installation of nest platforms in lakes and the placement of advisory signage. The USFWS recommends nest platforms be positioned with consideration given wind and wave patterns, loon territorial boundaries, previous traditional and non-traditional nest site locations, boat traffic and human activity patterns (USFWS 2004). Using ropes and floating signs to cordon-off high-risk territories can be effective to increase hatching success (USFWS 2004). Nesting platforms would be removed each fall to avoid freezing and returned in early spring for nesting season. As platforms and signs would primarily be floating and tethered to the substrate, effects to substrates would be minor, though long-term.

4.5.1.3.2 Biological Resources

Common loon habitats fall within areas with threatened and endangered species, including Canada lynx, gray wolf, northern long-eared bat, piping plover, rufa red knot, topeka shiner, Dakota skipper, Karner blue butterfly, Poweshiek skipperling, rusty patched bumble bee, Western prairie fringed orchid, Minnesota dwarf trout lily, and prairie bush clover. These areas include areas with critical habitat designations for Canada lynx and the gray wolf, among others. However, activities proposed under this project are not expected to have adverse impacts on biological resources. All of the restoration measures and management activities would be designed to have long term beneficial impacts to habitats and the native species that utilize the areas. Land acquisition would prevent development of the land and loss of habitat. USFWS anticipates that land acquisition will not adversely affect any ESA listed species or designated critical habitat. The placement of ANP anchors on lake bottoms and planting native vegetation on lakeshores would be the activities with the most potential to cause disturbance,

but can be mitigated through proper coordination. When specific locations and management activities are identified, Implementing Trustees will revisit to determine if any protected species and/or designated critical habitat occur in those areas. If occurrence is known or likely, Implementing Trustees would identify potential impacts as well as measures to avoid or minimize impacts such that when implemented, impacts are insignificant or discountable. If a determination of "no effect" cannot be made, Implementing Trustees would initiate consultation. As such, due to the scope and nature of this alternative and based on coordination with the USFWS there is anticipated to be no effect on the ESA-listed species that could potentially occur in the project area.

4.4.1.3.3 Socioeconomic Resources

This project would not harm loons and would provide long-term benefits to loons. Adverse impacts to cultural resources are not anticipated. As stated in the PDARP/PEIS, all projects implemented under subsequent restoration plans would secure all necessary state and federal permits, authorizations, consultations, or other regulatory processes, and ensure the project is in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

Land acquisition would transfer lands within State ownership from School Trust Lands to the State Conservation Lands for loon conservation and management, which would not change land use and management beyond the local area. Restoration and monitoring activities for this alternative would be located on public lands that may have current recreation and tourism use. The activities would be minor and short-term associated with temporary closures, and may have a minor impact on recreation.

4.5.1.4 Cumulative Impacts

The PDARP/PEIS found that implementation of bird restoration projects is consistent with its restoration goals and is not expected to contribute substantially to short-term or long-term, adverse cumulative impacts on physical, biological, or socioeconomic resources when analyzed in combination with other past, present, and reasonably foreseeable future actions. Although the PDARP/PEIS was specific to the Gulf of Mexico region, many of the actions evaluated are relevant in Minnesota. The condition of ecosystem in the current project area reflects water quality impacts from urban development, industry, transportation, agricultural runoff, atmospheric deposition, and other sources throughout the area. PDARP/PEIS section Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis, describes many of the federal, state, and local projects and programs related to water quality improvement that have occurred in the past and present and are expected to continue into the future, some of which are relevant to this area. The tourism industry in the region also offers a wide variety of activities, including boating, fishing, hunting, as well as ecotourism (wildlife watching, birding, visiting parks, wildlife refuges, and scenic viewing).

Any adverse impacts from implementation of this project would be short term and minor and would not contribute significantly to adverse cumulative impacts. If this alternative is carried out in conjunction with other environmental stewardship and restoration efforts, it may result in long-term beneficial cumulative impacts to physical and biological resources because of the potential for synergistic effects of this alternative with these other environmental stewardship and restoration activities.

4.5.1.5 No Action

The proposed alternative to restore common loons in Minnesota would not be pursued by the Open Ocean TIG at this time. All of the identified affected resources would remain in their current conditions, including conditions described in the affected environment as degrading in any “future without project” scenarios. Benefits to loons or other resources that would also benefit from the alternative would not be realized. The No Action Alternative would not contribute to long-term restoration benefits to physical, biological, or socioeconomic resources and would contribute to degradation of resources in the action area.

4.5.2 Restoration of Black Terns in North and South Dakota (Preferred Alternative)

The Black Tern Conservation on the Breeding Grounds of North Dakota and South Dakota alternative would help preserve breeding and foraging habitat for black terns in the Prairie Pothole Region (PPR) of North and South Dakota. The objective of this alternative would be to help preserve wetland and grassland habitat on private lands in the PPR through the acquisition of perpetual wetland and grassland conservation easements (approximately 2,000 wetland acres and 1,000 grassland acres) from willing landowners through the Prairie Pothole Joint Venture (PPJV) program.¹⁰ This is accomplished on a voluntary basis with participating landowners. The 2011 Land Protection Plan, Dakota Grassland Conservation Area North Dakota, South Dakota (USFWS LPP)¹¹ states that North Dakota and South Dakota have a waiting list of well over 800 landowners interested in selling wetland and grassland easements. The only thing restricting the USFWS from protecting the more than 300,000 acres on the waiting list is limited money. The LPP goes on to state that USFWS’s objective is to conserve up to 240,000 acres of wetlands and 1.7 million acres of grassland to augment the efforts of other conservation agencies and groups. These wetland and grassland conservation easements connect and expand existing lands under conservation protection. The LPP includes an integrated EA. The sections of that EA pertaining to this alternative are incorporated herein by reference and summarized below.

USFWS currently has all of the personnel in place necessary to implement this black tern restoration initiative through staff at wetlands offices, realty offices, national wildlife refuges and wetlands management districts in North Dakota and South Dakota. This alternative is consistent with Section 5.5.12.1 of the PDARP/PEIS ([PDARP/PEIS 2016](#)).

4.5.2.1 Resources Analyzed in Detail for this Alternative

Table 4-2 identifies how potentially affected resources are analyzed in this RP/EA for this alternative. In particular, it identifies whether resources were addressed in Section 4.2 (Resources Not Analyzed in Detail in this RP/EA), as well as resources that do not require additional analysis for this alternative because they are unaffected by it, or the impacts would be so minor that a more detailed NEPA analysis is not needed. It also identifies resources that will be analyzed in detail.

¹⁰ Information on the PPJV program can be found at <http://ppjv.org/about>

¹¹ https://www.fws.gov/mountain-prairie/refuges/lpp_PDFs/dkg_lpp_final_all.pdf

Table 4-2 NEPA Assessment of Resources for this Alternative

Potentially Affected Resource	Location of Analysis in Chapter 4
Physical Resources	
Geology and Substrates	Section 4.4.2.3
Hydrology and Water Quality	Section 4.4.2.3
Air Quality and Greenhouse Gas Emissions	Section 4.2
Noise	Section 4.2
Biological Resources	
Habitats	Section 4.4.2.3
Wildlife Species (including birds)	Section 4.4.2.3
Marine and Estuarine Fauna (fish, shellfish, benthic organisms)	Marine and estuarine fauna were determined to be unaffected by the common loon this project due to its inland location. As such, this resource is excluded from further analysis.
Protected Species	Section 4.4.2.3
Socioeconomic Resources	
Socioeconomics	Section 4.4.2.3
Environmental Justice	Section 4.2
Cultural Resources	Section 4.4.2.3
Infrastructure	Section 4.2
Land and Marine Management	Section 4.4.2.3
Tourism and Recreational Use	Section 4.4.2.3
Fisheries and Aquaculture	Section 4.2
Marine Transportation	Section 4.2
Aesthetics and Visual Resources	Section 4.2
Public Health and Safety, Including Flood and Shoreline Protection	Section 4.2

Note: Resource does not require additional analysis for this alternative because it is unaffected by the alternative, or the impacts would be so minor that a more detailed NEPA analysis is not needed.

4.5.2.2 Affected Environment

The PPR within the United States consists of over 100,000 square miles of depressional wetlands caused by glaciers in the last ice age (Ringleman 2005). The PPR is a breeding habitat for many wetland and grassland species, including an estimated 50 percent of the North American population of black terns (Beyersbergen et al. 2004), and is now dominated by croplands.

Figure 4-2 Prairie Potholes in North Dakota (USFWS)



Source: USFWS Partners for Fish and Wildlife Program, Mountain-Prairie Region Strategic Plan 2007-2011

The USDA Black Tern Technical Conservation Assessment states that for black terns, “wetland protection programs that consider characteristics of entire wetland landscapes would be most effective because wetlands that do not correspond to broad scale habitat needs of black terns may not be suitable despite favorable local conditions” (Naugle 2004). Black terns specifically require breeding habitat in shallow, highly productive freshwater wetlands with emergent vegetation (e.g. palustrine emergent wetlands, edges of riverine systems) (Naugle 2004). The Northern Prairie and Parkland Waterbird Conservation Plan states that black terns nest in “shallow, highly productive wetlands with emergent vegetation in freshwater (sometimes brackish or alkaline) marshes, along prairie sloughs, lake margins, edges of islands or slow-moving rivers, wet meadows, bogs, shrub-swamps and occasionally large stock ponds. Prefers wetlands surrounded by grassland rather than agricultural fields” (Waterbird Conservation Plan 2004).

Private lands selected for conservation easements for this alternative would be identified by the Habitat and Population Evaluation Team (HAPET) in the PPR based on habitat and breeding bird survey data, and would be located in North Dakota or South Dakota. As these final selections are as yet unknown, the affected environment would generally include any privately owned grassland or wetland ranging from pristine condition to a condition that could be restored back to a natural habitat in the PPR. The 2005 Prairie Pothole Joint Venture Implementation Plan, Landscape-Level Planning for Conservation of Birds in the U.S. PPR (Niemuth et al. 2008), 2011 Partners for Fish and Wildlife Region 6 Strategic Plan, and

2004 Northern Prairie and Parkland Waterbird Conservation Plan contain extensive information about the physical and biological environment in the PPR. That information is incorporated by reference herein.

No wetland or grassland habitat restoration activities are planned as part of this proposed project. It is intended to preserve existing black tern breeding habitat. This proposed project does not include any ground disturbing activities, applications of pesticides, predator control or any other type of active habitat management. USFWS and landowners voluntarily enter into agreements ensuring the landowners use and management of the lands would be protective of grasslands and wetlands (black tern habitat). Landowner contracts typically specify:

- All land under easement remains in private ownership.
- Property tax and land management, including control of noxious weeds and other invasive plants and trees, remains the responsibility of the landowner.
- Public access to the land remains under the control of the landowner.
- Perpetual protection of habitat for trust species by restricting the conversion of wetland and grassland to other uses.
- Alteration of the natural topography, conversion of native prairie to cropland, and drainage of wetlands are prohibited.
- Wetland easements prohibit the draining, burning, filling, or leveling of protected wetlands.
- Conversion of grassland to crop production or other uses that destroy vegetation are prohibited.

While the easement contract would specify perpetual protection, it would not eliminate all activities that landowners normally perform. Protected wetland basins may be hayed or grazed without restriction and farmed when dry from natural causes. Grassland easements would not restrict grazing in any way, and haying would be permitted after July 15 each year.

4.5.2.3 Environmental Consequences

4.5.2.3.1 Physical Resources

As stated in the PDARP/PEIS section 6.4.1.5.1, fee title land acquisition or use of a conservation easement may reduce disturbance of geology and substrates by protecting lands from development, or in this case, habitat conversion pressure. This would be a long-term beneficial effect that would extend beyond the life of the project.

Where easements and protected lands overlap ground water recharge zones or surface water resources, water sources and quality could be further protected from future degradation by helping to reduce runoff. Similarly, where protected land overlaps wetlands, the protection of natural hydrologic processes could indirectly help limit development and associated effects on water quality. These would be long-term beneficial effects (PDARP/EIS).

Pre-acquisition site assessments are conducted on individual tracts before purchase of any land interests. USFWS environmental contaminants specialists from Ecological Services offices in North Dakota and South Dakota are contacted to ensure policies and guidelines are followed before acquisition of conservation easements (USFWS LPP 2011).

4.5.2.3.2 *Biological Resources*

The PDARP/PEIS states that conservation of habitat through fee title acquisition, use restrictions, and improved management could have a long-term benefit to any habitat on the property acquired or protected. Conservation of habitat through conservation easements could have a long-term benefit to fish, birds, and terrestrial wildlife through the protection of riparian or terrestrial habitat. These habitats can be important for food supply and various life stages of some species. These benefits would depend on project-specific goals and the location of acquired land.

The 2011 USFWS Land Protection Plan states that protection of native prairie watersheds using conservation easements may be one of the best defenses to preclude further degradation of streams and prairie wetlands and the aquatic resources that depend on them. Protecting grasslands in the Dakota Grassland Conservation Area (DGCA) will help buffer the population declines grassland birds are experiencing in other parts of their ranges. Grassland bird populations are steady or increasing in the project area while decreasing throughout many other parts of their ranges. Preventing the establishment of some new cropland would slow the increase in volume of pesticides into the environment. The 2011 USFWS LPP also states that wetland and grassland easements are the most cost effective, socially and politically acceptable means to ensure protection of species habitats in the DGCA. The USFWS sees easements as the most viable way to conserve lands at the landscape scale necessary to protect wildlife values in the DGCA.

Importantly, these protected areas would exist regardless of changes in agricultural policy or economy, which are known to affect the rate of grassland conversion.

4.5.2.3.3 *Socioeconomic Resources*

The human population is generally sparse and towns are widely scattered in the project area. The farm and ranch ownerships vary widely in size, ranging from 160- to 30,000-acre blocks that help maintain an intact landscape. The ranchers' livelihoods depend on natural resources—grass, water, and open space—and the key to protecting the DGCA lies primarily in sustaining the current pattern of ranching and low-density use (USFWS LPP 2011).

The LLP states residents and county governments have expressed concerns about the amount of taxes paid to the counties when land is acquired in fee title. Because the project is an easement program, the land remains in private ownership; therefore, taxes paid to a county by the landowner are not affected. Over the short-term, money paid by USFWS for the wetland or grassland easement becomes another source of income for the landowner and, logically, a part of those dollars likely would be spent in the local area. Proximity to protected easement lands may enhance the property value of adjoining lands. The easement program is not expected to cause any adverse changes to the sociocultural climate in the project area but, rather, would help sustain the current condition. Unlike many other areas in the country, the key to protecting native prairie lies primarily in sustaining the current land use of livestock ranching. The USFWS views a strong and vibrant rural lifestyle, of which ranching is the dominant land use, as one of the key components to ensuring habitat integrity and wildlife resource protection. The LPP states there is potential for more protection of cultural resources due to the accelerated purchase of wetland and grassland easements. Minor long-term impacts on land management would result from this alternative through establishment of easements.

4.5.2.4 Cumulative Impacts

The PDARP/PEIS found that implementation of bird restoration projects is consistent with its restoration goals and is not expected to contribute substantially to short-term or long-term, adverse cumulative impacts on physical, biological, or socioeconomic resources when analyzed in combination with other past, present, and reasonably foreseeable future actions. Although the PDARP/PEIS was specific to the Gulf of Mexico region, many of the actions evaluated are relevant in North and South Dakota. The condition of ecosystem in the current project area reflects water quality impacts from industry, transportation, agricultural runoff, atmospheric deposition, and other sources throughout the area. PDARP/PEIS section Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis, describes many of the federal, state, and local projects and programs related to water quality improvement that have occurred in the past and present and are expected to continue into the future, some of which are relevant to this area. The tourism industry in the region also offers a wide variety of activities, and is particularly popular among duck hunters and birders.

This project would have no adverse environmental impacts and therefore would not contribute to adverse cumulative impacts. If this alternative is carried out in conjunction with other environmental stewardship and restoration efforts, it may result in long-term beneficial cumulative impacts to physical and biological resources because of the potential for synergistic effects of this alternative with these other environmental stewardship and restoration activities.

4.5.2.5 No Action

The proposed alternative to restore black terns on the breeding grounds of North and South Dakota through funding of conservation easements would not be pursued by the Open Ocean TIG at this time. All of the identified affected resources would remain in their current conditions, including conditions described in the affected environment as degrading in any “future without project” scenarios. Funding for additional agreements between landowners and the USFWS to conserve black tern habitat would not occur, and the land could potentially be converted to cropland or drained for other uses. Benefits to black terns or other resources that would also benefit from the alternative would not be realized. The No Action Alternative would not contribute to long-term restoration benefits to physical, biological, or socioeconomic resources and would contribute to degradation of resources in the action area.

4.5.3 Restoration of American White Pelican on the Upper Mississippi River

This alternative would enhance nesting opportunities for American white pelicans by providing additional nesting habitat in target established nesting areas within the American white pelican breeding range, building on an existing regional partnership between USFWS and USACE. The project would utilize dredged materials currently generated through maintenance dredging of navigation channels to create 10 acres of new nesting habitat within Pool 13 (Figure 3-3) located in the Upper Mississippi River National Wildlife and Fish Refuge (NWFR).

Pool 13 is impounded by Lock and Dam 13 at Fulton, Illinois and extends 34.2 miles to Lock and Dam 12 in Bellevue, IA (please refer to Figure 3-3).¹² Pools are river-like in nature having various flow velocities

¹² The area of river between two dams is called a “pool,” each numbered according to the dam that creates it.

extending laterally from the navigation channel to the backwaters. Upon impoundment in 1938, water levels in the river were permanently raised and stabilized, profoundly changing the character of the river (USFWS 2006). USACE currently dredges sand from the Upper Mississippi River to maintain a nine-foot deep navigation channel for commercial barge traffic. Dredge sand is available for use for a variety of purposes, including the creation of islands. USFWS has partnered with USACE for over 25 years to use this material for the construction of islands in the Mississippi River for habitat purposes. To implement this project, 10 acres of new island habitat would be constructed in coordination with USACE, Rock Island District; the Iowa Department of Natural Resources and the Illinois Department of Natural Resources.

USFWS or USACE equipment would be used for all island creation work, and no new infrastructure would be required. During the determination of the final placement of new river islands, wave action, water currents, and water surface elevation would be considered in order to reduce erosion. Per USACE recommendations, the islands would be armored with riprap to further prevent erosion and further hydraulic analysis would be conducted to verify shape, orientation, and riprap size and quantity. The newly created islands would be managed by the USFWS, under current management plans, practices and strategies. The project would take approximately one year to plan and, depending on the USACE dredge schedule, 1-5 years to complete. If this alternative became preferred and selected for implementation in this plan or a future restoration plan, a project monitoring plan would be developed. See Chapter 3 of this RP/EA for additional description of the planned project.

Similar projects have been planned within the NWFR in the Pool 13 reach of the river, although island building projects have not been completed in this pool. In 2004, USACE completed an environmental assessment (EA) for dredge spoil islands in Pool 13 as wetland mitigation for a navigational dredging project, and the EA covers both dredging and island creation specifically¹³. The USFWS most recent Comprehensive Conservation Plan (CCP) and Environmental Impact Statement (EIS) for the Upper Mississippi NWFR were completed in 2006.¹⁴ That plan includes specific Environmental Pool Plans and states that the USFWS has a goal of implementing more than 30 percent of the Environmental Pool Plan actions over the next 15 years. Actions listed for Pool 13 under the preferred alternative include island creation, but environmental impacts listed are generalized and not specific to island creation. Impacts specific to this proposed island creation are evaluated here.

The American white pelican has been documented as a common visitor to the NWFR since the 1980's. However, existing documents all predate any observed nesting in Pool 13 (or elsewhere in the NWFR); therefore none of the documents mention specific management actions for this species. The sections of these documents that pertain to island creation and impacts in Pool 13 are incorporated by reference and summarized where applicable below.

¹³ The Dredged Material Management Plan For Dredged Material Placement Upper Mississippi River Miles 525.1-538.7 Pool 13 Site Plan For Sabula Reach Sabula Lower, Dark Slough, Elk River And Pomme De Terre Dredge Cuts, Final 2004.

¹⁴ The Upper Mississippi River National Wildlife and Fish Refuge Comprehensive Conservation Plan and Final Environmental Impact Statement can be found at <https://www.fws.gov/midwest/planning/uppermiss/>

4.5.3.1 Resources Analyzed in Detail for this Alternative

Table 4-3 identifies how potentially affected resources are analyzed in this RP/EA for this alternative. In particular, it identifies whether resources were addressed in Section 4.2 (Resources Not Analyzed in Detail in this RP/EA), as well as resources that do not require additional analysis for this alternative because they are unaffected by it, or the impacts would be so minor that a more detailed NEPA analysis is not needed. It also identifies resources that will be analyzed in detail.

Table 4-3 NEPA Assessment of Resources for this Alternative

Potentially Affected Resource	Location of Analysis in Chapter 4
Physical Resources	
Geology and Substrates	Section 4.5.3.3
Hydrology and Water Quality	Section 4.5.3.3
Air Quality and Greenhouse Gas Emissions	Section 4.2
Noise	Section 4.2
Biological Resources	
Habitats	Section 4.5.3.3
Wildlife Species (including birds)	Section 4.5.3.3
Marine and Estuarine Fauna (fish, shellfish, benthic organisms)	This project would not affect marine or estuarine fauna. Freshwater fish, shellfish, and benthic organisms are addressed in the Wildlife Resources sections.
Protected Species	Section 4.5.3.3
Socioeconomic Resources	
Socioeconomics	Section 4.5.3.3
Environmental Justice	Section 4.2
Cultural Resources	Section 4.5.3.3
Infrastructure	Section 4.2
Land and Marine Management	Pool 13 is within public lands managed by the USFWS within the Upper Mississippi River NWFR. Refuge staff would manage the new islands as part of existing overall Pool 13 management and no changes in management would occur.
Tourism and Recreational Use	Section 4.5.3.3
Fisheries and Aquaculture	Section 4.2
Marine Transportation	Section 4.2

Potentially Affected Resource	Location of Analysis in Chapter 4
Aesthetics and Visual Resources	Section 4.2
Public Health and Safety, Including Flood and Shoreline Protection	Section 4.2

Note: Resource does not require additional analysis for this alternative because it is unaffected by the alternative, or the impacts would be so minor that a more detailed NEPA analysis is not needed.

Only those resource areas for which potential, adverse impacts are expected are discussed in detail in this draft RP/EA. The Open Ocean TIG analyzed the following resources in more detail below:

- **Physical Resources:** Geology and Substrates, Hydrology and Water Quality;
- **Biological Resources:** Habitats, Wildlife Species, Protected Species; and
- **Socioeconomic Resources:** Socioeconomics, Tourism and Recreation, Cultural Resources.

4.5.3.2 Affected Environment

Island loss in the lower one half of Upper Mississippi River pools has occurred since the locks and dams were installed in the mid-1930s, resulting in decreases in habitat for plants and animals. Island habitat has declined in Pool 13 since the construction of Lock and Dam 13 in 1938, as erosion by waves, ice, and river currents have reduced both the number and acreage of islands (USACE 2004). The Pool 13 reach of the NWFR is a 34.2 mile long segment of the Mississippi River and is the farthest south of the environmental pools in the NWFR (please refer to Figure 3-3). Pool 13 contains 28,117 acres of aquatic habitat. The upper and middle portions of the pool contain many islands, channels, and backwaters while the lower pool is a broad expanse of open water. Limestone bluffs line much of the shoreline in Pool 13. The Maquoketa River empties into the Mississippi River in Pool 13. The Iowa DNR’s Green Island Wildlife Management Area is located below the mouth of the Maquoketa River.

Chapter 3 of the Upper Mississippi River NWFR CCP/EIS details the affected environment for the NWFR as a whole, and describes in particular the physical, biological, and cultural resources that could be affected by an island creation project in Pool 13 and is incorporated by reference herein and summarized below. Because this project does not include the dredging activities by the USACE, the affected environment discussed refers only to the island creation area in Pool 13.

4.5.3.2.1 Physical Resources

The 2006 CCP for the Upper Mississippi River NWFR states the area is “covered by loess, a silty soil deposited by postglacial winds,” the “floodplain bedrock is covered by up to 150 feet (Pool 10) of alluvial soils,” and “soils within the pools vary from silty clay to sand.” Pool 13 has three major river ecosystem zones. The area where island creation would occur is in the lower elevational floodplains which “consist of more poorly drained silty loams and silty clay loams best suited for moderately flood tolerant to very tolerant bottomland hardwoods” (USFWS 2006).

The Mississippi River and the NWFR are “still being exposed to biotic risks and threats from a growing array of agricultural chemicals and their degradation products, excess nutrients from both point and non-point sources, dissolved heavy metals in water and sediment, and other toxic compounds or

invasive organisms” (USFWS 2006). Pool 13 is located between two locks, and the USFWS notes in their CCP that “the lock and dam system has permanently inundated lands previously rejuvenated through annual drying and ‘flood pulse’ cycles” (ibid). USFWS notes that locks and dams have significantly changed the wetland and island habitats in the pool, as “initially the pools supported flourishing, productive wetlands, within a few decades the vast marshes became decadent as they filled with fine sediments, and turbidity from rough fish and wave action suppressed growth of aquatic plants” (ibid). Further information about geology and substrates can be found in the Soils section 3.1.5 of the 2006 CCP, and further information about hydrology can be found in the Hydrology and Water Quality section 3.1.4 of the 2006 CCP.

4.5.3.2.2 Biological Resources

Following the creation of Lock and Dam 13 in 1938 and the subsequent erosion of island habitats and sediment accumulation in Pool 13, habitats have changed significantly, aquatic habitat has degraded, vegetative marsh habitats have converted to open water, and “bathymetric diversity” has mostly been eliminated, all resulting in a loss of productivity for fish and wildlife in the pools (USFWS 2006). However, the NWFR still boasts a large variety of wildlife and vegetation, and hosts several federally listed threatened and endangered species. The 2006 CCP identified the bald eagle and Higgins eye pearlymussel as federally endangered, and identified the eastern Massasauga rattlesnake, sheepsnose (mussel) and spectaclecase (mussel) as candidates. The candidate species have since been listed, along with the Northern long-eared bat. Due to the location of the island creation project, the mussel species are the only endangered species included in the affected environment for this project. The current federal species list and listing date for the NWFR includes:

- Higgins eye pearlymussel (endangered - 1976)
- Eastern Massasauga rattlesnake (threatened - 2016)
- Sheepsnose mussel (endangered – 2012)
- Spectaclecase mussel (endangered – 2012)
- Northern long-eared bat (threatened – 2016)

Higgins eye pearlymussel and sheepsnose mussels reside in deep water with moderate currents, while spectaclecase mussels are found in more sheltered areas in river beds, therefore mussel surveys would be necessary to determine new island placement in Pool 13.

While the 2006 CCP does mention American white pelicans specifically it notes the species is “a relatively new, but common, visitor to the Refuge in spring, summer and fall,” it goes on to state:

“The closest nesting colonies are in western Minnesota (Marsh Lake) and east-central Wisconsin (Horicon National Wildlife Refuge). Large numbers (less than 100) of pelicans first showed up on the Refuge in the early 1980s, with sudden build-ups of more than 1,000 in the mid-1980s. This increase in numbers coincides with a continental increase following the ban on DDT and other pesticides in 1972. The pelican joined other species that are high on the food chain (Bald Eagle, Peregrine Falcon, Great Blue Herons, and Double-crested Cormorants) in making a strong population recovery.”

American white pelicans now regularly nest on rookeries islands in Pool 13, including Smith Bay Island, Cormorant Island North and South, Gomer Island, Woodruff Island and Pelican Island (USFWS 2013).

The 2006 CCP states the Refuge and Upper Mississippi River system are inundated with invasive species. Native benthic and river species are affected by invasive fish (Asian carp, round goby), plants (Eurasian milfoil), and invertebrates (zebra mussel, faucet snail). The zebra mussel in particular is a threat to native mussel populations, including the Higgins eye pearlymussel.

In addition to protected species, the system of pools within the Refuge host a variety of terrestrial and aquatic wildlife due in part to the three ecologic zones within each pool: lower zones with deep water interspersed with islands, middle zones with backwater marshes and shallow lakes, and upper zones with braided channels and forested islands. The Refuge falls within the Mississippi Flyway, through which an estimated 40 percent of US waterfowl migrate, and it is a critical migration corridor for ten waterfowl species including tundra swan, ring-necked duck and hooded merganser, lesser snow goose, Canada goose, wood duck, mallard, blue-winged teal, canvasback, and lesser scaup. Surveys have also recorded over 160 species of songbird in the Refuge, secretive marsh birds, raptors, and many species of colonial nesting birds including double-crested cormorants, great blue herons, and black terns. The Refuge supports at least 119 species of fish, 39 species of freshwater mussel, 22 species of reptile, and 13 species of amphibians (USFWS 2006). Additional information about wildlife, vegetation, and invasive species in the NWFR and in the pools can be found in the Fish, Wildlife and Habitat section 3.2 of the CCP.

4.5.3.2.3 *Socioeconomic Resources*

The land area near Pool 13 is primarily rural or undeveloped. Pool 13 has various recreational activities throughout, including hunting, canoeing, and wildlife watching. None of these activities occur specifically within the area that would be impacted from this alternative. The nearest recreational areas to the proposed island creation sites are along the shore, and there are no canoe trails, hunting zones, or hunting closure areas within this part of the river. Cultural resources have been identified throughout the NWFR.

4.5.3.3 *Environmental Consequences*

Island construction activities and continued island presence in the river post-construction have potential physical, biological and human use effects, described below.

4.5.3.3.1 *Physical Resources*

For its assessment of island creation in Pool 13 in 2004, the USACE determined that dredged material deposition for island creation could result in potential long term adverse effects to physical resources from island building activities, including:

- Changes in bottom topography;
- Blockage or filling of side channels; and
- Interruption of hydrologic processes.

The 2006 CCP recognizes that some habitat projects will increase water turbidity during construction, but this effect will be of relatively short duration and offset by long-term gains in local water quality associated with the project. In addition to these short-term effects, for this project, approximately 10 acres of substrate would be converted to island habitat area. The 2006 CCP notes the following long-term benefits of island creation include:

- Decrease wind and wave action;
- Improve flow patterns and sediment transport;
- Improvements in water quality;
- Improve floodplain structural integrity; and
- Reverse a trend to more-or-less static geomorphology which started when the lock and dams went into operation in the 1930s.

In the determination of the final placement of new river islands, wave action, water currents, and water surface elevation would be considered in order to reduce erosion. Soil used in the creation of the islands is not anticipated to be different from contaminants currently found in NWFR soils as the dredged materials are from a similar location (see USFWS CCP section 3.1.7 for discussion on contaminants).

The newly created islands would become part of Upper Mississippi River NWFR which would be responsible for their management. Additional protection measures for island creation identified by the USACE in its 2004 EA for island-building projects in this area include: shoreline protection, vegetation plantings, mammalian predator management, and seasonal public closures. Post-construction monitoring for this project would ensure that any island enhancements that were implemented as part of this project (e.g., plantings, shoreline stabilization, signage) would remain in place and functional.

In summary, the project is anticipated to result in minor, short-term adverse impacts to water quality due to increased turbidity from soil placement. The project would also have long-term effects on geomorphology and water flow in the river channel, which are anticipated to largely be beneficial.

4.5.3.3.2 Biological Resources

The project would create 10 acres of new island area in the river channel, which would permanently remove 10 acres of existing benthic habitat and 10 acres of open water habitat within Pool 13. The action would create 10 acres of terrestrial and aquatic habitat. These habitats would support growth of fish and invertebrates, as well as aquatic plants (USACE 2004). Because they are protected from predators, additional vegetated islands would expand existing nesting habitat for white pelicans within Pool 13.

The placement of spoil materials on 10 acres of benthic habitat would have a long-term adverse impact on benthic organisms in the directly impacted area, and may have short term adverse effects to nearby open water species through increased turbidity and disturbance during construction (including diving ducks such as the canvasback and lesser scaup) (USACE 2004).

Island creation would benefit Pool 13 species in addition to white pelicans by providing more island and wetland habitat, and further restoring the pool to the original, pre-dam river flow patterns, creating more benthic variability. The USACE 2004 EA states the benefits of island creation in this pool:

“(Islands) provide habitat for terrestrial species and semi-aquatic species. Islands provide new nesting, feeding, and loafing areas for such species as waterbirds, reptiles, amphibians, and furbearers. Islands in the lower third of a pool protect aquatic vegetation by deflecting the river’s current and breaking up waves. The aquatic vegetation located in the protected areas behind islands is used for food by migrating waterfowl and as habitat for other aquatic life and life history stages.”

Three federally endangered mussel species in the NWFR (Higgins eye pearly mussel, sheepnose, spectaclecase) may be affected by these island creation activities. Freshwater mussel surveys would be conducted within the proposed project area. Results of these surveys would be used to further refine the project footprint and would be designed to avoid potential impacts to identified mussel resources.

USACE describes several mitigation activities in the 2004 environmental assessment that would avoid “significant effects” on fish and wildlife, endangered and threatened species critical habitats, or wetlands. These methods include the following and would also be taken into consideration for this alternative:

- Size and design of the islands to facilitate rapid ecological development;
- Consideration of wave action, water currents, and water surface elevation to reduce erosion potential;
- Riprap armoring to reduce erosion potential;
- Mussel surveys to determine existing mussel habitat; and
- Location placement based on historical island position.

USACE determined that island creation in Pool 13 would have a “substantial positive effect on habitat diversity and interspersion” (2004). The USFWS CCP for the NWFR notes that the unavoidable adverse effects of loss of open water habitat would be “relatively local in nature and more than offset by the long-term diversity and ecological health of the broader landscape” (2006).

The CCP and USFWS state that invasive zebra mussels are currently an issue within the NWFR. However, as long as new islands created in Pool 13 are sourced from dredged materials from within the pool, activities should not increase the presence of zebra mussels.

The CCP states that the biological benefits of island creation include improvements in aquatic plant growth and increased nesting and loafing habitat for waterfowl and turtles, and that “improvement of emergent marsh habitat through habitat projects such as island construction would positively impact a variety of birds such as bitterns, rails, black terns and pied-billed grebes” (2006). The USACE EA and the USFWS CCP concluded that no long-term adverse impacts to habitat should result from island creation beyond impacts to benthic habitat. In summary, the project is anticipated to result in short-term adverse impacts to habitats due to increased turbidity from soil placement. Although the project would result in the permanent loss of 10 acres of benthic habitat and open water habitat, the project would create 10 acres of terrestrial and aquatic habitat that should be valuable for both terrestrial and aquatic species.

4.5.3.3.3 Socioeconomic Resources

This project is generally not anticipated to affect tourism or recreation use within the NWFR. It is possible that some visitors interested in birding may benefit from this alternative associated with more or enhance sitings of American pelicans or other birds that utilize the newly created habitat areas.

All work would be completed under the USACE beneficial use of dredge permitting and may not use local labor, as dredging would be conducted independently of this project by the USACE. All work would be done on public lands. As such, benefits to the local economy are anticipated to be negligible to minor. The USACE found that island creation would not adversely impact area sand and gravel firms, area employment, community cohesion, or property values and tax revenues. USACE also determined

"no adverse impacts to the growth of the community or region are anticipated as a direct result of the proposed project" (USACE 2004).

As land-disturbing activities in the NWFR have the potential to impact cultural resources, the USFWS states in its CCP that it will provide the Regional Historic Preservation Officer a description and location of all projects, activities, routine maintenance and operations that affect ground and structures, details on requests for allowable uses, and the range of alternatives being considered. In addition, the "regional officer will analyze these undertakings for their potential to affect historic properties and enter into consultation with the State Historic Preservation Officer and other parties as appropriate" (USFWS 2006). This is consistent with typical procedures that are undertaken for restoration projects planned to address natural resource injury caused by the DWH spill. More information about cultural resources and the process for identifying them in the NWFR can be found in section 3.5 and section 4.2.2 of the CCP.

4.5.3.4 Cumulative Impacts

The PDARP/PEIS found that implementation of bird restoration projects is consistent with its restoration goals and is not expected to contribute substantially to short-term or long-term, adverse cumulative impacts on physical, biological, or socioeconomic resources when analyzed in combination with other past, present, and reasonably foreseeable future actions. Although the PDARP/PEIS was specific to the Gulf of Mexico region, many of the actions evaluated are relevant to the Upper Mississippi River. The condition of ecosystem in the current project area reflects water quality impacts from urban development, industry, transportation, agricultural runoff, atmospheric deposition, and other sources throughout the area. PDARP/PEIS section Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis, describes many of the federal, state, and local projects and programs related to water quality improvement that have occurred in the past and present and are expected to continue into the future, some of which are relevant to this area. The tourism industry in the region also offers a wide variety of activities, and is particularly popular for fishing, hunting, and birding.

If this alternative is carried out in conjunction with other environmental stewardship and restoration efforts, it may result in long-term beneficial cumulative impacts to physical and biological resources because of the potential for synergistic effects of this alternative with these other environmental stewardship and restoration activities.

4.5.3.5 No Action

The alternative to restore American white pelicans on the upper Mississippi River would not be pursued by the Open Ocean TIG at this time. All of the identified affected resources would remain in their current conditions, including conditions described in the affected environment as degrading in any "future without project" scenarios. Benefits to target species or other resources that would also benefit from the alternative would not be realized. The No Action Alternative would not contribute to long-term restoration benefits to physical, biological, or socioeconomic resources and would contribute to degradation of resources in the action area.

4.5.4 Restoration of Black Terns in the Upper Midwest

The black tern was once a common summer resident in wetlands of the upper Midwest region. Breeding populations have experienced considerable declines over the past century (Heath et al. 2009), most likely attributed to extensive loss and degradation of wetland habitats (Dahl 1990, 2014). This

alternative would restore palustrine and lacustrine marsh habitat and enhance nesting conditions for black terns at eight priority colonies in the Upper Mississippi and Great Lakes Region (Region) identified primarily on public lands (USFWS National Wildlife Refuges (NWRs) and state Wildlife Management Areas (WMAs)). The colonies would all be located within Important Bird Areas (IBAs) identified by BirdLife International and may include the Agassiz NWR, Sherburne NWR, and Upper Mississippi River NWR IBAs in Minnesota; the Horicon Marsh State Wildlife Area and Grassy Lake State Wildlife Area IBAs in Wisconsin; and the Ogontz Bay IBA, St. Clair Flats State Wildlife Area, and Wigwam Bay State Wildlife Area in Michigan (Figure 4-3).

Figure 4-3 Approximate Locations of Black Tern Colonies Where Restoration Activities Would be Planned.



Proposed restoration and management activities that would be undertaken under this alternative are similar to ongoing activities in these areas, and could include:

- a) Removal and control of narrow-leaved and hybridized cattail and common reed to provide appropriate interspersion of water and emergent vegetation;
- b) Prevention of woody vegetation encroachment around wetlands;
- c) Water level management;
- d) Installation of floating artificial nest platforms; and
- e) Development of a stewardship program to enhance landowner awareness and support in beneficial habitat management.

The alternative could also assess black tern nesting success and fledging success, daily nest survival, first-year survival and adult annual survival, and recruitment through a regional monitoring and adaptive management program. These efforts would build on current efforts in Minnesota, Wisconsin, and

Michigan. A standardized monitoring program at eight priority benchmark sites aimed at estimating black tern adult occupancy would be established.

4.5.4.1 Resources Analyzed in Detail for this Alternative

Table 4-4 identifies how potentially affected resources are analyzed in this RP/EA for this alternative. In particular, it identifies whether resources were addressed in Section 4.2 (Resources Not Analyzed in Detail in this RP/EA), as well as resources that do not require additional analysis for this alternative because they are unaffected by it, or the impacts would be so minor that a more detailed NEPA analysis is not needed. It also identifies resources that will be analyzed in detail.

Table 4-4 NEPA Assessment of Resources for this Alternative

Potentially Affected Resource	Location of Analysis in Chapter 4
Physical Resources	
Geology and Substrates	Section 4.4.4.3
Hydrology and Water Quality	Section 4.4.4.3
Air Quality and Greenhouse Gas Emissions	Section 4.2
Noise	Section 4.2
Biological Resources	
Habitats	Section 4.4.4.3
Wildlife Species (including birds)	Section 4.4.4.3
Marine and Estuarine Fauna (fish, shellfish, benthic organisms)	This project would not affect marine or estuarine fauna. Freshwater fish, shellfish, and benthic organisms are addressed, if applicable, in the wildlife discussion of the Biological Resources section.
Protected Species	Section 4.4.4.3
Socioeconomic Resources	
Socioeconomics	Restoration activities for this alternative would be located on public NWR and WMA lands and in important bird areas which are not located near population centers and are not anticipated to substantially affect local communities. Restoration and monitoring work would be performed by USFWS.
Environmental Justice	Section 4.2
Cultural Resources	Section 4.4.4.3
Infrastructure	Section 4.2

Potentially Affected Resource	Location of Analysis in Chapter 4
Land and Marine Management	Restoration and monitoring would be managed by USFWS in cooperation with state partners. Because affected lands are already managed for the protection of wildlife, generally either by state or federal land managers, land management is not anticipated to change as a result of this alternative.
Tourism and Recreational Use	Section 4.4.4.3
Fisheries and Aquaculture	Section 4.2
Marine Transportation	Section 4.2
Aesthetics and Visual Resources	Section 4.2
Public Health and Safety, Including Flood and Shoreline Protection	Section 4.2

Note: Resource does not require additional analysis for this alternative because it is unaffected by the alternative, or the impacts would be so minor that a more detailed NEPA analysis is not needed.

Only those resource areas for which potential, adverse impacts are expected are discussed. The Open Ocean TIG analyzed the following resources in more detail below:

- **Physical Resources:** Geology and Substrates, Hydrology and Water Quality
- **Biological Resources:** Habitats, Wildlife Species, Protected Species
- **Socioeconomic Resources:** Tourism and Recreational Use, Cultural Resources.

4.5.4.2 Affected Environment

The Upper Mississippi River and Great Lakes Joint Venture (herein “Joint Venture”) area is one of the largest and most ecologically diverse joint venture regions in the US. The black tern restoration project areas are located within the Boreal Hardwood Transition conservation region, characterized by coniferous and northern hardwood forests, nutrient-poor soils, and numerous clear lakes, bogs, and river systems with coastal estuaries, river impoundments, large shallow lakes, and natural wild rice lakes important to many breeding and migrating waterfowl and other waterbirds, and within the Prairie Hardwood Transition conservation region, characterized by early succession forest, oak savanna, and numerous pothole-type wetlands and shallow lakes making the region especially valuable to breeding and migrating waterfowl and waterbirds (Soulliere et al. 2007). The Joint Venture Waterbird Conservation Plan Strategy (Soulliere et al. 2007) describes black terns as breeding throughout the region beginning in late May through early July, with the exception of in the central hardwoods conservation region, and they are a species of high conservation concern in both the Boreal Hardwood and Prairie Harwood Transition regions.

The USDA Black Tern Technical Conservation Assessment states that black terns specifically require breeding habitat in shallow, highly productive freshwater wetlands with emergent vegetation (e.g. palustrine emergent wetlands, edges of riverine systems) (Naugle 2004). The Northern Prairie and Parkland Waterbird Conservation Plan details black tern nesting habitat as “shallow, highly productive wetlands with emergent vegetation in freshwater (sometimes brackish or alkaline) marshes, along

prairie sloughs, lake margins, edges of islands or slow-moving rivers, wet meadows, bogs, shrub-swamps and occasionally large stock ponds. Prefers wetlands surrounded by grassland rather than agricultural fields” (Beyersbergen et al. 2004).

The eight priority areas in Minnesota, Wisconsin, and Michigan identified for restoration and monitoring activities for this alternative have current nesting colonies of black terns. These areas are described briefly in Table 4-5.

Table 4-5 Potential Black Tern Restoration Alternative Locations

Location	State	Description
Agassiz NWR	Minnesota	Agassiz National Wildlife Refuge is comprised of 40,100 acres of wetland, 10,000 acres of shrubland, 7,000 acres of forestland, 4,250 acres of grassland, and 150 acres of cropland. Agassiz is located in northwestern Minnesota in the aspen/parkland transitional zone between the coniferous forest, tall grass prairie and the prairie pothole region of the United States. (USFWS 2000)
Sherburne NWR	Minnesota	The refuge consists of 30,665 acres and includes oak savannah, wetlands, and Big Woods habitat. Wetlands comprise about one-third of the refuge acreage, and provide habitat for many waterbird species. The refuge has 23 restored wetlands where water levels can be managed for wildlife. (Joint Venture 2007)
Upper Mississippi River NWFR	Minnesota	Contained entirely within the UMVGL Region, this refuge encompasses portions of Minnesota, Wisconsin, Iowa, and Illinois. The black tern project would occur in the Minnesota portion of the refuge. The refuge was established to protect bottomland habitat for migratory birds and fish, and currently contains about 240,000 acres of wooded islands, marshes, and backwaters. Restoring riverine habitat is the main focus of management activities. The refuge is important for multiple waterbird species. (Joint Venture 2007)
Horicon Marsh State Wildlife Area	Wisconsin	Horicon Marsh encompasses 32,000 acres and is the largest freshwater cattail marsh in the United States. The refuge encompasses the northern two-thirds of the marsh and the State Wildlife Area comprises the remainder of the marsh. About 17,000 acres of wetlands and 4,000 acres of upland on the refuge provide critical habitat for ducks, cranes, egrets, herons, cormorants, pelicans, marshbirds, and shorebirds. Within the marshland interior are several narrow islands that rise above the surrounding marsh. These islands are designated Natural Areas based on their unique bird populations. (Joint Venture 2007)
Grassy Lake State Wildlife Area	Wisconsin	Grassy Lake Wildlife Area is a 695-acre property which consists of approximately 380 acres of wetland, 210 acres of upland and 105 wooded acres. The property provides opportunities for public hunting, particularly waterfowl, and an area for wildlife production. Current public use of the property is highest for hunting deer, waterfowl and pheasant. Trapping muskrats and other furbearing animals is significant. (WDNR 2017)
Ogontz Bay IBA	Michigan	A high quality Great Lakes coastal bulrush marsh, on the shores of Big Bay de Noc, the Ogontz Bay marshes support one of the Michigan's largest remaining breeding colonies of the rare black tern. (Audubon 2018)
St. Clair Flats State Wildlife Area	Michigan	The world's largest freshwater delta composed of approximately 25,000 acres of cattail, bulrush, and grasses interspersed with open channels. A highly important wetland for breeding, migrating and wintering waterfowl and very high densities of rare marsh-nesting species including American and Least Bitterns, Forster's and Black Terns, and Marsh Wren. (Audubon 2018)
Wigwam Bay State Wildlife Area	Michigan	Coastal marsh adjoining Saginaw Bay, part of a much larger network of high quality emergent cattail habitat. Hosts a good variety of emergent marsh breeders, including four conservation concern species including American and least Bitterns, marsh wren, and black tern. About 30% of the IBA is part of the Wigwam Bay State Wildlife Area. Primary land use is wildlife conservation. Recreational activities and commercial fishing are secondary uses. (Audubon 2018)

The Upper Mississippi River and Great Lakes Region Joint Venture (Joint Venture) Waterbird Habitat Conservation Strategy (Soulliere et al. 2007) and the Upper Mississippi Valley/Great Lakes Waterbird Conservation Plan (Wires et al. 2010), along with location-specific USFWS NWR (USFWS Agassiz NWR 2005, Sherburne NWR 2005, and Upper Mississippi River NWR 2006) and WMA (WDNR Grassy Lake 2012 and Horicon Marsh 2012, MDNR St. Clair Flats, McFadden 2014) and state wildlife action plan (WI 2015, MI 2015, MN 2015) documents and environmental assessments contain extensive information on the environmental characteristics of the colony locations and form the basis for the analysis of the affected environment and environmental consequences for this alternative.

4.5.4.2.1 *Physical Resources*

The restoration locations for this alternative are in specific areas of the upper Midwest where wetlands and grasslands coincide. Since physical geological and hydrological resources vary throughout the region, the table below details the physical resources for each project location (Table 4-6).

Table 4-6 Physical Resources at Black Tern Restoration and Monitoring Project Locations

Location	Geology/Soils	Hydrology
Agassiz NWR (MN)	<p>Agassiz NWR is located in the eastern Red River Valley in what was once the lakebed of ancient Glacial Lake Agassiz. The terrain is relatively flat. The layer of till and lake sediments on Agassiz NWR is estimated to exceed 200 feet in depth. The Refuge's surface soils are typical of lakebed deposits, consisting of mostly peat or silty loams and clays.</p> <p>(USFWS Agassiz Final CPP, 2005, Ch. 3)</p>	<p>Impermeable soils and subsurface rock layers in combination with flat topography and minimal stream gradient favor the ponding of surface waters in and around the Refuge, as well as overtopping of banks and flooding. The Refuge's many pools furnish water storage capacity. Agassiz's impoundments with their marshes, mudflats, and open water are the dominant geographic features of the Refuge. They are also the focus of the Refuge's aquatic habitat management efforts on behalf of migratory birds.</p> <p>(USFW Agassiz Final CPP, 2005, Ch. 3)</p>
Sherburne NWR (MN)	<p>The Refuge lies within the deciduous forest-woodland zone of Minnesota on the Anoka Sandplain, a large flat sandy outwash area now thought to be lacustrine in origin, with small dune features and low moraines exposed above the outwash. The uplands within the Refuge consist of these flat sandy areas with some rolling small sand dune areas, interspersed with wetlands and four natural lakes.</p> <p>(USFWS Sherburne Final CCP, 2005, Ch. 3)</p>	<p>The Refuge was established along a portion of the St. Francis River Valley, historically known for its wildlife resources. The St. Francis River begins in Benton County, about 18 miles from where it enters the northwest corner of the Refuge. After traveling through the Refuge, the St. Francis River exits the Refuge's south spur and drains into the Elk River just north of Big Lake, then drains into the Mississippi River within the city limits of Elk River.</p> <p>(USFWS Sherburne Final CCP, 2005, Ch. 3)</p>
Upper Mississippi River NWFR (MN)	<p>Much of the Upper Mississippi River Basin is covered by loess, a silty soil deposited by postglacial winds. These soils form a mantle over half the Upper Mississippi and Illinois sub-basins and serve as a major source of silt to the Upper Mississippi River System. Floodplain bedrock is covered by up to 150 feet of alluvial soils (clay, silt, sand and gravel). Soils within the pools vary from silty clay to sand. Sand terraces, occurring at slightly higher elevations bordering the floodplain of the Mississippi and its larger tributaries, consist of glacial outwash deposited during periods of higher average flow.</p> <p>(USFWS UMR NWFR CCP, 2006, Ch. 3)</p>	<p>Hydrology and water quality play a vital role in maintaining the ecological integrity of the Refuge. Water flow within the entire basin is influenced by agriculture, urban development and even the thousands of reservoirs installed throughout the basin. The USACE has 76 reservoirs, holding 40 million-acre feet of water; this volume would take three months to flow past St. Louis at average discharges (Wlosinski 1999). An estimated 3,000 more reservoirs with unknown capacity also occur in the basin.</p> <p>(USFWS UMR NWFR CCP, 2006, Ch. 3)</p>

Location	Geology/Soils	Hydrology
Horicon Marsh State Wildlife Area (WI)	<p>Much of the property is dominated by muck soils in the bottomlands. In the uplands most soil is well drained silt loam. Some intermediately drained silty clay loams also exist.</p> <p>(Wisconsin DNR, Horicon IFMP, 2014, pg. 1-3)</p>	<p>Horicon Marsh State Wildlife Area lies within the Upper Rock River watershed. The east branch of the Rock River is the most significant source of water for Horicon Marsh. A dam on the Rock River allows artificial regulation of the waters of Horicon Marsh State Wildlife Area. A number of ditches and dikes throughout the area create expanses of open water of various sizes and configurations. Level ditches are flat-bottomed and closed at both ends so that they do not drain water, but instead hold it, while lift pumps flood areas behind the dikes, creating impoundments. Horicon Marsh is therefore seasonally flooded in some areas and permanently flooded in others.</p> <p>(Wisconsin NHIP, EA for Shaw and Horicon Marsh State Wildlife Areas, 2012)</p>
Grassy Lake State Wildlife Area (WI)	<p>Situated within rolling morainal topography, Grassy Lake is a shallow, hard-water seepage lake that supports dense stands of emergent aquatic vegetation throughout its basin.</p> <p>(WDNR Natural Areas Program, 2018)</p>	<p>Marsh and submergent aquatic communities are found in areas with permanent water. These communities are associated with natural water bodies (e.g., Grassy Lake).</p> <p>(WDNR Columbia County Master Plan, 2012, Ch. 2)</p>
Ogontz Bay IBA (MI)	<p>Nearshore bay area location only with no specific management plan. This IBA is a high quality Great Lakes coastal bulrush marsh, on the shores of Big Bay de Noc (Audubon 2018).</p>	<p>Nearshore bay area location only with no specific management plan. This IBA is a high quality Great Lakes coastal bulrush marsh, on the shores of Big Bay de Noc.</p>
St. Clair Flats Wildlife Area (MI)	<p>Not specified in plans for this location.</p>	<p>The marshlands and islands within SCFWA are a river delta formation resulting from St. Clair River flow into Lake St. Clair. Located between the St. Clair and Detroit Rivers, Lake St. Clair has a total area of 28,400 mi² and is a significant portion of the connecting waters between Lakes Huron and Erie.</p> <p>(MDNR, St. Clair Flats Wildlife Area MP, 2014)</p>
Wigwam Bay State Wildlife Area (MI)	<p>No state plans for this location.</p>	<p>No state plans for this location. Mostly emergent marsh (cattail and bulrush), shrubland, with a variety of other negligible cover types (Audubon 2018).</p>

Additional information can be found in the Upper Mississippi Valley/Great Lakes Joint Venture Waterbird Habitat Conservation Strategy (Soulliere et al. 2007), Upper Mississippi Valley/Great Lakes Waterbird Conservation Plan (Wires et al. 2010), and individual USFWS NWR and WMA plans and state management plans described in Table 4-3.

4.5.4.2.2 Biological Resources

The Upper Mississippi Valley/Great Lakes Region provides nesting, roosting, and foraging habitat for 46 regularly-occurring waterbird species, and although the region has experienced significant wetland loss, relative to other bird planning areas it remains rich in wetland communities (Wires et al. 2010). All waterbird species occurring in the region have been impacted to some degree by habitat loss, and for marsh nesting species like the black tern the impacts have been severe (Wires et al. 2010). Conservation threats in the region include wetland loss/degradation, threats to islands, dredging impacts, predation, and vegetative succession (Ibid). Invasive species within the marsh habitats specifically include common reed, reed canary grass, purple loosestrife, and hybrid cattail and are considered a primary reason for black tern decline in the region (Audubon Minnesota 2014).

While the restoration locations for this alternative occur in similar marsh and grassland habitats with similar habitat impacts, specific habitat types and wildlife may vary. The table below details the biological resources for each project location (Table 4-7).

Table 4-7 Biological Resources at Black Tern Restoration and Monitoring Project Locations

Location	Habitat Types	Wildlife
Agassiz NWR (MN)	Wetlands and open water comprise approximately 37,400 acres or 61 percent (almost two-thirds) of Agassiz's 61,500 acres. Included are cattail/mixed emergent marsh, bulrush emergent, open water/mudflats, sedge meadow, and common reed. Wetlands and open water are important or indispensable to many of the migratory birds found on the Refuge, either during nesting season or in transit during migration. The Refuge has been designated a Globally Important Bird Area for its outstanding value to wild birds and their habitats, as well as its efforts to conserve these. (USFWS Agassiz Final CPP, 2005, Ch. 3)	Many kinds of birds, mammals, fish, reptiles, and amphibians inhabit the lands administered by Agassiz NWR, for which the Refuge is recognized internationally. The Refuge is especially important to migratory birds, both during nesting and migrating seasons. Overall, more than 120 species of birds have been recorded nesting at Agassiz NWR. Forty-nine species of mammals have been documented on Agassiz NWR. (USFWS Agassiz Final CPP, 2005, Ch. 3)
Sherburne NWR (MN)	The Refuge is located in the Mississippi Headwaters/Tallgrass Prairie Ecosystem. The three major ecological communities within this ecosystem are the tallgrass prairie, the northern boreal forest, and the eastern deciduous forest. Glacial moraines and other deposits resulted in a myriad of lakes and wetlands that are common throughout this area. After the Refuge was established, impoundments were created in an effort to mitigate the earlier drainage. During the more than 30 years since the Refuge was established, wetland areas have increased from 34 percent relative cover to 45 percent relative cover. (USFWS Sherburne Final CPP 2005, Ch. 1 & 3)	Due to its ecological and vegetative diversity, this ecosystem supports at least 121 species of neotropical migrants and other migratory birds. It provides breeding and migration habitat for significant populations of waterfowl plus a variety of other water birds. The ecosystem supports several species of candidate and federally listed threatened and endangered species including the Bald eagle, Piping plover, Higgins eye pearly mussel, Karner blue butterfly, prairie bush clover, Leedy's roseroot, dwarf trout lily, and the western prairie fringed orchid. The increasingly rare paddlefish and lake sturgeon are also found in portions of this ecosystem. (USFWS Sherburne Final CPP 2005, Ch. 1)
Upper Mississippi River NWR (MN)	The upper pool zones extend downstream of dams, and retain a system of braided channels and forested islands that occurred prior to installation of the locks and dams. Many of the wet meadows that existed prior to inundation in the upper and middle zones are now forested due to succession and elimination of fire. Many of the productive marshes of mid-pool backwaters have lost their vegetative habitats and converted to open water, wind-swept, riverine lakes. Sediment continues to fill and degrade aquatic habitats. Other backwaters have attained equilibrium with riverine conditions and maintain aquatic habitat. (USFWS UMR NWR CCP, 2006, Ch. 3)	The U.S. Fish and Wildlife Service's Region 3 list of Resource Conservation Priorities contains 243 species of fish and wildlife, of which, 65 birds, three mammals, six fish, two reptiles, 26 invertebrates, and 13 plants occur on the Refuge. The Refuge lies within the Mississippi Flyway, through which an estimated 40 percent of the continent's waterfowl migrate. It is a critical migration corridor for 10 species. Colonial nesters on the Refuge include species that nest on floating mats of aquatic vegetation, such as the Black Tern, and tree-nesting species, including Great Blue Herons, Double-crested Cormorants, Great Egrets, and Green Herons. (USFWS UMR NWR CCP, 2006, Ch. 3)

Location	Habitat Types	Wildlife
Horicon Marsh State Wildlife Area (WI)	The Horicon Marsh is the largest contiguous freshwater cattail marsh in the lower 48 states. Much of the current forested habitat has been degraded to some extent as a result of past use and/or introduction of invasive exotic plants. Grassland habitat is severely fragmented likely resulting in high predation rates for those birds that attempt to nest there. Water levels cannot be effectively manipulated to the extent necessary to adequately manage vegetation within the marsh. Several impoundments have been constructed to better facilitate manipulation of water levels. The landscape surrounding the Horicon Marsh is used primarily for agriculture. (WDNR Horicon IFMP, 2014)	The large emergent wetlands and associated open water areas of Horicon Marsh State Wildlife Area, combined with seasonal mudflats, offer migratory birds such as waterfowl, shorebirds, and colonial waterbirds diverse habitats during the migratory seasons. Shorebirds such as greater and lesser yellowlegs, semipalmated sandpiper, least sandpiper and pectoral sandpiper also rely on Horicon Marsh State Wildlife Area as an important migratory stopover. (Wisconsin NHIP, EA for Shaw and Horicon Marsh State Wildlife Areas, 2012)
Grassy Lake State Wildlife Area (WI)	The most prominent feature is the shallow, hardwater seepage lake that supports dense stands of emergent and submergent aquatic vegetation. The wetlands and uplands provide good habitat for waterfowl and birds, including one of the largest nesting colonies of black terns in Wisconsin. (WDNR Columbia County Master Plan, 2012)	The property is heavily used for deer, waterfowl, and pheasant hunting. Trapping muskrats and other furbearing animals is significant too. This property is considered part of an Important Birding Area. (WDNR Columbia County Master Plan, 2012)
Ogontz Bay IBA (MI)	A high quality Great Lakes coastal bulrush marsh, on the shores of Big Bay de Noc. (Audubon 2018)	Ogontz Bay marshes support one of the Michigan's largest remaining breeding colonies of the rare black tern. (Audubon 2018)
St. Clair Flats IBA (MI)	The world's largest freshwater delta composed of approximately 25,000 acres of cattail, bulrush, and grasses interspersed with open channels. (Ogontz Bay Marshes, Audubon 2018)	A highly important wetland for breeding, migrating and wintering waterfowl and very high densities of rare marsh-nesting species including American and least bitterns, Forster's and black terns, and marsh wren. (Ogontz Bay Marshes, Audubon 2018)
Wigwam Bay IBA (MI)	Coastal marsh adjoining Saginaw Bay, part of a much larger network of high quality emergent cattail habitat. Primary land use is wildlife conservation. (Wigwam Bay Marshes, Audubon 2018)	Hosts a good variety of emergent marsh breeders, including four conservation concern species including American and Least bitterns, marsh wren, and black tern. About 30% of the IBA is part of the Wigwam Bay State Wildlife Area. (Wigwam Bay Marshes, Audubon 2018)

Threatened and endangered species occur within the black tern nesting colony locations identified for this alternative and include areas with critical habitat designations for species like Canada lynx and the gray wolf. The table below details the potential threatened and endangered species for each project location (Table 4-8).

Table 4-8 Threatened and Endangered Species in Project Locations

Species	Minnesota	Wisconsin	Michigan	Critical Habitat Designation in Upper Midwest
Canada lynx (T)	Yes	Yes	Yes	Yes
Gray wolf (T)	Yes	Yes	Yes	Yes
Northern long-eared bat (T)	Yes	Yes	Yes	
Indiana bat (E)			Yes	
Piping plover (E)	Yes	Yes	Yes	Yes
Rufa red knot (T)	Yes	Yes	Yes	
Eastern Massasauga rattlesnake (T)		Yes	Yes	
Topeka shiner (E)	Yes			Yes
Dakota skipper (T)	Yes			Yes
Poweshiek skipperling (E)	Yes	Yes		Yes
Rusty patched bumble bee (E)	Yes	Yes		
Eastern prairie fringed orchid (T)		Yes	Yes	
Western prairie fringed orchid (T)	Yes			
Hine’s emerald dragonfly (E)		Yes	Yes	Yes
Mitchell’s satyr (E)			Yes	
Source: USFWS Ecological Services Website (Accessed 2018).				

Additional information on the affected environments of these areas can be found in the UMRGL Joint Venture Waterbird Habitat Conservation Strategy (Soulliere et al. 2007), Upper Mississippi Valley/Great Lakes Waterbird Conservation Plan (Wires et al. 2010), and individual USFWS NWR and WMA plans and state management plans indicated in Table 4-4.

4.5.4.2.3 Socioeconomic Resources

The affected environment for this alternative is primarily public NWR and WMA lands. These lands within the Region in Minnesota, Wisconsin, and Michigan are used for recreation, including wildlife watching, hiking, and hunting, and have historic and cultural resources throughout. For example, the Agassiz NWR has “resources of archeological and cultural value that tell fragments of the long story of

human habitation and endeavor in the area” (USFWS 2005), and the Sherburne NWR has archeological evidence that “indicates people of all major cultural traditions have occupied the Refuge area from the end of the last glacier to the present time” (USFWS 2005).

4.5.4.3 Environmental Consequences

There are two main components to the potential restoration activities in the eight project locations: habitat management actions and post-restoration monitoring activities. Restoration could include removal of vegetation, prevention of woody vegetation encroachment, water level management, and installation of nest platforms, and on-site monitoring could include nest visits, setting camera traps, trapping and banding black tern adults and chicks, and locating and inventorying nesting areas in locations with potential habitat across the black tern population range. For example, in Agassiz NWR the USFWS raises water levels to depths that will flood out cattails and favor bulrush emergent habitat, uses drawdowns to maintain or re-establish bulrush where open water or mudflats occur, and monitors the extent of bulrush habitat and bird-nesting activities (USFWS 2005). Environmental assessments undertaken by USFWS for each of the NWR locations, frequently as part of broad Comprehensive Conservation Planning efforts, and by states for WMAs, have previously assessed potential impacts of restoration activities in these areas, and are summarized in the following sections.

4.5.4.3.1 Physical Resources

In the 2005 Agassiz NWR Comprehensive Conservation Plan and Environmental Assessment (CCP/EA), the USFWS describes impacts of potential habitat, water, and wildlife management activities in the refuge. The USFWS currently manages water impoundments and represses wetland and upland succession to maintain open water, consistent with the potential restoration activities for black terns described in this alternative. The 2005 CCP/EA found that these activities would have no significant impacts to physical resources (USFWS 2005a). Similarly, in a 2005 Sherburne NWR CCP/EA the USFWS found that changing water impoundment system and management of upland habitat areas would not have a significant impact on physical resources in that refuge (USFWS 2005b). Findings of the 2006 Upper Mississippi River NWR were similar (USFWS 2006). Horicon Marsh State Wildlife Area borders the Horicon Marsh NWR. A 2007 CCP/EA for the NWR conducted for habitat management activities found that habitat management practices that benefit waterbirds within the Refuge would have no significant impacts on physical resources (USFWS 2007b). Marsh restoration activities were found to have potential short-term minor impacts on wetland substrates and water quality during the restoration process, as vegetation is removed or replanted or water levels are altered to better suit black tern nesting habitat. Any disturbances would be localized to the project area (USFWS 2007). Post-restoration or monitoring activity impacts on physical resources in the project areas were not anticipated (USFWS 2007).

Additional information and examples of marsh management practices and impacts can be found in the Agassiz NWR CCP/EA (2005), Sherburne NWR CCP/EA (2005), Upper Mississippi River NWR CCP & EA (2006) and Horicon Marsh NWR CCP/EA (2007).

4.5.4.3.2 Biological Resources

In the Agassiz, Sherburne, Upper Mississippi River and Horicon NWR CCPs /EAs, the USFWS assessed potential impacts of a number of marsh habitat management activities that may be conducted as part of the proposed alternative. The existing CCP/EAs found that restoration activities that are undertaken, which may include wetland restoration, vegetation planting, and placing nest boxes, may have short term adverse impacts to biological resources (USFWS 2005a, 2005b, 2006, 2007). Some minor long term adverse impacts were also identified. For example, areas with restored bird populations or breeding colonies may draw additional visitors to the area, resulting in potential long-term indirect adverse impacts from human presence. However, the long-term impact of these restoration activities, including the removal of invasive species, would generally restore habitat and provide long term benefits to biological resources (USFWS 2005a, 2005b, 2006, 2007). Monitoring activities were anticipated to have temporary impacts on local wildlife during banding, nest visits, and other inventorying activities. Long-term benefits to birds were also expected from this activity. In particular, re-establishing historic breeding colonies and establishing new colonies would provide additional habitat for birds.

Additional discussion of potential impacts of marsh management practices can be found in the Agassiz NWR CCP/EA (2005), Sherburne NWR CCP/EA (2005), Upper Mississippi River NWR CCP/EA (2006) and Horicon Marsh CCP/EA (2007).

4.5.4.3.3 Socioeconomic Resources

IBAs are commonly used for recreation activities like hiking, wildlife watching, and hunting. Restoration and monitoring activities for this alternative would be minor and temporary, but on public lands temporary closures during the nesting season could exclude visitors from certain areas. As such, short-term minor adverse impacts to visitation may occur. However, long-term benefits associated with potential increased birding opportunities may be provided by this project in those areas.

Prior to restoration activities conducted for this alternative, surveys would be conducted on public lands where not previously surveyed to ensure cultural resources would not be affected. A complete review of all alternatives under Section 106 of the NHPA 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. This project would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

4.5.4.4 Cumulative Impacts

The PDARP/PEIS found that implementation of bird restoration projects is consistent with its restoration goals and is not expected to contribute substantially to short-term or long-term, adverse cumulative impacts on physical, biological, or socioeconomic resources when analyzed in combination with other past, present, and reasonably foreseeable future actions. Although the PDARP/PEIS was specific to the Gulf of Mexico region, many of the actions evaluated are relevant in the Upper Midwest as well. The condition of ecosystem in the current project area reflects water quality impacts from urban development, industry, transportation, agricultural runoff, atmospheric deposition, and other sources throughout the area. PDARP/PEIS section Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis, describes many of the federal, state, and local projects and programs related to water quality improvement that have occurred in the past and present and are expected to continue into the future, some of which are relevant to this area. The tourism industry in the region,

which includes visits to affected NWRs, includes a wide variety of activities such as boating, hunting, and fishing, and ecotourism (wildlife watching, birding, and scenic viewing).

If this alternative is carried out in conjunction with other environmental stewardship and restoration efforts, it may result in long-term beneficial cumulative impacts to physical and biological resources because of the potential for synergistic effects of this alternative with these other environmental stewardship and restoration activities.

4.5.4.5 No Action

Under the No Action Alternative, the alternative to restore black terns in the Upper Midwest would not be pursued by the Open Ocean TIG at this time. All of the identified affected resources would continue to evolve under current conditions, including any trends in adverse effects to resources from other human activities. Benefits to black terns or other resources that would also benefit from the alternative would not be realized.

4.5.5 Riparian and Coastal Conservation to Restore Spawning and Juvenile Habitat for Gulf Sturgeon

USEPA and USDA propose to restore Gulf sturgeon through improved spawning and juvenile survival by improving the quality of riparian habitats and receiving waters in Louisiana, Mississippi, Alabama, and Florida. This would be accomplished through technical and financial assistance to willing private and public landowners. Eligible landowners include undeveloped forested upland headwaters, farms and ranches, as well as cities lining coastal estuary habitats. This project would implement standard best practices of USEPA and USDA as relevant. This alternative would include riparian and wetland restoration and storm water control on agriculture, forest, and urban lands to benefit sturgeon. Practices expected to be implemented as part of this project (and commonly applied by USEPA and USDA) potentially include, but are not limited to, the following activities:

- Riparian Forest Buffer
- Filter Strip
- Riparian Herbaceous Cover
- Water and Sediment Control Basin
- Stormwater Runoff Control
- Critical Area Planting
- Access Control
- Grassed Waterway
- Urban Forestry
- Bioswale

Project management and oversight, planning, implementation, and monitoring would be a partnership effort between USDA, EPA, and the federal and state water quality and fish management agencies. USDA and EPA will use its existing staff, authorities, and expertise to work with willing partners to implement conservation practices on their lands. There are four phases: outreach to potential partners, selection of priority parcels, site-specific conservation planning and implementation, and post-implementation monitoring. Time to completion is three years from project initiation.

4.5.5.1 Resources Analyzed in Detail in this EA

Table 4-9 identifies how potentially affected resources are analyzed in this RP/EA for this alternative. In particular, it identifies whether resources were addressed in Section 4.2 (Resources Not Analyzed in Detail in this RP/EA), as well as resources that do not require additional analysis for this alternative because they are unaffected by it, or the impacts would be so minor that a more detailed NEPA analysis is not needed. It also identifies resources that will be analyzed in detail.

Table 4-9 NEPA Assessment of Resources for this Alternative

Potentially Affected Resource	Location of Analysis in Chapter 4
Physical Resources	
Geology and Substrates	No impacts associated with geologic hazards are expected for the proposed project, 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.
Hydrology and Water Quality	Section 4.4.5.3
Air Quality and Greenhouse Gas Emissions	Section 4.4.5.3
Noise	Section 4.2
Biological Resources	
Habitats	Section 4.4.5.3
Wildlife Species (including birds)	Section 4.4.5.3
Marine and Estuarine Fauna (fish, shellfish, benthic organisms)	Section 4.4.5.3
Protected Species	Section 4.4.5.3
Socioeconomic Resources	
Socioeconomics	Activities would be undertaken under agreements with willing landowners, therefore impacts are not expected to substantively affect social or economic conditions. The project may result in some aesthetic improvements in urban areas if additional vegetative plantings are made in public areas. Impacts to tourism or recreation are not anticipated.
Environmental Justice	Section 4.2
Cultural Resources	Section 4.4.5.3

Potentially Affected Resource	Location of Analysis in Chapter 4
Infrastructure	Section 4.2
Land and Marine Management	Landowners participating to the program area anticipated to include cities, farms and ranches, as well as those owning undeveloped forested upland headwaters. Investments on private lands are not anticipated to affect tourism or recreation. It is possible that minor benefits to tourism or recreation could occur associated with investments in highly visible public locations.
Tourism and Recreational Use	
Fisheries and Aquaculture	Section 4.2
Marine Transportation	Section 4.2
Aesthetics and Visual Resources	Section 4.2
Public Health and Safety, Including Flood and Shoreline Protection	Section 4.2

Note: Resource does not require additional analysis for this alternative because it is unaffected by the alternative, or the impacts would be so minor that a more detailed NEPA analysis is not needed.

Only those resource areas for which potential, adverse impacts are expected are discussed in detail in this draft RP/EA. The Open Ocean TIG analyzed the following resources in more detail below:

- **Physical Resources:** Hydrology and Water Quality
- **Biological Resources:** Habitats, Wildlife Species, Protected Species, Marine and Estuarine Fauna
- **Socioeconomic Resources:** Cultural Resources

4.5.5.2 Affected Environment

Activities undertaken for this project would be located on lands that would improve the quality of receiving waters and riparian habitats associated with Gulf sturgeon critical habitat. Gulf sturgeon critical habitat was designated in 2003, and extends to 14 river and tributary geographic areas that flow into the Gulf of Mexico. These 14 areas encompass 2,783 river kilometers and 6,042 square kilometers of estuarine and riverine habitat and are located in Louisiana, Mississippi, Alabama, and Florida (USFWS/NMFS 2003).

4.5.5.2.1 Physical Resources

The Gulf sturgeon critical habitat designation extensively details the hydrology of river and tributary areas where the species habitat may be found, and includes sections on freshwater habitat, estuarine and marine habitat, as well as details for each of the 14 critical habitat units (USDOC 2003). Gulf sturgeon require rivers that have large areas of diverse habitat with natural variations in water flow, velocity, temperature, and turbidity. They spawn in river habitat that consists of limestone bluffs and outcroppings, cobble, limestone bedrock covered with gravel and small cobble, gravel, or sand, and young sturgeon are typically found on sandbars and sand shoals in open, unstructured areas (USDOC 2003).

4.5.5.2.2 Biological Resources

The Gulf sturgeon is found in the coastal rivers of the northeastern Gulf of Mexico generally from Lake Pontchartrain in Louisiana to the Suwanee River in Florida. Critical habitat has been designated for the species in Mississippi to include portions of the Bogue Chitto, Bouie, Chickasawhay, Leaf, Pascagoula and Pearl Rivers and the Gulf of Mexico. Gulf sturgeon are primitive, anadromous fish that annually migrate from the Gulf of Mexico into freshwater streams to spawn. Subadults and adults spend eight to nine months each year in rivers. Adult and subadult holding areas have been identified in the Pascagoula River. The decline of the Gulf sturgeon is primarily due to limited access to riverine migration routes and historic spawning areas, habitat modification, and water quality degradation.

The Gulf sturgeon critical habitat designation extensively details the habitats of these river and tributary areas, and includes sections on Freshwater Habitat, Estuarine and Marine Habitat, and details for each of the 14 critical habitat units (USDOC 2003).

4.5.5.2.3 Socioeconomic Resources

The large river habitats where Gulf sturgeon is found are used extensively for river navigation, as well as for recreational activities, including boating and hunting. Some areas are dredged to maintain boat channels. Land uses surrounding the habitat areas vary from urban uses to agricultural and silvicultural uses. The areas where this alternative would occur were popular with prehistoric Native Americans for fishing and food gathering long before the first European explorers arrived on the coast. A complete review of this alternative under Section 106 of the NHPA 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. This alternative would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

4.5.5.3 Environmental Consequences

Each project site would undergo the standard USDA environmental compliance review before implementation. This covers all pertinent state and federal environmental regulations, including ESA and NHPA. The process would include the following considerations:

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 Conservation Practices (CPs) and analyzing the effects of those practices.¹⁵ 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 PDARP/PEIS. Because of this, this alternative

¹⁵ 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

contemplates using USDA-NRCS conservation practices to achieve certain PDARP/PEIS restoration goals in this RP/EA. This analysis hereby incorporates by reference the standards and specifications for the conservation practices in Appendix D of 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,¹⁶ and in the USDA-NRCS Conservation Effects Assessment Project reports.¹⁷ Each of those assessments is based on a review of the best available scientific studies and methodological approaches, as well as professional judgment.¹⁸ 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 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 work with private landowners to develop site-specific conservation plans outlining a combination of conservation practices.¹⁹ 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/EA includes examples of the conservation practices that the Open Ocean TIG expects would be implemented in the project area for this alternative and how those practices would be expected to affect the environment. These are consistent with the types of conservation practices anticipated.
3. **The Open Ocean TIG Approach to Site-Specific Environmental Review for the Selected Sites:** Subsequent environmental review would occur in addition to this NEPA analytical approach to

¹⁶ 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

¹⁷ <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/nra/ceap/>

¹⁸ 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.

¹⁹ The landowner outreach program, conservation planning activities, and creation of conservation plans would not require project-specific environmental compliance measures described in this section.

determine whether a planned site-specific action is below the maximum impacts described in this RP/EA. If the site-specific action falls within the range of impacts described in this RP/EA, the analysis of the effects would be documented on the Environmental Evaluation Worksheet and the action would proceed. The Environmental Evaluation Worksheet would be routed through the Open Ocean TIG to the Administrative Record, where it would be publicly available. If the evaluation of the planned site-specific action indicates effects are likely to exceed the maximum impacts described in this RP/EA, the OOTIG would undertake additional site-specific environmental review consistent with NEPA requirements and other requirements for protection of the environment. The OO TIG does not propose to take actions that would result in any significant adverse impacts on the environment.

The sections below analyze the anticipated environmental consequences of this alternative.

4.5.5.3.1 *Physical Resources*

This project aims to enhance water quality in the various watersheds by helping landowners develop and implement conservation plans that limit nonpoint source pollution. Practices expected to be implemented as part of this project (and commonly applied by USEPA and USDA) potentially include, but are not limited to:

- Riparian Forest Buffer;
- Filter Strip;
- Riparian Herbaceous Cover;
- Water and Sediment Control Basin;
- Stormwater Runoff Control;
- Critical Area Planting;
- Access Control;
- Grassed Waterway;
- Urban Forestry; and
- Bioswale.

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 project would ultimately decrease nutrient and sediment runoff and improve the hydrology of affected watersheds by restoring it to a more natural hydrologic cycle. It would also enhance water quality in the affected 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 affected watersheds. The drainage area for the watershed 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. Stream crossings and grade stabilization installed in streams would be constructed would be designed so as not to cause an appreciable rise in floodwaters. Impacts on water quality and hydrology associated with specific nutrient reduction activities that may be undertaken (including grade stabilization structure, Grassed Waterway, Heavy Use Area Protection, Streambank and Shoreline Protection, Structure for Water Control) are extensively described in the Alabama RP/EA II, which anticipates short term minor to moderate impacts of these actions, which is incorporated here by reference.²⁰

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 OO TIG would consider best practices referenced in PDARP/PEIS Section 6.15 and Appendix 6.A. Additional best practices may be recommended for site-specific conservation practices in different locations due to differences in relevant conditions. The following best practices are contemplated and would be implemented to the extent practicable in order to avoid or minimize impacts on wetlands:

- In the design of conservation practices the OO TIG would consider resiliency measures related to increasing storm intensities and changing weather patterns (CEQ, 2016).
- Any practice that involves the discharge of dredged or fill material into waters of the United States, including wetlands, would require authorization by USACE. Appropriate authorization from USACE 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 there are no leaks of antifreeze, hydraulic fluid, or other substances and cleaning and sealing all equipment that would be used in the water to rid it of chemical residue. Develop a contract stipulation to disallow use of any leaking equipment or vehicles.
- Prohibit use of hazardous materials, such as lead paint, creosote, pentachlorophenol, and other wood preservatives during construction in, over or adjacent to, sensitive sites during construction and routine maintenance.

²⁰ *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.
http://www.gulfspillrestoration.noaa.gov/sites/default/files/2018_03_AL%20RP%20II%20Camera%20Ready%20EA_clean.pdf

- Avoid or minimize, to the maximum extent practicable, placement of dredged or fill material in wetlands and other aquatic resources.
- Design construction equipment corridors to avoid or 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 tar balls.
- 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.

4.5.5.3.2 Biological Resources

In general, this alternative could result in short-term, minor adverse 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, 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 on biological resources associated specific nutrient reduction activities that may be undertaken are extensively described in the Alabama RP/EA II, which anticipates short-term, minor to moderate, adverse impacts from these practices.

Best Practices. The OO TIG would consider best practices referenced in PDARP/PEIS Section 6.15 and Appendix 6.A. Additional best practices may be recommended for site-specific conservation practices in different locations due to differences in relevant conditions. The following best practices are contemplated and would be implemented to the extent practicable to avoid or 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 to 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 there is no observable presence of mud, seeds, vegetation, insects and other species.

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 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.

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 species that could occur in estuaries and marine habitats.

All conservation practices would occur on land. Additionally, all project activities would occur inland, not near coastal beaches or intertidal flats. There would be a lack of suitable habitat for ESA-listed species that are marine or estuarine, or that depend on beach/intertidal flat habitats. ESA-listed species that occur inland, in riparian areas, or on agricultural lands may be present within project areas once specific locations are identified. However, all of the restoration measures and management activities will be designed to have long term beneficial impacts to habitats and the native species that utilize the areas, and are expected to have minimal or no adverse impacts on the environment.

If this project becomes preferred, additional coordination with USFWS would be required. Specific locations and management activities would be identified, and Implementing Trustees would revisit this project to determine if any protected species and/or designated critical habitat occur in those areas. If occurrence is known or likely, Implementing Trustees would identify potential impacts as well as measures to avoid or minimize impacts such that when implemented, impacts are insignificant or discountable. If a determination of "may affect, not likely to adversely affect" could not be made, Implementing Trustees would initiate formal consultation.

4.5.5.3.3 *Socioeconomic Resources*

For project activities in which the action would involve a study, education, or land acquisition that does not have the potential to disturb cultural resources, there would be no potential to affect cultural resources. For those project activities that include construction, ground disturbance, or other related activities, if any culturally or historically important resources were identified during consultations or predevelopment surveys, such areas would be avoided during construction. A complete review of all alternatives under Section 106 of the NHPA 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 areas. Alternatives would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

4.5.5.4 Cumulative Impacts

The PDARP/PEIS found that implementation of sturgeon restoration projects is consistent with its restoration goals and is not expected to contribute substantially to short-term or long-term, adverse cumulative impacts on physical, biological, or socioeconomic resources when analyzed in combination with other past, present, and reasonably foreseeable future actions. Many of the actions evaluated in the PDARP/PEIS are relevant in the project area. The condition of ecosystem in the current project area reflects water quality impacts from urban development, industry, transportation, agricultural runoff, atmospheric deposition, and other sources throughout the area. PDARP/PEIS section Appendix 6.B, Additional Actions for Consideration in Cumulative Impacts Analysis, describes many of the federal, state, and local projects and programs related to water quality improvement that have occurred in the past and present and are expected to continue into the future. The tourism industry in the region also offers a wide variety of activities such as boating, ecotourism (wildlife watching, birding, visiting parks, wildlife refuges, and scenic viewing), hunting, and fishing. If this alternative is carried out in conjunction with other environmental stewardship and restoration efforts, it may result in long-term beneficial cumulative impacts to physical and biological resources because of the potential for synergistic effects of this alternative with these other environmental stewardship and restoration activities.

4.5.5.5 No Action

The proposed alternative to restore spawning and juvenile habitat for Gulf sturgeon would not be pursued by the Open Ocean TIG at this time. Unless funded through other means, addressing the excess nutrients 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 runoff to nearby waters. Benefits to sturgeon or other resources that would also benefit from the alternative would not be realized.

4.6 Summary of No Action Alternative

Under the No Action Alternative, the alternatives that would restore birds and sturgeon would not be pursued by the Open Ocean TIG. All of the identified affected resources would remain in their current conditions, including conditions described in the affected environment as degrading in any “future without project” scenarios. Benefits to birds, Gulf sturgeon, or other resources that would also benefit from the alternatives would not be realized. The No Action Alternative would not contribute to long-term restoration benefits to physical, biological, or socioeconomic resources and would contribute to degradation of resources in the affected action areas.

4.7 Comparison of Impacts of Alternatives

The environmental analysis demonstrated that there would only be minor to moderate adverse impacts in addition to environmental benefits from the proposed restoration alternatives. The No Action Alternative largely had minor to moderate adverse impacts. A summary of impacts for projects involving construction or acquisition as well as the No Action alternative is located in Table 4-5.

As addressed in the PDARP/PEIS, alternatives which only include planning activities would cause direct, short-term, minor adverse impacts through associated fieldwork. These impacts would be very minor

and localized to the alternative site. Adverse impacts to the biological and physical environment also could include short-term disturbance of habitats and species, minor emissions from vehicles, and minor disturbance to terrestrial, estuarine, and marine environments. Long-term benefits to target species, as well as other long-term benefits to habitats, are anticipated for several alternatives.

Implementing Trustees would conduct due diligence to ensure that no unanticipated effects to listed species and habitats would occur. Adverse impacts would be minimized by following mitigation measures, BMPs and other guidance developed during the permitting process, environmental reviews, consultation process, and other relevant regulatory requirements. The Open Ocean TIG would also consider best practices referenced in PDARP/PEIS Section 6.15 and Appendix 6.A.

Table 4-10 Summary of Environmental Consequences

Project	Geology and Substrates	Hydrology and Water Quality	Habitats	Wildlife Species	Protected Species	Cultural Resources	Land Management	Tourism and Recreation
Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems	NE	NE	NE	NE	NE	NE	NE	NE
Restoration of Common Loons in Minnesota	s/l	s	+/s	+	+	NE	NE	+/s
Restoration of Black Terns in North and South Dakota	NE	NE	+	+	+	NE	NE	+/NE
Restoration of American White Pelican on the Upper Mississippi River	+/s/l	+/s/l	+s/l	+s	+	NE	NE	+/s
Restoration of Black Terns in the Upper Midwest	s	+/s	+/s/l	+s	+/s/l	NE	NE	NE
Riparian and Coastal Conservation to Restore Spawning and Juvenile Habitat for Gulf Sturgeon	NE	s	+/s	+/s	+/s	NE	NE	s
No Action	S	S	S	S	S	NE	S	S

Notes: Impacts to air quality, noise, environmental justice, infrastructure, marine transportation, fisheries and aquaculture, public health and safety, aesthetics and visual resources are not anticipated.

- + Beneficial effect
- NE No effect
- s Short-term minor adverse effect
- S Short-term moderate adverse effect
- S** Short-term major adverse effect
- l Long-term minor adverse effect
- L Long-term moderate adverse effect
- L** Long-term major adverse effect

4.8 Compliance with Environmental Laws and Regulations

The Open Ocean TIG would ensure compliance with all applicable federal, state and local laws and regulations relevant to the proposed restoration alternatives. The Open Ocean TIG has started coordination and reviews for protected species and their designated critical habitat under the ESA, cultural resources under the NHPA, permits under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act, consistency with the Coastal Zone Management Act²¹, and other federal statutes, where appropriate. Wherever pre-existing consultations or permits are present, they would be reviewed to determine if the consultations/permits are still valid or if additional consultation/permitting is necessary. Implementing Trustees are required to implement alternative-specific mitigation measures (including BMPs) identified in the RP/EA and completed consultations/permits. Oversight, provided by the Implementing Trustees, would include conducting due diligence with regard to ensuring no unanticipated effects to listed species and habitats occur, including ensuring that BMPs are implemented and continue to function as intended.

While many of these reviews are in process and some may not be finalized before alternatives are selected and the Final RP/EA is issued, progress to date suggests that all the proposed preferred alternatives would be able to meet permitting and other environmental compliance requirements and that all alternatives would be implemented in accordance with all applicable laws and regulations.

Federal environmental compliance responsibilities and procedures would follow the Trustee Council SOP, which are laid out in Section 9.4.6 of that 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 DWH project portal. The Implementing Trustees would keep a record of compliance documents (e.g., ESA letters, permits) and ensure that they are submitted for inclusion in the Administrative Record.

4.8.1 Additional Laws

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 PDARP/PEIS.

Additional federal laws may apply to the alternatives considered in this RP/EA. Legal authorities applicable to restoration alternative development were fully described in the context of the DWH restoration planning in the 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.

²¹ Pursuant to the Coastal Zone Management Act 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 (in this RP/EA states with coastal management programs and coastal resources/uses that could be affected are Minnesota, Louisiana, and Mississippi). The Open Ocean TIG is submitting consistency determinations for state review coincident with public review of this document as relevant.

Additional federal laws, regulations, and executive orders that may be applicable include but are not limited to:

- Endangered Species Act (16 U.S.C. §§1531 et seq.)
- Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §§1801 et seq.)
- Marine Mammal Protection Act (16 U.S.C. §§1361 et seq.)
- Coastal Zone Management Act (16 U.S.C. §§1451 et seq.)
- National Historic Preservation Act (16 U.S.C. §§470 et seq.)
- Coastal Barrier Resources Act (16 U.S.C. §§3501 et seq.)
- Migratory Bird Treaty Act (16 U.S.C. §§703 et seq.)
- Bald and Golden Eagle Protection Act (16 U.S.C. §§668 et seq.)
- Clean Air Act (42 U.S.C. §§7401 et seq.)
- Federal Water Pollution Control Act (CWA, 33 U.S.C. §§1251 et seq.) and/or Rivers and Harbors Act (33 U.S.C. §§401 et seq.)
- Marine Protection, Research and Sanctuaries Act
- Estuary Protection Act
- Archaeological Resource Protection Act
- National Marine Sanctuaries Act
- Farmland Protection Policy Act
- 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

Chapter 5: Monitoring and Adaptive Management Plans

Monitoring and adaptive management supports all restoration activities under the PDARP/PEIS by tracking and evaluating restoration progress toward goals, determining the need for corrective actions, addressing key uncertainties, and ensuring compliance with appropriate regulations (see PDARP/PEIS Appendix 5.E, Monitoring and Adaptive Management Framework, for additional details). Through monitoring and adaptive management, decisions are continuously informed by evolving restoration data and information. The adaptive management process incorporates monitoring of restoration progress, consideration of uncertainties, and opportunities for the Trustees to adapt restoration activities to ensure restoration success.

Project-level monitoring may include a variety of activities such as pre-implementation monitoring, as-built monitoring (to document successful completion of construction elements, if applicable), performance monitoring, or post-implementation monitoring. Monitoring can be conducted to identify environmental factors that may influence project success, support project compliance, and/or provide data to better understand ecological functions and benefits that would be used to inform decisions related to current or future DWH restoration projects. Pre-implementation monitoring can include monitoring to support project planning, design, location, or implementation; or monitoring to document initial conditions. Post-implementation monitoring can help gauge restoration progress and success. The bulk of project monitoring activities may fall under performance monitoring, which is intended to document whether projects have met their established performance criteria and determine the need for interim corrective actions.

Adaptive management is a form of structured decision-making applied to the management of natural resources in the face of uncertainty (Pastorok et al. 1997; Williams 2011). It is an iterative process that integrates monitoring and evaluation of management actions, where adjustments are made to management approaches based on observed outcomes (NRC 2004). Within the context of ecological restoration, adaptive management addresses uncertainty hindering restoration decisions by linking science-based approaches to restoration decision-making (Steyer and Llewellyn 2000; Thom et al. 2005). Within the context of DWH NRDA restoration, adaptive management includes implementing corrective actions, when necessary, to projects that are not trending toward established performance criteria; making adjustments over time to projects that require recurrent or ongoing decision-making; and informing the selection, design, and implementation of restoration projects. The emphasis of adaptive management for DWH NRDA restoration projects is learning from the results of strategic implementation and targeted monitoring as a way to reduce uncertainties concerning restoration decisions.

Adaptive management at the project level includes activities that occur during project planning, implementation, and evaluation. The level of adaptive management needed for a given project (and in turn described in the project-specific MAM Plan) will vary based on project specifics. Some DWH NRDA restoration projects may be well-understood and not have uncertainties that warrant adaptive management beyond corrective actions. For elements of the Restoration Plan with higher degrees of uncertainty or where numerous restoration projects are planned within a given geographic area and/or for the benefit of a particular resource, a more robust approach to adaptive management may be

described in the MAM Plan. Examples of situations that may require more robust MAM include restoration of resources with limited scientific understanding, the use of novel approaches and/or techniques, and restoration at large spatial scales and/or long time scales.

Consistent with Section 10 of the Trustee Council SOP for the Implementation of Natural Resource Restoration for the *Deepwater Horizon* (DWH) Oil Spill (revised November 15, 2016), the implementing trustee will develop MAM plans for all projects other than those selected only for engineering and design. In addition, for a Draft RP/EA, MAM plans are only developed for preferred projects. To the extent the Trustees selected different preferred projects in a Final RP/EA, MAM plans will be developed for those projects, consistent with the requirements and guidelines set forth in the Final PDARP/PEIS, the Trustee Council SOP (Section 10) and the Monitoring and Adaptive Management Procedures and Guidelines Manual Version 1.0 (the Trustee MAM plan template from that latter document is reproduced in Appendix C of this RP/EA).

This Draft RP/EA includes three preferred project alternatives. One of these preferred project alternatives (Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use, and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems) involves planning/data collection intended to generate critical information needed to design, evaluate and prioritize future restoration activities for Gulf sturgeon and therefore is treated similar to engineering and design activities. As a result, this document does not include a MAM plan for this project alternative. As a general matter, the Trustees note that progress towards meeting project objectives would be monitored, and adaptive measures undertaken if/as necessary to address circumstances that arise. For this sturgeon project, such actions could include (but are not limited to) deploying additional equipment to maintain project schedule or modifying capture equipment to improve catch success and/or address any unanticipated project consequences. In addition, all data collected by the project would undergo proper QAQC protocols, be reviewed and verified following the process outlined in Section 3 of the MAM Manual. Data would be made publicly available, in accordance with the Federal Open Data Policy (Section 10.6.6 of SOP; DWH NRDA Trustees 2016b), through the DIVER Explorer Interface within a year of when the data collection occurred.

MAM plans for each of the other two preferred restoration alternatives (Restoration of Common Loons in Minnesota and Restoration of Black Terns in North Dakota and South Dakota) are provided in the following sections of this chapter.

5.1 Monitoring and Adaptive Management Plan for *Deepwater Horizon* NRDA Project: Restoration of Common Loons in Minnesota

5.1.1 Introduction

This MAM Plan is a living document and may be updated as needed to reflect changing conditions and/or new information.

5.1.1.1 Project Overview

The objectives of this proposed alternative are to reduce mortality and increase reproductive success of common loons at breeding, nesting, and migration staging locations in Minnesota by focusing on restoration activities that include: 1) acquisition and/or easements of lakeshore loon nesting habitat; 2) enhancing loon productivity by providing artificial nesting platforms in targeted lakes and engaging Minnesota lake associations in loon conservation activities; and 3) reducing loon exposure to lead-based fishing tackle.

5.1.1.2 Restoration Type Goals and Project Restoration Objectives

As outlined within the *Deepwater Horizon* Oil Spill PDARP/PEIS, this restoration project falls under the following programmatic goal, restoration type, restoration approach, restoration technique, TIG, and restoration plan:

- Programmatic Goal: Restore and Protect Living, Coastal, and Marine Resources
- Restoration Type: Birds
- Restoration approach(es): Restore and conserve bird nesting and foraging habitat. Prevent incidental bird mortality.
- Restoration technique(s): Acquire targeted lake shorelines to facilitate direct protection of loons and ensure future availability of nest sites and supporting habitat. Enhance loon productivity by installing artificial nest platforms (ANPs) in targeted lakes and by recruiting MN lake associations in loon conservation activities. Increase adult loon survival rates by funding intervention projects that promote the use of alternatives to lead fishing jigs and sinkers in MN.
- TIG: Open Ocean
- Restoration plan: Open Ocean Trustee Implementation Group Restoration Plan 1/Environmental Assessment (RP/EA).

Objective 1: *Acquisition and protection of critical lakeshore nesting and foraging habitat.*

The primary objective of land acquisition is to protect loon nesting and foraging habitat through perpetual easements. This activity will provide direct protection of priority nesting areas and ensure future availability of nest sites and supporting habitat. High priority nesting areas are those with active nests, on deep clear lakes that are resilient to climate change, and which are currently threatened by human encroachment.

Objective 2: *Habitat enhancement and lake stewardship.*

The primary objective of habitat enhancement and lake stewardship is to enhance loon productivity by providing artificial nest platforms (ANPs) in targeted lakes and recruiting MN lake associations to enact loon conservation measures protective of loon habitat and water quality.

- a) Artificial Nest Platforms: Providing ANPs is a proven technique to enhance loon nesting on lakes with adequate water quality and forage base (Piper 2002; Desorbo et al. 2007). Platforms provide alternate nest sites to help mitigate the effects of nesting habitat loss resulting from shoreline development, nesting failure due to fluctuating water levels, and shoreline-based nest predation.
- b) Lake Stewardship: Minnesota has more than 500 lake associations committed to the preservation and protection of lakes throughout the state. Established lake associations will be contacted and encouraged to adopt loon conservation measures intended to help increase loon productivity.

Objective 3: *Reduce exposure of common loons to lead through advocacy of non-toxic fishing tackle.*

Lead toxicosis, resulting from ingestion of lead fishing tackle, is recognized as one of the leading causes of mortality in breeding common loons (e.g., Grade et al. 2018). The primary objective of reducing exposure of common loons to lead is to provide a proactive educational and assistance program that encourages Minnesota anglers, retailers, tackle manufacturers, nonprofit associations and schools to use environmentally friendly no-lead fishing tackle.

5.1.1.3 Conceptual Setting

Habitat loss and degradation in nesting areas are primary threats to common loons. Other threats include human disturbance (particularly from water-based recreational activities and water management practices) and toxicosis from ingested lead fishing tackle (e.g., sinkers and jigheads). This project includes components (i.e., land acquisition, loon nesting habitat enhancement and lake stewardship, and the reduction in the exposure to lead fishing tackle) intended to reduce each of these threats, thereby reducing threats to loon survival and reproduction. See Table 5-1 for more information about project activities, outputs and anticipated outcomes.

5.1.1.4 Sources of Uncertainty

See Table 5-2.

5.1.2 Project Monitoring

Parameter #1: Baseline status of loon lake and shoreline use through data analysis to guide identification of priority lakes where restoration activities will occur (i.e., acquisition, placement of ANP's and lake stewardship) and inform survey/monitoring design to examine loon productivity (i.e., ANP use, territorial occupancy, and nest success) attributed to restoration activities.

- a. Rationale: Baseline conditions understood through analysis of existing data will inform location of restoration implementation for greatest loon benefit.
- b. Method: Identification, compilation, and evaluation of existing loon data.
- c. Timing, Frequency, and Duration: This activity is expected to take four weeks and will be completed prior to implementation of other project tasks.
- d. Sample Size: N/A
- e. Sites: N/A
- f. Performance Criteria: Completion of data evaluation, identification of priority lakes to target for restoration.

g. Corrective Action: N/A

Table 5-1 Project Activities and Anticipated Outcomes

Activity	Output	Short-term outcome	Long-term outcome
<ul style="list-style-type: none"> Implement acquisition activities to deter development and disturbance 	<ul style="list-style-type: none"> Protection and conservation of priority loon nesting habitats, foraging, and staging areas 	<ul style="list-style-type: none"> Maintain or increase loon nesting habitat Maintain or increase common loon productivity 	<ul style="list-style-type: none"> Protection of key habitats in perpetuity Increased reproductive success of common loons
<ul style="list-style-type: none"> Install artificial nest platforms (ANPs) in targeted lakes Engage MN lake associations in implementing loon conservation and monitoring activities 	<ul style="list-style-type: none"> Increase in loon nesting opportunities Protection and conservation of loon nesting habitats, foraging and staging areas 	<ul style="list-style-type: none"> Maintain or increase loon nesting habitat Maintain or increase common loon productivity Increase public awareness and involvement in common loon conservation 	<ul style="list-style-type: none"> Conservation of key habitats in perpetuity Increased reproductive success of common loons Increased public involvement in common loon conservation
<ul style="list-style-type: none"> Implement advocacy of non-toxic fishing tackle outreach, education and tackle exchanges 	<ul style="list-style-type: none"> Protection of common loon 	<ul style="list-style-type: none"> Increase public outreach Increase public awareness Increase non-toxic tackle exchanges 	<ul style="list-style-type: none"> Decrease in exposure of common loon to lead fishing tackle Increase in adult loon survivorship

Table 5-2 Key Uncertainties

Uncertainty	Summary of Strategy to Resolve
Targeted habitats do not become available for purchase.	If acquisition of target habitats is not feasible at a specific high priority lake, other high priority lakes would be considered for habitat acquisition.
Nesting platforms are not utilized by common loons	Conduct targeted monitoring on habitat metrics specific to common loon nesting habitat requirements. Monitoring data will be used to determine the need to relocate nesting platforms and/or decrease disturbance.
Lack of interest by lake associations to join registry and/or implement conservation activities	Consider expanding outreach to include lakes with no known lake association. Consider other methods of outreach (social media, television advertisement, etc.). Increase direct communication and collaboration opportunities between lake associations and MDNR. Consider working with tackle shops to find alternatives to lead.

Parameter #2: Length of linear shoreline acquired.

- a) Rationale: Length of linear shoreline is expected to be proportional to available loon nesting habitat.
- b) Method: This parameter is the length (i.e., number of linear meters) of shoreline suitable for common loon nesting, as well as area (i.e., hectares) and location of properties acquired through purchase of targeted parcels, including islands, through property deed.
- c) Timing, Frequency, and Duration: Land acquisitions will be recorded after each purchase and reported during each annual reporting cycle as well as at the end of the project or at OO TIG request. Acquisition will occur over a 3-year period as parcels become available.
- d) Sample Size: N/A
- e) Sites: Acquired parcels
- f) Performance Criteria: Easements of up to 250 feet linear shoreline of target habitats.
- g) Corrective Action: Purchase of parcels will be subject to negotiations. If, for any reasons, the Implementing Trustee is unable to purchase the parcel, the next available parcel will be sought and/or funding allocated for acquisition could be used to implement habitat enhancement/ lake stewardship activities and advocacy of non-toxic fishing tackle outreach, education and tackle exchanges.

Parameter #3: Number and location of ANPs deployed.

- a) Rationale: The proper placement of ANPs is expected to be proportional to available loon nesting habitat.
- b) Method: This parameter is the number and location of ANPs deployed.
- c) Timing, Frequency and Duration: TBD
- d) Sample Size: Target of up to 45 nests per year for 3 years (n = 135)
- e) Sites: Platforms will be placed along targeted shoreline in lakes within proximity to established breeding loon populations (i.e., within approximately 20 km).
- f) Performance Criteria: 45 nests per year for 3 years (n = 135)
- g) Corrective Action: The reasons preventing deployment of all ANPs will be identified. Target numbers of ANPs will be redeployed in subsequent years.

Parameter #4: Number ANPs occupied by nesting loons.

- a) Rationale: The proper placement of ANPs is expected to be proportional to available loon nesting habitat.
- b) Method: This parameter is the number of ANPs occupied by nesting loons.
- c) Timing, Frequency and Duration: annually
- d) Sample Size: 45 nests per year for 3 years (n = 135)
- e) Sites: Platforms will be placed along targeted shoreline in lakes within proximity to established breeding loon populations (i.e., within approximately 20 km).
- f) Performance Criteria: Minimum 15 percent increase in occupancy of all deployed ANPs each year, minimum 45 percent occupancy of all deployed ANPs after 3 years.
- g) Corrective Action: Conduct targeted monitoring on habitat metrics specific to common loon nesting habitat requirements. Monitoring data will be used to determine the need to relocate nesting platforms and/or decrease disturbance.

Parameter #5: Number and location of lake associations recruited.

- a) Rationale: The number and location of lake associations is expected to be proportional to the implementation of loon conservations measures intended to help increase loon productivity.
- b) Method: This parameter is the number and location of lake associations recruited for inclusion in the Loon Friendly Lake Association registry program.
- c) Timing, Frequency, and Duration: Recruitment of lake associations in the program will occur over a 3-year period. Recruitment numbers will be recorded annually.
- d) Sample size: Approximately 40 lake associations will be contacted annually.
- e) Sites: N/A
- f) Performance criteria: N/A
- g) Corrective action: N/A. Data will be used for reporting purposes.

Parameter #6: Number and type of intervention activities implemented to promote the use of environmentally friendly fishing jigs and sinkers.

- a) Rationale: Number and type of intervention activities implemented to promote the use of environmentally friendly fishing jigs and sinkers will be proportional to lead-attributed loon toxicosis.
- b) Method: This parameter is the number of lead tackle exchanges, quantities of lead fishing tackle recovered, retail interest in point of purchase displays, and estimates of contacts with anglers, schools and lake associations.
- c) Timing, Frequency, and Duration: Program will be implemented opportunistically over a 3-year period
- d) Sample size: N/A
- e) Sites: TBD
- f) Performance criteria: Could include number of anglers, youth, and resorts engaged in the program; number of sample packets on non-lead fishing tackle distributed; number of tackle exchanges sponsored; number of point-of-purchase retail displays established; number of Lake and River Associations that became engaged in education and outreach activities; number of contact-days at consumer fishing shows; contacts with MN-based non-lead tackle manufacturers.
- g) Corrective action: The project implementers will recommit to reaching outreach targets.

Parameter #7: Presence/absence, territory occupancy and nest productivity.

- a) Rationale: The presence and absence of loons and nest productivity will inform loon nesting success.
- b) Method: Three or more surveys will be conducted at each project lake in accordance with protocol developed specifically for this project (see Parameter #1) to determine territorial occupancy during common loon breeding season; presence of a nest will be documented in occupied territories.
- c) Timing, Frequency, and Duration: Monitoring will be conducted pre-implementation and annually for 3 years post-implementation.
- d) Sample Size: Monitoring to occur on all project lakes (i.e., lakes with acquired parcels and Habitat Enhancement lakes).
- e) Sites: Lakes with acquired parcels and Habitat Enhancement lakes.
- f) Performance Criteria: Territory occupancy and establishment/abandonment rates.
- g) Corrective Action: Analysis will be conducted to identify association of lake and platform placement characteristics with lake/territory founding (establishment) and occupancy by common loons. Information will be used to conduct habitat use assessment to reduce key uncertainties and conduct analysis to inform selection of restoration lakes and optimize platform placement and Lake Association lakes.

5.1.3 Adaptive Management

This project supports an adaptive management approach to bird restoration by conducting a habitat use assessment to reduce key uncertainties and conduct analyses that will inform the selection, design and optimization of future project portfolios. This approach may evolve over time as Trustees gain new insight and knowledge from restoration activities.

5.1.4 Evaluation

Monitoring data will be used to assess progress against anticipated project outcomes identified in Table 1, determine the need for addressing project uncertainties identified in Table 2, and assess the need for adaptive management/corrective action (see Table 5-3).

5.1.5 Project-Level Decisions: Performance Criteria and Potential Corrective Actions

Table 5-3 List of Project Monitoring Parameters, Performance Criteria, and Potential Corrective Actions.

Monitoring Parameter	Final Performance Criteria used to determine Project Success	Interim Performance Criteria	Potential corrective actions or mid-course corrections*
<i>Acreage of acquired land, by habitat type</i>	<i>Number of acres acquired through purchase</i>	<i>% completion expenditure of available acquisition funding every 6 months</i>	<i>Increase investment of project resources into parcel identification and acquisition</i>
<i>Artificial Nesting Platforms deployed</i>	<i>Full deployment plan</i>	<i>% of full deployment plan complete per 3 months</i>	<i>Increase deployment effort (deploy additional equipment), modify deployment equipment</i>
<i>Artificial nesting platform use</i>	<i>Number of ANPs used by loons</i>	<i>Number of ANPs used by loons</i>	<i>Relocate unused nesting platforms and/or decrease disturbance.</i>
<i>Number and location of lake associations recruited</i>	<i>Full recruitment of target lake associations</i>	<i>% of full recruitment plan complete per 3 months</i>	<i>Increase recruitment effort</i>
<i>Lead tackle intervention activities</i>	<i>Full deployment of lead tackle intervention activities plan</i>	<i>% of full lead reduction plan complete per 3 months</i>	<i>Increase intervention activities effort or modify approach</i>
<i>Loon survey</i>	<i>Survey data demonstrate the presence/absence of COLO in project site areas</i>	<i>% of loon survey plan complete annually</i>	<i>Increase loon survey activities effort or modify approach</i>

*The table provides the triggers for helping determine whether adjustments to the project are needed based on the performance criteria; potential corrective actions for unknown or unanticipated conditions should they arise would need to be determined.

5.1.6 Monitoring Schedule

See Table 5-4.

Table 5-4 Project Monitoring Schedule.

Monitoring Parameter	Pre-Execution	Year 1	Year 2	Year 3	Year 4	Year 5
Acquisition		X	X	X		
ANP		X	X	X		
Lake Associations		X	X	X		
Lead out		X	X	X		
COLO survey	X	X	X	X	X	X

5.1.7 Data Management

All data will undergo proper QAQC protocols, be reviewed and verified following the process outlined in Section 3 of the MAM Manual. Data will be made publicly available, in accordance with the Federal Open Data Policy (Section 10.6.6 of SOP; DWH NRDA Trustees 2016b), through the DIVER Explorer Interface within a year of when the data collection occurred.

5.1.8 Reporting

Data summaries and interim analyses and interpretation will be compiled in annual monitoring reports. Reports will be made available through the DIVER Explorer Interface within a year of report development.

5.1.9 Roles and Responsibilities

USDOl would be the lead Trustee agency for this project, and would ensure that the project is completed. Work may be conducted by contractor or cooperative agreement with university or other entity.

5.2 Monitoring and Adaptive Management Plan for *Deepwater Horizon* NRDA Project: Black Tern Conservation on the Breeding Grounds of North Dakota and South Dakota

5.2.1 Introduction

This MAM Plan is a living document and may be updated as needed to reflect changing conditions and/or new information.

5.2.1.1 Project Overview

This proposed alternative would protect palustrine emergent wetland habitat and adjacent upland grassland habitat to enhance and improve breeding site selection (i.e., occupancy) and foraging conditions for black terns (BLTE) in more than 30 counties in North and South Dakota located in the Prairie Pothole Region (PPR) using a decision-support tool specific to black terns. Conservation easement agreements would be implemented on a voluntary basis with participating landowners as part of ongoing USFWS conservation programs in North and South Dakota. See Section 3.5.3.1 for additional information.

5.2.1.2 Restoration Type Goals and Project Restoration Objectives

The overall goals for the Restoration Type under which this project falls, as identified in the PDARP, are:

- Restore lost birds by facilitating additional production and/or reduced mortality of injured bird species;
- Restore or protect habitats on which injured birds rely; and
- Restore injured birds by species where actions would provide the greatest benefits within geographic ranges that include the Gulf of Mexico.

The project restoration objectives are:

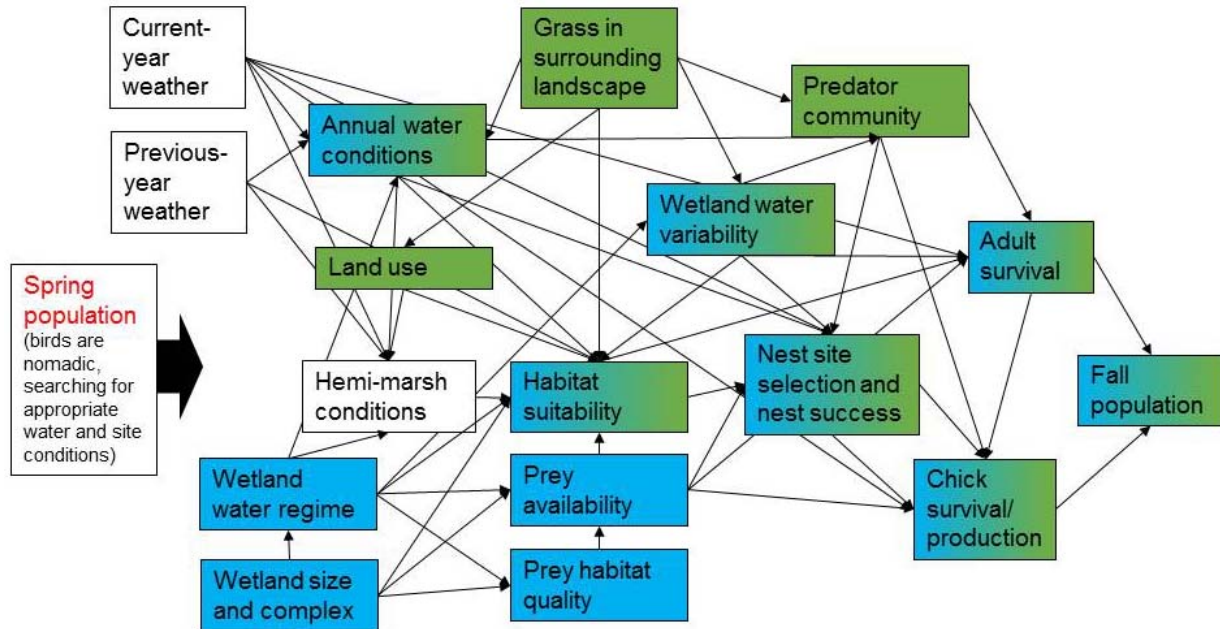
- Implement conservation actions on 2,000 wetland acres and 1,000 grassland acres of private lands working with willing landowners to protect black tern nesting and foraging habitat.

5.2.1.3 Conceptual Setting

Landscape-level factors and processes strongly influence BLTE distribution, abundance, and wetland selection within the Prairie Pothole Region (Figure 5-1). In particular, the density of wetland basins and amount of grassland on the landscape are associated with BLTE nesting (Naugle et al. 1999, 2000). More

specifically, Naugle et al. (2000) determined that BLTE are an area-dependent species that tend to occupy large semi-permanent wetlands (18.9 hectares or 46.7 acres) with <50% of the surrounding lands in cropland. This project would create more wetland and grass habitat suitable for use by black terns for nesting and foraging purposes.

Figure 5-1 Factors Influencing Black Tern Nest Site Selection and Population Growth*



**Influence diagram of factors influencing black tern settling patterns, nest site and foraging site selection are thought to follow a hierarchical process from landscape-scale to individual wetland basins nested within a high wetland-density and high grassland component. The flow of the diagram is from left to right beginning with settling decisions in spring to successful reproduction prior to fall migration. Colored boxes show the influence of the two conservation treatments, where green indicates the influence of grasslands, blue indicates the influence of wetlands, and green and blue indicates that the combined effects of grasslands and wetlands.*

5.2.1.4 Potential Sources of Uncertainty

See Table 5-5.

Table 5-5 Key Uncertainties

Key Uncertainty	Potential Impact Project Success and or Decision Making
Landowner interest in participation in easements varies over time	Even during the years of high commodity prices (~2008-2011), interest in conservation easements in the eastern Dakotas remained high and <u>exceeded</u> available easement funding. The Trustees anticipate a relatively low probability of impacting project success.
Will location of willing landowners be consistent with the highest priority easement locations (according to model estimates)	Given the number of interested, willing landowners on the “waiting list” for participation in the wetland and grassland easement programs in the project area, finding landowner locations consistent with the highest priority easement locations is expected to be feasible and will allow for achieving the 2,000 and 1,000 acre targets of wetland and grassland easements, respectively.

5.2.2 Project Monitoring

Parameter #1: Wetland easement acres

- a) Purpose: Determine number of acres of wetland easements secured with willing landowners for priority BLTE wetland sites annually. Ideally, the 2,000 acres target will be reached within the first two years.
- b) Method(s): Acreage estimates will be based on ArcGIS and existing USFWS evaluation criteria and processes.
- c) Timing, Frequency, and Duration: Ongoing, as easements are secured.
- d) Sample Size(s): N/A.
- e) Sites: Parcels subject to easement.

Parameter #2: Grassland easement acres

- a) Purpose: Determine number of acres of grassland secured annually. Ideally, the 1,000 acres target will be reached within the first two years.
- b) Method(s): Acreage estimates will be based on ArcGIS and existing USFWS evaluation criteria and processes.
- c) Timing, Frequency, and Duration: Ongoing, as easements are secured.
- d) Sample Size(s): N/A.
- e) Sites: Parcels subject to easement.

Parameter #3: Occupancy Estimation

- a) Purpose: Wetlands will be surveyed for the presence/absence of BLTE.
- b) Method(s): Following occupancy methods described by MacKenzie et al. (2006, 2017) and additional protocols and methodologies (e.g., Loesch et al. 2013, Niemuth et al. 2013), basin-level BLTE surveys will be conducted for the presence/absence of breeding and foraging BLTE. At

the time of the surveys, there will be an effort to determine whether or not the wetland basin is used for foraging versus nesting.

- c) Timing, Frequency, and Duration: It is anticipated that a presence/absence surveys will be conducted once annually for a roughly 4-week period (late May through mid-June) over 3-4 years.
- d) Sample Size(s): TBD- the number of wetland basins to be evaluated for BLTE presence/absence monitoring will not be known until wetland easement contracting processes have been initiated, some portion have been completed, and we get agreement for monitoring by individual landowners.
- e) Sites: TBD- this will not be determined until wetland easement contracting processes have been initiated, some portions have been completed, and we get agreement for monitoring by individual landowners.

Parameter #4: Productivity Index

- a) Purpose: BLTE using wetlands will be surveyed for deriving an index to productivity (i.e., ratio of young:adult based on plumage; Heath et al. 2009)
- b) Method(s): Following standard methods and protocols (e.g., Loesch et al. 2013, Niemuth et al. 2013), basin-level BLTE surveys will be conducted for the presence/absence of breeding and foraging BLTE. An index to productivity will be done at individual basins that had BLTE present during the first survey using the ratio of young:adult.
- c) Timing, Frequency, and Duration: It is anticipated that a presence/absence surveys will be conducted once annually for a roughly 4-week period (late May through mid-June) over 3-4 years.
- d) Sample Size(s): TBD- the number of wetland basins to be evaluated for BLTE presence/absence monitoring will not be known until wetland easement contracting processes have been initiated, some portion have been completed, and we get agreement for monitoring by individual landowners.
- e) Sites: TBD- this will not be determined until wetland easement contracting processes have been initiated, some portions have been completed, and we get agreement for monitoring by individual landowners.

5.2.3 Adaptive Management

For the proposed project, the increase in managed and protected wetland and grassland acres would restore injured BLTE to an extent to be determined. As previously stated, the proposed project has an objective target for perpetual easements of 2,000 and 1,000 acres respectively, for wetlands and grasslands in the eastern Dakotas, i.e., North and South Dakota.

Data collected each year will be evaluated to determine what wetland and landscape characteristics are most strongly associated with use and breeding by BLTE. These findings will be used to further inform and refine selection of land parcels for conservation easements in following years, as well as further refining BLTE spatial habitat models (Niemuth et al. 2009) that will be used to initially identify parcels for conservation investments.

5.2.4 Evaluation

Analysis Method: Parameter #1 (Wetland easement acres)

- Progress to full project implementation on 2,000 priority wetland acres will occur biannually. Acreage estimates will be based on ArcGIS and existing USFWS evaluation criteria and processes. For wetland easements, the target acreage is 2,000 acres.

Analysis Method: Parameter #2 (Grassland easement acres)

- Progress to full project implementation on 1,000 priority grassland acres will occur biannually. Acreage estimates will be based on ArcGIS and existing USFWS evaluation criteria and processes. For grassland easements, the target acreage is 1,000 acres.

Analysis Method: Parameter #3 (Occupancy Estimation)

- Following occupancy methods described by MacKenzie et al. (2006, 2018) and additional protocols and methodologies (e.g., Loesch et al. 2013, Niemuth et al. 2013), basin-level BLTE surveys will be conducted for the presence/absence of breeding and foraging BLTE. At the time of the surveys, there will be an effort to determine whether or not the wetland basin is used for foraging versus nesting.

Analysis Method: Parameter #4 (Productivity Index)

- Following standard methods and protocols (e.g., Loesch et al. 2013, Niemuth et al. 2013), basin-level BLTE surveys will be conducted for the presence/absence of breeding and foraging BLTE. An index to productivity will be done at individual basins that had BLTE present during the first survey using the ratio of young:adult.

5.2.5 Project-Level Decisions: Performance Criteria and Potential Corrective Actions

Table 5-6 List of Project Monitoring Parameters, Performance Criteria, and Potential Corrective Actions.

Monitoring Parameter	Final Performance Criteria used to determine Project Success	Interim Performance Criteria	Potential corrective actions or mid-course corrections*
<i>Priority wetland easement acres</i>	<i>2,000 acres of priority wetland easement acres</i>	<i>Biannual acreage of priority wetland easement acres is less than 2,000</i>	<i>Continue to identify willing landowner participants with priority wetland easement acres and develop new easements</i>
<i>Priority grassland easement acres</i>	<i>1,000 acres of priority grassland easement acres</i>	<i>Biannual acreage of priority grassland easement acres is less than 1,000</i>	<i>Continue to identify willing landowner participants with priority grassland easement acres and develop new easements</i>
<i>BLTE Occupancy</i>	<i>BLTE habitat occupancy at full nesting density in high priority wetlands</i>	<i>BLTE habitat occupancy at current or successional nesting density in high priority wetlands</i>	<i>Amend management of high priority wetlands or adjacent grassland to include vegetation management or hydrologic modification/enhancement. Alternatively amend high priority site selection criteria to target more appropriate high priority wetlands/grasslands.</i>
<i>BLTE Productivity</i>	<i>BLTE productivity commensurate with full nesting density in high priority wetlands</i>	<i>Current BLTE productivity associated with high priority wetlands/grasslands</i>	<i>Amend management of high priority wetlands or adjacent grassland to include vegetation management or hydrologic modification/enhancement. Alternatively amend high priority site selection criteria to target more appropriate high priority wetlands/grasslands.</i>

**The table provides the triggers for helping determine whether adjustments to the project are needed based on the performance criteria; potential corrective actions for unknown or unanticipated conditions should they arise would need to be determined.*

5.2.6 Monitoring Schedule

See Table 5-7.

Monitoring Parameters	Pre-Execution Monitoring	Execution Monitoring (initial) As-built (Year 0)	Post-Execution Monitoring (ongoing) Year 1	Post-Execution Monitoring (ongoing) Year 2	Post-Execution Monitoring (ongoing) Year 3	Post-Execution Monitoring (ongoing) Year 4	Post-Execution Monitoring (ongoing) Year 5
Compliance flights			x	x	x	x	x
Stratification of program wetlands				x	x	x	x
Water level assessment			x	x	x	x	x
Determination of wetland use			x	x	x	x	x
Determination of breeding activity			x	x	x	x	x
Adaptive acquisition based on previous results				x	x	x	x

5.2.7 Data Management

Data will be compiled within 1-3 months after collection. The volume has yet to be determined and is contingent on the identification of high priority easement locations. The number of sites is likely to occur across more than 30 counties within eastern North and South Dakota. It is expected that data collection will involve as many as 200-400 datasheets per year depending on the number of technicians, and whether or not each technician is considered an independent observer. There is likely to be a number of databases (ACCESS or EXCEL), as well as model output, statistical output and code, and geospatial data associated with this project. In addition, the Trustees may provide the BLTE model outputs for identification of priority sites and the landowner list used to award easement contracts. However, it should be noted, that if a landowner list is provided as per project management, these data must ensure all personally identifiable information (PII) are protected. Such data must not be made publicly available given their sensitive nature. All data will undergo proper QAQC protocols, be reviewed and verified following the process outlined in Section 3 of the MAM Manual. Data will be made publicly available, in accordance with the Federal Open Data Policy (Section 10.6.6 of SOP; DWH NRDA Trustees 2016b), through the DIVER Explorer Interface within a year of when the data collection occurred.

5.2.8 Reporting

Data summaries and interim analyses and interpretation will be compiled in annual monitoring reports. Reports will be made available through the DIVER Explorer Interface within a year of report development.

5.2.9 Roles and Responsibilities

USDOI would be the lead Trustee agency for this project, and would ensure that the project is completed. Work may be conducted by contractor or cooperative agreement with university or other entity.

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Appendix B: List of Preparers

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Mike Donlan	President
Leslie Genova	Principal
Benjamin Hull	Practice Area Assistant

Appendix C: Monitoring and Adaptive Management Template

December 2017

C. MAM Plan Template

The Cross-TIG MAM work group has established a template and set of guidelines for the development of project-level MAM Plans (Section 10.6.3 of SOP; DWH NRDA Trustees, 2016). This template, in conjunction with the guidance in Section 2.4 and subsections within, is intended to serve as a resource for the TIGs in the development of their project-specific MAM Plans. Collectively, the components of the MAM Plan document the level of MAM needed at the project scale.

- C.1 Introduction
 - C.1.1 Project Overview
 - C.1.2 Restoration Type Goals and Project Restoration Objectives (Section 2.4.1)
 - C.1.3 Conceptual Setting (Section 2.4.2)
 - C.1.3.1 Potential Sources of Uncertainty (Section 2.4.3)
- C.2 Project Monitoring (Section 2.4.4)
- C.3 Adaptive Management (Section 2.4.5)
- C.4 Evaluation (Section 2.4.6)
- C.5 Project-Level Decisions: Performance Criteria and Potential Correction Actions (Section 2.4.7)
- C.6 Monitoring Schedule (Section 2.4.4.3)
- C.7 Data Management (Section 2.4.8)
- C.8 Reporting (Section 2.4.9 and Attachment D)
- C.9 Roles and Responsibilities
- C.10 References
- C.11 MAM Plan Revision History

Reference

DWH NRDA Trustees. 2016. Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the *Deepwater Horizon* (DWH) Oil Spill. Originally approved May 4, 2016; revised November 15, 2016.

Appendix D: 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
<p>Geology and Substrates</p>	<p>Short-term: During construction period. <u>Long-term</u>: Over the life of the project or longer.</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
<p>Hydrology and Water Quality</p>	<p><u>Short-term</u>: During construction period.</p> <p><u>Long-term</u>: Over the life of the project or longer.</p>	<p><u>Hydrology</u>: 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.</p> <p><u>Water quality</u>: 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.</p> <p><u>Floodplains</u>: 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.</p> <p><u>Wetlands</u>: 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.</p>	<p><u>Hydrology</u>: 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.</p> <p><u>Water quality</u>: 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.</p> <p><u>Floodplains</u>: 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.</p> <p><u>Wetlands</u>: 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.</p>	<p><u>Hydrology</u>: The effect on hydrology could be measurable and widespread. The effect could permanently alter hydrologic patterns including surface and groundwater flows.</p> <p><u>Water quality</u>: 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.</p> <p><u>Floodplains</u>: 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.</p> <p><u>Wetlands</u>: 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.</p>

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
Air Quality	<p><u>Short-term</u>: During construction period.</p> <p><u>Long-term</u>: Over the life of the project or longer.</p>	<p>The impact on air quality may be measurable but could be localized and temporary, such that the emissions do not exceed USEPA's <i>de minimis</i> criteria for a general conformity determination under the Clean Air Act (40 CFR 93.153).</p>	<p>The impact on air quality could be measurable and limited to local and adjacent areas. Emissions of criteria pollutants could be at USEPA's <i>de minimis</i> criteria levels for general conformity determination.</p>	<p>The impact on air quality could be measurable over a widespread area. Emissions would be high, such that they could exceed USEPA's <i>de minimis</i> criteria for a general conformity determination.</p>
Noise	<p><u>Short-term</u>: During construction period.</p> <p><u>Long-term</u>: Over the life of the project.</p>	<p>Increased noise could attract attention, but its contribution to the soundscape would be localized and unlikely to affect current user activities.</p>	<p>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.</p>	<p>Increased noise could attract attention and dominate the soundscape over widespread areas. Noise levels could eliminate or discourage user activities.</p>
Habitats	<p><u>Short-term</u>: Lasting less than two growing seasons.</p> <p><u>Long-term</u>: Lasting longer than two growing seasons.</p>	<p>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.</p> <p>Opportunity for increased spread of non-native species could be detectable but temporary and localized and could not displace native species populations and distributions.</p>	<p>Impacts on native vegetation could be measurable 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.</p> <p>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.</p>	<p>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.</p> <p>Actions could result in the widespread increase of non-native species and result in broad and permanent changes to native species populations and distributions.</p>

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
<p>Wildlife Species (including birds)</p>	<p><u>Short-term</u>: Lasting up to two breeding seasons, depending on length of breeding season.</p> <p><u>Long-term</u>: Lasting more than two breeding seasons.</p>	<p>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.</p> <p>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.</p>	<p>Impacts on native species, their habitats, or the natural processes sustaining them could be detectable and widespread. 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.</p> <p>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.</p>	<p>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.</p> <p>Actions could result in the widespread increase of non-native species and result in broad and permanent changes to native species populations and distributions.</p>

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
<p>Marine and Estuarine Fauna (fish, shellfish, benthic organisms)</p>	<p><u>Short-term</u>: Lasting up to two spawning seasons, depending on length of season.</p> <p><u>Long-term</u>: Lasting more than two spawning seasons.</p>	<p>Impacts could be detectable and localized but small. Disturbance of individual species could occur; however, there could be no change in the diversity or local populations of marine and estuarine species. Any disturbance could not interfere with key behaviors such as feeding and spawning. There could be no restriction of movements daily or seasonally.</p> <p>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.</p>	<p>Impacts could be readily apparent and result in a change in marine and estuarine species populations in local and adjacent areas. Areas being disturbed may display a change in species diversity; however, overall populations could not be altered. Some key behaviors could be affected but not to the extent that species viability is affected. Some movements could be restricted seasonally.</p> <p>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.</p>	<p>Impacts could be readily apparent and could substantially change marine and estuarine species populations over a wide-scale area, possibly river-basin-wide. Disturbances could result in a decrease in fish species diversity and populations. The viability of some species could be affected. Species movements could be seasonally constrained or eliminated.</p> <p>Actions could result in the widespread increase of non-native species and result in broad and permanent changes to native species populations and distributions.</p>

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
<p>Protected Species</p>	<p><u>Short-term</u>: Lasting up to one breeding/growing season.</p> <p><u>Long-term</u>: Lasting more than one breeding/ growing season.</p>	<p>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.</p>	<p>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.</p>	<p>Impacts on protected species, their habitats, or the natural processes sustaining them could be detectable, widespread, and permanent.</p> <p>Substantial impacts on the population numbers of protected species, or interference with their survival, growth, or reproduction could be expected.</p> <p>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.</p>

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
Fisheries and Aquaculture	<p><u>Short-term</u>: Lasting up to two spawning seasons, depending on length of season.</p> <p><u>Long-term</u>: Lasting more than two spawning seasons.</p>	<p>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 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.</p> <p>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.</p>	<p>Impacts could be readily apparent and result in a change managed fish populations in local and adjacent areas. Areas being disturbed may display a change in species diversity; however, overall populations could not be altered. Some key behaviors could be affected but not to the extent that species viability is affected. Some movements could be restricted seasonally.</p> <p>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.</p>	<p>Impacts could be readily apparent and could substantially change managed fish populations over a wide-scale area, possibly river-basin-wide. Disturbances could result in a decrease in fish species diversity and populations. The viability of some species could be affected. Species movements could be seasonally constrained or eliminated.</p> <p>Actions could result in the widespread increase of non-native species and result in broad and permanent changes to native species populations and distributions.</p>
Socioeconomics and Environmental Justice	<p><u>Short-term</u>: During construction period.</p> <p><u>Long-term</u>: Over the life of the project or longer.</p>	<p>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.</p> <p>Actions could not disproportionately affect minority and low-income populations.</p>	<p>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.</p> <p>Actions could disproportionately affect minority and low-income populations. However, the impact could be temporary and localized.</p>	<p>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.</p> <p>Actions could disproportionately affect minority and low-income populations, and this impact could be permanent and widespread.</p>
Cultural Resources	<p><u>Short-term</u>: During construction period.</p> <p><u>Long-term</u>: Over the life of the project or longer.</p>	<p>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.</p>	<p>Disturbance of a site(s), building, structure, or object not expected to result in a substantial loss of important cultural information.</p>	<p>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.</p>

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
Infrastructure	<p><u>Short-term</u>: During construction period.</p> <p><u>Long-term</u>: Over the life of the project or longer.</p>	<p>The action could affect public services or utilities, but the impact could be localized and within operational capacities.</p> <p>There could be negligible increases in local daily traffic volumes resulting in perceived inconvenience to drivers but no actual disruptions to traffic.</p>	<p>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.</p> <p>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.</p>	<p>The action could affect public services or utilities over a widespread area resulting in the loss of certain services or necessary utilities.</p> <p>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.</p>
Land and Marine Management	<p><u>Short-term</u>: During construction period.</p> <p><u>Long-term</u>: Over the life of the project or longer.</p>	<p>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.</p>	<p>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.</p>	<p>The action could cause permanent changes to and conflict with land uses or management plans over a widespread area.</p>

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
<p>Tourism and Recreational Use</p>	<p><u>Short-term:</u> During construction period. <u>Long-term:</u> Over the life of the project or longer.</p>	<p>There could be partial developed recreational site closures to protect public safety. The same site capacity and visitor experience could remain unchanged after construction. The impact could be detectable and/or could only affect some recreationists. Users could likely be aware of the action but changes in use could be slight. There could be partial closures to protect public safety. Impacts could be local. There could be a change in local recreational opportunities; however, it could affect relatively few visitors or could not affect any related recreational activities.</p>	<p>There could be complete site closures to protect public safety. However, the sites could be reopened after activities occur. There could be slightly reduced site capacity. The visitor experience could be slightly changed but still available. The impact could be readily apparent and/or could affect many recreationists locally and in adjacent areas. Users could be aware of the action. There could be complete closures to protect public safety. However, the areas could be reopened after activities occur. Some users could choose to pursue activities in other available local or regional areas.</p>	<p>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.</p>
<p>Aesthetics and Visual Resources</p>	<p><u>Short-term:</u> During construction period. <u>Long-term:</u> Over the life of the project or longer.</p>	<p>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.</p>	<p>There could be a change in the viewshed that was readily apparent and attracts attention. Changes could not dominate the viewshed, although they could detract from the current user activities or experiences.</p>	<p>Changes to the characteristic views could dominate and detract from current user activities or experiences.</p>

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
Public Health and Safety, Including Flood and Shoreline Protection	<p><u>Short-term</u>: During construction period.</p> <p><u>Long-term</u>: Over the life of the project or longer.</p>	<p>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.</p> <p>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.</p>	<p>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.</p> <p>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.</p>	<p>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.</p> <p>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.</p>