Deepwater Horizon Natural Resource Damage Assessment

Open Ocean Trustee Implementation Group Draft Restoration Plan 4 and Environmental Assessment: Fish and Water Column Invertebrates and Sea Turtles

October 2024

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Executive Summary

On April 20, 2010, the *Deepwater Horizon* (DWH) mobile drilling unit exploded, resulting in loss of life and a massive release of oil and natural gas from the BP Exploration and Production, Inc. (BP) Macondo well. 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 legal settlement,[1] BP agreed to pay $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 were unknown at the time of the settlement but may come to light in the future. The settlement allocated a specific sum for restoration across 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 TIG (or the TIG) is responsible for restoring natural resources and their services within the Open Ocean Restoration Area that were injured by the DWH oil spill.[2]

In the PDARP/PEIS, the DWH NRDA Trustees developed a set of Restoration Types, 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 under the five programmatic Restoration Goals evaluated for restoration.[3] The TIG has prepared this *Draft Restoration*

[1] The PDARP/PEIS, Record of Decision, and Consent Decree can be found on the DWH Trustee website: www.gulfspillrestoration.noaa.gov/.

[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 TIG will address these species throughout their life stages and geographic ranges, including restoration in offshore, coastal, and inland areas, and outside of the Gulf of Mexico.

[3] PDARP/PEIS programmatic 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.

Plan 4 and Environmental Assessment: Fish and Water Column Invertebrates and Sea Turtles (RP4/EA) to address a subset of the injuries to natural resources in the Open Ocean Restoration Area resulting from the DWH oil spill and to provide the TIG with OPA and National Environmental Policy Act (NEPA) analyses and public input to aid in their decision-making process. The project alternatives evaluated in this RP4/EA are consistent with the Restoration Type goals for Fish and Water Column Invertebrates (FWCI) and Sea Turtles (ST), as described in Sections 5.5.6 and 5.5.10 of the PDARP/PEIS.

The OPA NRDA regulations provide that Trustees must consider a reasonable range of restoration alternatives before selecting their preferred alternative(s) (15 CFR § 990.53). The Open Ocean TIG reviewed 87 restoration project ideas proposed by individual members of the public, non-governmental organizations, and local, state, and federal agencies, ultimately identifying 12 project alternatives for full evaluation in this document, as summarized in Table ES-1. Table ES-2 provides a summary of the anticipated environmental consequences of the 12 projects (10 preferred; 2 non-preferred) and the no action alternatives evaluated in this RP/EA.

Table ES-1 The Reasonable Range of Restoration Alternatives Proposed in this RP4/EA

Alternative	Preferred	Estimated Project Costs
Fish and Water Column Invertebrates (FWCI) Restoration Type		
FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries) This project would reduce mortality of priority injured fish species including reef fish, highly migratory species (HMS), coastal migratory pelagic species, and other species such as flounders, drums, and sea trout by advancing use and adoption of best release practices. Such practices include the use of appropriate hooks, tackle, and landing tools and minimizing fight time to reduce mortality associated with regulatory discards, catch-and-release fishing, barotrauma, and depredation (the removal of fish or fishing gear by non-target species such as marine mammals or sharks prior to retrieval by a fisher or angler). This project would continue and expand on the Open Ocean TIG's existing *Reduction of Postrelease Mortality from Barotrauma in the Gulf of Mexico Reef Fish Recreational Fisheries* project, which began the successful "Return 'Em Right" program. Restoration activities would include: (1) conducting public outreach and education and distributing release gear for recreational fisheries; (2) monitoring gear use and progress towards use of best practices through studies and at-sea observer programs; and (3) assessing the efficacy of best release practices by hosting workshops and conducting studies.	Preferred	$66,220,000

Alternative	Preferred	Estimated Project Costs
FWCI2, Next Generation Fishing This project would reduce mortality for priority injured fish species including reef fish and reef-associated fish, HMS, coastal migratory pelagic species, and other species such as menhaden, drums, and sea trout by addressing bycatch in commercial fishing fleets. The project would provide fishing communities with methodologies and incentives to reduce bycatch mortality to fishery resources. Restoration activities would include: (1) receiving input from interested parties to develop an implementation plan for activities to reduce or prevent the increase of bycatch in commercial fisheries; (2) conducting training, outreach, and technical assistance to support a "next generation" of commercial fishers who voluntarily implement fishing practices intended to reduce bycatch; (3) advancing the voluntary use of new fishing gear, best practices, and techniques through outreach and technical support to reduce bycatch in commercial fisheries; and (4) supporting data collection and sharing for a next generation commercial fishing fleet.	Preferred	$57,200,000
FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality This project would reduce bycatch, depredation, and disruption of spawning aggregations for priority injured fish species including reef fish and HMS through the collection and sharing of data, development of models, and advancement of communication networks for commercial and recreational fisheries. This project would build on the information gathered in the Open Ocean TIG's *Communication Networks and Mapping Tools to Reduce Bycatch – Phase I* project, which assessed the feasibility of commercial fisher- and recreational angler-led hotspot communication networks for several Gulf of Mexico fisheries. Restoration activities would include: (1) developing models to guide restoration and monitoring efforts for injured FWCI populations; (2) identifying and conserving spawning aggregation sites, initially focusing on reef fish populations; (3) enhancing at-sea observer coverage for the commercial reef fish fishery to gather data and monitor restoration project effectiveness; and (4) developing bycatch and depredation hotspot communication networks to reduce mortality of injured fish populations.	Preferred	$18,040,000
FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates This project would reduce mortality to priority injured fish species including reef fish, HMS, coastal migratory pelagic species, other fish species such as drums and sea trout, and water column invertebrates by reducing diverse threats such as marine debris, invasive species, impaired water quality, and impacts from energy development and production to improve environmental conditions. Restoration activities would include: (1) identifying conservation strategies and prioritizing areas for implementation; and (2) implementing a range of conservation strategies including, but not limited to, preventing and removing marine debris, preventing and removing invasive species such as lionfish, addressing water quality threats such as reducing risks and impacts from harmful algal blooms (HABs), and/or reducing potential impacts to FWCI during energy infrastructure site assessment, operation, and/or decommissioning.	Preferred	$14,300,000

Alternative	Preferred	Estimated Project Costs
FWCI5, Education and Stewardship Partnerships with Charter Anglers This project would reduce sources of mortality for priority injured fish species including reef fish and HMS from illegal charter fishing practices by conducting outreach and assessing changes in illegal charter fishing activities in the Gulf of Mexico. Restoration activities would include: (1) developing an implementation and communications plan; (2) conducting outreach and education to fishing groups and individuals on the impacts of illegal charter fishing activities on fish and invertebrate resources; and (3) evaluating rates of change in legal fishing effort following project outreach efforts.	Preferred	$3,000,000
FWCI6, Communication, Adaptive Management, Planning, and Integration This project would help improve the effectiveness of DWH FWCI Restoration Type-funded projects by addressing gaps in current understanding of high-priority FWCI resources injured by the spill, facilitating coordination among DWH FWCI projects, and expanding outreach to fishing communities to increase awareness of and engagement with DWH restoration activities. Restoration and monitoring and adaptive management (MAM) activities would include: (1) enhancing monitoring support including at-sea observer coverage and electronic monitoring capacity and conducting data collection and analysis to characterize fish populations and evaluate restoration activities; and (2) facilitating engagement with external partners (e.g., commercial fishers, recreational anglers) to enhance coordination and strategy building and improve awareness, communication, and engagement with partners across DWH FWCI projects, both ongoing and those proposed in this RP4/EA.	Preferred	FWCI Restoration Type: $8,010,000 MAM Allocation: $15,250,000
FWCI7, Reduction in Fish Post-release Mortality from Depredation This project would reduce the risk of depredation of injured reef fish and HMS in commercial and recreational fisheries by working cooperatively with fishing communities and other partners to test and implement depredation reduction strategies and improve understanding of fish depredation. Restoration activities would include: (1) collecting and analyzing data to assess the characteristics, extent, frequency, and geographical distribution of dolphin and shark interactions with fisheries; (2) developing and testing strategies to mitigate depredation by implementing pilot programs with partners in recreational and commercial fishing communities including identifying shark depredation hotspots and testing commercially available shark deterrent devices with fishing communities to measure perceived effectiveness, buy-in, and any barriers to adoption of these devices; and (3) conducting outreach and engagement to advance awareness of best practices and to provide education for the adoption and proper use of these practices.	Non-Preferred	$5,052,000

Alternative	Preferred	Estimated Project Costs
Sea Turtles (ST) Restoration Type		
ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles) This project would prevent the loss of high-density sea turtle nesting habitat by conserving nesting beach habitat in perpetuity through land acquisition. This project would build on the Open Ocean TIG's *Long Term Nesting Habitat Protection for Sea Turtles* project, continuing current acquisition efforts at Archie Carr National Wildlife Refuge (NWR) and expanding acquisition efforts to Nathaniel P. Reed Hobe Sound NWR. Restoration activities would include: (1) acquiring priority parcels from willing sellers within the approved acquisition boundaries of Archie Carr and Hobe Sound NWRs; and (2) as needed, removing derelict structures from acquired parcels that pose risks to nesting sea turtles and hatchlings.	Preferred	$5,000,000
ST2, Gulf-Wide Sea Turtle Bycatch Reduction This project would reduce the risk of commercial fishery interactions with sea turtles through outreach, education, and alternative fishing gear distribution to Gulf of Mexico commercial fishing communities. This project would build on Regionwide TIG (*Sea Turtle Early Restoration Project, Shrimp Trawl Bycatch Reduction component*) and Open Ocean TIG (*Reducing Juvenile Sea Turtle Bycatch through Development of Reduced Bar Spacing in Turtle Excluder Devices*) projects, continuing existing, successful efforts to reduce sea turtle bycatch in Gulf of Mexico commercial fisheries. Restoration activities would include: (1) continuing and expanding the National Oceanic and Atmospheric Administration's (NOAA) Gear Monitoring Team (GMT) efforts, such as conducting courtesy dockside and at-sea inspections of required turtle excluder devices (TEDs) in the shrimp trawl fishery and expanding GMT outreach and bycatch reduction efforts to commercial hook-and-line fisheries; and (2) encouraging voluntary adoption of small-bar TED prototypes, including conducting industry outreach and funding the manufacture and installation of small-bar TEDs on participating vessels.	Preferred	$8,500,000
ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction This project would seek to reduce the risk of vessel strikes to sea turtles by taking a phased approach to identify hotspots and areas of highest risk of vessel strikes, determine risk factors, and implement site-specific voluntary conservation measures such as boater outreach and education at selected locations. Restoration activities would include: (1) analyzing existing datasets to assess the temporal and spatial distribution of vessel strikes in the Gulf of Mexico and identify areas of concern; (2) evaluating potential hotspots by conducting in-situ studies to understand local variables influencing turtle-vessel interactions and assessing risk of vessel strikes; and (3) implementing site-specific, voluntary measures at three or more hotspot locations.	Preferred	$3,500,000

Alternative	Preferred	Estimated Project Costs
ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements This project would improve capacity to identify and monitor in-water threats to and support response and rehabilitation facilities for sea turtles during emergency events. This project would build on existing efforts from Early Restoration Phase IV (*Sea Turtle Early Restoration, Enhancement of the Sea Turtle Stranding and Salvage Network and Development of an Emergency Response Program component*). Restoration and MAM activities would include: (1) enhancing Gulf of Mexico-wide Sea Turtle Stranding and Salvage Network (STSSN) coordination, including continuing NOAA's role as the state STSSN Coordinator for Louisiana, Mississippi, and Alabama; (2) supporting sea turtle emergency response activities and enhancing emergency preparedness; and (3) enhancing STSSN data management and analysis and conducting mortality investigations.	Preferred	ST Restoration Type: $5,300,000 MAM Allocation: $5,700,000
ST5, Kemp's Ridley Nesting Enhancement in Mexico This project would reduce hatchling mortality for Kemp's ridley sea turtles at nesting beaches in Mexico. This project would build on Kemp's ridley nest protection efforts in Mexico funded through Early Restoration Phase IV *Sea Turtle Early Restoration Project, Kemp's Ridley Sea Turtle Nest Detection component* and the Regionwide TIG's *Restore and Enhance Sea Turtle Nest Productivity* projects. Restoration activities would include: (1) conducting beach patrols to locate sea turtles, sea turtle tracks, and sea turtle nests; (2) protecting sea turtle eggs from the nests located during patrols, either in situ or by transferring eggs to a corral; and (3) maintaining infrastructure for the six sea turtle camps from which beach patrols and sea turtle nest corrals are operated.	Non-preferred	$5,520,000
	Sum (Preferred)	**$210,020,000**

Table ES-2 A Comparison of Impacts for the Reasonable Range Proposed in the RP4/EA

Project	Geology and Substrates	Hydrology and Water Quality	Air Quality	Noise	Habitats	Wildlife Species	Marine and Estuarine Fauna	Protected Species	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
FWCI Restoration Type																	
No Action - FWCI	NE	NE	NE	NE	I	L	L	L	L	NE	NE	NE	NE	L	NE	NE	NE
FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries) (preferred)	NE	s	s	s	s,+	s,+	s,+	s,+	+	NE	NE	+	+	+	NE	+	+
FWCI2, Next Generation Fishing (preferred)	NE	s	s	s	NE	s,+	s,+	s,+	+	NE	NE	+	+	+	NE	+	+
FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality (preferred)	NE	s	s	s	NE	s,+	s,+	s,+	+	NE	NE	+	+	+	NE	+	+
FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates (preferred)	s,+	s,+	s	s	s,+	s,+	s,+	s,+	+	NE	NE	+	+	+	NE	+	+
FWCI5, Education and Stewardship Partnerships with Charter Anglers (preferred)	+	+	NE	NE	+	+	+	+	+	NE	NE	+	+	+	NE	+	+
FWCI6, Communication, Adaptive Management, Planning, and Integration (preferred)	NE	s	s	s	NE	s,+	s,+	s,+	+	NE	NE	+	+	+	NE	+	+
FWCI7, Reducing Fish Mortality from Depredation (non-preferred)	NE	s	s	s	s,+	s,+	s,+	s,+	+	NE	NE	+	+	+	NE	+	+
ST Restoration Type																	
No Action – ST	I	NE	NE	NE	I	L	L	L	NE	NE	NE	I	I	I	NE	I	I
ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles) (preferred)	s,+	s	s	s	S,+	S,+	+	S,+	I,+	NE	NE	+	+	NE	NE	s,+	+

Project	Geology and Substrates	Hydrology and Water Quality	Air Quality	Noise	Habitats	Wildlife Species	Marine and Estuarine Fauna	Protected Species	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
ST2, Gulf-Wide Sea Turtle Bycatch Reduction (preferred)	s	NE	s	s	NE	NE	NE	+	NE	NE	NE	NE	+	+	NE	+	NE
ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction (preferred)	NE	NE	s	s	NE	s	s	s,+	NE	NE	NE	NE	+	NE	NE	+	+
ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements (preferred)	s	s	s	s	s	s	s	S,+	+	NE	NE	NE	+	NE	NE	s,+	NE
ST5, Kemp's Ridley Nesting Enhancement in Mexico (non-preferred)	S	s	s	s	S,+	S,+	NE	S,+	+	NE	NE	+	+	NE	NE	s,+	+

+	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

Public Participation in this RP4/EA

The Open Ocean TIG prepared this RP4/EA to (1) inform the public about DWH NRDA restoration planning efforts in the Open Ocean Restoration Area, (2) present analyses on the potential restoration benefits and environmental consequences of the reasonable range of restoration alternatives, and (3) seek public comment on this RP4/EA.

The public is encouraged to review and comment on this RP4/EA during the 45-day comment period following publication of the public notice. The deadline for submitting written comments is specified in the public notice published in the *Federal Register* and on the National Park Service's Planning, Environment, and Public Comment website (see link below). Comment period information and other details can also be found on the Trustees' website.[4] During the comment period, comments can be submitted by any of following methods:

- **Online.** https://parkplanning.nps.gov/OOTIGRP4
- **By mail.** Hard copy addressed to U.S. Fish and Wildlife Service Gulf Restoration Office, 1875 Century Blvd., Atlanta, GA 30345. To be considered, mailed comments must be postmarked on or before the comment deadline.
- **During the public webinars.** See Section 1.6 for details on the webinar.

Please note that personal identifying information included in the submitted comments (such as name, address, phone number, and email address) may be made publicly available at any time. Personal information is not required to submit comments.

[4] The Trustees' website can be found at www.gulfspillrestoration.noaa.gov.

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List of Abbreviations/Acronyms

A	
ATV	All-terrain vehicle
B	
BLL	Bottom longline fishery
BMP	Best management practice
BP	BP Exploration and Production, Inc.
C	
CEQ	Council on Environmental Quality
CFMC	Caribbean Fishery Management Council
CFR	Code of Federal Regulations
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
D	
DIVER	Data Integration Visualization Exploration and Reporting
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DWH	*Deepwater Horizon*
E	
EA	Environmental Assessment
EFH	Essential Fish Habitat
EO	Executive Order
ESA	Endangered Species Act of 1973
F	
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
FRA	Fiscal Responsibility Act of 2023
FWCI	Fish and Water Column Invertebrates Restoration Type
G	
GCOOS	Gulf of Mexico Coastal Ocean Observing System
GMT	Gear Monitoring Team
GOMFMC	Gulf of Mexico Fishery Management Council

Gulf	Gulf of Mexico
H	
HAB	Harmful algal bloom
HMS	Highly migratory species
I	
IUU	Illegal, unregulated, and unreported fishing
M	
MAM	Monitoring and adaptive management
MAM Manual	Monitoring and Adaptive Management Procedures and Guidelines Manual
MBTA	Migratory Bird Treaty Act
MDBC	Mesophotic and Deep Benthic Communities
MMPA	Marine Mammal Protection Act
N	
NEPA	National Environmental Policy Act of 1969
NEPA Phase 2 Revisions	NEPA Implementation Revisions Phase 2 (89 *Federal Register* 35442)
NFWF-GEBF	National Fish and Wildlife Foundation Gulf Environmental Benefit Fund
NGO	Non-governmental organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRDA	Natural Resource Damage Assessment
NWR	National Wildlife Refuge
O	
OPA	Oil Pollution Act of 1990
P	
PDARP/PEIS	2016 *Deepwater Horizon* Oil Spill: Final Programmatic Damage Assessment and Restoration Plan/Programmatic Environmental Impact Statement
R	
RESTORE Act	Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act
RFIP	Recreational Fishery Implementation Plan
ROD	Record of Decision
RP	Restoration Plan

S

SOPs	Standard operating procedures
ST	Sea Turtles Restoration Type
STSSN	Sea Turtle Stranding and Salvage Network

T

TED	Turtle exclusion device
TIG	Trustee Implementation Group
Trustees	*Deepwater Horizon* oil spill Natural Resource Damage Assessment Trustees

U

UAS	Uncrewed aircraft systems
U.S.C.	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

1 Introduction, Purpose and Need, and Public Participation

This *Draft Restoration Plan 4 and Environmental Assessment: Fish and Water Column Invertebrates and Sea Turtles* (herein referred to as RP4/EA) was prepared by the Open Ocean Trustee Implementation Group (Open Ocean TIG or the TIG). The Open Ocean TIG includes Trustees from four federal agencies: the National Oceanic and Atmospheric Administration (NOAA); the United States Department of the Interior (DOI); the United States Department of Agriculture (USDA); and the United States Environmental Protection Agency (USEPA). The Open Ocean TIG is responsible for restoring natural resources and services in the Open Ocean Restoration Area that were injured or lost as a result of the *Deepwater Horizon* (DWH) oil spill.

The Open Ocean TIG prepared this RP4/EA to continue restoration of natural resources and the services they provide that were injured or lost as a result of the DWH oil spill, to inform the public about the DWH Natural Resource Damage Assessment (NRDA) restoration planning efforts, and to seek public comment on the identified reasonable range of alternatives for restoration of injured resources. This RP4/EA was prepared in accordance with the *Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan/Programmatic Environmental Impact Statement* (PDARP/PEIS; DWH Trustees, 2016) and the Record of Decision (ROD),[5] the Oil Pollution Act of 1990 (OPA), and the National Environmental Policy Act of 1969 (NEPA) and its implementing regulations (40 Code of Federal Regulations [CFR] §§ 1500-1508). This RP4/EA focuses on a reasonable range of alternatives to restore injuries to fish and water column invertebrates and sea turtles in the Open Ocean Restoration Area. In this RP4/EA, the TIG identifies its preferred alternatives, which the TIG believes would best compensate the public, in part, for the injuries caused by the DWH oil spill in the Open Ocean Restoration Area.

1.1 Background and Summary of Settlement

On April 20, 2010, the DWH mobile drilling unit exploded, caught fire, and eventually sank in the Gulf of Mexico (Gulf), resulting in a massive release of oil from BP Exploration and Production, Inc.'s (BP's) Macondo well and causing pervasive natural resource injuries across the northern Gulf. Extensive response actions, including cleanup activities and actions to try to prevent the oil from reaching sensitive resources, were undertaken to try to reduce harm to people and the environment. However, many of these response actions had collateral impacts on the environment and natural resource services. The breadth of injuries incurred from the incident are described in Chapter 4 of the PDARP/PEIS.

Under the authority of OPA, a council of federal and state trustees (DWH Trustees[6]) was established to assess natural resource injuries resulting from the incident and to work to make the environment and public whole for those injuries. In accordance with OPA and the OPA NRDA regulations, in February 2016, the DWH Trustees issued a PDARP/PEIS and subsequent ROD detailing a plan to fund and implement restoration projects across the Gulf with available restoration funds. The PDARP/PEIS set forth the process for DWH restoration planning to select specific projects for implementation including

[5] The PDARP/PEIS, ROD, and Consent Decree can be found on the DWH Trustee website: www.gulfspillrestoration.noaa.gov/.

[6] The Trustees are the entities authorized under OPA to act on behalf of the public to assess the natural resource injuries resulting from the DWH oil spill and to develop and implement project-specific restoration plans to compensate for those injuries. Together with the members of the Open Ocean TIG, state Trustees authorized by the governors of Alabama, Florida, Mississippi, Louisiana, and Texas compose, as a whole, the Trustee Council.

outlining programmatic Restoration Goals and Restoration Types (see Figure 5.4-1 of the PDARP/PEIS). The PDARP/PEIS also established a distributed governance structure that assigned a TIG for each of the eight Restoration Areas.[7] The Open Ocean TIG conducts restoration planning for the funding allocated to the Open Ocean Restoration Area. Chapter 7 of the PDARP/PEIS provides detailed information on the Trustees and the TIG governance structure. In April 2016, the U.S. District Court for the Eastern District of Louisiana entered a Consent Decree resolving civil claims by the Trustees against BP arising from the DWH oil spill.[5]

1.2 Restoration Planning by the Open Ocean TIG

Restoration planning from the DWH oil spill began in the Open Ocean on April 20, 2011, as part of the Early Restoration Framework Agreement wherein BP agreed to provide up to $1 billion toward Early Restoration projects in the Gulf.[8] The Open Ocean TIG is implementing or has completed implementation for five Early Restoration projects. Restoration planning by the TIG continued with the release of three post-settlement restoration plans, two in 2019 and one in 2023.[9]

On June 1, 2023, the Open Ocean TIG invited the public to submit project ideas for restoration in the Open Ocean Restoration Area related to the Fish and Water Column Invertebrates (FWCI) and Sea Turtles (ST) Restoration Types. The TIG subsequently screened 87 project idea submissions. On June 25, 2024, following the completion of screening, the TIG posted a public notice on the DWH Trustees' website indicating that the TIG was initiating this RP4/EA (see additional detail in Section 1.6).

Table 1-1 shows the total Open Ocean TIG settlement funds, funds allocated to date for planning and projects, and funds proposed for this RP4/EA. For the most up-to-date project information, see NOAA's Data Integration Visualization Exploration and Reporting (DIVER) website.[10]

[7] Restoration Areas: Restoration in Alabama, Florida, Louisiana, Mississippi, Texas, Regionwide, Open Ocean, and Adaptive Management and Unknown Conditions.

[8] The Early Restoration Framework Agreement can be found at www.fws.gov/doiddata/dwh-ar-documents/994/DWH-AR0233493.pdf.

[9] The March 2019 *Final Restoration Plan 1 and Environmental Assessment: Birds and Sturgeon* (RP1/EA) can be found at www.gulfspillrestoration.noaa.gov/media/document/dwh-arz002398pdf, the November 2019 *Final Restoration Plan 2 and Environmental Assessment: Fish, Sea Turtles, Marine Mammals, and Mesophotic and Deep Benthic Communities* (RP2/EA) can be found at www.gulfspillrestoration.noaa.gov/media/document/dwh-arz003947pdf, and the 2023 *Final Restoration Plan 3 and Environmental Assessment: Birds* (RP3/EA) can be found at www.gulfspillrestoration.noaa.gov/media/document/final-ootig-rp3508-pdf0pdf.

[10] NOAA's DIVER Explorer for DWH restoration projects can be accessed at www.diver.orr.noaa.gov.

Table 1-1 Open Ocean TIG Funds by Restoration Goal and Restoration Type

PDARP/PEIS Programmatic Restoration Goal	Restoration Type	Total Open Ocean TIG Settlement Funds	Funds Allocated[11]	Funds Proposed in this RP4/EA	Funds Remaining
Replenish and Protect Living Coastal and Marine Resources	Fish and Water Column Invertebrates	$400,000,000	$80,213,312	$166,770,000	$153,109,688
	Sturgeon	$15,000,000	$3,055,220	-	$11,944,780
	Sea Turtles	$55,000,000	$20,863,902	$22,300,000	$11,836,098
	Marine Mammals	$55,000,000	$23,501,256	-	$31,498,744
	Birds	$70,000,000	$48,882,465	-	$21,117,535
	Mesophotic and Deep Benthic Communities	$273,300,000	$128,056,161	-	$145,243,839
Provide & Enhance Recreational Opportunities	Provide & Enhance Recreational Opportunities	$22,397,916	$22,388,991	-	$8,925
Monitoring & Adaptive Management	N/A	$200,000,000	$22,698,392	$20,950,000	$156,351,608
Administrative Oversight and Comprehensive Planning	N/A	$150,000,000	$71,576,348	-	$78,423,652
	Total:	**$1,240,697,916**	**$421,236,046**	**$210,020,000**	**$609,441,852**

1.3 Oil Pollution Act and National Environmental Policy Act Compliance

As an oil pollution incident, the DWH oil spill is subject to the provisions of OPA (33 United States Code [U.S.C.] § 2701 *et seq*.). A primary goal of OPA is to make the environment and public whole for injuries to natural resources and services resulting from an incident involving an oil discharge or substantial threat of an oil discharge.

Federal trustees must comply with NEPA (42 U.S.C. § 4321 *et seq*.), its regulations (40 CFR §§ 1500-1508), and agency-specific NEPA procedures when proposing restoration projects. The NEPA analysis associated with this integrated OPA/NEPA document is being prepared in accordance with amendments

[11] This includes funds allocated to restoration planning (e.g., plan development), Early Restoration projects, Open Ocean TIG RP1/EA, RP2/EA, and RP3/EA projects, activities that inform restoration planning (e.g., address data gaps), and monitoring and adaptive management activities, as reported through the NOAA DIVER website. Data is current as of September 2024.

to NEPA under the Fiscal Responsibility Act of 2023 (FRA; 42 U.S.C. § 4336b, June 2023) and as codified in the NEPA Implementing Regulations Revisions Phase 2 ("Phase 2 Revisions") on July 1, 2024 (89 *Federal Register* 35442). The PDARP/PEIS was intended to be used to tier the NEPA analysis in subsequent restoration plans prepared by the TIGs (40 CFR § 1501.11; see Chapter 6 of the PDARP/PEIS). A tiered environmental analysis is an analysis that focuses on project-specific issues and summarizes or references (rather than repeats) the broader issues discussed in a programmatic NEPA analysis, in this case the PDARP/PEIS. The NEPA analysis in this RP4/EA tiers from the PDARP/PEIS where applicable. Additionally, the Open Ocean TIG relies on incorporation by reference of existing NEPA analyses, management plans, studies, or other relevant material (40 CFR § 1501.12) and adoption of existing NEPA analyses (40 CFR § 1506.3), where applicable, in the analysis of impacts in Chapter 4 of this RP4/EA.

The FRA amended NEPA to require that when a federal agency relies on a programmatic environmental document more than five years old, the federal agency must reevaluate the analysis and any underlying assumptions in the programmatic environmental document to ensure the analysis remains valid. The DWH Federal Trustees reviewed the framework of the PDARP/PEIS for continued relevance, and in a memorandum dated June 28, 2024,[12] affirmed the continued validity of the PDARP/PEIS to the overall program. The Federal Trustees will evaluate whether new information or changed circumstances may affect the continued validity of the PDARP/PEIS at the project level during the preparation of each tiered RP/EA. Consistent with the FRA amendment to NEPA, and with 40 CFR § 1501.11, the Open Ocean TIG determined that the analysis in the PDARP/PEIS (DWH Trustees, 2016) and the underlying assumptions therein in the context of the projects proposed in this RP4/EA remain valid and that it continues to be applicable as a programmatic evaluation for DWH restoration planning.

NOAA is the lead federal Trustee for preparing this RP4/EA pursuant to NEPA (40 CFR § 1501.7). The three other federal Trustees of the Open Ocean TIG (DOI, USDA, and USEPA) are acting as cooperating agencies for the purposes of compliance with NEPA in the development of this RP4/EA (40 CFR §§ 1501.8 and 1508.1). Each federal cooperating agency on the TIG will review the analysis for adequacy in meeting the standards set forth in its own NEPA implementing procedures and subsequently adopt the NEPA analysis, if appropriate (40 CFR § 1506.3). Adoption of the EA would be completed via signature on the relevant NEPA decision document.

1.4 Purpose and Need

The Open Ocean TIG has undertaken this restoration planning effort to meet the purpose of contributing to the compensation for and restoration of natural resources and their services injured in the Open Ocean Restoration Area resulting from the DWH oil spill. This RP4/EA is consistent with and tiers from the PDARP/PEIS, which identified extensive and complex injuries to natural resources and their services across the Gulf as well as a need to and a plan for comprehensive restoration consistent with OPA. This RP4/EA falls within the scope of the purpose and need identified in the PDARP/PEIS. As described in Section 5.3 of the PDARP/PEIS, the Restoration Goals work independently and together to benefit injured resources and services. The reasonable range of restoration alternatives in this RP4/EA addresses the programmatic Restoration Goal: Replenish and Protect Living Coastal and Marine Resources.

[12] The *Deepwater Horizon Trustee Analysis and Affirmation for Continued Applicability of the PDARP/PEIS* can be found at https://www.fws.gov/doiddata/dwh-ar-documents/775/DWH-ARZ012870.pdf.

As discussed in Section 5.5.6 and 5.5.10 of the PDARP/PEIS, the Open Ocean TIG recognizes a need for restoration of the highly migratory resources, including fish and sea turtles, injured by the DWH oil spill at different life stages and across their wide geographic ranges. For many of these injured species, reproduction, foraging, and migratory habitat may occur outside of the Gulf in U.S. or international areas. The TIG can maximize the benefits and cost effectiveness of restoration by considering opportunities for restoration across the geographic ranges and lifecycles for the highly migratory resources injured by the spill. This RP4/EA proposes multiple projects that would partially occur outside of the northern Gulf.

Additional information about the purpose and need for DWH NRDA restoration can be found in Section 5.3.2 of the PDARP/PEIS.

1.5 Proposed Action and Alternatives

The Open Ocean TIG proposes to undertake the restoration alternatives identified as preferred in this RP4/EA to provide compensatory restoration towards meeting the Replenish and Protect Living Coastal and Marine Resources Restoration Goal identified in the PDARP/PEIS (Section 1.5) and the FWCI and ST Restoration Types (Section 5.5.6 and Section 5.5.10, respectively).

Table 1-2 below identifies the reasonable range of restoration alternatives evaluated in this RP4/EA, including those identified as preferred by the Open Ocean TIG for implementation. If selected through a Final RP4/EA and TIG decision document, the preferred alternatives would be implemented over approximately the next 6 to 15 years. The reasonable range includes projects that would be implemented along the coast and in waters of the U.S. Gulf of Mexico, U.S. Caribbean Sea, and U.S. Atlantic Ocean, and potentially the Mexican Gulf of Mexico, the Caribbean, and Atlantic waters of Canada and northern South America.

The total estimated cost to implement the preferred restoration alternatives in this RP4/EA would be approximately $210 million, which would be allocated from the Open Ocean TIG's FWCI and ST Restoration Types and Monitoring and Adaptive Management (MAM) allocation. This would leave a balance across all Open Ocean TIG Restoration Types of approximately $609 million and any unallocated earned interest remaining for future restoration plans, restoration planning activities, or MAM activities and administrative oversight (Table 1-1). Detailed information on all alternatives can be found in Section 2.4.

Table 1-2 The Reasonable Range of Restoration Alternatives Proposed in this RP4/EA

Alternative	Preferred	Estimated Project Costs
Fish and Water Column Invertebrates (FWCI) Restoration Type		
FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries) This project would reduce mortality of priority injured fish species including reef fish, highly migratory species (HMS), coastal migratory pelagic species, and other species such as flounders, drums, and sea trout by advancing use and adoption of best release practices. Such practices include the use of appropriate hooks, tackle, and landing tools and minimizing fight time to reduce mortality associated with regulatory discards, catch-and-release fishing, barotrauma, and depredation (the removal of fish or fishing gear by non-target species such as marine mammals or sharks prior to retrieval by a fisher or angler). This project would continue and expand on the Open Ocean TIG's existing *Reduction of Postrelease Mortality from Barotrauma in the Gulf of Mexico Reef Fish Recreational Fisheries* project, which began the successful "Return 'Em Right" program. Restoration activities would include: (1) conducting public outreach and education and distributing release gear for recreational fisheries; (2) monitoring gear use and progress towards use of best practices through studies and at-sea observer programs; and (3) assessing the efficacy of best release practices by hosting workshops and conducting studies.	Preferred	$66,220,000
FWCI2, Next Generation Fishing This project would reduce mortality for priority injured fish species including reef fish and reef-associated fish, HMS, coastal migratory pelagic species, and other species such as menhaden, drums, and sea trout by addressing bycatch in commercial fishing fleets. The project would provide fishing communities with methodologies and incentives to reduce bycatch mortality to fishery resources. Restoration activities would include: (1) receiving input from interested parties to develop an implementation plan for activities to reduce or prevent the increase of bycatch in commercial fisheries; (2) conducting training, outreach, and technical assistance to support a "next generation" of commercial fishers who voluntarily implement fishing practices intended to reduce bycatch; (3) advancing the voluntary use of new fishing gear, best practices, and techniques through outreach and technical support to reduce bycatch in commercial fisheries; and (4) supporting data collection and sharing for a next generation commercial fishing fleet.	Preferred	$57,200,000

Alternative	Preferred	Estimated Project Costs
FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality This project would reduce bycatch, depredation, and disruption of spawning aggregations for priority injured fish species including reef fish and HMS through the collection and sharing of data, development of models, and advancement of communication networks for commercial and recreational fisheries. This project would build on the information gathered in the Open Ocean TIG's *Communication Networks and Mapping Tools to Reduce Bycatch – Phase I* project, which assessed the feasibility of commercial fisher- and recreational angler-led hotspot communication networks for several Gulf of Mexico fisheries. Restoration activities would include: (1) developing models to guide restoration and monitoring efforts for injured FWCI populations; (2) identifying and conserving spawning aggregation sites, initially focusing on reef fish populations; (3) enhancing at-sea observer coverage for the commercial reef fish fishery to gathering data and monitor restoration project effectiveness; and (4) developing bycatch and depredation hotspot communication networks to reduce mortality of injured fish populations.	Preferred	$18,040,000
FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates This project would reduce mortality to priority injured fish species including reef fish, HMS, coastal migratory pelagic species, other fish species such as drums and sea trout, and water column invertebrates by reducing diverse threats such as marine debris, invasive species, impaired water quality, and impacts from energy development and production to improve environmental conditions. Restoration activities would include: (1) identifying conservation strategies and prioritizing areas for implementation; and (2) implementing a range of conservation strategies including, but not limited to, preventing and removing marine debris, preventing and removing invasive species such as lionfish, addressing water quality threats such as reducing risks and impacts from harmful algal blooms (HABs), and/or reducing potential impacts to FWCI during energy infrastructure site assessment, operation, and/or decommissioning.	Preferred	$14,300,000
FWCI5, Education and Stewardship Partnerships with Charter Anglers This project would reduce sources of mortality for priority injured fish species including reef fish and HMS from illegal charter fishing practices by conducting outreach and assessing changes in illegal charter fishing activities in the Gulf of Mexico. Restoration activities would include: (1) developing an implementation and communications plan; (2) conducting outreach and education to fishing groups and individuals on the impacts of illegal charter fishing activities on fish and invertebrate resources; and (3) evaluating rates of change in legal fishing effort following project outreach efforts.	Preferred	$3,000,000

Alternative	Preferred	Estimated Project Costs
FWCI6, Communication, Adaptive Management, Planning, and Integration This project would help improve the effectiveness of DWH FWCI Restoration Type-funded projects by addressing gaps in current understanding of high-priority FWCI resources injured by the spill, facilitating coordination among DWH FWCI projects, and expanding outreach to fishing communities to increase awareness of and engagement with DWH restoration activities. Restoration and MAM activities would include: (1) enhancing monitoring support including at-sea observer coverage and electronic monitoring capacity and conducting data collection and analysis to characterize fish populations and evaluate restoration activities; and (2) facilitating engagement with external partners (e.g., commercial fishers and recreational anglers) to enhance coordination and strategy building and improve awareness, communication, and engagement with partners across DWH FWCI projects, both ongoing and those proposed in this RP4/EA.	Preferred	FWCI Restoration Type: $8,010,000 MAM Allocation: $15,250,000
FWCI7, Reduction in Fish Post-release Mortality from Depredation This project would reduce the risk of depredation of injured reef fish and HMS in commercial and recreational fisheries by working cooperatively with fishing communities and other partners to test and implement depredation reduction strategies and improve understanding of fish depredation. Restoration activities would include: (1) collecting and analyzing data to assess the characteristics, extent, frequency, and geographical distribution of dolphin and shark interactions with fisheries; (2) developing and testing strategies to mitigate depredation by implementing pilot programs with partners in recreational and commercial fishing communities including identifying shark depredation hotspots and testing commercially available shark deterrent devices with fishing communities to measure perceived effectiveness, buy-in, and any barriers to adoption of these devices; and (3) conducting outreach and engagement to advance awareness of best practices and to provide education for the adoption and proper use of these practices.	Non-Preferred	$5,052,000
Sea Turtles (ST) Restoration Type		
ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles) This project would prevent the loss of high-density sea turtle nesting habitat by conserving nesting beach habitat in perpetuity through land acquisition. This project would build on the Open Ocean TIG's *Long Term Nesting Habitat Protection for Sea Turtles* project, continuing current acquisition efforts at Archie Carr National Wildlife Refuge (NWR) and expanding acquisition efforts to Nathaniel P. Reed Hobe Sound NWR. Restoration activities would include: (1) acquiring priority parcels from willing sellers within the approved acquisition boundaries of Archie Carr and Hobe Sound NWRs; and (2) as needed, removing derelict structures from acquired parcels that pose risks to nesting sea turtles and hatchlings.	Preferred	$5,000,000

Alternative	Preferred	Estimated Project Costs
ST2, Gulf-Wide Sea Turtle Bycatch Reduction This project would reduce the risk of commercial fishery interactions with sea turtles through outreach, education, and alternative fishing gear distribution to Gulf of Mexico commercial fishing communities. This project would build on Regionwide TIG (*Sea Turtle Early Restoration Project, Shrimp Trawl Bycatch Reduction component*) and Open Ocean TIG (*Reducing Juvenile Sea Turtle Bycatch through Development of Reduced Bar Spacing in Turtle Excluder Devices*) projects, continuing existing, successful efforts to reduce sea turtle bycatch in Gulf of Mexico commercial fisheries. Restoration activities would include: (1) continuing and expanding NOAA Gear Monitoring Team (GMT) efforts, such as conducting courtesy dockside and at-sea inspections of required turtle excluder devices (TEDs) in the shrimp trawl fishery and expanding GMT outreach and bycatch reduction efforts to commercial hook-and-line fisheries; and (2) encouraging voluntary adoption of small-bar TED prototypes, including conducting industry outreach and funding the manufacture and installation of small-bar TEDs on participating vessels.	Preferred	$8,500,000
ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction This project would seek to reduce the risk of vessel strikes to sea turtles by taking a phased approach to identify hotspots and areas of highest risk of vessel strikes, determine risk factors, and implement site-specific voluntary conservation measures such as boater outreach and education at selected locations. Restoration activities would include: (1) analyzing existing datasets to assess the temporal and spatial distribution of vessel strikes in the Gulf of Mexico and identify areas of concern; (2) evaluating potential hotspots by conducting in-situ studies to understand local variables influencing turtle-vessel interactions and assessing risk of vessel strikes; and (3) implementing site-specific, voluntary measures at three or more hotspot locations.	Preferred	$3,500,000
ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements This project would improve capacity to identify and monitor in-water threats to and support response and rehabilitation facilities for sea turtles during emergency events. This project would build on existing efforts from Early Restoration Phase IV (*Sea Turtle Early Restoration, Enhancement of the Sea Turtle Stranding and Salvage Network and Development of an Emergency Response Program component*). Restoration and MAM activities would include: (1) enhancing Gulf of Mexico-wide Sea Turtle Stranding and Salvage Network (STSSN) coordination, including continuing NOAA's role as the state STSSN Coordinator for Louisiana, Mississippi, and Alabama; (2) supporting sea turtle emergency response activities and enhancing emergency preparedness; and (3) enhancing STSSN data management and analysis and conducting mortality investigations.	Preferred	ST Restoration Type: $5,300,000 MAM Allocation: $5,700,000

Alternative	Preferred	Estimated Project Costs
ST5, Kemp's Ridley Nesting Enhancement in Mexico This project would reduce hatchling mortality for Kemp's ridley sea turtles at nesting beaches in Mexico. This project would build on Kemp's ridley nest protection efforts in Mexico funded through Early Restoration Phase IV *Sea Turtle Early Restoration Project, Kemp's Ridley Sea Turtle Nest Detection component* and the Regionwide TIG's *Restore and Enhance Sea Turtle Nest Productivity* projects. Restoration activities would include: (1) conducting beach patrols to locate sea turtles, sea turtle tracks, and sea turtle nests; (2) protecting sea turtle eggs from the nests located during patrols, either in situ or by transferring eggs to a corral; and (3) maintaining infrastructure for the six sea turtle camps from which beach patrols and sea turtle nest corrals are operated.	Non-preferred	$5,520,000
	Sum (Preferred)	**$210,020,000**

1.5.1 Natural Recovery/No Action Alternative

Under the Natural Recovery/No Action Alternative, the Open Ocean TIG would not select and implement any of the restoration alternatives proposed in this RP4/EA (see Section 3.6). In the PDARP/PEIS, the Trustees analyzed the Natural Recovery/No Action Alternative programmatically and found that it would not meet the purpose and need for restoring lost natural resources and their services. A No Action Alternative for each Restoration Type is included in this RP4/EA analysis pursuant to NEPA as a "…benchmark, enabling decision-makers to compare the magnitude of environmental effects of the action alternatives" (Council on Environmental Quality [CEQ], 1981). The No Action alternatives are analyzed in Section 4.4.

1.5.2 Severability of Projects

Restoration alternatives identified in this RP4/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 TIG's selection of any remaining alternatives. Alternatives not proposed as preferred for implementation at this time may be considered in future restoration planning by the Open Ocean TIG or by other TIGs.

1.6 Public Involvement

On June 1, 2023, the Open Ocean TIG posted a public invitation on the DWH Trustees' website to submit project ideas for restoration in the Open Ocean related to the FWCI and ST Restoration Types.[13] A total of 87 submissions were received and screened. On June 25, 2024, the Open Ocean TIG posted a public notice on the DWH Trustees' website indicating that the TIG was initiating restoration planning for this RP4/EA.[14]

[13] The invitation to submit project ideas can be found at https://www.gulfspillrestoration.noaa.gov/2023/06/submit-your-ideas-open-ocean-restoration-area-planning.

[14] The Notice of Intent to begin restoration planning can be found at https://www.gulfspillrestoration.noaa.gov/2024/06/open-ocean-trustees-initiate-fourth-restoration-plan.

The public is encouraged to review and comment on this RP4/EA during the 45-day comment period following publication of the Notice of Availability in the *Federal Register*. Comments can be submitted during the comment period by any of the following methods.

Online. https://parkplanning.nps.gov/OOTIGRP4

By mail. Hard copy addressed to U.S. Fish and Wildlife Service Gulf Restoration Office, 1875 Century Blvd., Atlanta, GA 30345.

To be considered, mailed comments must be postmarked on or before the comment deadline. The deadline for submitting comments is specified in the *Federal Register*, on the National Park Service's Planning, Environment, and Public Comment website, and on the Trustees' website.

During the public webinar. The Open Ocean TIG will also hold two public webinars to facilitate the public review and comment process. The webinar dates, times, and registration links are as follows:

- Thursday, November 14, 2024, from 1 – 2 pm Eastern Time. Register at: https://attendee.gotowebinar.com/register/7244601192809206361
- Wednesday, November 20, 2024, from 5 – 6 pm Eastern Time. Register at: https://attendee.gotowebinar.com/register/7473782296991218265

After the close of the comment period, the Open Ocean TIG will consider all comments received and revise this RP4/EA, as appropriate. A summary of comments received and the TIG's responses, where applicable, will be included in the final RP4/EA.

Personal identifying information included in the submitted comments (such as name, address, phone number, and email address) may be made publicly available at any time. Personal information is not required to submit comments.

1.7 Administrative Record

The DWH Trustees opened a publicly available Administrative Record for the DWH oil spill NRDA,[15] including restoration planning activities, concurrently with publication of the 2010 Notice of Intent (pursuant to 15 CFR § 990.45). DOI is the lead federal Trustee for maintaining the Administrative Record. Information about restoration project implementation is provided to the public through the Administrative Record and other outreach efforts (Section 1.6), including the DWH Trustees' website.[16]

1.8 Coordination with Other Gulf Restoration Programs

As discussed in Section 1.5.6 of the PDARP/PEIS, coordination with other Gulf restoration programs promotes successful implementation of restoration projects and optimizes ecosystem recovery. The Open Ocean TIG is committed to coordinating with other DWH oil spill and Gulf restoration programs (e.g., the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States [RESTORE] Act, the National Fish and Wildlife Foundation's Gulf Environmental Benefit Fund [NFWF-GEBF]) to maximize the overall ecosystem impact of restoration efforts and ensure effective use of funds by identifying synergies and reducing potential redundancies in project selection.

[15] The DWH Administrative Record can be found at www.doi.gov/deepwaterhorizon/adminrecord.

[16] The Gulf Spill Restoration website can be found at www.gulfspillrestoration.noaa.gov.

This coordination would ensure that funds are allocated for critical restoration projects across the Gulf and specifically within the Open Ocean Restoration Area.

Of relevance to this RP4/EA, investments have been made under NFWF-GEBF to leverage sea turtle nesting habitat acquisitions in Archie Carr NWR and expand benefits achieved under similar DWH Trustee acquisition projects. In addition, NFWF-GEBF has also invested in monitoring of recreationally important fish species in the northern Gulf to inform restoration opportunities. Further, work completed under a RESTORE-funded project to identify reef fish spawning aggregations would be leveraged for project activities proposed in this RP4/EA.

Restoration alternatives evaluated in this RP4/EA which leverage funds from RESTORE or NFWF-GEBF are identified within the project descriptions in Section 2.4.

1.9 Next Steps

This RP4/EA is intended to provide the public and decision makers with information and analysis on the Open Ocean TIG's proposal to implement the proposed action described in this RP4/EA, which includes restoration alternatives to restore injured fish, water column invertebrates, and sea turtles. To help inform the TIG's decision on which alternatives to propose for implementation, the environmental impacts of the alternatives are assessed in Chapter 4 and Appendix A. This RP4/EA, together with public review and comment, is intended to guide the TIG's selection of projects for implementation in the subsequent final RP4/EA that best meet the purpose and need as described in Section 1.4 above.

2 Restoration Planning Process

NRDA restoration under OPA is a process that includes evaluating injuries to natural resources and their 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 (i.e., connection) to natural resource injuries and service losses resulting from an oil spill. As part of the NRDA process, the Trustees consider a reasonable range of restoration alternatives[17] before selecting their preferred alternative(s) (15 CFR § 990.53(a)(2)). The OPA NRDA regulations (15 CFR Part 990) provide factors (also referred to as evaluation standards) to be used by Trustees to evaluate projects designed to compensate the public for injuries caused by oil spills.

The Open Ocean TIG developed a screening process, described in this chapter, based on the OPA NRDA regulations at 15 CFR § 990.53 to help identify the reasonable range of alternatives evaluated in this RP4/EA. The reasonable range of alternatives is consistent with the DWH Trustees' selected programmatic alternative and the goals identified in the PDARP/PEIS. This chapter summarizes the injuries addressed by this RP4/EA and the projects considered in the reasonable range of alternatives. The restoration planning process was also conducted in accordance with the Consent Decree, the Trustee Council's Standard Operating Procedures (SOPs; DWH Trustees, 2021), OPA NRDA regulations, and NEPA and its implementing regulations (40 CFR §§ 1500-1508).

2.1 Summary of Injuries Addressed in this RP4/EA

Chapter 4 of the PDARP/PEIS summarizes the injury assessment, which documents 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 RP4/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 DWH oil spill. This RP4/EA proposes alternatives for the FWCI and ST Restoration Types described in the PDARP/PEIS. This section summarizes the most relevant information from Chapter 4 of the PDARP/PEIS injury assessment and establishes the nexus for restoration planning for these Restoration Types.

2.1.1 Fish and Water Column Invertebrates

As a result of the DWH oil spill, at least 43,300 square miles (112,000 square kilometers) of the Gulf were covered in a surface slick of oil for 113 days in 2010. Below the surface slick, it was estimated that a daily average of 75 billion cubic yards (57 billion cubic meters) of water was contaminated, a volume equal to more than 40 times the average daily discharge of the Mississippi River at New Orleans, Louisiana. Consequently, water column resources across all levels of the food chain were injured, including bacteria, invertebrates, estuarine-dependent species such as red drum, shrimp, and sea trout, and large open-water predatory species such as bluefin tuna that migrate from the Gulf into the Atlantic Ocean and beyond.

In surface waters, the Trustees estimate that 2 to 5 trillion larval fish and 37 to 68 trillion invertebrates were killed and, in deeper waters, 86 million to 26 billion fish larvae and 10 million to 7 billion planktonic invertebrates were killed. The mortality of larval fish constitutes a biological loss not only due

[17] For the purposes of this RP4/EA, each project evaluated in the reasonable range is considered a separate alternative; therefore, the terms "project" and "alternative" are used interchangeably.

to the loss of larval fish that may have grown to adulthood, but also because these larvae represent a key food source for larger predators. In addition to mortality, injuries to fish such as changes in growth and physiology were determined to have occurred but were not quantified.

2.1.2 Sea Turtles

Following the DWH oil spill, the Trustees quantified injuries to four of the five sea turtle species that inhabit the Gulf, including loggerhead, Kemp's ridley, green, and hawksbill sea turtles. Leatherback sea turtles were also determined to have been injured from the spill. These injuries are summarized in Section 4.8 of the PDARP/PEIS.

All five species are listed as threatened or endangered under the Endangered Species Act (ESA) and are long-lived, migrate long distances, and occur across a variety of habitats within the Gulf and beyond. Injuries to these species spanned habitat types, from the open ocean to nearshore and shoreline environments, and impacted turtles of all life stages. The Trustees estimated that between 4,900 and 7,600 large juvenile and adult sea turtles (Kemp's ridley, loggerhead, and hard-shelled sea turtles not identified to species) and between 55,000 and 160,000 small juvenile sea turtles (Kemp's ridley, green, loggerhead, hawksbill, and hard-shelled sea turtles not identified to species) died as a result of the oil spill. In addition, nearly 35,000 hatchling sea turtles (loggerhead, Kemp's ridley, and green sea turtles) were injured by response activities, and thousands more were lost due to unrealized reproduction from adults killed by the DWH oil spill.

2.2 Screening for a Reasonable Range of Alternatives

In developing a reasonable range of alternatives suitable for addressing the injuries caused by the DWH oil spill, the Open Ocean TIG considered the Trustees' programmatic Restoration Goals and Restoration Type-specific goals specified in the PDARP/PEIS, the evaluation standards in the OPA NRDA 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 by the Open Ocean TIG or other DWH restoration funding sources (e.g., NFWF-GEBF, Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act [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's SOPs, the Open Ocean TIG considered project ideas submitted by the public. Additional information about the screening process applied by the Open Ocean TIG to generate a reasonable range for this RP4/EA is provided below.

2.2.1 Open Ocean TIG Screening Process

On June 1, 2023, the Open Ocean TIG requested submissions of public ideas through August 14, 2023, to inform the TIG's restoration planning. The screening process developed by the Open Ocean TIG for the purpose of preparing this RP4/EA included reviewing ideas submitted by the public via the DWH NRDA project submission portal.[18] Project ideas needed to be submitted or existing ideas needed to be updated during the solicitation period to be considered in this RP4/EA. As described in the project solicitation, during screening, the TIG considered the following priorities:

[18] The project submission portal can be accessed at www.gulfspillrestoration.noaa.gov/restoration/give-us-your-ideas.

- For the FWCI Restoration Type, project ideas that address the objectives and priority species identified in the TIG's *Fish and Water Column Invertebrates Strategic Plan* (Open Ocean TIG, 2022).
    - High priority species include blue marlin, spotted sea trout, mullets, menhaden, greater amberjack, red grouper, vermilion and red snapper, yellowfin tuna, and king mackerel.
    - High priority objectives include:
        - Reducing bycatch.
        - Reducing illegal, unregulated, and unreported (IUU) fishing.
        - Improving health of priority fish species by developing tools and techniques to reduce uncertainty in restoration and providing best practices to stakeholders and fishing communities.
        - Reducing threats from marine debris.
        - Reducing post-release mortality in recreational fisheries.
    - The Trustees also prioritized ideas that build off successful restoration techniques implemented through previously funded FWCI Restoration Type projects.
- For the ST Restoration Type, the Trustees prioritized ideas that are consistent with the *Strategic Framework for Sea Turtle Restoration Activities* (Regionwide TIG, 2017) and address the following restoration techniques:
    - Reducing injury and mortality through improved response to threats and emergency events.
    - Reducing risk from vessel strikes.
    - Improving awareness and use of bycatch reduction devices.
    - Conserving sea turtle nesting habitat.

The Open Ocean TIG reviewed the PDARP/PEIS Programmatic Restoration Goals and developed a set of screening criteria for identifying project ideas to establish a reasonable range of alternatives for restoration in this RP4/EA. The TIG reviewed 87 restoration project ideas: 25 of which were specific to FWCI, 52 of which were specific to ST, 6 of which applied to both resources; and 4 of which did not pertain to either resource. These ideas were proposed by individual members of the public, non-governmental organizations (NGOs), and local, state, and federal agencies. Project review and screening took place through stages and application of criteria identified in Table 2-1 below and summarized in Figure 2-1.

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

Screening Stage	Criteria/Factors Considered
Initial screening/ project idea eligibility	Project ideas were removed if they: • Were unrelated to FWCI and/or ST. • Had insufficient information for evaluation. • Were already required by local, state, or federal law. • Were duplicates of other submissions. The TIG carried forward 81 project ideas: 25 applicable to the FWCI Restoration Type, 50 applicable to the ST Restoration Type, and 6 co-resource ideas (i.e., those applicable to both Restoration Types).

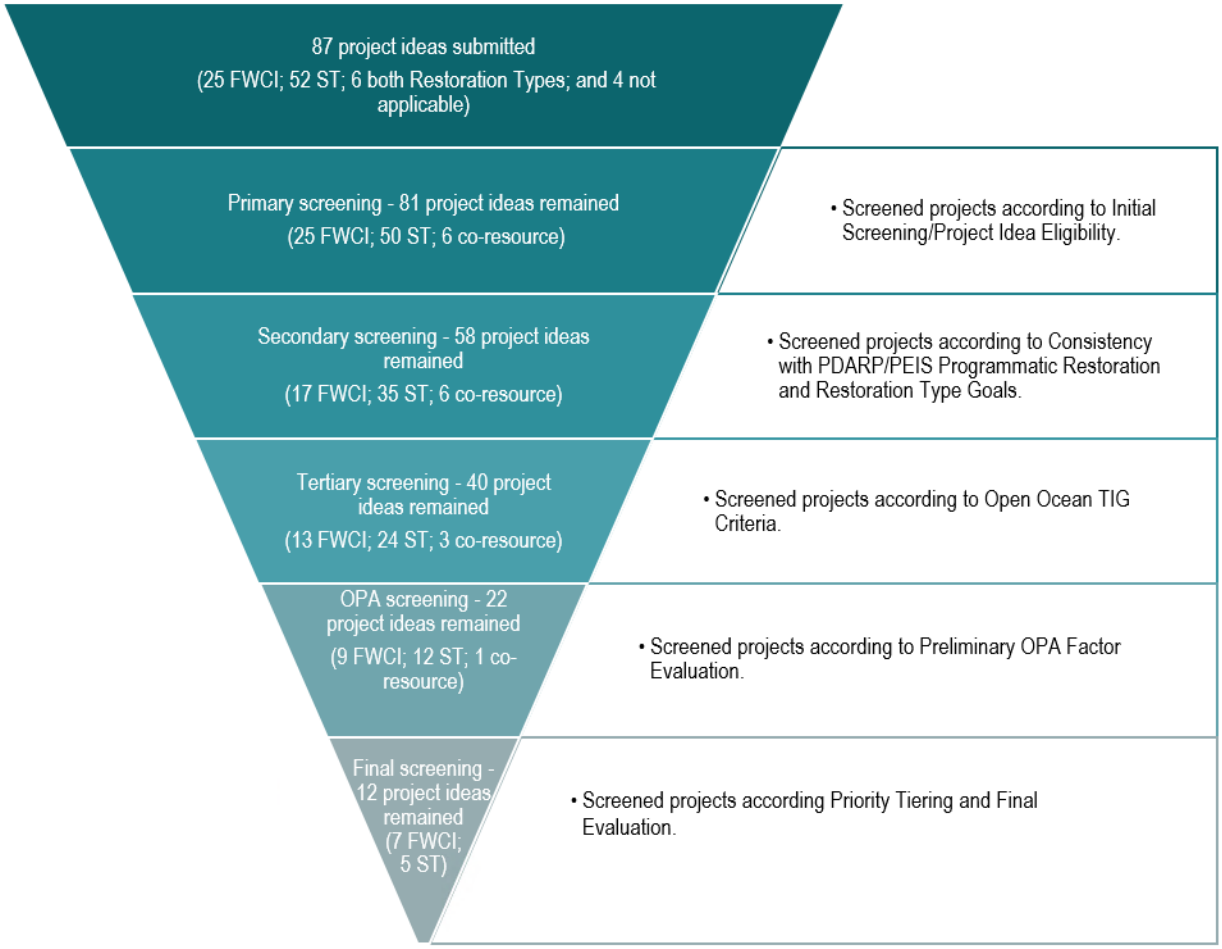
Screening Stage	Criteria/Factors Considered
Consistency with PDARP/PEIS Programmatic and Restoration Types Goals	Project ideas were evaluated for consistency with the Replenish and Protect Living Coastal and Marine Resources PDARP/PEIS Programmatic Restoration Goal and the adaptive management processes described in the PDARP/PEIS. Project ideas were further evaluated for their ability to support one or more of the PDARP/PEIS other Programmatic Restoration Goals and consistency with FWCI and/or ST Restoration Type goals and Restoration Approaches. Project ideas that supported PDARP/PEIS Programmatic Restoration Goals and FWCI and/or ST Restoration Type goals and objectives but did not include implementation activities and were not phased implementation projects (e.g., monitoring, education) were removed and considered for potential elements to incorporate in project ideas that continue in the screening process. After screening for consistency with the PDARP/PEIS, the TIG carried forward 58 project ideas: 17 applicable to the FWCI Restoration Type, 35 applicable to the ST Restoration Type, and 6 co-resource ideas.
Evaluation based on additional Open Ocean TIG criteria	Project ideas were evaluated using additional criteria determined by the TIG: • The extent to which the idea addressed priorities identified in the public notice for project ideas. • Whether the project idea was consistent with and addressed restoration for priority species identified in the *Fish and Water Column Invertebrates Restoration Strategy* (Open Ocean TIG, 2022) or the *Strategic Framework for Sea Turtle Restoration Activities* (Regionwide TIG, 2017), as applicable. • Whether the project idea was unlikely to be conducted by other TIGs. • For project ideas that were proposed as phased implementation, whether future implementation phases would meet screening criteria. Project ideas were also evaluated in coordination with subject matter experts for the following criteria: • Technical feasibility. • Whether the project idea had foreseeable issues related to compliance with regulatory (e.g., fishery management, ESA) and/or permitting requirements. • The "readiness to proceed" with implementation of the project idea. • The extent to which a project idea could be scaled or leveraged with other funding sources. • The level of anticipated direct and indirect resource benefits compared to the resource injury. The TIG carried forward 40 project ideas: 13 applicable to the FWCI Restoration Type, 24 applicable to the ST Restoration Type, and 3 co-resource ideas.

Screening Stage	Criteria/Factors Considered
Evaluation based on OPA factors	The TIG conducted a preliminary OPA NRDA screening based on:[19] • The cost to carry out the alternative (e.g., cost compared to restoration benefits). • 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 would prevent future injury as a result of the incident and/or 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. The TIG carried forward 22 project ideas: 9 applicable to the FWCI Restoration Type, 12 applicable to the ST Restoration Type, and 1 co-resource idea.

Final screening and determination of a reasonable range	Remaining project ideas were prioritized into the following categories:
	• Tier 1 projects that were a priority for this RP4/EA.
	• Tier 2 projects that met screening criteria but were not a priority for this RP4/EA.
	Tier 1 project ideas were carried through for further development. Some ideas were modified to better align with the TIG's restoration objectives. Revised Tier 1 project ideas were then evaluated based on:
	• The results of previous screening steps.
	• The readiness to proceed with each project idea, such as:
	  ○ Whether implementing partners had been identified.
	  ○ Whether the project could commence in a reasonable timeframe.
	  ○ Whether the project did not have foreseeable negative environmental impacts.
	  ○ Whether broad community or stakeholder support had been demonstrated.
	• The extent to which the idea addressed or included the following:
	  ○ The target Restoration Type's Open Ocean TIG restoration objectives (see the *Fish and Water Column Invertebrates Strategic Plan* [Open Ocean TIG, 2022] for FWCI Restoration Type objectives).
	  ○ Measurements of project success following guidelines from the Monitoring and Adaptive Management Procedures and Guidelines Manual (MAM Manual).
	  ○ Inclusive and early engagement and collaboration, such as:
	  ▪ Opportunities for meaningful engagement and collaboration with underserved and overburdened communities in decision-making processes that may affect the health of their community or environment and actions to reduce barriers to accessing the project benefits and maintain the engagement of a diverse range of community groups and/or underserved and overburdened communities in the restoration actions as possible.
	  ▪ Engagement with Tribal Nations, as appropriate, where subsistence practices, ways of living, Indigenous Knowledge and traditions may be impacted.
	  ○ Equitable benefits to underserved and overburdened communities.
	This step resulted in 12 projects (7 FWCI and 5 ST) that are included in the reasonable range of alternatives in this RP4/EA.

[19] The TIG conducted a thorough OPA NRDA evaluation of the reasonable range of alternatives, described in Chapter 3.

Figure 2-1 Screening Process Summary



2.3 Alternatives Not Considered for Further Evaluation in this RP4/EA

The Open Ocean TIG's decision to advance 12 of the 87 project ideas to the reasonable range of alternatives is based on balancing the considerations outlined above in the context of the full suite of restoration projects previously funded by the TIG. In some cases, project ideas met or nearly met screening criteria but: (1) needed further technical development; (2) did not align as closely with the priorities of the Open Ocean TIG; or (3) may already be receiving funding through other DWH settlement funding mechanisms. Project ideas not included in the reasonable range of alternatives for this RP4/EA, or not selected for implementation in the final RP4/EA, may be considered for future restoration planning.

2.4 Reasonable Range of Restoration Alternatives Considered

From the process described above, the Open Ocean TIG identified a reasonable range of seven FWCI and five ST restoration alternatives for further consideration and evaluation in this RP4/EA (Table 2-2). Summaries of each of these alternatives are provided in the following subsections of this chapter. OPA NRDA and NEPA evaluations of these alternatives are provided in Chapters 3 and 4 of this RP4/EA, respectively. A No Action Alternative for each Restoration Type is included in this RP4/EA pursuant to

NEPA as a "…benchmark, enabling decision-makers to compare the magnitude of environmental effects of the action alternatives."

Table 2-2 Reasonable Range of Alternatives Considered in this RP4/EA

Alternative	Estimated Project Costs
Fish and Water Column Invertebrates (FWCI)	
FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries)	$66,220,000
FWCI2, Next Generation Fishing	$57,200,000
FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality	$18,040,000
FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates	$14,300,000
FWCI5, Education and Stewardship Partnerships with Charter Anglers	$3,000,000
FWCI6, Communication, Adaptive Management, Planning, and Integration	$23,260,000
FWCI7, Reducing Fish Post-Release Mortality from Depredation	$5,052,000
Sea Turtles (ST)	
ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles)	$5,000,000
ST2, Gulf-Wide Sea Turtle Bycatch Reduction	$8,500,000
ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction	$3,500,000
ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements	$11,000,000
ST5, Kemp's Ridley Nesting Enhancement in Mexico	$5,520,000

2.4.1 Project Descriptions: Fish and Water Column Invertebrates

This RP4/EA identifies seven restoration alternatives consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal (PDARP/PEIS Section 5.3.1) and underlying FWCI Restoration Type (PDARP/PEIS Section 5.5.6):

- FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries)
- FWCI2, Next Generation Fishing
- FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality
- FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates
- FWCI5, Education and Stewardship Partnerships with Charter Anglers
- FWCI6, Communication, Adaptive Management, Planning, and Integration
- FWCI7, Reduction in Fish Post-release Mortality from Depredation

Descriptions of these restoration alternatives are provided below.

2.4.1.1 FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries)

Restoration Approaches

Voluntary fisheries-related actions to increase fish biomass; Reduce post-release mortality of red snapper and other reef fishes in the Gulf of Mexico recreational fishery using fish descender devices; Reduce mortality among highly migratory species and other oceanic fishes (PDARP/PEIS Appendix 5.D.3.5, 5.D.3.6, and 5.D.3.2)

Restoration Techniques

Emerging fishing technologies; Provide recreational fishers of reef fish and HMS with emerging fishing technologies including handling and release devices and best practices, and the training to use them (PDARP/PEIS Appendix 5.D.3.5 and 5.D.3.6)

Project Goal

Restore recreationally important fish populations injured by the oil spill by reducing mortality from regulatory discards, shark depredation, and catch-and-release fishing.

Project Location

The U.S. and Mexican Gulf of Mexico, Caribbean Sea, and U.S. Atlantic (Figure 2-2)

Project Summary

The National Oceanic and Atmospheric Administration (NOAA) would be the lead Implementing Trustee for this project. Additional project partners may include, but are not limited to, state natural resource agencies, Fishery Management Councils, the Gulf States Marine Fisheries Commission, and universities (e.g., University of Florida). This project would continue and expand on the Open Ocean TIG's RP2/EA *Reduction of Postrelease Mortality from Barotrauma in the Gulf of Mexico Reef Fish Recreational Fisheries* project, which launched the successful "Return 'Em Right" program in May 2022 to reduce post-release mortality of reef fish by providing education about best release practices and distributing release gear to thousands of recreational anglers across the Gulf. These best release practices include using appropriate hooks, tackle, and landing tools, minimizing fight time, reducing depredation of hooked fish, and reducing the risk of barotrauma mortality by using descending devices. This RP4/EA project would continue these efforts, as well as expand the methods and scope of the existing Return 'Em Right program to additional species, timeframes, and locations including the Atlantic for some species groups. While the current Return 'Em Right program focuses on reef fish, this project would expand efforts to include best release practices and release gear for HMS, coastal migratory pelagic species, other species such as flounders, drums, and sea trout, and other reef fish, such as deepwater groupers and tilefish injured by the oil spill. This new component of the existing project would:

- **Conduct outreach and education and distribute release gear** for recreational fisheries by:
    - **Maintaining existing Return 'Em Right activities and infrastructure** to support existing education and device distribution in an efficient and strategic manner.
    - **Expanding Return 'Em Right outreach** through the development of marketing campaigns, direct engagement with the fishing community at relevant events and meetings, and providing dock demonstrations and similar activities.
    - **Developing educational materials, a communications plan, and an implementation strategy** specific to each fishery and geographic area. As part of this effort, partners (e.g.,

industry groups, private or for-hire anglers) would be engaged in the planning process for each species group to identify best practices, limitations in angler knowledge, and existing barriers that prevent anglers from adopting tools or release practices. This knowledge would inform the implementation strategies and help Return 'Em Right outreach efforts to collaboratively and inclusively engage the recreational fishing community.

    - **Collaborating with fishing equipment manufacturers to develop cost-effective gear** for distribution among the fishing community including predator avoidance tools, other tools for dehooking and handling, and descending tools.

- **Monitor gear use and progress toward best practice use** for priority species by:
    - **Conducting studies on angler behavior and attitudes** to characterize baseline conditions, assess the status of recreational angler attitudes toward best practices and tools, and track changes in these attitudes over time. These studies may evaluate anglers' awareness of release protocols and knowledge of when to use them or may involve gathering suggestions for improving tools and methods.
    - **Improving data collection and reporting tools** such as web portals, mobile applications, and databases that are used to organize and manage project-specific data.
    - **Enhancing at-sea observer coverage** on boats to monitor the effective use of best practices, to collect information to validate the results of self-reporting studies, and to collect additional information about fishing effort and recapture rates.
- **Assess the efficacy of best release practices and estimate post-release mortality** for priority species by:
    - **Conducting workshops** with project partners and interested parties (e.g., fishing communities, researchers, scientists, managers) to discuss best practices for validating the effectiveness of release methods and associated gear technologies; to prioritize implementation of Return 'Em Right activities for various species and geographies; and to explore methods of estimating post-release mortality and how these may affect fisheries data and stock assessments.
    - **Conducting studies to validate the effectiveness of release practices and tools** across species, locations, and environments within the Gulf and U.S. Atlantic. These studies may use methods such as capture-tag-recapture, telemetry, underwater video, and other techniques to improve the accuracy of release mortality rate estimates. In addition, these studies may also test new technologies or practices to reduce depredation and post-release predation of released fish by sharks, marine mammals, and other predators.
- **Analyze and distribute data** from the above-described studies to incorporate findings into programmatic evaluations and/or educational programming, to make results publicly available for interested parties such as fishing clubs, or to present at regional and national fisheries management meetings.

Caught fish may be released for multiple reasons, such as being a non-target species or a regulatory discard (e.g., when the fish is out of season, a bag limit has been reached, the fish is undersized). Post-release mortality may occur due to post-release predation, barotrauma, or for other reasons. Reducing the risk of post-release mortality increases the chance that those surviving fish may contribute to the health and resilience of their population. The Return 'Em Right program was established by the Open Ocean RP2/EA project to increase awareness among recreational anglers of post-release mortality, and to provide the tools and education necessary to release fish in a manner that improves their chances of survival. By the end of 2023, it was estimated that approximately 30,000 recreational anglers had

completed the education module and received packages of release gear. Expanding this program to new regions and additional priority injured species would help populations of priority fish species recover and foster a long-term, conservation-minded ethos among the recreational angling community to support the longevity of healthy fish populations.

General Project Activities and Implementation Timing

Project activities would include planning and design, implementation (including conducting studies and data analysis, developing and distributing educational materials and gear, and performing outreach), and project performance monitoring (see Section 3.2 for OPA NRDA project performance monitoring requirements). Implementation activities and geographic locations would be tailored to each species group to include areas that have connectivity to injured populations and would have greatest benefit.

The project is expected to take approximately 15 years to complete. Planning and implementation of angler attitude studies would begin in Year 1 and continue throughout the project duration. Implementation of education, outreach, advertising, and field studies to validate post-release mortality would begin in Year 2 and continue throughout the project duration. The inclusion of different species and different geographies could be phased and staggered over time throughout the project duration. For example, activities focused on reef fish and HMS may begin first in the northern Gulf and U.S. Atlantic followed by the southern Gulf. Activities focused on flounders, drums, sea trout, and coastal migratory pelagic species could follow in subsequent years of the project, similarly beginning in the northern Gulf, and for coastal migratory pelagic species, activities could be expanded in later years to the U.S. Atlantic and southern Gulf.

Project performance monitoring and reporting of data related to post-release mortality would be analyzed and distributed in Years 11 through 15.

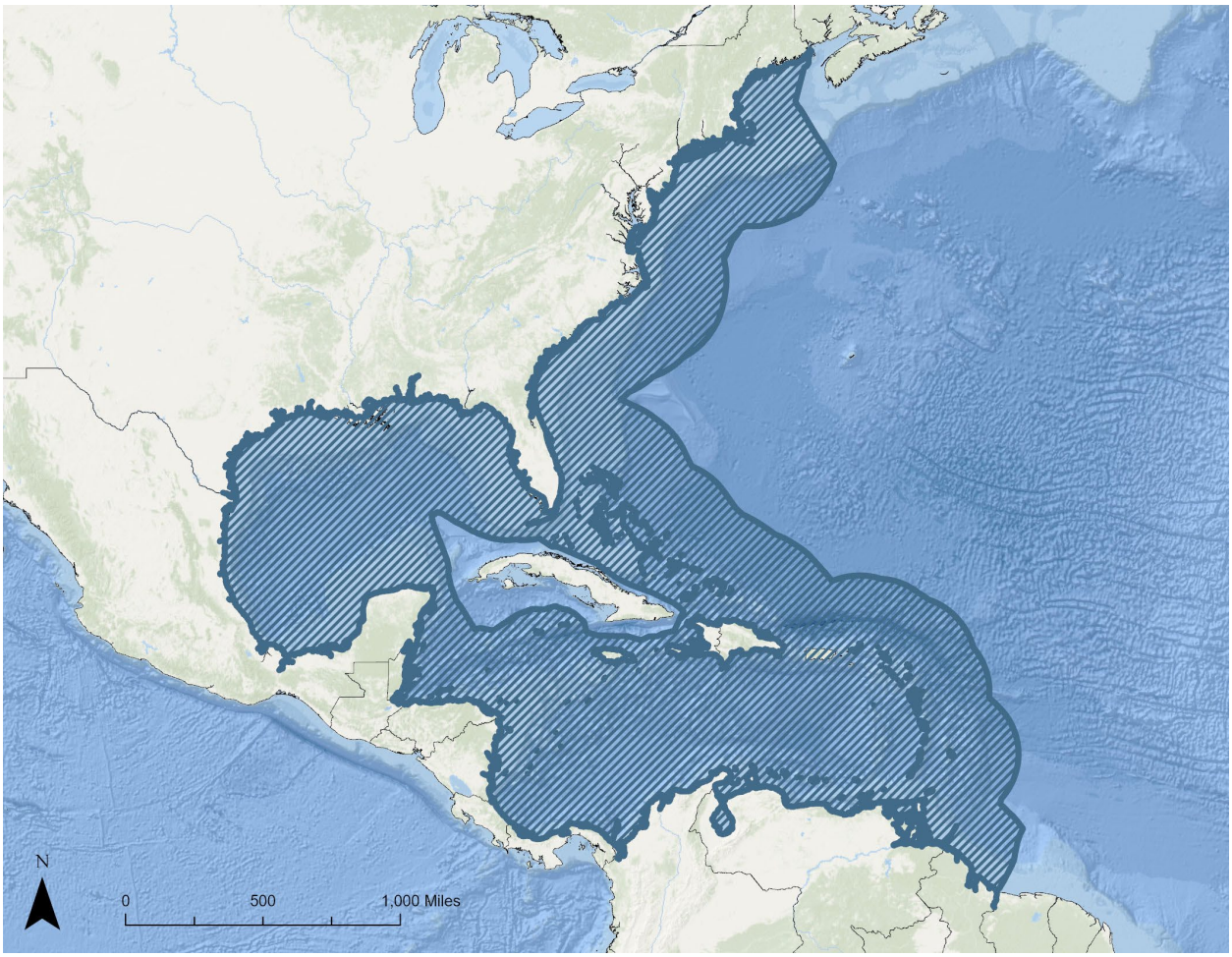
Maintenance

No short- or long-term maintenance would be required. Recreational anglers would maintain equipment that they voluntarily adopt in coordination with their existing gear maintenance.

Costs

The total estimated project cost is $66,220,000, which includes planning, implementation, project performance monitoring, oversight, and contingency.

Figure 2-2 **FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries): General Project Location**



2.4.1.2 FWCI2, Next Generation Fishing

Restoration Approaches

Reduce mortality among highly migratory species and other oceanic fishes; Voluntary fisheries-related actions to increase fish biomass (PDARP/PEIS Appendix 5.D.3.2 and 5.D.3.5)

Restoration Technique

Emerging fishing technologies (PDARP/PEIS Appendix 5.D.3.5)

Project Goal

Restore injured FWCI resources by implementing strategies to reduce bycatch or prevent the increase of bycatch in commercial fishing fleets that target fish with connectivity to injured populations by providing fishing communities with methodologies and incentives to reduce impacts to fishery resources.

Project Location

The U.S. Gulf of Mexico, U.S. Caribbean Sea, and U.S. Atlantic Ocean; and potentially the Mexican Gulf of Mexico, the Caribbean, and Atlantic waters of Canada and northern South America (Figure 2-3)

Project Summary

NOAA would be the lead Implementing Trustee for this project. Additional project implementation partners may include regional management bodies (e.g., Gulf of Mexico Fishery Management Council, Gulf States Marine Fisheries Commission) and NGOs. This project seeks to restore injured FWCI resources by implementing strategies in commercial fisheries to help fishing fleets adopt conservation techniques that reduce sources of mortality while also helping them adapt to changing conditions including climate change and globalization of fishing efforts. Climate change is expected to impact the distribution of fish species including spawning and feeding grounds. Further, the "local-to-global" shift in fishing effort, which is shifting seafood production to favor global imports, has been associated with higher rates of bycatch. One cause of this shift in Gulf fisheries is the aging population structure of the current Gulf fishing fleet ("graying of the fleet"). To maintain catch levels, commercial fishing fleets may expend increased fishing effort over a wider area, which can result in higher rates of bycatch. Therefore, addressing these dynamics by developing strategies to reduce bycatch or prevent the increase of bycatch would protect and restore crucial FWCI resources injured by the DWH oil spill. Fish species groups that may benefit from this project include reef and reef-associated fish, HMS, coastal migratory pelagic species, and other species such as menhaden, drums, and sea trout.

Specifically, this project would:

- **Develop an implementation plan** to conduct project activities to reduce or prevent the increase of bycatch in commercial fisheries that target fish populations in the Gulf or with connectivity to injured FWCI populations. This process would include workshops and engagement with interested parties, including subject matter experts and representatives of engaged organizations.
- **Conduct outreach and education and support the development of a "next generation" fishing fleet.** This would be accomplished by:
    - **Developing and implementing a training program** to provide education on best practices, conservation techniques, and resource stewardship principles to reduce bycatch for a new generation of fishers. Training may cover topics such as best practices for handling and releasing fish, identifying protected species, promoting entrepreneurship in the fishing industry, and navigating the regulatory system. This program would

coordinate with current training programs to leverage existing resources and streamline implementation and may be directed toward several entry points to the fishing industry (e.g., high school, community college, trade schools, industry associations). Outreach and education may be extended to international audiences.

  - **Providing outreach, technical assistance, and support services** for existing and new fishers who participate in the training program for retention within the fishing industry. These services may be implemented directly or through grants, and activities may include permitting assistance, host organizational services, or translation and interpretation. Outreach may be conducted through communication channels such as social media and engagement through local practices and may utilize translated materials to reach underserved and underrepresented communities.

- **Advance the use of new gear, best practices, and techniques to reduce bycatch** in commercial fisheries among the next generation of fishers. Outreach would be conducted to engage fishing fleets in voluntary actions, which may include fishery gear trials, and demonstrations of how new gear, best practices, and techniques can reduce bycatch and fish mortality. In addition, incentives may be used to support the purchase of modern, efficient gear and vessels. Communication channels may be developed to facilitate the exchange of best practices and information within the domestic and international fishing communities. Finally, the project would facilitate the modernization of data collection and distribution processes.
- **Support systems for collecting, analyzing, and sharing fishery-dependent data** from the next generation commercial fishing fleet, such as fishing effort and catch or environmental conditions. These data would inform restoration efforts, fisheries science and management, understanding of climate-induced changes to fisheries resources, and may help to address uncertainties (e.g., long-term population shifts, fisheries management) within the commercial fishing community. The data may also be used to evaluate restoration effectiveness, inform restoration, and fisheries science and management.

This project would increase training for conservation-oriented fishing practices that would decrease fish mortality now and, in the future, and help commercial fishers adapt to changing conditions in the industry and climate while reducing impacts to fish populations.

General Project Activities and Implementation Timing

Project activities would include planning and design, implementation (including outreach and education; advancement of conservation-minded fishing gear, best practices, and techniques; and data systems development), project performance monitoring, and oversight. Implementation activities and geographic locations would be tailored to each species group to include areas that have connectivity to injured populations and would have greatest benefit.

The project is expected to take approximately 15 years to complete. Planning would occur in Years 1 and 2 and may continue throughout the project duration. Implementation of training and outreach activities and bycatch reduction strategies would be dependent on the phased nature of the project and a schedule would be developed cooperatively with implementation partners.

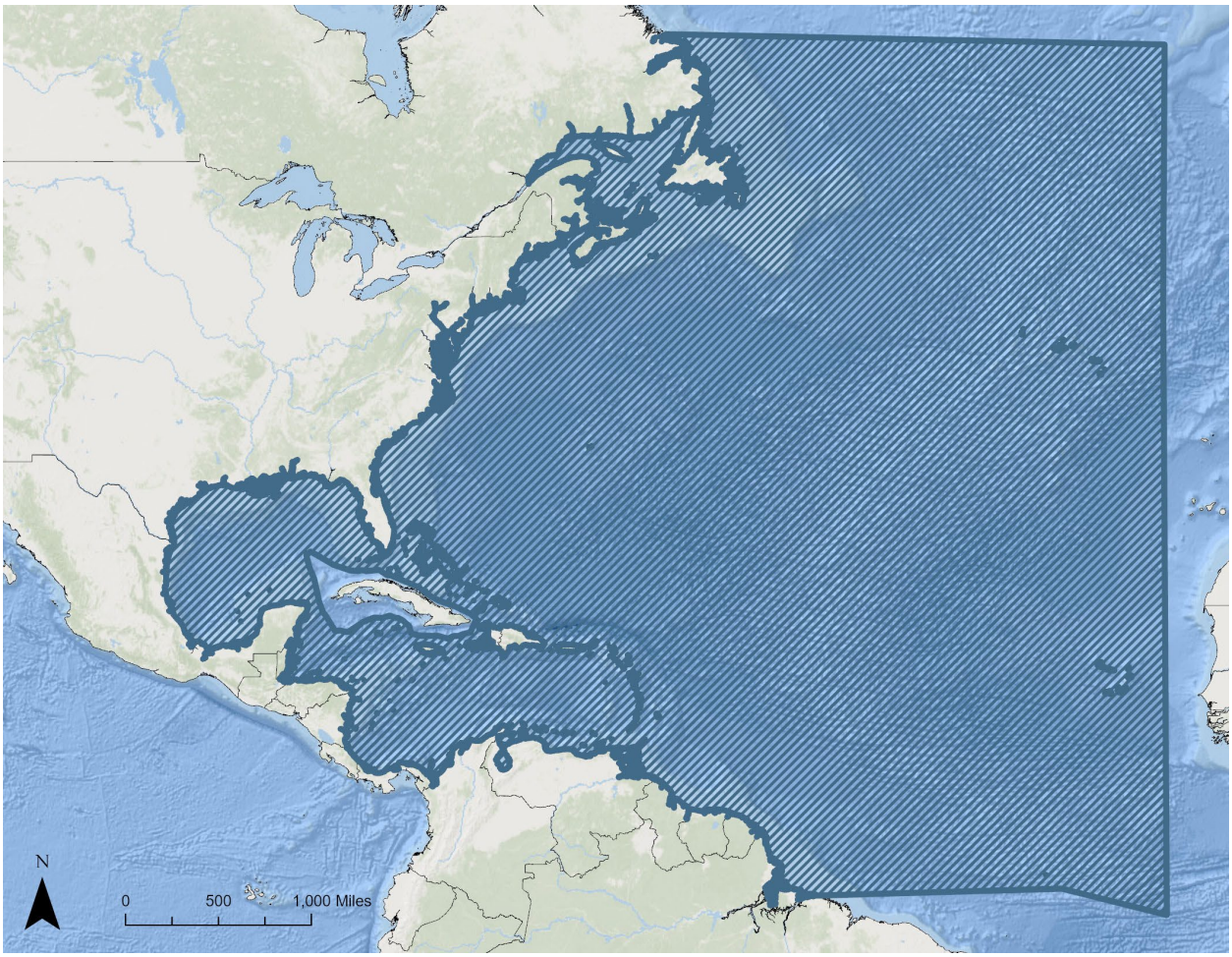
Maintenance

No short- or long-term maintenance would be required. Commercial fishers would maintain any gear that they voluntarily adopt in coordination with their existing gear maintenance.

Costs

The total estimated project cost is $57,200,000, which includes planning, implementation, project performance monitoring, oversight, and contingency.

Figure 2-3 FWCI2, Next Generation Fishing: General Project Location



2.4.1.3 FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality

Restoration Approach

Voluntary fisheries-related management actions to increase fish biomass (PDARP/PEIS Appendix 5.D.3.5)

Restoration Technique

Emerging fishing technologies (PDARP/PEIS Appendix 5.D.3.5)

Project Goal

Restore FWCI resources injured by the oil spill by implementing strategies to reduce bycatch, depredation, and the disruption of spawning aggregation through the use of data and communications networks.

Project Location

The U.S. Gulf of Mexico (Figure 2-4)

Project Summary

NOAA would be the lead Implementing Trustee for this project. Potential project implementation partners may include private contractors, universities and research institutions, regional management bodies, and NGOs. This project would build on the information gathered through the Open Ocean TIG's RP2/EA *Communication Networks and Mapping Tools to Reduce Bycatch – Phase I* project, which began the planning and development process for a bycatch hotspot identification system and communication network for fishers. Further, this project would leverage information on fish spawning aggregation sites that has been developed through the RESTORE-funded project titled *Cooperative monitoring program for spawning aggregations in the Gulf of Mexico: an assessment of existing information, data gaps and research priorities* (Erisman et al., 2024). This RP4/EA project seeks to develop models and voluntary communication networks that would minimize bycatch, depredation, and interactions with spawning aggregations of reef fish, HMS, and/or other high-priority fish species while maintaining target catch levels. In addition, this project would develop a plan to enhance the management and conservation of spawning aggregations and to communicate opportunities for conservation practices to state and regional managers and fishing communities.

Specifically, this project would:

- **Develop models** for use in planning restoration and monitoring efforts for injured FWCI populations. Model predictions would be made available to fishing communities and management agencies through an online platform and tested throughout the project to allow for user feedback on the utility and success of the platform in reducing fisheries interactions with non-target species, specifically by reducing bycatch and depredation and avoiding interactions with spawning aggregations. This effort would involve:
    - **Assessing data gaps and collecting necessary data,** including data obtained through fishery-dependent monitoring programs, surveys, remote sensing, existing fisheries data from DWH NRDA projects, and cooperative research involving fishing communities, managers, and scientists.
    - **Developing dynamic species distribution models** for northern Gulf priority fish species, such as red grouper, gag grouper, red snapper, vermilion snapper, greater amberjack,

spotted sea trout, gray triggerfish, golden tilefish, and others identified by NOAA. Models may also be developed to support conservation planning for HMS including tunas and billfish and for some protected species.

- **Identify and conserve spawning aggregation sites** for priority fish species, initially focusing on reef fish populations. This would be accomplished by:
    - **Convening a workgroup of fish spawning experts** comprised of scientists, managers, commercial fishers, and charter anglers to develop a conservation strategy identifying conservation needs, spawning areas that may benefit from conservation measures, and voluntary actions that may result in protection of spawning aggregations.
    - **Collecting data on spawning aggregations,** including identifying the timing and location of such spawning aggregations and any associated environmental factors, developing communication networks and communicating data that would inform models of spawning activity, and developing maps of spawning aggregation areas to be avoided.
- **Enhance at-sea observer coverage** from 2 to approximately 5 percent of sea days for the commercial reef fish fishery to gather data and monitor restoration project effectiveness. This project activity would build upon activities initiated under the first phase of the proposed *FWCI6, Communication, Adaptive Management, Planning, and Integration* project and may be funded through a cross-project monitoring effort.
- **Develop bycatch communication networks** to allow reef fish and other commercial and charter vessels to communicate data that would inform models of bycatch probability and depredation. Initially, this project would include the development of three bycatch communication networks. The first would target approximately 40 commercial vessels in the eastern Gulf that use vertical line, bottom longline (BLL), and bandit gear. These vessels would be equipped with electronic monitoring systems and/or reporting systems to transmit real-time fishing data to project partner(s) who would then synthesize these data and produce maps to identify fishing sites with low bycatch potential. A second and third communication network would communicate bycatch and depredation data to Florida and Texas charter boat groups that use rod and reel equipment. This charter network would allow fishers and anglers to share bycatch and depredation observations without specifically sharing preferred fishing spots. Future bycatch networks may be developed by leveraging the infrastructure created for the initial portions of the project.

The bycatch of non-target fish species and disruption of fish spawning aggregations may have undesired biological consequences and delay the restoration of species injured by the DWH oil spill. By allocating fishing effort to areas with higher probability of target catch and lower probability of unwanted fisheries interactions with bycatch, predators, and spawning aggregations, fishers and anglers may improve the economic efficiency of fishing effort while simultaneously protecting and improving priority Gulf fish species populations. Efforts would initially be focused on Gulf reef fish and expanded to include HMS and other potential priority species in later years. Enhancing the understanding of spawning activities to inform improvements in conservation and management of these spawning aggregations is crucial to ensure restoration of injured species.

General Project Activities and Implementation Timing

Project activities would include planning, implementation (including data assessment, collection, and model development; enhancement of at-sea observer coverage that may be funded and coordinated through a cross-project monitoring effort; conservation strategy development; and development of communication networks), and project performance monitoring.

The project is expected to take approximately 8 years to complete. Data assessment would occur in Year 1, and data collection and engagement with interested parties would occur in Years 1 through 5. The

models and online platform would be developed in Years 2 through 4, further refined in Years 5 and 6, and tested in Years 7 and 8. Enhancement of at-sea observer coverage would occur in Years 1 through 4. Development and implementation of communication networks would begin in Year 1 and continue for the duration of the project.

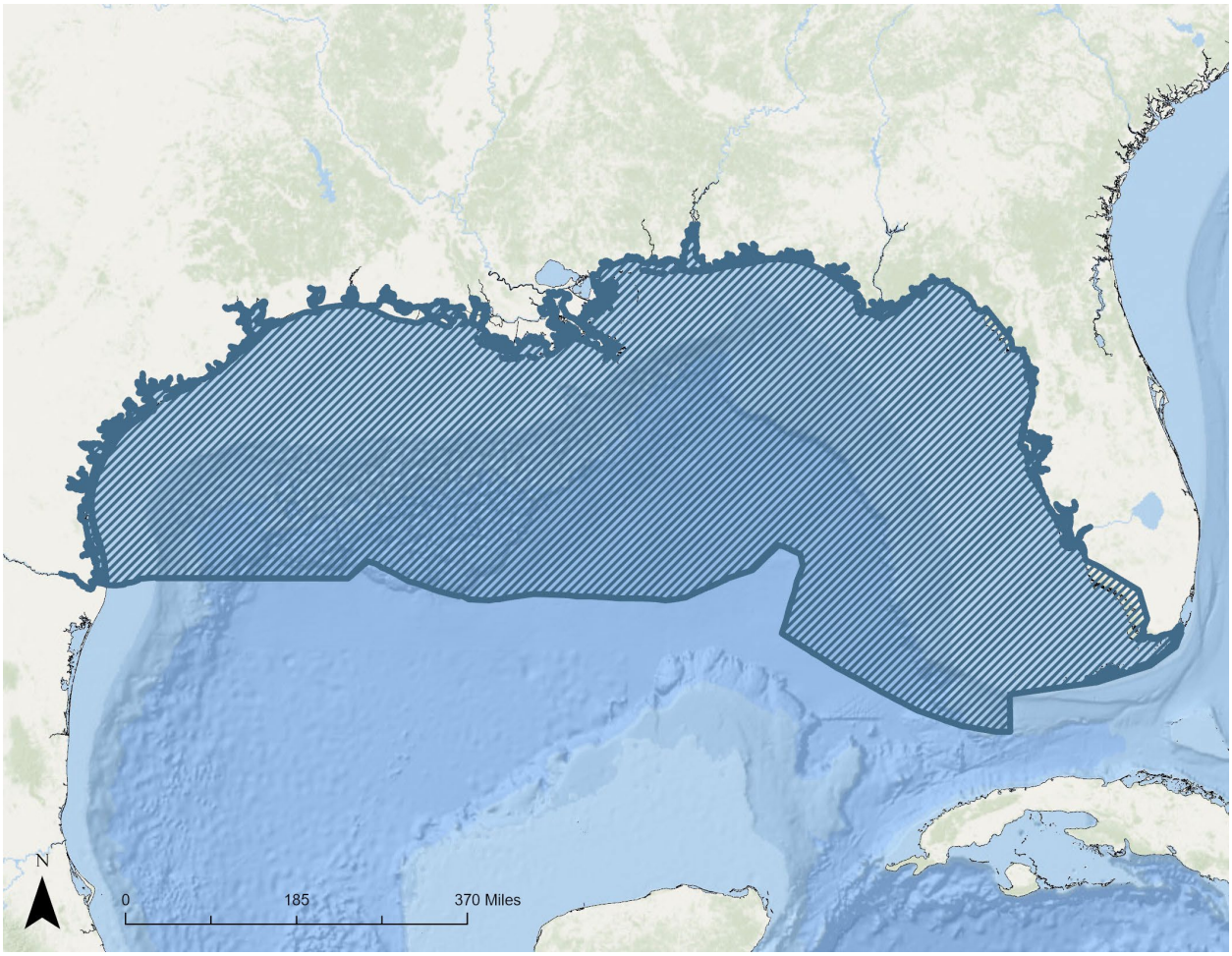
Maintenance

The infrastructure of the modeling networks would be maintained by NOAA or implementing partners, and the infrastructure of the bycatch communication networks would be maintained by implementing partners for the duration of the project.

Costs

The total estimated project cost is $18,040,000, which includes planning, implementation, project performance monitoring, oversight, and contingency.

Figure 2-4 FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality: General Project Location



2.4.1.4 FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates

Restoration Approaches

Reduce impacts of ghost fishing through gear conversion and/or removal of derelict fishing gear; Protect and conserve marine, coastal, estuarine, and riparian habitats; Reduce pollution and hydrologic degradation to coastal watersheds (PDARP/PEIS Appendix 5.D.3.1, 5.D.1.7, and 5.D.2.2)

Restoration Techniques

Implement contract and volunteer removal programs to collect existing derelict fishing gear; Conduct voluntary gear conversion programs; Develop and implement management actions in conservation areas and/or restoration projects (e.g., debris removal, invasive species control); Reduce pollution and hydrologic degradation to coastal watersheds (PDARP/PEIS Appendix 5.D.3.1, 5.D.1.7, and 5.D.2.2)

Project Goal

Restore injured FWCI resources by addressing diverse threats such as marine debris, changes to water quality, invasive species, and impacts from energy development and production to improve environmental conditions.

Project Location

The U.S. Gulf of Mexico (Figure 2-5)

Project Summary

NOAA would be the lead Implementing Trustee for this project in coordination with co-implementing trustees, DOI, USEPA, and USDA. Project partners may include other government agencies, regional management bodies (e.g., Gulf States Marine Fisheries Commission), and NGOs. This project would seek to restore FWCI resources injured by the DWH oil spill by reducing mortality from diverse threats, including marine debris, changes to water quality such as eutrophication and HABs, invasive species, and energy development and production. Addressing these threats would improve environmental conditions in the Gulf and in areas connected to injured populations. Priority species that would primarily benefit include billfish, drums and sea trout, jacks, forage fish, sea basses and groupers, snappers, tunas and mackerels, demersal species, crabs and lobsters, and water column invertebrates. Project activities would include activities intended to develop partnerships with Gulf communities, resource managers, and subject matter experts to identify and prioritize areas for implementation that would provide the greatest benefit to fish and invertebrate species (e.g., sensitive fisheries habitat). Some project activities may be targeted toward species-specific goals, whereas others may focus on community- or population-level goals.

Specifically, this project would:

- **Conduct planning to identify conservation strategies and target areas for implementation,** selecting activities that would provide long-lasting benefits for FWCI.
- **Implement a range of conservation activities,** including, but not be limited to:
    - **Preventing and removing marine debris** such as abandoned or derelict fishing gear or installing technologies to prevent or intercept marine debris, including plastics and microplastics, near known marine debris pathways (e.g., Gulf tributaries, marinas, shoreline public access sites), and conduct education and outreach regarding threats to fish and invertebrate resources from marine debris and derelict fishing gear.
    - **Reducing negative effects from changes in water quality** by characterizing the effects of HABs, eutrophication and hypoxic events, hydrologic changes, and/or pollution on priority species to identify conservation strategies and inform restoration efforts;

developing methods to reduce impacts of HAB events on priority fish resources; improving water quality and reducing nutrient influx to address sources of pollution impacting FWCI (including locations such as marinas, marine parks, energy production facilities, or shoreline public access sites); and conducting education and outreach for strategies to reduce threats associated with water quality that negatively affect FWCI.

- **Preventing and removing invasive aquatic species** such as lionfish through direct removal of individuals; studying the effectiveness of preventative measures on reducing their abundance; and conducting education and outreach for methods to prevent, remove, and mitigate impacts from aquatic invasive species.
- **Reducing negative effects from energy infrastructure exploration, operation, and/or decommissioning** by characterizing their impacts to priority species; conducting education and outreach; and developing and implementing conservation best practices to reduce mortality during energy development and production activities.

Threats to the marine environment from marine debris, changes in water quality, invasive species, and energy-related development and production activities may place additional pressure on FWCI populations injured by the DWH oil spill. Marine debris may harm fish resources by entangling or trapping animals (as with ghost fishing gear) or through ingesting pollutants such as plastics and microplastics. HABs, and the chronic or episodic water quality conditions that lead to them, may harm fish resources by causing illness or death. Invasive species, such as lionfish, may outcompete native fish for prey and disrupt sensitive ecological relationships. Impacts from energy development, such as noise from construction, seismic exploration, use of explosives to remove decommissioned platforms, and releases of oil, may cause physical and chemical disturbances to habitats, disruption of normal behaviors, stress, hearing loss, and illness. This project would implement voluntary strategies to reduce the pressure from these threats on FWCI populations in the Gulf.

General Project Activities and Implementation Timing

Project activities would include planning, implementation (including marine debris prevention and removal, water quality enhancement, invasive species prevention and removal, education and outreach, and development of voluntary conservation practices for energy development and production activities), and project performance monitoring.

The project is expected to take approximately 10 years to complete. Planning would occur in Years 1 and 2, and implementation of voluntary conservation strategies would occur after initial planning is complete, estimated from Year 2 throughout the duration of the project. Project performance monitoring would occur concurrently with implementation throughout the duration of the project.

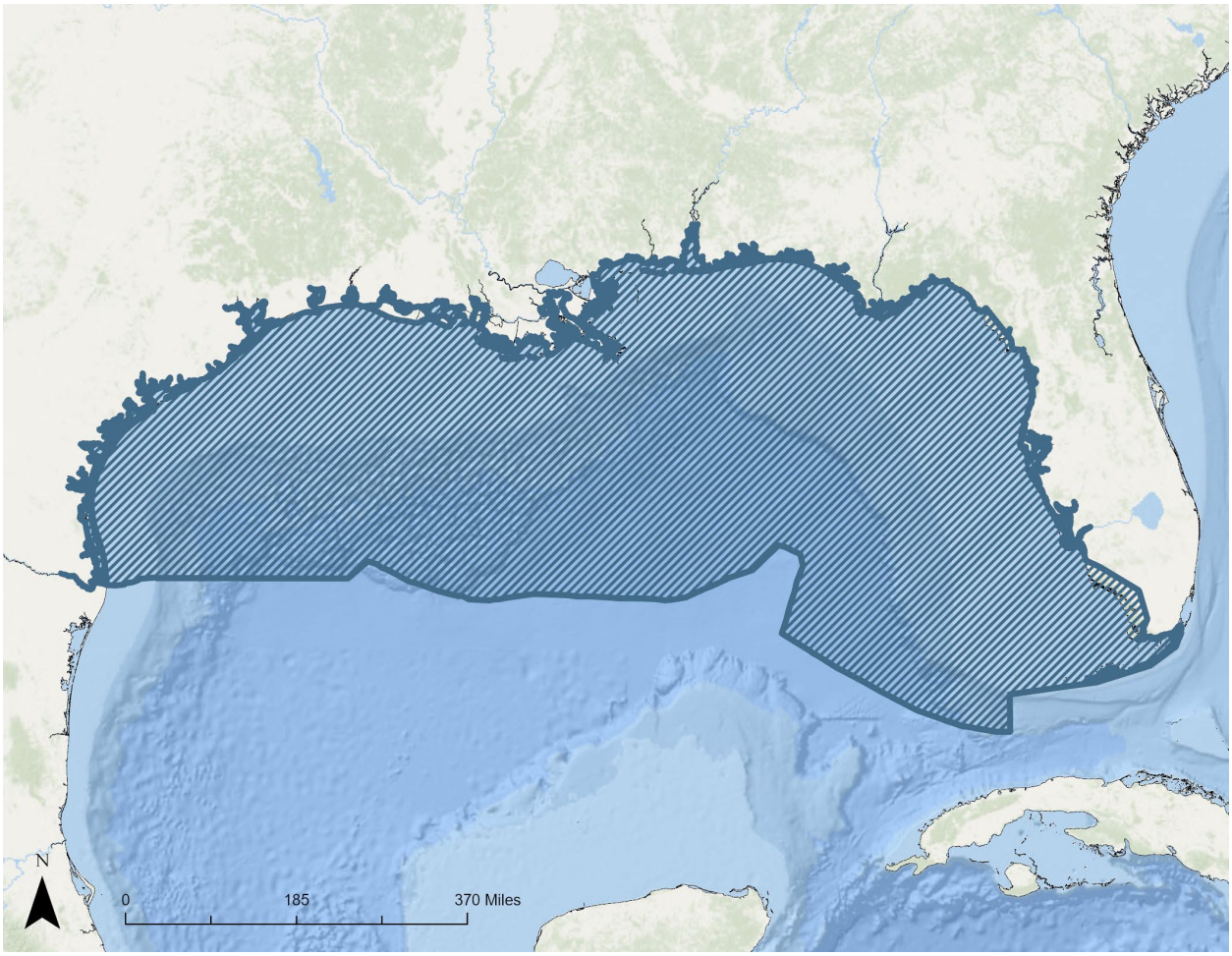
Maintenance

No short- or long-term maintenance would be required. Any maintenance required would be incorporated into implementation agreements with implementation partners.

Costs

The total estimated project cost is $14,300,000, which includes planning, implementation, project performance monitoring, oversight, and contingency.

Figure 2-5 FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates: General Project Location



2.4.1.5 FWCI5, Education and Stewardship Partnerships with Charter Anglers

Restoration Approach

Voluntary fisheries-related actions to increase fish biomass (PDARP/PEIS Appendix 5.D.3.5)

Restoration Technique

Illegal, unregulated, unreported (IUU) fishing (PDARP/PEIS Appendix 5.D.3.5)

Project Goal

Restore injured FWCI resources by reducing illegal fishing through education, outreach, and project performance monitoring.

Project Location

The U.S. Gulf of Mexico (Figure 2-6)

Project Summary

NOAA would be the lead Implementing Trustee for this project, with NOAA's Office of Law Enforcement advising on released outreach material. Project implementation partners may include other government agencies, enforcement partners, local fishing associations, and licensed and federally permitted recreational anglers. The goal of this project is to promote best fishing practices in the Gulf by providing education and outreach for industry partners and the public and evaluating change in legal fishing effort after outreach has occurred. These efforts would educate the public on the benefits of legally permitted charters with the goal to reduce illegal fishing charters. Species that may benefit from this project include reef fish, other oceanic fishes such as snapper and grouper species, yellowfin tuna, bluefin tuna, and swordfish, among others injured by the oil spill.

Specifically, this project would:

- **Develop implementation and communications plans** for project activities to facilitate coordination with existing restoration activities and partners, complete a roadmap for project implementation and management, and manage cooperative agreements and contracts within the agency and among project partners.
- **Conduct outreach and education** to enhance awareness of illegal fishing activities and their negative impacts on FWCI resources and to deter unpermitted charter fishing. For instance, outreach and education materials may contain information related to existing regulations and appropriate methods of avoiding participation in illegal charter activities. Outreach teams may install signage at key locations, provide translated materials or multi-lingual liaison(s), create public service announcement videos, or work with partners and interested parties to identify common issues or misinterpretations. In communities where illegal charter fishing is found to be prevalent, liaisons may target efforts toward education and deterrence through use of media campaigns (e.g., web stories, articles in fishing magazines). Assessments would be conducted to understand the impacts of education and outreach campaigns and to evaluate the rates of change in illegal charter fishing practices. These assessments would be used to improve project outreach and education.

Some boats in the Gulf advertise charter services but fail to meet federal regulations for charter vessels or hold Merchant Mariner Credentials issued by the U.S. Coast Guard. In addition to safety concerns and socioeconomic impacts to local fishing communities, illegal charter fishing practices place fish and other resources injured by the DWH oil spill at risk by contributing to overfishing, bycatch, and post-release mortality and causing habitat destruction. Illegal charter fishing may result in higher bycatch and post-

release mortality if proper techniques and gear such as venting tools, descender devices, and sea turtle conservation gear are not used. Illegal charter fishing may cause habitat destruction if appropriate precautions are not taken. Further, harvest from illegal charter fishing is usually unreported; thus, these catches are not accounted for by fisheries managers in tracking annual quotas and are not considered when setting annual catch limits. By raising awareness of illegal charter fishing practices and conducting outreach to deter these practices from occurring, this project would aim to protect fish resources by addressing a source of overfishing, post-release mortality, and habitat destruction in the Gulf.

General Project Activities and Implementation Timing

Project activities would include planning, implementation (including outreach and education, assessment of rates of illegal fishing, project performance monitoring, and oversight).

The project is expected to take approximately 8 years to complete. Planning would occur in Years 1 and 2, and implementation of outreach, education, and project performance monitoring activities would occur from Year 1 throughout the duration of the project. Project performance monitoring would occur concurrent with implementation throughout the duration of the project.

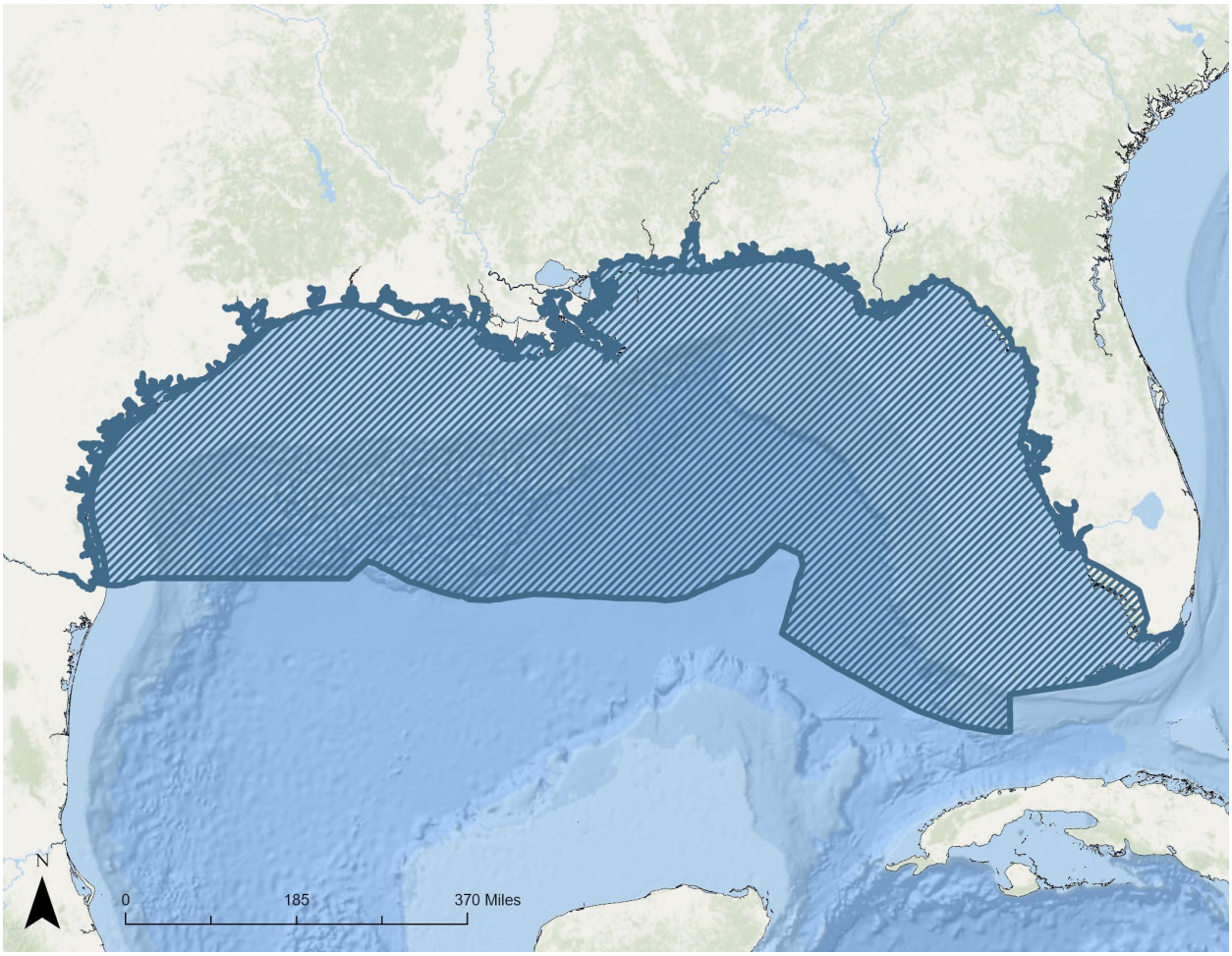
Maintenance

No short- or long-term maintenance would be required.

Costs

The total estimated project cost is $3,000,000, which includes planning, implementation, project performance monitoring, oversight, and contingency.

Figure 2-6 FWCI5, Education and Stewardship Partnerships with Charter Anglers: General Project Location



2.4.1.6 FWCI6, Communication, Adaptive Management, Planning, and Integration

Restoration Approach

Voluntary fisheries-related actions to increase fish biomass (PDARP/PEIS Appendix 5.D.3.5)

Restoration Technique

Resource-level monitoring and adaptive management to address critical uncertainties (i.e., increased at-sea observer coverage and electronic monitoring capacity and other forms of field data collection to support decision making)

Project Goal

Restore injured FWCI resources by improving understanding of high-priority fisheries and species' spatial distribution, abundance, habitat characteristics, trophic dynamics, and the threats they face using various methods such as observation, electronic monitoring, tagging, mapping, ground-truthing, and predictive modeling, and to coordinate efforts across projects.

Project Location

The U.S. Gulf of Mexico, U.S. Caribbean Sea, and U.S. Atlantic Ocean; and potentially the Mexican Gulf of Mexico, the Caribbean, and Atlantic waters of Canada and northern South America (Figure 2-7)

Project Summary

NOAA would be the lead Implementing Trustee for this project. Additional project implementation partners may include NOAA cooperative institutes, private partners, and NGOs. This project would support FWCI Restoration Type-funded projects, both ongoing and those proposed in this restoration plan, by addressing gaps in current understanding of high-priority injured fish resources that would enhance restoration and management, facilitating coordination among FWCI projects, and expanding outreach to fishing communities to increase awareness of and engagement with DWH restoration activities. Project activities would be conducted in areas where FWCI restoration projects are being conducted.

Specifically, this project would:

- **Enhance monitoring support for FWCI restoration.** This would be accomplished by:
    - **Enhancing at-sea observer coverage and electronic monitoring capacity** by supporting at-sea observer recruitment and training, providing dedicated bycatch estimation experts, and purchasing and installing electronic monitoring equipment. Coordination for this step may include the development of annual implementation plans.
    - **Conducting workshops** for Gulf and U.S. Atlantic fish tagging programs to engage fishers, anglers, scientists, researchers, and managers to review the status of tagging networks, assess needs and priorities related to DWH restoration, and establish opportunities for collaboration, citizen science, and data sharing.
    - **Collecting and analyzing data** such as observations, electronic monitoring, animal tagging and tracking, and predictive modeling to inform population characterizations for high-priority species in the Gulf and throughout species' ranges. Data would be used to support and evaluate the performance of restoration activities for these species. Data analyses may include enhancements for annual bycatch estimates for priority southeast U.S. fisheries to support restoration planning and evaluation; baseline quantification to estimate restoration progress and system change; and models of species abundance, distribution, and migration patterns, among others.

- **Facilitate communication and engagement across the multiple FWCI restoration projects.** Related activities may include:
    - **Identification of and engagement with interested parties** through outreach activities.
    - **Enhancing across-project coordination and strategy building** by developing an implementation plan, supporting across-project communications, and holding an annual meeting or workshop for FWCI project teams to coordinate on communications planning and strategy development.
    - **Conducting outreach and engagement with fishing communities** to improve awareness of the DWH program by attending in-person events, providing on-the-ground presence for long-term relationship building, empowering individuals to act as project liaisons with fishing communities, utilizing diverse communications channels, and providing a platform for questions, information sharing, and feedback to NOAA regarding how efforts are received.

To enhance the restoration and long-term survival of fish resources, managers must fill knowledge gaps to understand species' spatial distribution, abundance, habitat characteristics, trophic dynamics, and the threats they face. This project would address uncertainties by conducting data collection and analysis for high-priority species, thereby meeting the Open Ocean TIG's restoration priorities as outlined in the *Open Ocean Trustee Implementation Group Monitoring and Adaptive Management Strategy* (Open Ocean TIG, 2020) and *Fish and Water Column Invertebrates Strategic Plan* (Open Ocean TIG, 2022). By coordinating these efforts across FWCI restoration projects, this project would improve resource-wide efficiency for common monitoring needs. Additional engagement with the Gulf fishing community on a resource-wide level would improve the fishing community's awareness of and participation in DWH restoration projects. In addition, by facilitating communication and strategic planning across FWCI-funded projects, this project would aid in co-development of restoration concepts and goals and ensure that FWCI projects maximize restoration benefits.

As this project is intended to support FWCI restoration projects, both ongoing and those proposed in this RP4/EA, activities may be expanded beyond the U.S. Gulf and Atlantic Ocean, and potentially to the Mexican Gulf, the Caribbean, and Atlantic waters of Canada and northern South America in order to support activities proposed in these locations in the future.

General Project Activities and Implementation Timing

Project activities would include planning, implementation (including at-sea observers and electronic monitoring, workshops, field data collection and analysis, outreach and engagement with interested parties, and strategy development), project performance monitoring, and oversight.

The project would take approximately 15 years to complete. Planning would occur in Years 1 and 2. Implementation would begin in Year 2 and continue through the duration of the project. Reviews of project progress would occur in Year 5 and Year 10 to assess budget allocation and project progress toward restoration goals. Project performance monitoring would begin in Year 1 concurrently with project implementation and continue through the duration of the project.

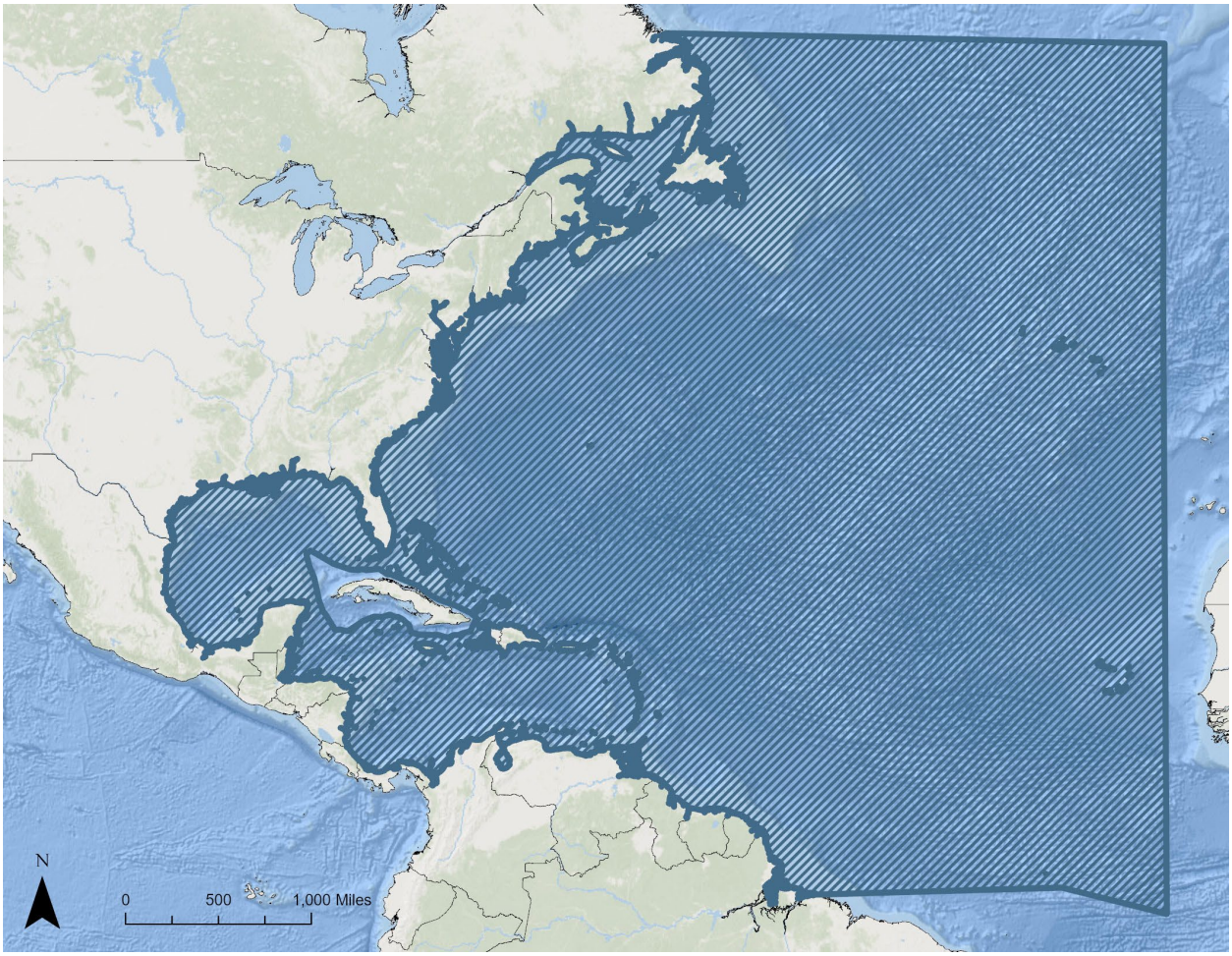
Maintenance

No short- or long-term maintenance would be required.

Costs

The total estimated project cost is $23,260,000, which includes $8,010,000 from the FWCI Restoration Type allocation for planning, implementation, oversight, and contingency, and $15,250,000 from the MAM allocation for implementation and project performance monitoring activities.

Figure 2-7 FWCI6, Communication, Adaptive Management, Planning, and Integration: General Project Location



2.4.1.7 FWCI7, Reduction in Fish Post-Release Mortality from Depredation

Restoration Approach

Voluntary fisheries-related actions to increase fish biomass (PDARP/PEIS Appendix 5.D.3.5)

Restoration Technique

Emerging fishing technologies (PDARP/PEIS Appendix 5.D.3.5)

Project Goal

Restore injured FWCI resources by reducing fish mortality from depredation in commercial fisheries and recreational fisheries by working cooperatively with fishing communities and other partners to test and implement depredation reduction strategies and improve understanding of fish depredation.

Project Location

The U.S. Gulf of Mexico and South U.S. Atlantic (Figure 2-8)

Project Summary

NOAA would be the lead Implementing Trustee for this project. Additional project implementation partners may include regional management bodies (e.g., Gulf of Mexico Fishery Management Council) and NGOs. This project would enhance data collection and analysis efforts to quantify the spatiotemporal nature of depredation in the Gulf and the extent to which depredation affects fish mortality; identify, test, and evaluate strategies to reduce depredation without negatively affecting commercial and recreational fisheries yield; and advance the use of new measures through education, outreach, and collaborative partnerships. Through these activities, this project is designed to reduce unreported fish mortality associated with shark and marine mammal depredation of reef fish and HMS, including marlin, yellowfin tuna, reef fish, red snapper, spotted sea trout, and other commercially and recreationally important fish species injured by the oil spill.

Specifically, this project would:

- **Expand data collection and analysis** to assess the characteristics, extent, frequency, and geographical distribution of dolphin and shark interactions with fisheries. Data may be gathered by enhancing existing data collection programs, such as enhancing the Marine Recreational Information Program, the Southeast For-Hire Integrated Electronic Reporting logbook program, state fishery surveys, HMS data collection programs, and the future Federal Commercial Electronic Logbook program. Expansion of these programs would allow for collection of more information on the nature, scale, and frequency of marine mammal and shark interactions with private recreational and charter and commercial hook-and-line fisheries. Depredation has been partially quantified in commercial fisheries based on federal fishery observer data. To supplement industry observations, genetic methods and video sampling may also be used to characterize both the scale and the species responsible for depredation, including both managed and protected species.
- **Cooperatively develop and test strategies to mitigate depredation** in a statistically defensible framework by implementing pilot programs with partners in the Gulf recreational and commercial fishing communities. Initial implementation would occur in nearshore waters of the Florida Panhandle. These mitigation strategies may include changes to fishing methods (e.g., shorter soak times, faster retrieval) or development of mechanical or chemical deterrent technology. Mitigation strategies that would be tested under this program include:

  - **Identifying shark depredation hotspots** by analyzing data collected through existing applications commonly used by the Gulf commercial and charter fishing fleets and other anglers. One application suitable for this purpose was recently co-developed with the Gulf charter fleet and may be used by captains to map shark depredation hotspots.
  - **Testing commercially available shark deterrent devices** with fishing communities to measure effectiveness and evaluate buy-in from fishers and anglers and any barriers to adoption of these devices. A survey would be distributed among Gulf commercial and charter captains to gather data on fishers and anglers' preferred strategies for mitigating shark depredation. Subsequently, commercially available devices would be purchased and provided to these captains with incentives to test the devices on a per-trip basis and collect data regarding the effectiveness of these devices.
- **Conduct outreach and education** to advance awareness of best practices and to provide education for the adoption and proper use of these practices. Outreach and education strategies may include a campaign to encourage best practices, distribution of educational materials, and in-person opportunities to engage with fishing communities at events, meetings, and other gatherings. This would also include collaborating with fishing equipment manufacturers to develop cost-effective solutions for providing equipment to anglers and distributing this equipment in an efficient and strategic manner.

Current data suggest that instances of depredation, scavenging, and illegal direct feeding of sharks and marine mammals in the Gulf have escalated in recent years. Illegal dolphin feeding is considered a significant contributor, with the highest rates of dolphins stealing bait or catch from lines coinciding with areas with the highest reported rates of illegal feeding by anglers and boaters. These interactions pose problems for both fishing communities and wildlife. Dolphins may be severely injured or killed when caught by or entangled in fishing gear, hit by a boat or its propeller, or in rare cases, deliberately harmed. Anecdotal reports also suggest that sharks have been entangled in fishing gear during depredation events, and some fishers and anglers have resorted to using fireworks or firearms to deter shark depredation when releasing undersized fish back into the water. For fishing communities, these interactions may lead to lost catches, damaged equipment, and diminished fishing experiences. For fish species injured by the DWH oil spill, mortality from depredation and scavenging may hinder restoration. Current data indicate that dolphins primarily interact with private recreational, charter, and commercial rod and reel fisheries across the Gulf and along the east coast of Florida. Shark interactions have been documented in the same types of fisheries in both the Gulf and the U.S. Atlantic. By enhancing understanding of dolphin and shark interactions with these fisheries and seeking more effective management and prevention strategies, this project would reduce mortality of priority species from depredation and scavenging, thereby replenishing and protecting living marine resources injured by the DWH oil spill.

General Project Activities and Implementation Timing

Project activities would include planning, implementation (including data collection and analysis, surveys, mitigation strategy testing, and outreach and education), project performance monitoring, and oversight.

The project would take approximately up to 10 years to complete. Planning would occur in Years 1 and 2. Implementation would begin in Year 2 and continue through the duration of the project. Project performance monitoring would begin concurrent with implementation and continue through the duration of the project.

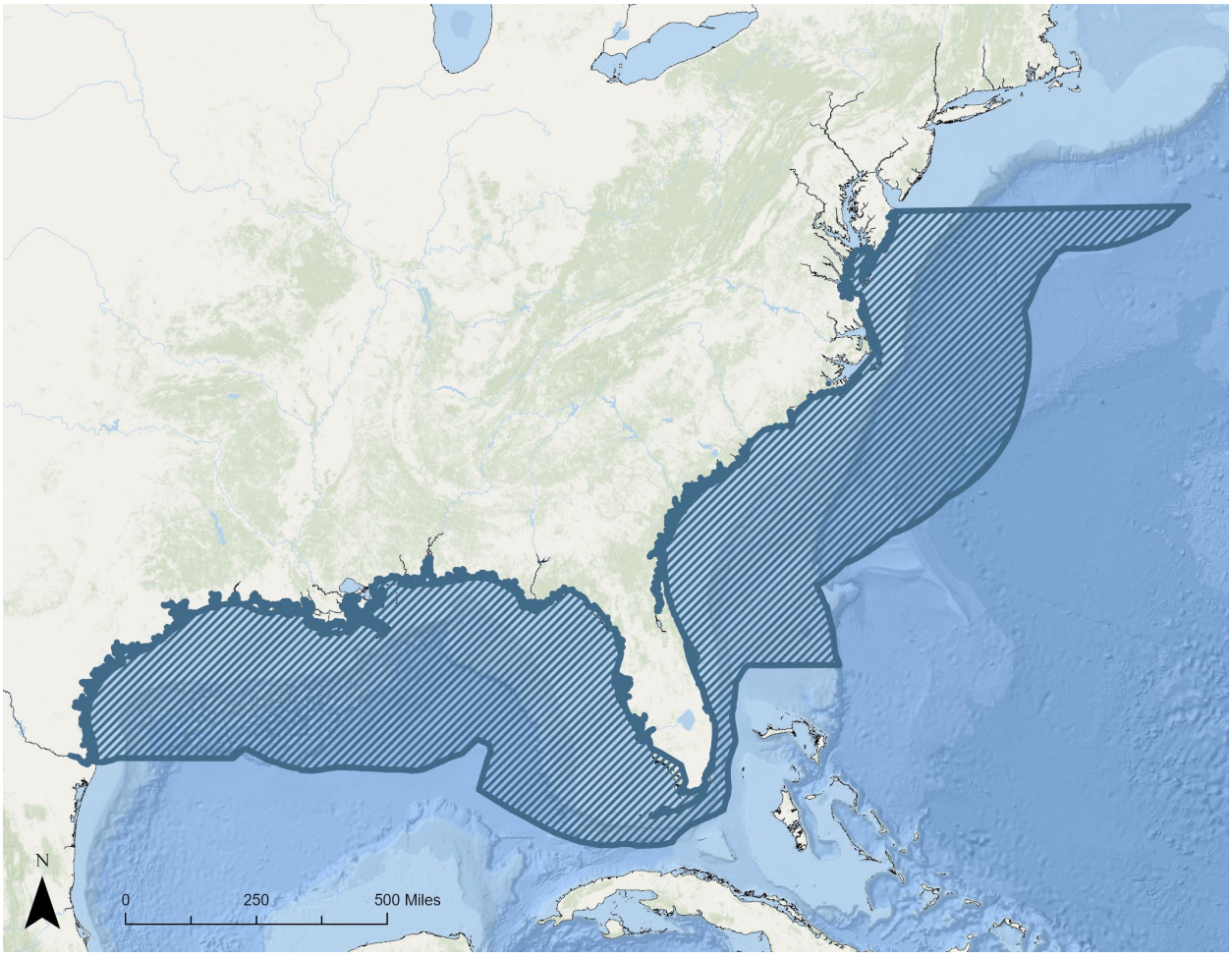
Maintenance

No short- or long-term maintenance would be required. Recreational anglers and commercial fishers would maintain any gear or technology that they voluntarily adopt in coordination with their existing gear maintenance.

Costs

The total estimated project cost is $5,052,000, which includes planning, implementation, project performance monitoring, oversight, and contingency.

Figure 2-8 FWCI7, Reduction in Fish Post-Release Mortality from Depredation: General Project Location



2.4.2 Project Descriptions: Sea Turtles

This RP4/EA identifies five restoration alternatives consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal (PDARP/PEIS Section 5.3.1) and underlying ST Restoration Type (PDARP/PEIS Section 5.5.10):

- ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles)
- ST2, Gulf-Wide Sea Turtle Bycatch Reduction
- ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction
- ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements
- ST5, Kemp's Ridley Nesting Enhancement in Mexico

Descriptions of these restoration alternatives are provided below.

2.4.2.1 ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles)

Restoration Approach

Enhance sea turtle hatchling productivity and restore and conserve nesting beach habitat (PDARP/PEIS Appendix 5.D.4.3)

Restoration Technique

Acquire lands for conservation of nesting beach habitat (PDARP/PEIS Appendix 5.D.4.3)

Project Goals

Prevent the loss of high-density sea turtle nesting beach habitat through acquisition using a willing seller approach and preservation of acquired habitat in perpetuity.

Project Location

Archie Carr and Hobe Sound NWRs, Florida (Figure 2-9)

Project Summary

DOI would be the lead Implementing Trustee for this project. Project implementation partners may include Archie Carr and Hobe Sound NWRs, local governments (Brevard, Indian River, Martin, and St. Lucie Counties), and NGOs (The Conservation Fund). This project would continue and expand the Open Ocean TIG's RP2/EA *Long Term Nesting Habitat Protection for Sea Turtles* project efforts, continuing current acquisition efforts at Archie Carr NWR and expanding acquisition efforts to Hobe Sound NWR. It would also build on previous efforts from NFWF-GEBF land acquisition projects at Archie Carr NWR (*Archie Carr National Wildlife Refuge Acquisitions*). Since 2021, The Conservation Fund, partnering with the U.S. Fish and Wildlife Service (USFWS) and the State of Florida, and utilizing Open Ocean TIG and NFWF-GEBF funds, has protected eight priority beachfront parcels at Archie Carr NWR, totaling 7.83 acres (approximately 826 linear feet) of nesting beach. This project seeks to further prevent the loss of high-density sea turtle nesting beach habitat by establishing long-term protection and conservation of this habitat through land acquisition strategies, thereby helping to ensure successful sea turtle nesting, emergence of turtle hatchlings from nests, and their successful transit to the water.

This new component of the existing project would:

- **Acquire priority parcels** from willing sellers within the approved acquisition boundaries of Archie Carr and Hobe Sound NWRs. Over 90 priority parcels have been identified for future analysis for project suitability. Priority parcels include those that are undeveloped or those with at-risk structures that, through acquisition, would help protect and/or provide the ability to create contiguous protected nesting habitat. All parcels would be acquired by a third-party land trust and would be donated to either USFWS, the State of Florida, or Brevard, Indian River, Martin, or St. Lucie Counties.
- **As needed, remove derelict structures** from developed, acquired parcels that pose risks to nesting sea turtles and hatchlings. Such structures may include, but are not limited to, disused, single-family homes, seawalls, boardwalks, or parking lots. DOI would evaluate which, if any, derelict structures would need to be removed.

Archie Carr NWR is located along Melbourne Beach on Florida's central east coast and consists of four segments, spanning 20.5 miles. Hobe Sound NWR is located along Jupiter Island on Florida's southeast coast and consists of two segments, spanning 3.5 miles. The high-energy beaches at Archie Carr NWR host the highest density nesting beach habitat for loggerhead sea turtles in the world and is the most significant area for green turtle nesting in North America. The pristine, undisturbed beach and dune

habitat at Hobe Sound NWR also hosts dense nesting habitat for loggerhead, green, and leatherback sea turtles. Hobe Sound NWR abuts nearly 10 miles of Indian River Lagoon that supports predation refugia and seagrass foraging habitat for juvenile and adult sea turtles.

Archie Carr and Hobe Sound NWRs are mosaics of public and private lands. However, rapid development and increasing land costs are occurring within the acquisition boundaries, highlighting the need for prompt acquisition and conservation easement implementation. Strategic acquisition and conservation easements of priority parcels from willing sellers would help minimize fragmentation, address protected landscape gaps, reduce the risk of additional coastal armoring (e.g., riprap, rock walls, sheet metal pilings), and contribute to overall sea turtle protection, conservation, and management objectives. Strategic land acquisition is a viable and preferred coastal management alternative for barrier island ecosystem management and conservation. Land acquisition contributes to restoration of the hatchling life stage for three species of sea turtles injured in the spill, addresses a primary threat such as loss or degradation of nesting beach habitat, restores turtles that use both the Gulf and the Atlantic Ocean, and is a conservation action identified in recovery plans for injured, ESA-listed sea turtle species.

The project would ensure permanent protection of nesting habitat that contributes to the historic nesting distribution of loggerhead, green, and leatherback sea turtles that forage in the Gulf. Acquisition of priority parcels would be pursued through either fee-simple acquisition or less-than fee easement acquisition from willing sellers. As potential parcels become available and proposed for acquisition, DOI will bring the proposal to the Open Ocean TIG for their awareness. Conservation of this valuable habitat would reduce anthropogenic disturbances, lessen future threats, and support sea turtle hatchling survival. The project would target leatherback, green, and loggerhead sea turtles and would also benefit an abundance of coastal resources.

General Project Activities and Implementation Timing

Project activities would include planning, implementation (including land acquisition and removal of derelict structures), and project performance monitoring.

The project is expected to take approximately 5 to 6 years to complete. Planning (including identification of and engagement with willing sellers) and implementation (parcel acquisition) would occur in Years 1 to 5. Project performance monitoring and reporting would occur in Year 6.

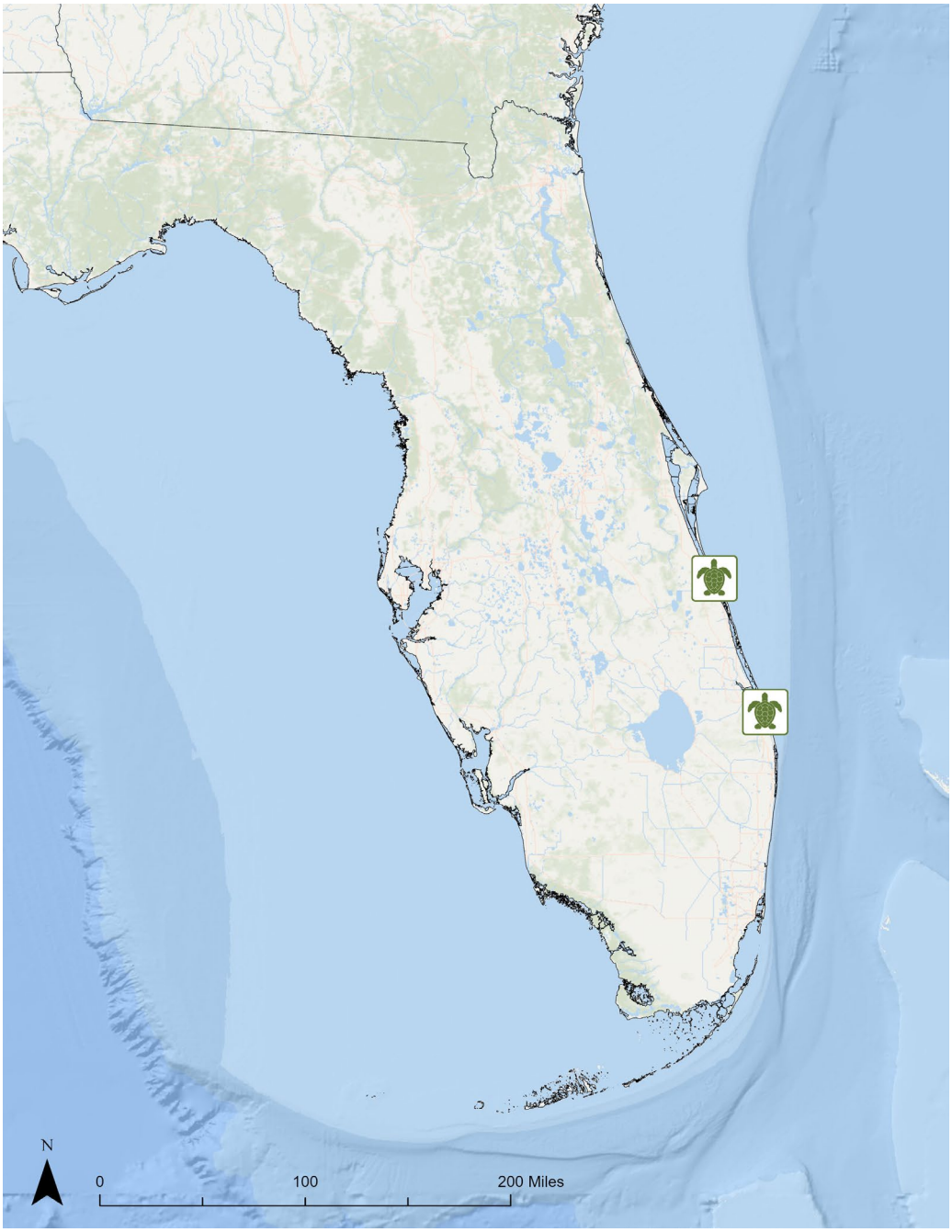
Maintenance

No short-term maintenance would be needed. Acquired parcels would be transferred to USFWS, the State of Florida, or Brevard, Indian River, Martin, or St. Lucie Counties for habitat maintenance and management in perpetuity.

Costs

The total estimated project cost is $5,000,000, which includes planning, implementation, project performance monitoring, oversight, and contingency.

Figure 2-9 ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles): General Project Location



2.4.2.2 ST2, Gulf-Wide Sea Turtle Bycatch Reduction

Restoration Approaches

Reduce sea turtle bycatch in commercial fisheries through identification and implementation of conservation measures; Reduce sea turtle bycatch in commercial fisheries through enhanced training and outreach to the fishing community (PDARP/PEIS Appendix 5.D.4.1 and 5.D.4.2)

Restoration Techniques

Identification of potential new measures, such as gear modifications (e.g., hook size and type), changes in fishing practices (e.g., reduced soak times), and/or temporal and spatial fishery management to reduce sea turtle bycatch in Gulf commercial fisheries; Expansion of the NOAA Gear Monitoring Team Program (PDARP/PEIS Appendix 5.D.4.1 and 5.D.4.2)

Project Goals

Provide targeted outreach and education to shrimp trawl (otter/skimmer) and commercial hook-and-line fisheries to encourage the proper use of existing methods and gear that reduce risk of sea turtle bycatch. Purchase and provide alternative fishing gear for shrimp trawls (otter/skimmer), such as small-bar TEDs, to reduce the risk of sea turtle bycatch.

Project Location

The U.S. Gulf of Mexico (Figure 2-10)

Project Summary

NOAA would be the lead Implementing Trustee for this project. Project implementation partners may include the U.S. Coast Guard, state law enforcement and fisheries agencies, commercial fisheries, and local communities. This project would build on existing Regionwide TIG (*Sea Turtle Early Restoration Project, Shrimp Trawl Bycatch Reduction component*) and Open Ocean TIG (*Reducing Juvenile Sea Turtle Bycatch through Development of Reduced Bar Spacing in Turtle Excluder Devices*) projects, continuing these successful efforts to reduce sea turtle bycatch in Gulf commercial fisheries.

Through the Regionwide TIG's project, NOAA's GMT has made significant progress in improving and maintaining TED compliance in the Gulf shrimp trawl fishery and conducting outreach and education within fishing communities and training enforcement entities, resulting in TED compliance rates above 90 percent for the Gulf shrimp trawl fishery. In addition, through the existing Open Ocean TIG's project, small-bar TED prototypes (those with 2.5-inch bar spacing) were designed and tested in fishery-independent and -dependent trials. These small-bar TEDs were determined to successfully reduce small, juvenile sea turtle bycatch while maintaining target catch rates. This RP4/EA project would build on the success of these two projects to continue reducing interactions with sea turtles in Gulf commercial fisheries.

Specifically, this project would:

- **Continue and expand on existing GMT efforts,** including:
    - **Conducting courtesy dockside and at-sea inspections of required TEDs in the shrimp trawl fishery.** The GMT would continue to engage and conduct outreach with the fishing community, provide training to state and federal enforcement agencies to enhance understanding of TED requirements and ensure consistency, and conduct outreach and training events at venues such as net shops and TED manufacturers.

    - **Expanding GMT outreach efforts to commercial hook-and-line fisheries** by providing education and outreach related to sea turtle resuscitation, dehooking, and safe handling and release requirements to reduce sea turtle harm or mortality from bycatch.
- **Encourage voluntary adoption of small-bar TED prototypes,** including:
    - **Conducting industry outreach** to provide awareness of new small-bar TED prototypes and recruiting volunteers within the shrimp otter trawling fleet.
    - **Funding the manufacture and installation of small-bar TEDs on participating vessels.** Participating vessels would be equipped with two to four small-bar TEDs with 2.5-inch bar spacing to reduce small, juvenile sea turtle bycatch while maintaining target catch rates. Up to 100 vessels may be recruited for voluntary participation. Project partners would collaborate with net shops and coordinate with commercial fishers to distribute and install the new TEDs.

Bycatch is a leading marine threat to sea turtles in the Gulf. To avoid sea turtle bycatch, shrimp otter trawls and some skimmer trawls are required to use TEDs. When used correctly, TEDs can be up to 97 percent effective in excluding turtles from shrimp trawls; however, these success rates drop sharply when TEDs are used improperly. Increasing education and compliance in the Gulf shrimp trawl fleet is critical to ensure successful turtle exclusion. TED compliance in the Gulf shrimp trawl fishery saw a 5 to 10 percent increase with the implementation of the Regionwide TIG's *Sea Turtle Early Restoration Project, Shrimp Trawl Bycatch Reduction component* project, which is expected to end in approximately 2 years. Existing NOAA GMT efforts in the shrimp trawl fishery would be continued for an additional 8 years beyond the remainder of the existing effort under the Regionwide TIG's project. In addition, the GMT would expand outreach and education efforts to the commercial hook-and-line fisheries by providing education and outreach related to safe handling and release requirements for sea turtles and the use of recommended gear. The project would also continue and seek opportunities to enhance outreach efforts to underserved communities, as GMT members speak multiple languages, including Vietnamese.

The second component of the project involves obtaining voluntary adoption of a new 2.5-inch bar-spaced TED prototype which was tested during the existing Open Ocean TIG's *Reducing Juvenile Sea Turtle Bycatch through Development of Reduced Bar Spacing in Turtle Excluder Devices* project. The new small-bar TED prototypes meet the current regulatory requirements but have the added value of reducing bycatch of small, juvenile turtles that pass through existing TED bars or are otherwise unable to lift the TED flap to escape. Currently, NOAA shrimp trawl observer program data show the majority of sea turtle bycatch to be small, juvenile turtles that could be excluded with use of a TED with smaller bar spacing, such as those that would be installed through the proposed RP4/EA project.

Incentivized and voluntary gear use has proven effective in restoration projects, and it is anticipated that for this proposed project, the response would be no different. In addition, based on feedback, vessel owners would be willing to use the equipment if provided. Additionally, the GMT has been highly successful in their outreach and education efforts.

General Project Activities and Implementation Timing

Project activities would include planning, implementation (including outreach with the shrimp trawl and commercial hook-and-line fisheries and manufacture and installation of small-bar TEDs), and project performance monitoring.

The project is expected to take approximately 8 years to complete. Planning and project management and GMT efforts within the shrimp fishery would begin in Year 1 and continue through the duration of the project. Outreach and education related to commercial hook-and-line fisheries would begin in Year 2 and

continue through the duration of the project. Outreach and incentivized use of the new small-bar TED prototypes would occur throughout the duration of the project.

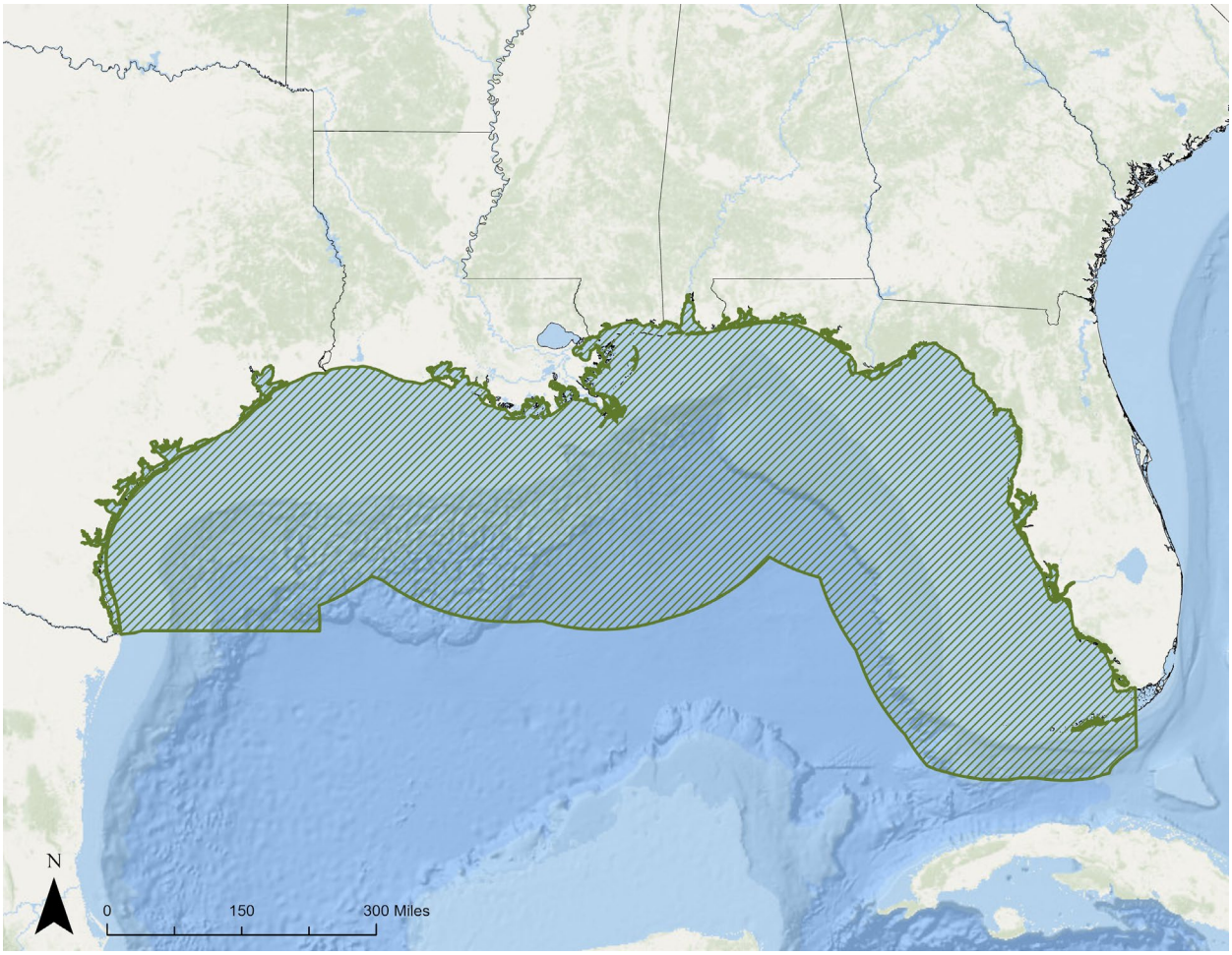
Maintenance

No short- or long-term maintenance would be required. Commercial fishers would maintain small-bar TEDs that they voluntarily adopt in coordination with their existing gear maintenance.

Costs

The total estimated project cost is $8,500,000, which includes planning, implementation, project performance monitoring, oversight, and contingency.

Figure 2-10 ST2, Gulf-Wide Sea Turtle Bycatch Reduction: General Project Location



2.4.2.3 ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction

Restoration Approach

Reduce injury and mortality of sea turtles from vessel strikes (PDARP/PEIS Appendix 5.D.4.7)

Restoration Techniques

Public outreach and education; Enhanced understanding of the temporal and spatial distribution of vessel strikes; Development of potential mechanisms to reduce the frequency of vessel strikes (PDARP/PEIS Appendix 5.D.4.7)

Project Goals

Identify spatial and temporal areas of concern for sea turtle vessel strikes in the Gulf of Mexico. Examine specific locations within the areas of concern with high-risk vessel-turtle interactions to inform which restoration activities may be most impactful in each location. Establish and support the adoption of voluntary site-specific measures in at least three areas of concern to reduce the risk of vessel strikes to sea turtles.

Project Location

Inshore, nearshore, and coastal locations of the five Gulf states (Figure 2-11)

Project Summary

NOAA would be the lead Implementing Trustee for this project. Project partners may include Sea Turtle Stranding and Salvage Network (STSSN) State Coordinators, DWH NRDA State Trustees, universities, researchers, and NGOs. This project would seek to reduce the risk of vessel strikes to sea turtles by taking a phased approach to identify hotspots and areas of highest risk of vessel strikes, determine risk factors, and implement site-specific voluntary conservation measures such as boater outreach and education at selected locations.

Specifically, the project would:

- **Complete data analyses** (phase 1):
    - **Analyze existing datasets** for each of the five Gulf states, including sea turtle stranding data from the STSSN database, Automatic Identification System data, high resolution satellite data, recreational fisheries registration data, and other environmental data to assess the temporal and spatial distribution of vessel strikes in the Gulf.
    - **Identify areas of concern and hotspots** from an investigation of spatial and temporal variables that may influence the frequency of vessel strikes, such as distance to marinas, location type (such as an inlet or open water), and temporal characteristics such as day of the week or holidays. Areas of concern would be locations where high vessel and sea turtle activity coincide, and each area of concern may consist of one or multiple hotspots. These locations are anticipated to consist of inlets, bays, coastal foraging areas, mating areas, and coastal areas off nesting beaches.
- **Evaluate potential hotspots** (phase 2):
    - **Conduct data collection studies** to understand local variables influencing turtle-vessel interactions. These may include visual observations of recreational boating and sea turtle activity and social science surveys.
    - **Assess risk, identify implementation sites, and develop a vessel strike risk reduction strategy.** Analyses would incorporate existing and newly gathered data such as boater behavior and demographic information, vessel speed, sea turtle habitat use and foraging

behavior, sea turtle density, as well as relevant local regulations, and allow for exploration of risk across time (e.g., seasons) and under different scenarios (e.g., environmental conditions). The analysis would help inform the selection of implementation sites for phase 3.

- **Implement site-specific, voluntary measures to reduce vessel strike risk** (phase 3):
  - **Implement site-specific, voluntary measures to reduce the risk of vessel strikes at three or more hotspot locations** identified in the prior two phases. These activities may involve large-scale coordinated public education and outreach to influence boater behavior.

Vessel strikes constitute a high threat to sea turtles in the Gulf, making the reduction of vessel-sea turtle interactions a high priority for sea turtle restoration and recovery under the ESA. However, due to the economic and social importance of recreational boating activities that can contribute to vessel strikes, broad-scale mitigation is not viable, and risk-reduction measures are instead most effective when targeted and tailored to specific local conditions. Successfully identifying and implementing voluntary measures to reduce vessel strikes to sea turtles requires engagement with and support from the local community. Boater surveys and assessments of local boater behavior would be key considerations when determining whether proposed conservation measures may be successful at a given site. Therefore, this project seeks to understand areas of concern, identify hotspots, and implement tailored measures to reduce vessel strikes by catalyzing voluntary change in local boating behavior.

General Project Activities and Implementation Timing

Project activities would include planning, implementation (including data collection and analysis, hotspot identification, and implementation of restoration activities), and project performance monitoring.

The project is expected to take approximately 8 years to complete. Planning and project management would begin in Year 1 and continue through the duration of the project. Phase 1 would begin in Year 1 and continue through Year 2. Phase 2 is expected to begin in Year 2 and continue through Year 4. Phase 3 and project performance monitoring is expected to begin in Year 4 and continue through the duration of the project.

Maintenance

No short- or long-term maintenance would be required.

Costs

The total estimated project cost is $3,500,000, which includes planning, implementation, project performance monitoring, oversight, and contingency.

Figure 2-11 ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction: General Project Location

ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements

Restoration Approach

Increase sea turtle survival through enhanced mortality investigation and early detection of and response to anthropogenic threats and emergency events (PDARP/PEIS Appendix 5.D.4.6)

Restoration Techniques

Enhanced network response and coordination; Enhanced preparedness and response capacity for emergency events; Enhanced investigation of mortality sources; Enhanced data access and analysis (PDARP/PEIS Appendix 5.D.4.6)

Project Goals

Enhance STSSN activities and coordination among STSSN partners. Support emergency response activities and preparedness. Manage the Gulf of Mexico STSSN database and synthesize, analyze, and distribute data across the network.

Project Location

Coastal locations of the five Gulf states (Figure 2-12)

Project Summary

NOAA would be the lead Implementing Trustee for this project. Project partners may include STSSN State Coordinators, the sea turtle research community, and NGOs. This project would build on existing efforts from Early Restoration Phase IV (*Sea Turtle Early Restoration Project, Enhancement of the Sea Turtle Stranding and Salvage Network and Development of an Emergency Response Program component*). The *Sea Turtle Early Restoration Project*, specifically the STSSN component led by NOAA, has enhanced the STSSN by increasing the capacity of stranding response teams across the Gulf, improving data management and diagnostic tools, and developing emergency response plans to improve preparedness and response efforts to sea turtles during emergency events. This project would continue funding specific STSSN coordination, emergency response, and data management activities for 8 years.

Specifically, this project would:

- **Continue to enhance Gulf-wide STSSN coordination** through continued leadership across the Gulf STSSN.
    - **Continue NOAA's Gulf-wide coordination of the STSSN,** through which NOAA provides regular and frequent communication among State STSSN Coordinators and the National Coordination Team.
    - **Continue NOAA's role as State STSSN Coordinator for Louisiana, Mississippi, and Alabama,** through which NOAA's Office of Protected Resources oversees and coordinates the permitted members of the STSSN, facilitates stranding response activities, provides training to STSSN responders, creates and maintains reporting protocols, and assists with data analysis and interpretation.
- **Support emergency response activities and enhance emergency preparedness** through funding support for the STSSN coordinators and local stranding responders and rehabilitation facilities during emergency events. For example, the project may support response to cold stun events or oil spill response preparedness. This project may support the improvement of emergency response protocols and/or may assist local partners by bridging gaps in funding coverage, such as supply and equipment purchases, vessel or equipment rentals, or staff labor necessary during an emergency event.

- **Continue to enhance STSSN data management and data analysis** through database maintenance, development and refinement of data tools, and production and distribution of data analyses.
    - **Maintain and improve the STSSN database and provide technical support** to ensure functionality of the database, the quality and consistency of its data, the continuous development of data tools to match user needs, and the availability of troubleshooting support.
    - **Conduct data synthesis and analysis and coordinate data sharing across the Gulf** to provide both real-time and recent data summaries to managers for use in planning, implementation, evaluation, and prioritization of restoration needs. These data may assist a variety of sea turtle restoration partners, including the GMT, sea turtle stranding observer programs, vessel strike reduction programs, marine debris programs, or recreational fishing programs. This would include both informal data sharing among the Gulf state STSSN coordinators and formal reports on STSSN findings and trends.
    - **Conduct mortality investigation work** across the Gulf to determine the cause of stranding/mortality, provide consistent necropsy data, and improve threat identification.

The STSSN is a collaborative network of federal, state, and permitted local partners that was established in the early 1980s to respond to and document reports of sea turtles found deceased or alive but compromised along U.S. coastlines from Maine to Texas. The STSSN's primary functions are to respond to stranded sea turtles, rehabilitate and release live-stranded sea turtles, and necropsy dead, stranded sea turtles. In the Gulf, the most frequently stranded species are loggerhead, green, and Kemp's ridley sea turtles.

Necropsies and related mortality investigations provide a source of vital data to managers, who use these data to identify threats and target current and future restoration efforts. The Open Ocean TIG proposes to use funding from the TIG's MAM allocation for these mortality investigations and STSSN data management. By continuing and expanding STSSN activities, including managing STSSN data, this project would continue the high level of surveillance and data sharing across the Gulf that is necessary for restoration and adaptive management targeting critical threats to sea turtles, thereby meeting the Open Ocean TIG's restoration priorities as outlined in the *Open Ocean Trustee Implementation Group Monitoring and Adaptive Management Strategy*.

General Project Activities and Implementation Timing

Project activities would include planning and project management, implementation (including implementation of STSSN activities, STSSN database management and administration, and emergency response activities), and project performance monitoring.

The project is expected to take approximately 8 years to complete. Planning and project management, implementation (which would include stranding response and coordination, database management, data analyses and reporting, and emergency response), and project performance monitoring would begin in Year 1 and continue through the duration of the project.

Maintenance

Project partners would maintain STSSN equipment, supplies, and/or vessels provided by the project. Additionally, NOAA would maintain the STSSN database for the duration of the project.

Costs

The total estimated project cost is $11,000,000, which includes $5,300,000 from the ST Restoration Type for planning, implementation (STSSN coordination and emergency response and preparedness),

oversight, and contingency, and $5,700,000 from the MAM allocation for implementation (data collection, analysis, and sharing) and project performance monitoring.

Figure 2-12 ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements: General Project Location

2.4.2.4 ST5, Kemp's Ridley Nesting Enhancement in Mexico

Restoration Approach

Enhance sea turtle hatchling productivity and restore and conserve nesting beach habitat (PDARP/PEIS Appendix 5.D.4.3)

Restoration Technique

Enhance protection of nests (PDARP/PEIS Appendix 5.D.4.3)

Project Goals

Enhance Kemp's ridley sea turtle reproduction by patrolling for and protecting nests in Tamaulipas, Mexico.

Project Location

Tamaulipas, Mexico (Figure 2-13)

Project Summary

DOI would be the Lead Implementing Trustee for this project. Partners may include the USFWS International Affairs Office, Texas State Trustee agencies, and the Gladys Porter Zoo. This project would build on Kemp's ridley nest protection efforts in Mexico funded through the Early Restoration Phase IV *Sea Turtle Early Restoration Project, Kemp's Ridley Sea Turtle Nest Detection component* and the Regionwide TIG's *Restore and Enhance Sea Turtle Nest Productivity* projects. These projects have collectively funded 12 years of nest protection activities in Tamaulipas, including beach patrols to identify nests and the subsequent protection or relocation of nests to increase hatchling success throughout Mexico's Kemp's ridley nesting beaches. This project would build on these previous efforts by continuing and enhancing nest detection, egg relocation, and nest protection activities in Tamaulipas, Mexico for 10 years.

Specifically, this project would:

- **Conduct beach patrols** to locate sea turtles, sea turtle tracks, and sea turtle nests. In addition to locating turtle nests for protection, patrols collect important monitoring data, including synchronous nesting events and hatchling releases. Patrols are conducted by bi-national crews comprised of staff from Mexico and the Gladys Porter Zoo and are supervised by trained sea turtle biologists.
- **Protect sea turtle eggs** from the nests located during patrols, either in-situ or by transferring eggs to a corral. These corrals protect the eggs from predation, thereby improving hatchling recruitment and maximizing the number of hatchlings released to the Gulf.
- **Maintain infrastructure** for the six sea turtle camps from which beach patrols and sea turtle nest corrals are operated. This maintenance may include upkeep of the camp infrastructure, which includes housing for project staff, as well as replacement of aging or damaged infrastructure.

Through the existing Early Restoration project, staff have logged over a million miles of beach patrols, documented tens of thousands of nests, and supported the return of millions of sea turtle hatchlings to the sea. The 78-mile stretch of beach in the state of Tamaulipas, Mexico where this project would occur is particularly important, as it constitutes the majority of nesting beaches for Kemp's ridley sea turtles. This project is intended to maximize the number of Kemp's ridley hatchlings that can be released to the Gulf by increasing the number of nests in this area that can be protected from predation or anthropogenic influence.

General Project Activities and Implementation Timing

Project activities would include planning, implementation (including annual nest protection activities), and project performance monitoring.

The project is expected to take approximately 10 years to complete. Planning, implementation, and project performance monitoring would each begin in Year 1 and continue through the duration of the project.

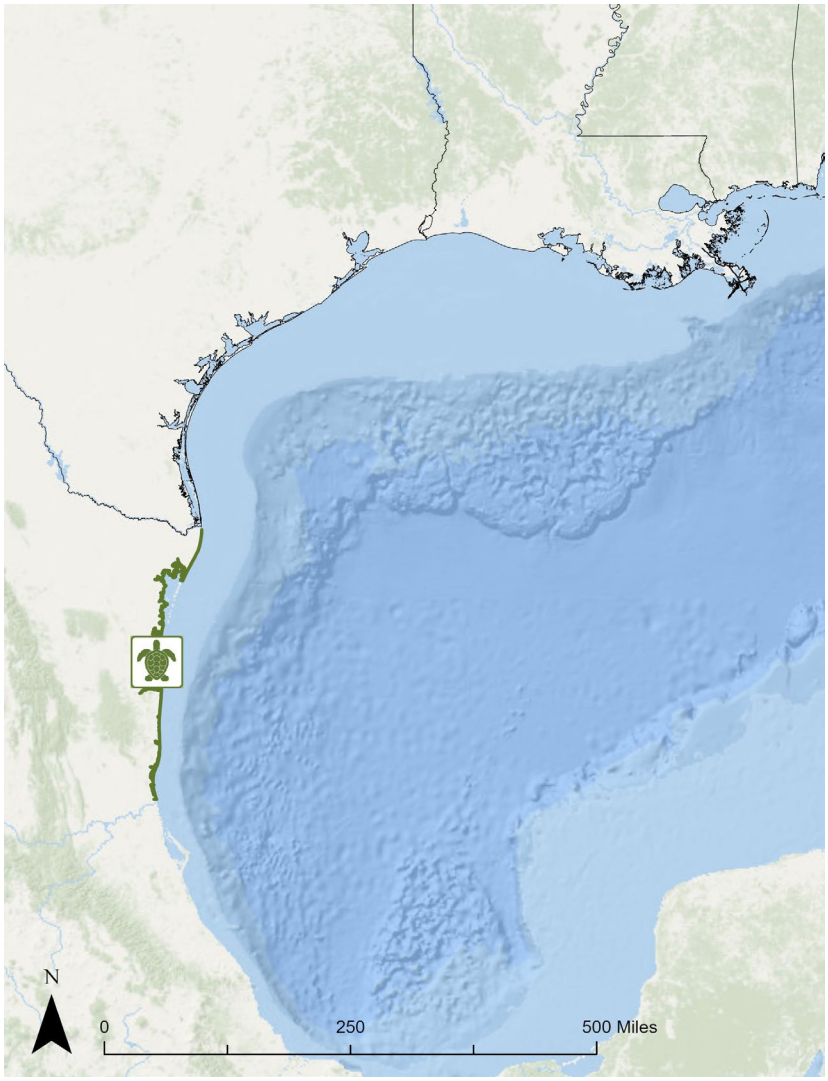
Maintenance

Nest protection equipment (e.g., corrals) and camp infrastructure would require short-term maintenance. Project partners would conduct long-term maintenance in coordination with their existing nest protection and management activities.

Costs

The total estimated project cost is $5,520,000, which includes project planning, implementation, project performance monitoring, oversight, and contingency.

Figure 2-13 ST5, Kemp's Ridley Nesting Enhancement in Mexico: General Project Location



3 OPA NRDA Evaluation of Alternatives

The Open Ocean TIG developed a reasonable range of restoration alternatives for consideration and evaluation in this RP4/EA. This chapter provides an OPA NRDA analysis of each alternative considered in this RP4/EA. A summary of the OPA NRDA evaluation standards (Section 3.1), project performance monitoring requirements (Section 3.2), estimated project costs (Section 3.3), and best management practices (BMPs) (Section 3.4) are provided at the beginning of this chapter. These are followed by project-specific OPA NRDA evaluations (Section 3.5), the Natural Recovery/No Action Alternative evaluations (Section 3.6), and a summary of conclusions of the OPA NRDA evaluation for all project alternatives (Section 3.7).

3.1 Summary of OPA NRDA Evaluation Standards

According to the OPA NRDA regulations, Trustees are responsible for identifying a reasonable range of alternatives (15 CFR § 990.53(a)(2)) that can be evaluated according to the OPA NRDA evaluation standards (15 CFR § 990.54). Based on the evaluation of the standards listed below, and after incorporating any other screening criteria identified by Trustees, Trustees select preferred restoration alternative(s). If Trustees conclude that two or more alternatives are equally preferable, the OPA NRDA regulations provide that the most cost-effective alternative must be chosen (15 CFR § 990.54(b)).

Chapter 2 describes the screening and identification of a reasonable range of alternatives for evaluation under OPA. Chapter 3 describes the Trustees' evaluation of the reasonable range of alternatives to identify preferred restoration alternatives based on, at a minimum, the following standards found in 15 CFR § 990.54(a):

- The cost to carry out the alternative (Cost-effectiveness).
- 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 (Goals and objectives).
- The likelihood of success of each alternative.
- The extent to which each alternative would prevent future injury resulting from the incident and avoid collateral injury resulting from implementing the alternative (Avoid collateral injury).
- The extent to which each alternative benefits more than one natural resource and/or service (Benefits).
- The effect of each alternative on public health and safety (Health and safety).

3.2 Monitoring Requirements

When developing a restoration plan under the OPA NRDA regulations, Trustees establish restoration objectives that are specific to the natural resources that were injured (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 would be determined, including criteria that would necessitate corrective actions (15 CFR § 990.55(b)(2)). Should a corrective action become necessary from unanticipated conditions, the Implementing Trustee would evaluate the corrective action for consistency with the OPA NRDA and NEPA analyses conducted in this RP4/EA in accordance with Section 9.5.2 of the Trustee Council's SOPs. Regulatory requirements for the monitoring component of a restoration plan are further described in 15 CFR § 990.55(b)(3). The DWH Trustees identified Monitoring, Adaptive Management, and Administrative Oversight as one of the programmatic Restoration Goals in the PDARP/PEIS. As described in Chapter 5, Appendix E of the PDARP/PEIS, the Trustees committed to a

MAM framework that incorporates best available science into planning and design of each alternative, identifies and reduces key uncertainties, tracks and evaluates progress towards Restoration Goals, and determines the need for corrective actions (DWH Trustees, 2021b). The MAM framework provides a flexible, science-based approach to implement and monitor restoration.

The Open Ocean TIG developed draft MAM plans for each of the preferred alternatives identified in this RP4/EA (Appendix D). These MAM plans outline the monitoring needed to evaluate each alternative's progress toward meeting project-specific objectives, appropriate corrective actions, and adaptive management where applicable. The plans included in Appendix D are consistent with the requirements and guidelines set forth in the PDARP/PEIS (DWH Trustees, 2016), the Trustee Council's SOPs (DWH Trustees, 2021), and the Trustees' MAM Manual (DWH Trustees, 2024). The MAM plans are intended to be updated as needed to reflect changing conditions and to incorporate new information as it becomes available. For example, if initial data analysis indicates that the sampling design for the alternative is inadequate, or if any uncertainties are resolved or new uncertainties are identified during implementation and monitoring of the alternative, the plan may be revised. Updates to MAM plans and any additional details concerning the status of monitoring activities will be made publicly available through DIVER.

3.3 Estimated Project Costs

The cost provided for each restoration alternative is the estimated cost to implement the specific restoration project. Cost estimates incorporate contingencies and reflect the most current planning and information available to the Open Ocean TIG at the time of completing this RP4/EA. Estimated costs reflect all costs associated with implementing each alternative, potentially including but not limited to planning, construction or implementation, contingency, maintenance, project performance monitoring, and Trustee oversight. Should budgets change prior to or during project implementation, Implementing Trustees would seek TIG approval for updated budgets.

3.4 Best Management Practices

As part of the environmental compliance process, federal agencies provide guidance on BMPs such as project design criteria, lessons learned, and expert advice. DWH Trustees incorporate appropriate BMPs into planning and design to avoid or minimize impacts on natural resources, including protected and listed species and their habitats. BMPs are identified in required permits, consultations, or environmental reviews, including those described in Appendix 6.A of the PDARP/PEIS (DWH Trustees, 2016). BMPs that each project would implement are described within each project's environmental analysis in Appendix A. Through technical assistance with regulatory agencies, additional BMPs may be identified for implementation and would be noted in compliance documentation.

3.5 OPA NRDA Evaluation of the Reasonable Range of Alternatives

Below is an evaluation of each project in the reasonable range using the OPA NRDA standards. Full project descriptions for these alternatives are provided in Section 2.4.

3.5.1 FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries) (preferred)

OPA NRDA Evaluation Standard	Evaluation
Cost-effectiveness	The total estimated cost of $66,220,000 includes project planning, implementation (conducting outreach and education, distributing release gear, monitoring gear use and progress towards best practice use, conducting studies and data analysis to assess the efficacy of best release practices and post-release mortality), project performance monitoring, oversight and management, and contingency. The project is expected to take approximately 15 years to complete; as such, project costs reflect the reasonable costs to implement comprehensive initiatives for the duration of the project. Estimated costs to carry out this alternative are based on similar, previously implemented projects to reduce post-release mortality, including the Open Ocean TIG's *Reduction of Postrelease Mortality from Barotrauma in the Gulf of Mexico Reef Fish Recreational Fisheries* project, as well as the estimated costs of relevant gear. This project would leverage existing expertise and program structure including available Return 'Em Right educational materials and gear distribution systems to improve cost-effectiveness. Validating effectiveness of tools and techniques would improve cost-effectiveness, and project activities would be adaptively managed based on ongoing community feedback which would also improve cost-effectiveness over time. As such, the Open Ocean TIG has determined that the project costs are reasonable and appropriate.
Goals and Objectives	This project is consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal and underlying FWCI Restoration Type goals. The project has a clear nexus to injuries as it would help compensate for injuries to Gulf FWCI populations resulting from the DWH oil spill by reducing the post-release mortality of fish caught but not retained due to catch-and-release recreational fishing, released as non-target catch, or released as a regulatory discard. Post-release mortality is a threat to priority species due to high levels of recreational fishing, and reducing post-release mortality would benefit priority species. Implementation locations would be tailored to each species group to include areas that have connectivity to injured populations and would have greatest benefit to the injured population. The proposed mortality reduction activities align with restoration techniques identified in the PDARP/PEIS and the DWH Open Ocean TIG *Fish and Water Column Invertebrates Strategic Plan* and would reduce sources of post-release mortality of fish and invertebrate resources.
Likelihood of Success	This project utilizes reliable methods that have been previously employed by the Open Ocean TIG. This project would utilize existing organizational infrastructure from the Return 'Em Right program, building on the existing program, continuing existing and successful Return 'Em Right activities, and expanding these activities to new locations and species. The project is technically feasible and uses best available science, proven techniques, and established methods, increasing its likelihood of success. Additional validation of techniques allows for continued improvement in release practices. In addition, it addresses the implementation considerations identified in the PDARP/PEIS by proposing outreach, incentives, and education to encourage participation by the recreational fishing community. As such, the Open Ocean TIG believes this project is technically feasible and anticipates that it would have a high likelihood of success.

OPA NRDA Evaluation Standard	Evaluation
Avoid Collateral Injury	This project is not expected to cause collateral injuries to natural resources as it focuses primarily on education and outreach related to fishing gear and best practices for safe release. Any environmental consequences related to the proposed techniques or gear distributed as part of this program would be evaluated during project planning and would be minimized by education related to the proper use of gear and techniques. Any possible collateral injury to fish, marine mammal, or sea turtle resources that could arise from conducting studies to validate the effectiveness of release practices and tools would be evaluated and minimized to the extent possible during study design. Further, project activities would be conducted within the scope of authorized activities and if any activities would be outside the scope, additional compliance would be conducted. Project implementation would increase resilience of priority resources to prevent collateral injury to natural resources.
Benefits	This project would benefit fish resources across several species. Reef fish that currently benefit from Return 'Em Right activities, such as snappers and groupers, would benefit from the continuation and expansion of program activities. Additional species groups, such as HMS, coastal migratory pelagic species, and other species such as flounders, drums, and sea trout, would benefit from the expansion of Return 'Em Right activities to their species groups and geographies. Expected benefits to these species would include reductions in post-release mortality from barotrauma and other causes, which would improve the likelihood that released fish are able to survive and contribute to population health and resilience. This project may also have ancillary benefits for protected species including sea turtles and marine mammals such as bottlenose dolphins by reducing interactions with gear and harm associated with post-release mortality.
Health and Safety	Since project activities would primarily involve outreach, education, and gear distribution relating to existing fishing practices, the project is not likely to pose a risk to public health and safety. Educational activities would advance the safe and proper use of techniques and gear and would encourage operational safety. Project elements that involve at-sea activities, such as observer coverage or fishing studies, would follow relevant safety measures and practices to reduce risk of injury.
Summary: Based on the OPA evaluation, this project is identified as a preferred restoration alternative at this time.	

3.5.2 FWCI2, Next Generation Fishing (preferred)

OPA NRDA Evaluation Standard	Evaluation
Cost-effectiveness	The total estimated cost of $57,200,000 includes project planning, implementation (developing an implementation plan; conducting outreach and education; supporting the development of a "next generation" fishing fleet; advancing the use of new gear, best practices, and techniques to reduce bycatch; and supporting systems for collecting, analyzing, and sharing fishery-dependent data), project performance monitoring, administration and management, and contingency. The project is expected to take approximately 15 years to complete; as such, project costs reflect the reasonable costs to implement comprehensive initiatives for the duration of the project. Estimated costs to carry out this alternative are based on similar, previously implemented projects, NOAA's experience with similar activities, and the estimated costs of relevant gear. This project is designed to improve cost effectiveness over time by considering stakeholder input, project performance monitoring, and evaluating effectiveness of restoration activities. These factors would inform the selection of areas for implementation over the duration of the project. As such, the Open Ocean TIG has determined that the project costs are reasonable and appropriate.

OPA NRDA Evaluation Standard	Evaluation
Goals and Objectives	This project is consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal and underlying FWCI Restoration Type goals. The project has a clear nexus to injuries as it would help compensate for injuries to Gulf FWCI populations resulting from the DWH oil spill by reducing the risk of current and future bycatch in commercial fishing fleets by providing access to more effective and efficient gear, best practices, and techniques that reduce bycatch of non-target species. Implementation locations would be tailored to each species group to include areas that have connectivity to and would have greatest benefit to the injured populations of priority species. The proposed bycatch reduction activities align with restoration techniques identified in the PDARP/PEIS and the DWH Open Ocean TIG *Fish and Water Column Invertebrates Strategic Plan* and would reduce sources of mortality for fish and invertebrate resources from bycatch.
Likelihood of Success	This project would provide training, outreach, and education on resource conservation, bycatch reduction techniques, and gear use through voluntary participation of fishing fleets to advance use of best practices to reduce bycatch. This project would include initial project planning and phased implementation for injured population of priority species to allow time for coordination with project partners and increase the likelihood of success. The project is technically feasible, uses best available science, proven techniques, established methods, and builds upon existing successful efforts. Further, early feedback from fishing representatives has indicated that there is fishing community support for the proposed activities. As such, the Open Ocean TIG believes this project is technically feasible and anticipates that it would have a high likelihood of success.
Avoid Collateral Injury	This project is not expected to cause collateral injuries to natural resources as it would consist primarily of training, education, and outreach regarding best practices of next generation gear, best practices, and fishing techniques, as well as support of data management systems. Project activities would occur from existing facilities, and minimal at-sea work is anticipated. Any environmental consequences related to the proposed techniques or gear distributed as part of this program are expected to be within the scope of existing, permitted fisheries activities, would be evaluated during study design, and would be minimized by education related to the proper use of the gear and techniques. Should any potential effects be identified during project performance monitoring, the Open Ocean TIG would ensure proper coordination and protective measures are implemented.
Benefits	This project would benefit fish resources across several species. Species expected to benefit from bycatch reduction efforts through this project include reef fish and reef-associated fish such as red snapper, vermilion snapper, red grouper, and golden tilefish; HMS such as blue marlin and yellowfin tuna; coastal migratory pelagic species such as king mackerel; and other species such as menhaden and spotted sea trout. These fish species would benefit from the best practices, conservation techniques, and resource conservation principles that would ultimately support more resilient fisheries. Overall, these activities would support restoration of FWCI resources by reducing the risk of bycatch, which would improve the likelihood that these fish are able to survive and contribute to population health and resilience. This project may also have ancillary benefits for other resources that are caught as bycatch, including marine mammals, sea turtles, and birds, assuming the unintended bycatch of such species is similarly reduced.

OPA NRDA Evaluation Standard	Evaluation
Health and Safety	Project activities would primarily involve training, education, outreach, and gear distribution relating to existing fishing practices. As such, the project is not likely to pose a risk to public health and safety. Educational activities would advance the safe and proper use of techniques and gear to encourage operational safety. Project elements that involve at-sea activities, including in-situ training for gear or best practices, would follow relevant safety measures and practices to reduce risk of injury.
Summary: Based on the OPA evaluation, this project is identified as a preferred restoration alternative at this time.	

3.5.3 FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality (preferred)

OPA NRDA Evaluation Standard	Evaluation
Cost-effectiveness	The total estimated cost of $18,040,000 includes project planning, implementation (developing models, assessing data gaps, identifying and conserving spawning aggregation sites, conducting outreach and education, enhancing at-sea observer coverage, and developing bycatch communication networks), project performance monitoring, oversight and management, and contingency. Estimated costs to carry out this alternative are based on similar, previously implemented projects, NOAA's experience with similar activities, and the estimated costs of relevant technology. This project would leverage existing information on spawning aggregation sites developed through a RESTORE-funded project to improve cost-effectiveness. As such, the Open Ocean TIG has determined that the project costs are reasonable and appropriate.
Goals and Objectives	This project is consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal and underlying FWCI Restoration Type goals. The project has a clear nexus to injuries as it would help compensate for injuries to Gulf FWCI populations resulting from the DWH oil spill by reducing the risk of fish mortality from bycatch and depredation, while also reducing interactions with spawning aggregations. The project advances the Trustee's goals by developing models to predict the timing and location of bycatch, depredation, and spawning aggregations, and creating a voluntary communication network to share this information. Fishing fleets may then avoid areas with spawning aggregations and high bycatch and depredation, allowing for increased reproduction and avoiding unnecessary mortality. The project would also involve collaborative development of a conservation plan for fish spawning aggregation sites that would encourage long-term benefits to be realized through voluntary adoption by fishing communities and ongoing collaboration with partners. The proposed activities align with restoration techniques identified in the PDARP/PEIS and the DWH Open Ocean TIG *Fish and Water Column Invertebrates Strategic Plan* and would reduce sources of mortality for fish and invertebrate resources.
Likelihood of Success	This project would involve reliable, established data collection, modeling, and mapping methods and best available science and proven techniques to improve understanding of species distributions, spawning aggregation sites, and bycatch and depredation trends across space and time. Furthermore, these efforts would build off activities implemented and demonstrated to be feasible and existing partnerships established through previous Open Ocean TIG FWCI projects. This project would also engage commercial and recreational vessels to collaboratively develop and test a communication network system for data collection and analysis to minimize bycatch and depredation and reduce impacts to spawning areas. As such, the Open Ocean TIG believes this project is technically feasible and anticipates that it would have a high likelihood of success.

OPA NRDA Evaluation Standard	Evaluation
Avoid Collateral Injury	This project is not expected to cause collateral injuries to natural resources as it focuses primarily on data collection, analysis, and model development, engagement with partners and interested parties, and development of communication networks. Enhancement of at-sea observer coverage is not expected to cause collateral injuries as it would be within the scope of existing fisheries activities. Any collateral injury to fish, marine mammal, or sea turtle resources that could arise from data collection activities to develop species distribution models or identify spawning aggregations would be evaluated and minimized during study design.
Benefits	This project would benefit fish resources across several species groups including reef fish, HMS, coastal migratory pelagic species, and other species such as sea trout and amberjack. This project aims to reduce the risk that these fishes would be caught as bycatch, vulnerable to depredation, or have their spawning aggregations disturbed, which would improve the likelihood that these fishes are able to survive and contribute to population health and resilience. This project may also have ancillary benefits for other resources that may be caught as bycatch, including marine mammals, sea turtles, and seabirds and protected fish and invertebrate species such as the giant manta ray and smalltooth sawfish.
Health and Safety	Since project activities would primarily involve data collection and tool development related to existing fishing practices, the project is not likely to pose a risk to public health and safety. Any at-sea project activities would follow relevant safety measures and practices to reduce risk of injury.
Summary: Based on the OPA evaluation, this project is identified as a preferred restoration alternative at this time.	

3.5.4 FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates (preferred)

OPA NRDA Evaluation Standard	Evaluation
Cost-effectiveness	The total estimated cost of $14,300,000 includes project planning, implementation (identifying conservation strategies, implementing a range of activities including preventing and removing marine debris and invasive species, reducing negative effects from changes in water quality and energy development, and education and outreach), project performance monitoring, oversight and management, and contingency. The project is expected to take approximately 10 years to complete; as such, project costs reflect the reasonable costs to implement comprehensive initiatives for the duration of the project. Estimated costs to carry out this alternative are based on NOAA's experience with similar restoration activities. The project would leverage available knowledge and expertise of established partners and involve coordination with existing programs to advance shared goals to improve cost effectiveness. As such, the Open Ocean TIG has determined that the project costs are reasonable and appropriate.

OPA NRDA Evaluation Standard	Evaluation
Goals and Objectives	This project is consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal and underlying FWCI Restoration Type goals. The project has a clear nexus to injuries as it would help compensate for injuries to Gulf FWCI populations resulting from the DWH oil spill by reducing non-fishing threats from anthropogenic stressors such as marine debris, impaired water quality, invasive species, and energy development. Project activities would provide restoration benefits to resources not easily addressed through other techniques and provides a strong nexus to the ecosystem level injury by focusing on restoration of resources and the services they provide across a range of coastal and oceanic zones. The proposed activities align with restoration techniques identified in the PDARP/PEIS and the DWH Open Ocean TIG *Fish and Water Column Invertebrates Strategic Plan* and would reduce sources of mortality for FWCI resources.
Likelihood of Success	This project would utilize established best practices and methods for marine debris and invasive species removal and prevention, addressing water quality impacts, and outreach and education relating to the impacts of energy exploration and development. These activities have been demonstrated to be successful and are known to benefit FWCI, other living marine resources, and the environment. This project would be implemented in an adaptive manner by first identifying specific locations that would benefit from select activities during implementation planning. Initial project implementation activities may be small-scale to inform which activities have the greatest likelihood of success. Project performance monitoring would be conducted to ensure novel and innovative techniques are effectively meeting project objectives. Working with implementation partners would increase the likelihood of success by using existing local networks with additional knowledge of local conditions. As such, the Open Ocean TIG believes this project is technically feasible and anticipates that it would have a high likelihood of success.
Avoid Collateral Injury	This project is not anticipated to cause collateral injuries to natural resources as it focuses primarily on using established best practices to reduce sources of anthropogenic stress on fish resources. Any project activities such as marine debris or invasive species removal that have the potential to impact habitat or other natural resources would be evaluated prior to their implementation. Project implementation would include BMPs to reduce the risk of collateral injury to natural resources. Furthermore, project performance monitoring would help evaluate any collateral injures resulting from any activities to inform ongoing project planning.
Benefits	This project would benefit fish resources across several species groups including HMS such as billfish and tunas; coastal migratory pelagic species such as mackerels; other species such as snappers, sea basses, groupers, drums, sea trout, and jacks; demersal species; and water column invertebrates. These species would benefit from the reduced mortality risk from environmental stressors, such as from ingestion of or entanglement in marine debris, improvement in water quality such as the reduction in the risk of HABs that may cause anoxia or metabolic stress, reduction in competition for prey on reefs through the removal of lionfish, and reduction in mortality risk from stressors related to energy development. By reducing the risk of mortality from these anthropogenic stressors, this project would improve the likelihood that FWCI resources are able to survive and contribute to population health and resilience. This project's activities may also provide ancillary benefits for other resources that experience reduced fitness or mortality from marine debris, changes in water quality, invasive species, and energy activities, such as marine mammals, sea turtles, and seabirds.
Health and Safety	This project is not likely to pose a risk to public health and safety. Any marine debris or invasive species removal activities would follow relevant safety measures during implementation. Public health and safety may benefit from project activities due to improved water quality, reduced marine debris, and reduction in lionfish, which have toxic barbs.
Summary: Based on the OPA evaluation, this project is identified as a preferred restoration alternative at this time.	

3.5.5 FWCI5, Education and Stewardship Partnerships with Charter Anglers (preferred)

OPA NRDA Evaluation Standard	Evaluation
Cost-effectiveness	The total estimated cost of $3,000,000 includes project planning, implementation (developing implementation and communications plans, conducting outreach and education, and support for desktop-based data gathering and analysis), assessing effectiveness of outreach and education activities (i.e., project performance monitoring), oversight and management, and contingency. Estimated costs to carry out this alternative are based on NOAA's experience with similar activities. Cost effectiveness would be evaluated on an ongoing basis and adaptively managed based on ongoing community feedback to continue to improve cost effectiveness. As such, the Open Ocean TIG has determined that the project costs are reasonable and appropriate.
Goals and Objectives	This project is consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal and underlying FWCI Restoration Type goals. The project has a clear nexus to injuries as it would help compensate for injuries to Gulf FWCI populations resulting from the DWH oil spill by reducing the incidence of federally unpermitted charter fishing in the Gulf. The proposed education and outreach measures to reduce these activities align with restoration techniques identified in the PDARP/PEIS and the DWH Open Ocean *TIG Fish and Water Column Invertebrates Strategic Plan* and would reduce sources of mortality for FWCI resources.
Likelihood of Success	This project would seek to reduce impacts from illegal charter fishing activity and overfishing, bycatch, post-release mortality, and other risks associated with illegal charter fishing. The project is technically feasible and uses best available science, proven techniques, and established methods. This project would engage Gulf fishing communities to provide tools to help identify and deter these activities and would utilize a variety of outreach and education methods to improve likelihood of success, including media campaigns, signage, liaisons, and workshops on properly navigating regulations. Such education and outreach measures have been successfully implemented by NOAA and the Open Ocean TIG previously. Further, based on the success of similar projects and the ability to adaptively manage project activities based on project performance monitoring, the TIG believes this project is technically feasible and anticipates that it would have a high likelihood of success.
Avoid Collateral Injury	This project is not anticipated to cause collateral injuries to natural resources as it would focus primarily on outreach, education, and desktop-based data collection and analysis related to illegal charter fishing activities.
Benefits	This project would benefit several priority FWCI species including reef fish such as snappers and groupers and HMS such as yellowfin tuna, bluefin tuna, and swordfish. Illegal harvest is not reported and therefore cannot be accurately accounted for in fishery management decisions such as quotas and catch limits. Illegal charter fishing may also increase the incidence of bycatch or post-release mortality through lack of appropriate descender devices and other precautions or best practices. Activities to reduce illegal charter fishing would therefore reduce the number of fish harvested outside of set quotas and reduce bycatch and post-release mortality, improving the likelihood that fish survive and contribute to overall population health and resilience. This project may also have ancillary benefits for other resources that may be illegally harvested, caught as bycatch, or impacted by habitat damage, including protected species, marine mammals, sea turtles, and seabirds.
Health and Safety	Since project activities would primarily involve education and outreach and desktop-based data collection related to illegal charter fishing, this project is not likely to pose a risk to public health and safety. Any activities conducted in the field would follow relevant safety measures and practices to reduce risks to public health and safety.
Summary: Based on the OPA evaluation, this project is identified as a preferred restoration alternative at this time.	

3.5.6 FWCI6, Communication, Adaptive Management, Planning, and Integration (preferred)

OPA NRDA Evaluation Standard	Evaluation
Cost-effectiveness	The total estimated cost of $23,260,000 includes project planning, implementation (enhancing monitoring support for FWCI Restoration including enhancing at-sea observer coverage and electronic monitoring capacity, organizing workshops, and collecting and analyzing data; facilitating communication and engagement across multiple FWCI restoration projects including identifying and engaging with interested parties, enhancing coordination across projects, and conducting outreach and engagement with fishing communities), project performance monitoring, oversight and management, and contingency. The project is expected to take approximately 15 years to complete; as such, project costs reflect the reasonable costs to implement comprehensive initiatives for the duration of the project. Estimated costs to carry out this alternative are based on similar, previously implemented projects and on NOAA's experience with similar implementation and monitoring activities. This project would leverage existing programs to minimize costs and available expertise for additional project efficiencies. Using existing data, prioritizing activities to fill gaps for priority species groups, sequencing data collection and analysis over the life of the project, and creating management efficiencies over time would maximize project efficiencies. Further, data gathered may be leveraged by other DWH projects and programs. As such, the Open Ocean TIG has determined that the project costs are reasonable and appropriate.
Goals and Objectives	This project is consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal and underlying FWCI Restoration Type goals. The project has a clear nexus to injuries as it would help compensate for injuries to Gulf FWCI populations resulting from the DWH oil spill by supporting monitoring, data collection and analysis, and collaboration among FWCI restoration projects, both ongoing and those proposed in this restoration plan. Specifically, this project would enhance monitoring support for restoration projects through support for monitoring efforts, including fishery observer network coverage and electronic monitoring capacity, engagement and collaboration with partners including fishers and anglers on needs and priorities, and support and development of tagging networks, field data collection, and analysis. This project would also improve engagement and communication across FWCI projects by identifying interested parties, enhancing co-development of strategies across projects, and conducting outreach with fishing communities to improve awareness of and engagement with DWH restoration programs. The magnitude of project benefits has the potential to be substantial by increasing fishery participation in restoration projects, increasing adoption of best practices, providing information and analysis to develop more informed projects, and using data to inform management. The proposed data collection activities align with restoration techniques identified in the PDARP/PEIS and the DWH Open Ocean TIG *Fish and Water Column Invertebrates Strategic Plan* and address priorities identified in the *Open Ocean Trustee Implementation Group Monitoring and Adaptive Management Strategy* by filling key data gaps in current understanding of high-priority injured fish resources that would enhance restoration.
Likelihood of Success	This project utilizes existing and reliable data collection and analysis, monitoring, and outreach methods to support FWCI projects with proven techniques. Additionally, by improving the baseline knowledge of species distribution and abundance, enhancing monitoring coverage and capacity for restoration projects, improving coordination among FWCI restoration projects, and strengthening institutional relationships between DWH restoration programs and the Gulf fishing community, this project also amplifies the likelihood of success for the entire portfolio of FWCI projects. As such, the Open Ocean TIG believes this project is technically feasible and anticipates that it would have a high likelihood of success.

OPA NRDA Evaluation Standard	Evaluation
Avoid Collateral Injury	This project is not anticipated to cause collateral injuries to natural resources as it focuses primarily on engagement and collaboration with partners and interested parties, data collection, and monitoring. Data collection activities are not anticipated to result in collateral injury; however, any field activities that have the potential to impact habitat or other natural resources would be evaluated prior to their implementation. Project implementation would include BMPs to reduce the risk of collateral injury to natural resources and would be conducted pursuant to any permit requirements to minimize collateral injury. Furthermore, project performance monitoring would help evaluate any collateral injuries to inform ongoing project planning.
Benefits	This project would benefit FWCI resources from enhanced conservation and management resulting from improved understanding of bycatch rates, establishment of baseline data to estimate the progress made during restoration activities, and general species characterization data such as abundance, distribution, and migration patterns. Other resources and protected species would benefit from decreased fisheries interactions such as bycatch and increased adoption of conservation techniques. This information would also provide ancillary benefits for FWCI species targeted in future restoration planning efforts and other natural resources that would benefit from the restoration projects such as marine mammals, sea turtles, and seabirds.
Health and Safety	This project is not likely to pose a risk to public health and safety. The use of existing data collection and at-sea observer programs with established safety programs would ensure the project would not affect public health and safety by complying with program health and safety requirements.
Summary: Based on the OPA evaluation, this project is identified as a preferred restoration alternative at this time.	

3.5.7 FWCI7, Reduction in Fish Post-release Mortality from Depredation (non-preferred)

OPA NRDA Evaluation Standard	Evaluation
Cost-effectiveness	The total estimated cost of $5,052,000 includes project planning, implementation (expanding data collection and analysis of data, cooperatively developing and testing strategies to mitigate depredation, and conducting outreach and education), project performance monitoring, oversight and management, and contingency. Estimated costs to carry out this alternative are based on similar, previously implemented projects, NOAA's experience with similar activities, and the estimated costs of relevant gear. These costs would be high relative to the potential benefits derived over the project duration. The project would rely on existing datasets to understand interactions; however, additional data analysis is needed to understand and quantify interactions leading to depredation. Additional data collection and gear testing prior to implementation would improve its cost-effectiveness. Based on the existing data gaps and associated uncertainties with costs, the Open Ocean TIG has determined that the project is not likely to deliver benefits cost effectively.

OPA NRDA Evaluation Standard	Evaluation
Goals and Objectives	This project is consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal and underlying FWCI Restoration Type goals. The project has a nexus to injuries as it would help compensate for injuries to Gulf FWCI populations resulting from the DWH oil spill by reducing fish mortality from depredation. The proposed mortality reduction activities align with restoration techniques identified in the PDARP/PEIS and the DWH Open Ocean TIG *Fish and Water Column Invertebrates Strategic Plan*. However, there is relatively high uncertainty surrounding the causes of and methods to reduce depredation. The tools to reduce depredation are novel, their adoption in the fishing community is an uncertainty, and additional data is needed to improve understanding and identification of depredation hotspots. These uncertainties may reduce the benefits of project implementation and the ability to meet project goals and objectives.
Likelihood of Success	This project would seek to identify reliable depredation deterrent methods to reduce the mortality of fish resources from depredation and scavenging. This project would engage fishing communities to gather local knowledge on interactions with sharks, mammals, and other predators and to collaboratively test depredation-deterrent strategies and technologies that would be voluntarily implemented. However, preliminary deterrent measures have not yet been identified, so implementation would be delayed until technologies or techniques to reduce depredation are identified and tested. For this reason and based on the additional key data gaps and uncertainties described above, the Open Ocean TIG has determined that this project does not have a high likelihood of success at this time.
Avoid Collateral Injury	Since depredation deterrents and techniques continue to be developed, and those that are available have not yet been fully evaluated, it is unknown the extent to which these methods may have collateral injuries on natural resources including FWCI, sharks, marine mammals, and seabirds. A high level of monitoring, not proposed in this project, may be needed to fully determine any collateral injures resulting from the use of any commercially available devices that would be provided during the project.
Benefits	This project would benefit fish resources across several species, including reef fish such as red snapper and HMS such as yellowfin tuna. Reducing depredation or scavenging would improve the likelihood that these fish are able to survive and contribute to population health and resilience; however, since depredation deterrents and techniques continue to be developed and those that are available have not yet been fully evaluated, it is unknown the extent to which these methods may benefit natural resources.
Health and Safety	Since project activities would primarily involve data collection and analysis relating to existing fishing practices and depredation deterrent methods, the project is not likely to pose a risk to public health and safety beyond those experienced through existing fishing practices. Project participants would be trained in the safety measures and proper use of any devices tested during the project.
Summary: Based on the OPA evaluation, specifically the cost-effectiveness, goals and objectives, likelihood of success, avoidance of collateral injury, and benefits when compared with other FWCI alternatives in this RP4/EA, this project is identified as a non-preferred restoration alternative in this RP4/EA.	

3.5.8 ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles) (preferred)

OPA NRDA Evaluation Standard	Evaluation
Cost-effectiveness	The total estimated cost of $5,000,000 includes project planning, implementation (acquisition of parcels and potential removal of derelict structures), project performance monitoring, oversight and management, and contingency. Estimated costs to carry out this alternative are based on similar, previously implemented projects to protect sea turtle nesting habitat, DOI's experience implementing the Open Ocean TIG's *Long Term Nesting Habitat Protection for Sea Turtles* project, and the best available estimates of high priority parcels' market value. Appraisals would be performed to establish a fair market value for each parcel purchased. Preventing habitat loss is generally more cost-effective than restoring lost or degraded habitat. As such, the Open Ocean TIG has determined that the project costs are reasonable and appropriate.
Goals and Objectives	This project is consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal and underlying ST Restoration Type goals. The project has a clear nexus to injuries as it would help compensate for injuries to Gulf sea turtle populations resulting from the DWH oil spill by preventing the loss of high-density sea turtle nesting habitat. Specifically, the proposed nesting beaches for acquisition are important to loggerhead, green, and leatherback sea turtles, all species that were injured from the DWH spill. Many of the sea turtles that nest at Archie Carr and Hobe Sound NWR may migrate to the Gulf for portions of their lives when not nesting (Ceriani et al., 2012, 2017). The proposed activities align with restoration techniques identified in the PDARP/PEIS and the DWH *Strategic Framework for Sea Turtle Restoration Activities* and would protect sea turtle nesting habitat in perpetuity.
Likelihood of Success	This project utilizes reliable nesting habitat acquisition methods that have been previously employed at similar locations within the proposed project area and by the Open Ocean TIG. This project would build on existing restoration work and organizational partnerships, increasing its likelihood of success. As such, the Open Ocean TIG believes this project is technically feasible and anticipates that it would have a high likelihood of success.
Avoid Collateral Injury	This project is not expected to cause collateral injuries to natural resources as it focuses primarily on land acquisition and conservation. Any environmental consequences of activities relating to the demolition of at-risk structures that act as barriers to sea turtle nesting would be evaluated during project planning and design, and appropriate BMPs would be implemented to minimize collateral injury.
Benefits	This project would benefit several Gulf sea turtle species that nest at Archie Car and Hobe Sound NWRs, including loggerhead, green, and leatherback sea turtles. The acquisition and conservation of parcels would prevent future development on and near these sea turtle nesting beaches, thereby preventing harm to habitat or species that would arise from development. Other beach-dwelling wildlife species, such as birds, may also experience long-term ancillary benefits from the conservation of these lands in perpetuity.
Health and Safety	Since project activities would primarily include acquisition of sea turtle nesting habitat, the project is not likely to pose risks to public health and safety. The project could benefit public health and safety by removing derelict structures that pose risks to nesting sea turtles and hatchlings; their removal may also reduce risks to human safety.
Summary: Based on the OPA evaluation, this project is identified as a preferred restoration alternative at this time.	

3.5.9 ST2, Gulf-Wide Sea Turtle Bycatch Reduction (preferred)

OPA NRDA Evaluation Standard	Evaluation
Cost-effectiveness	The total estimated cost of $8,500,000 includes project planning, implementation (training, travel, education and outreach, and equipment purchase and distribution), project performance monitoring, oversight and management, and contingency. The project is expected to take approximately 8 years to complete; as such, project costs reflect the reasonable costs to implement comprehensive initiatives for the duration of the project. Estimated costs to carry out this alternative are also based on experience with existing projects to reduce sea turtle bycatch, including the Regionwide TIG's *Sea Turtle Early Restoration Project, Shrimp Trawl Bycatch Reduction component* and the Open Ocean TIG's *Reducing Juvenile Sea Turtle Bycatch through Development of Reduced Bar Spacing in Turtle Excluder Devices* projects, as well as on the estimated costs of relevant gear. As such, the Open Ocean TIG has determined that the project costs are reasonable and appropriate.
Goals and Objectives	This project is consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal and underlying ST Restoration Type goals. The project has a clear nexus to injuries as it would help compensate for injuries to Gulf sea turtle populations resulting from the DWH oil spill by reducing the risk of interactions with Gulf commercial fisheries. This project would benefit all sea turtle species and life stages that may be caught as bycatch in the shrimp trawl and commercial hook-and-line fisheries, including, specifically, the small, juvenile turtles that pass through the grid bars of currently used 4-inch-bar-spaced TEDs. The proposed outreach and voluntary gear modification activities align with restoration techniques identified in the PDARP/PEIS and the DWH *Strategic Framework for Sea Turtle Restoration Activities* and would reduce risk of sea turtle mortality from bycatch.
Likelihood of Success	This project would use reliable outreach, voluntary gear modification, and other bycatch reduction methods that have been previously employed across the Gulf by the GMT and would encourage the adoption new gear in the form of small-bar TEDs (2.5-inch bar spacing) that have been successful in field trials. This project would build on existing restoration work and organizational partnerships, increasing its likelihood of success. As such, the Open Ocean TIG believes this project is technically feasible and anticipates that it would have a high likelihood of success.
Avoid Collateral Injury	The TIG does not anticipate that this project would cause collateral injury to natural resources, beyond the potential impacts from existing, permitted fishing practices. This project seeks to reduce risks to sea turtles from commercial fisheries interactions through voluntary implementation of gear modifications and sea turtle bycatch reduction strategies, and as such, project activities would not result in any additional collateral injuries to non-targeted species.
Benefits	This project seeks to reduce the risk of bycatch of sea turtles in Gulf shrimp trawl and commercial hook-and-line fisheries. As bycatch is a leading cause of mortality for sea turtles in the Gulf, this project would benefit sea turtles by reducing the risk of injury or mortality if sea turtles are caught by shrimp otter trawl nets or commercial hook-and-line fishing gear. The project may also provide minor ancillary benefits to other marine wildlife such as fish or marine mammals that may be caught as bycatch in the current 4-inch TEDs but excluded from a 2.5-inch TED.
Health and Safety	The Open Ocean TIG does not anticipate any negative impacts to public health and safety, beyond the potential impacts from existing fishing practices. When working with existing fisheries observer programs and commercial fishing communities, the project would incorporate existing health and safety measures.
Summary: Based on the OPA evaluation, this project is identified as a preferred restoration alternative at this time.	

3.5.10 ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction (preferred)

OPA NRDA Evaluation Standard	Evaluation
Cost-effectiveness	The total estimated cost of $3,500,000 includes project planning, implementation (data analysis to identify hotspots, in-situ studies and risk assessment, and implementation of site-specific conservation measures), project performance monitoring, oversight and management, and contingency. Estimated costs to carry out this alternative are based on similar, previously implemented projects such as the Florida TIG's *Assessing Risk and Conducting Public Outreach to Reduce Vessel Strikes on Sea Turtles Along Florida's Gulf Coast* and NOAA's experience with similar work. As such, the Open Ocean TIG has determined that the project costs are reasonable and appropriate.
Goals and Objectives	This project is consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal and underlying ST Restoration Type goals. The project has a clear nexus to injuries as it would help compensate for injuries to Gulf sea turtle populations resulting from the DWH oil spill by reducing the risk of recreational vessel strikes to sea turtles. The proposed data analysis activities and implementation of voluntary conservation measures to reduce vessel strikes align with restoration techniques identified in the PDARP/PEIS and the DWH *Strategic Framework for Sea Turtle Restoration Activities* and are expected to reduce risk of sea turtle injury and mortality.
Likelihood of Success	This project utilizes field data collection and analyses to identify conservation measures that would have the highest likelihood of success for reducing sea turtle injury or mortality from vessel strikes in selected hotspots. The use of existing data from organizational partners to identify areas of most need and location-specific data to tailor conservation measures to each site would improve efficacy of project outcomes. Furthermore, the Florida TIG's *Assessing Risk and Conducting Public Outreach to Reduce Vessel Strikes on Sea Turtles along Florida's Gulf Coast* project is currently underway and would provide insight into successful approaches that may be expanded on by the Open Ocean TIG through this project. As such, the Open Ocean TIG believes this project is technically feasible and anticipates that it would have a high likelihood of success.
Avoid Collateral Injury	The TIG does not anticipate that this project would cause collateral injury to natural resources. This project seeks to reduce risks to sea turtles from vessel strikes. Project activities would primarily be planning, data analysis, or centered around boater outreach and education and would not result in any additional collateral injuries beyond the potential impacts from existing boating practices.
Benefits	This project seeks to reduce vessel strikes with sea turtles in areas of high vessel activity overlapping with high sea turtle activity. This project would benefit sea turtles by reducing the risk of injury and mortality from vessel collisions. The project may also provide ancillary benefits to other wildlife species that experience vessel collisions such as large fish or marine mammals.
Health and Safety	The Open Ocean TIG does not anticipate any negative impacts to public health and safety. The project would implement standard boating safety measures when conducting field studies or identifying conservation measures to reduce vessel strike risk.
Summary: Based on the OPA evaluation, this project is identified as a preferred restoration alternative at this time.	

3.5.11 ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements (preferred)

OPA NRDA Evaluation Standard	Evaluation
Cost-effectiveness	The total estimated cost of $11,000,000 includes project planning, implementation (including organization and implementation of STSSN activities, emergency response activities, and STSSN database management and administration), project performance monitoring, oversight and management, and contingency. Estimated costs to carry out this alternative are based on similar, previously implemented projects and NOAA's experience with the STSSN through the Early Restoration Phase IV *Sea Turtle Early Restoration, Enhancement of the Sea Turtle Stranding and Salvage Network and Development of an Emergency Response Program component* and the Regionwide TIG's *Regionwide Enhancements to the Sea Turtle Stranding and Salvage Network and Enhanced Rehabilitation* projects. As such, the Open Ocean TIG has determined that the project costs are reasonable and appropriate.
Goals and Objectives	This project is consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal and underlying ST Restoration Type goals. The project has a clear nexus to injuries as it would help compensate for injuries to Gulf sea turtle populations resulting from the DWH oil spill both directly, through the rescue, rehabilitation, and release of stranded sea turtles, and indirectly, through the insight into sea turtle stressors gained by necropsy data and analysis of STSSN datasets. Further, mortality investigations and STSSN data management and distribution would address priorities identified in the *Open Ocean Trustee Implementation Group Monitoring and Adaptive Management Strategy*. The proposed activities align with techniques identified in the PDARP/PEIS, the DWH *Strategic Framework for Sea Turtle Restoration Activities*, and the *Open Ocean Trustee Implementation Group Monitoring and Adaptive Management Strategy* and would reduce the risk of sea turtle mortality from stranding.
Likelihood of Success	This project would enhance STSSN activities to rescue and rehabilitate stranded turtles or perform necropsies to better understand causes of mortality; to respond in emergencies such as cold stun events; and to analyze gathered data and distribute findings that would help target future sea turtle conservation efforts. This project would build on existing restoration projects and strengthen organizational partnerships, increasing its likelihood of success. As such, the Open Ocean TIG believes this project is technically feasible and anticipates that it would have a high likelihood of success.
Avoid Collateral Injury	The TIG does not anticipate that this project would cause collateral injury to natural resources. This project seeks to reduce mortality of stranded sea turtles by improving response and rehabilitation capacity or by improving the understanding of sea turtle stressors to help inform future restoration efforts. As such, project activities would not result in any collateral injuries.
Benefits	This project seeks to improve outcomes for stranded sea turtles through improved response capacity, particularly during emergency response events, and to analyze data that would better inform restoration efforts. This project would benefit sea turtles by reducing the risk of mortality during an emergency event and provides indirect benefits by identifying emerging threats and collaboration with NOAA's GMT and other restoration efforts conducting threat reduction activities.
Health and Safety	The Open Ocean TIG does not anticipate any negative impacts to public health and safety. The project would work with existing STSSN partners to implement existing health and safety measures during stranding response and/or mortality investigations.
Summary: Based on the OPA evaluation, this project is identified as a preferred restoration alternative at this time.	

3.5.12 ST5, Kemp's Ridley Nesting Enhancement in Mexico (non-preferred)

OPA NRDA Evaluation Standard	Evaluation
Cost-effectiveness	The total estimated cost of $5,520,000 includes project planning, implementation (nest protection activities, infrastructure repairs), project performance monitoring, oversight and management, and contingency. Estimated costs to carry out this alternative are based on similar, previously implemented projects and DOI's experience with similar work, including the Early Restoration Phase IV *Sea Turtle Early Restoration Project, Kemp's Ridley Sea Turtle Nest Detection component* and the Regionwide TIG's *Restore and Enhance Sea Turtle Nest Productivity* projects. As such, the Open Ocean TIG has determined that the project costs are reasonable and appropriate.
Goals and Objectives	This project is consistent with the Replenish and Protect Living Coastal and Marine Resources Restoration Goal and underlying ST Restoration Type goals. The project has a clear nexus to injuries as it would help compensate for injuries to Gulf sea turtle populations resulting from the DWH oil spill by detecting Kemp's ridley sea turtle nests and protecting eggs and hatchlings. The proposed nest protection activities align with restoration techniques identified in the PDARP/PEIS and the DWH *Strategic Framework for Sea Turtle Restoration Activities* and would reduce loss of sea turtle eggs and hatchlings from predation or anthropogenic influence. However, for this RP4/EA, the TIG prioritized projects that are ready to proceed to implementation. Since funding for nest protection activities in Tamaulipas is secured through other DWH NRDA projects for the next 2 years, this project is not in urgent need of funds and would not begin implementation for a few years.
Likelihood of Success	This project utilizes nest detection and egg protection measures that have been successfully implemented in past DWH restoration projects for Kemp's ridley sea turtles in Mexico. As such, the project's likelihood of success is high.
Avoid Collateral Injury	The TIG does not anticipate that this project would cause collateral injury to natural resources. This project seeks to reduce nest predation or egg poaching through the detection and protection of Kemp's ridley sea turtle nests in an area that hosts the global majority of Kemp's ridley nesting population. As such, project activities would primarily be centered around beach patrols, egg protection or relocation, and hatchling release, and would not result in any collateral injuries.
Benefits	This project seeks to reduce the loss of Kemp's ridley sea turtle eggs and hatchlings. This project would benefit Kemp's ridley sea turtles by reducing the risk of mortality from predation or poaching by relocating or protecting nests. While this project specifically targets Kemp's ridley sea turtles, other species of sea turtles that nest on the beaches of Tamaulipas, Mexico, such as green turtles (Shaver et al., 2020) may also benefit. While loggerhead, leatherback, and hawksbill sea turtles do not nest as frequently in Tamaulipas (Márquez-M et al., 2004), these species may also benefit if any happen to be present.
Health and Safety	The Open Ocean TIG does not anticipate any negative impacts to public health and safety. The TIG would work with existing organizational partners and replace project infrastructure as necessary to ensure the safety of the public and project team.
Summary: While all the sea turtle restoration projects analyzed in this RP4/EA are expected to be cost effective and have a high likelihood of success, this project has full funding for the near term. As such, the TIG would prefer to prioritize funding the other projects, which have more immediate funding needs, at this time. Therefore, this project is identified as a non-preferred restoration alternative in this RP4/EA.	

3.6 Natural Recovery/No Action Alternative

Pursuant to the OPA NRDA regulations, the 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 the Open Ocean TIG to accelerate the recovery of FWCI or sea turtles in the Open Ocean Restoration Area using DWH NRDA funding at this time.

If natural recovery processes are allowed to occur, one of four outcomes, or a combination of these, is anticipated 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 these scenarios, recovery would take much longer compared to a scenario in which restoration actions are undertaken. Given that technically feasible Restoration Approaches are available to compensate for interim natural resource and service losses, in the PDARP/PEIS, the DWH Trustees rejected this alternative from further OPA evaluation in subsequent restoration planning. Based on this determination, and incorporating that analysis by reference herein, the TIG did not further evaluate natural recovery as a viable alternative under OPA.[20]

3.7 OPA Evaluation Conclusions

As described above, the Open Ocean TIG conducted an OPA NRDA evaluation of each of the projects included in the reasonable range of alternatives for this RP4/EA. The TIG's choice of preferred alternatives is based on this evaluation (described above) and informed by the NEPA analysis presented in Chapter 4.

Table 3-1 OPA NRDA Evaluation Summaries

Alternative	OPA Evaluation Summary
FWCI Restoration Type	
FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries)	The estimated project costs are reasonable and appropriate, and the project would leverage previously conducted restoration and existing expertise and program structure, increasing its cost-effectiveness. This project would reduce the level of post-release mortality and increase survivorship of FWCI species and populations with connectivity to those injured by the DWH oil spill. This project builds on existing successful partnerships and on the success of the existing Return 'Em Right Program and would utilize techniques that are proven and established, increasing the likelihood of success. Thus, the Open Ocean TIG anticipates this project would be implemented successfully with minimal collateral impacts to natural resources and human health and safety. This project is likely to provide ancillary benefits to other wildlife, including other FWCI, marine mammal, sea turtle, and seabird species injured by the DWH oil spill and ESA-listed species. This project is identified as a preferred restoration alternative by the Open Ocean TIG.

[20] A No Action Alternatives for each Restoration Type is included in this RP4/EA analysis pursuant to NEPA as a "…benchmark, enabling decision-makers to compare the magnitude of environmental effects of the action alternatives." The environmental consequences of the NEPA The No Action Alternatives are considered separately in Chapter 4 and the NEPA Supporting Documentation Report in Appendix A.

Alternative	OPA Evaluation Summary
FWCI2, Next Generation Fishing	The estimated project costs are reasonable, appropriate, and based on previously implemented projects and experience with similar activities, increasing its cost-effectiveness. This project would reduce bycatch and increase survivorship of FWCI species and populations with connectivity to those injured by the DWH oil spill. This project builds on existing successful efforts, which have demonstrated that the tools and methods are technically feasible, based on best available science, and proven to be effective, increasing the likelihood of success. Thus, the Open Ocean TIG anticipates this project would be implemented successfully with minimal collateral impacts to natural resources and human health and safety. This project is likely to provide ancillary benefits to other wildlife, including other FWCI, marine mammal, sea turtle, and seabird species injured by the DWH oil spill. This project is identified as a preferred restoration alternative by the Open Ocean TIG.
FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality	The estimated project costs are reasonable and appropriate, based on previously implemented projects and experience with similar activities, and would leverage information from a RESTORE-funded project, increasing its cost-effectiveness. This project would reduce the risk of mortality from bycatch and depredation and protect spawning aggregations, increasing survivorship of FWCI species and populations with connectivity to those injured by the DWH oil spill. This project builds on existing partnerships and successful efforts, which have demonstrated that the tools and methods are technically feasible and effective, increasing the likelihood of success. Thus, the Open Ocean TIG anticipates this project would be implemented successfully with minimal collateral impacts to natural resources and human health and safety. This project is likely to provide ancillary benefits to other wildlife, including other FWCI, marine mammal, sea turtle, and seabird species injured by the DWH oil spill and ESA-listed species including giant manta ray and smalltooth sawfish. This project is identified as a preferred restoration alternative by the Open Ocean TIG.
FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates	The estimated project costs are reasonable and appropriate, are based on previously implemented projects and experience with similar activities, and would leverage expertise of established partners and existing programs, increasing its cost-effectiveness. This project would reduce the risk from multiple threats such as marine debris, invasive species, water quality, and energy development, increasing survivorship of FWCI species and populations with connectivity to those injured by the DWH oil spill. This project builds on existing partnerships and successful efforts, which have demonstrated that the tools and methods are technically feasible and effective. Further, the project would be implemented in stages to test and monitor the success of different project techniques, increasing the likelihood of success. Thus, the Open Ocean TIG anticipates this project would be implemented successfully with minimal collateral impacts to natural resources and human health and safety. This project is likely to provide ancillary benefits to other wildlife, including other FWCI, marine mammal, sea turtle, and seabird species injured by the DWH oil spill. This project is identified as a preferred restoration alternative by the Open Ocean TIG.

Alternative	OPA Evaluation Summary
FWCI5, Education and Stewardship Partnerships with Charter Anglers	The estimated project costs are reasonable and appropriate, are based on previous experience with similar activities, and would leverage expertise of established partners, in particular NOAAs Office of Law Enforcement and existing programs, increasing its cost-effectiveness. Cost effectiveness would be evaluated on an ongoing basis and adaptively managed based on community feedback to continually improve cost effectiveness. This project would reduce risks to FWCI from illegal charter fishing, increasing survivorship of FWCI species and populations with connectivity to those injured by the DWH oil spill. This project builds on successful efforts, which have demonstrated that the tools and methods are technically feasible and effective, and project performance monitoring to evaluate rates of change of fishing practices would inform project implementation, increasing the likelihood of success. Thus, the Open Ocean TIG anticipates this project would be implemented successfully with minimal collateral impacts to natural resources and human health and safety. This project is likely to provide ancillary benefits to habitat and other wildlife, including other FWCI, marine mammal, sea turtle, and seabird species injured by the DWH oil spill. This project is identified as a preferred restoration alternative by the Open Ocean TIG.
FWCI6, Communication, Adaptive Management, Planning, and Integration	The estimated project costs are reasonable and appropriate, are based on previously implemented projects and experience with similar activities, and would leverage existing programs, increasing its cost-effectiveness. This project would address existing gaps in current understanding of high-priority fish resources that would enhance their restoration and management, increasing survivorship of FWCI species and populations with connectivity to those injured by the DWH oil spill. This project would use existing and reliable tools and techniques with low uncertainty and builds on the entire portfolio of FWCI restoration projects to amplify the likelihood of success of all projects. Thus, the Open Ocean TIG anticipates this project would be implemented successfully with minimal collateral impacts to natural resources and human health and safety. This project is likely to provide ancillary benefits to other wildlife, including other FWCI, marine mammal, sea turtle, and seabird species injured by the DWH oil spill. This project is identified as a preferred restoration alternative by the Open Ocean TIG.
FWCI7, Reducing Fish Post-Release Mortality from Depredation	The estimated project costs are based on previous experience with similar activities; however, these costs would be high relative to the potential benefits derived over the project duration. Additional data collection and gear testing prior to implementation would improve its cost-effectiveness. This project would reduce fish mortality from depredation with the potential to increase survivorship of FWCI species and populations with connectivity to those injured by the DWH oil spill. However, there is relatively high uncertainty regarding the factors that contribute to and methods to reduce depredation. These uncertainties may reduce the benefits of project implementation, the ability to meet project goals and objectives, and likelihood of success. Because depredation deterrents and techniques continue to be developed and those that are available have not yet been fully evaluated, it is unknown the extent to which these methods may have collateral injuries on natural resources or the extent to which the project would provide ancillary benefits to other natural resources. The project is not likely to pose a risk to public health and safety. Based on uncertainties with costs, existing data gaps, the need to further develop the technologies and techniques to reduce depredation, test their efficacy, and evaluate their potential adoption in the fishing community, and collect additional data to improve understanding and identification of depredation hotspots, the Open Ocean TIG has determined that the project is not likely to deliver benefits cost effectively. Thus, this project is identified as a non-preferred restoration alternative by the Open Ocean TIG at this time.

Alternative	OPA Evaluation Summary
ST Restoration Type	
ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles)	The estimated project costs are reasonable and appropriate, are based on previously implemented projects and DOI's experience with similar activities, and would leverage restoration actions across NFWF-GEBF and previous Open Ocean TIG projects, maximizing cost-effectiveness. The project would protect and conserve sea turtle nesting habitat in perpetuity, ensuring that nesting sea turtles and their hatchlings have access to high-quality nesting habitat. This project builds on the Open Ocean TIG's successful efforts with acquiring sea turtle nesting habitat at Archie Carr NWR for long-term protection. Thus, the Open Ocean TIG anticipates this project would be implemented successfully with minimal collateral impacts to natural resources and human health and safety. This project is likely to provide ancillary benefits to habitat and other wildlife, including other bird species injured by the DWH oil spill. This project is identified as a preferred restoration alternative by the Open Ocean TIG.
ST2, Gulf-Wide Sea Turtle Bycatch Reduction	The estimated project costs are reasonable, appropriate, and based on previously implemented projects and experience with similar activities. The project would reduce the risk of sea turtle bycatch in commercial fisheries by ensuring proper use of TEDs, providing small-bar TEDs to voluntary trawl vessels to reduce the bycatch of juvenile sea turtles, and educating commercial hook-and-line fishing fleets on best sea turtle handling and resuscitation practices. This project builds on existing successful partnerships established through previous DWH-funded projects and would utilize techniques that are proven and established, increasing the likelihood of success. Thus, the Open Ocean TIG anticipates this project would be implemented successfully with minimal collateral impacts to natural resources and human health and safety. This project is likely to provide ancillary benefits to other marine fauna, including FWCI and marine mammals. This project is identified as a preferred restoration alternative by the Open Ocean TIG.
ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction	The estimated project costs are reasonable, appropriate, and based on previously implemented projects and experience with similar activities. This project would reduce the risk of vessel strikes to sea turtles by taking a phased approach to evaluating vessel strike hotspots, conducting field studies, and designing and implementing voluntary site-specific conservation measures to reduce vessel strikes. This project builds on existing successful partnerships established through projects funded by other TIGs and would take a phased approach to tailoring site-specific vessel strike conservation measures, increasing the likelihood of success. Thus, the Open Ocean TIG anticipates this project would be implemented successfully with minimal collateral impacts to natural resources and human health and safety. This project is likely to provide ancillary benefits to other marine fauna, including FWCI and marine mammals. This project is identified as a preferred restoration alternative by the Open Ocean TIG.
ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements	The estimated project costs are reasonable, appropriate, and based on previously implemented projects and experience with similar activities. This project would support the rescue, rehabilitation, and release of stranded and out-of-habitat sea turtles across the Gulf, in particular, supporting response and rescue from emergency events. Further, the project would support sustained mortality investigations and data management and sharing to inform the TIG's restoration and MAM priorities and potential future restoration needs. This project builds on existing successful partnerships established through projects funded by other TIGs. Thus, the Open Ocean TIG anticipates this project would be implemented successfully with minimal collateral impacts to natural resources and human health and safety. This project is identified as a preferred restoration alternative by the Open Ocean TIG.

Alternative	OPA Evaluation Summary
ST5, Kemp's Ridley Nesting Enhancement in Mexico	The estimated project costs are reasonable, appropriate, and based on previously implemented projects and experience with similar activities. This project would enhance nesting success for Kemp's ridley sea turtles at their primary nesting beaches in Mexico by conducting beach patrols, protecting nests and hatchlings, and maintaining or replacing patrol infrastructure. This project builds on existing successful partnerships established through projects funded by other TIGs. However, funding from these existing projects will provide near-term funding. Comparatively, the other Sea Turtle Restoration Type alternatives evaluated in this RP4/EA have more immediate funding needs, and as such, would provide restoration benefits sooner. As such, and compared with the other alternatives, this project is identified as a non-preferred restoration alternative by the Open Ocean TIG at this time.

4 Environmental Assessment

4.1 Overview of the NEPA Approach

NEPA (40 CFR §1502.16) requires federal agencies to comparatively evaluate the environmental effects of the alternatives under consideration, including effects to physical, biological, and socioeconomic resources. This integrated OPA/NEPA document is being prepared under amendments to NEPA authorized in the FRA and the NEPA Implementation Revisions Phase 2 (89 *Federal Register* 35442). NEPA conclusions presented herein are informed by the NEPA Supporting Documentation Report in Appendix A.

The NEPA analysis describes anticipated adverse and beneficial environmental impacts of the preferred and non-preferred alternatives. Together, these constitute the reasonable range of alternatives for this RP4/EA. A No Action Alternative is also analyzed for each Restoration Type (Appendix A.6). The NEPA Supporting Documentation Report is consistent with the PDARP/PEIS, which is incorporated by reference, and tiers where applicable. Resources analyzed and impact definitions (minor, moderate, major) align with the PDARP/PEIS (Appendix D).[21] Appendix A is organized to describe impacts in a manner that avoids redundancy and unnecessary information by discussing activities that do not require further NEPA analysis (A.2); analyzing resources with similar impacts across alternatives (A.3.1); and focusing on project-specific impacts by Restoration Type (A.5).

To determine whether an action has the potential to result in significant impacts, the context and intensity of the proposed action are considered. Context refers to the area of impacts (local, statewide, etc.) and duration (i.e., whether they are short- or long-term). Intensity refers to the severity of impact and could include the timing of the action (e.g., more intense impacts would occur during critical periods like high visitation or wildlife breeding/rearing). Intensity is also described in terms of whether the impact would be beneficial or adverse. "Adverse" is used in Appendix A and this chapter only to describe the Trustees' evaluation under NEPA. This term is defined and applied differently in consultations pursuant to ESA and other protected resource statutes. The analysis characterizes adverse impacts as short- or long-term and minor, moderate, or major. The analysis of beneficial impacts focuses on the duration (short- or long-term) and does not attempt to specify the intensity of the benefit.

The NEPA Supporting Documentation Report provided in Appendix A and the conclusions provided in this chapter address direct, indirect, and cumulative impacts of the proposed alternatives. Appendix 6.B of the PDARP/PEIS (Cumulative Impacts) is incorporated by reference into the cumulative impacts analysis presented in Section A.7 of this RP4/EA, including the methodologies for assessing cumulative impacts, identification of affected resources, and the cumulative impacts scenario. Further, brief project descriptions focusing on activities that would result in environmental impacts are provided in Appendix A.5; Section 2.4 provides complete project descriptions for each alternative.

To streamline the NEPA process and present a concise document that provides sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a Finding of No

[21] 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.

Significant Impact (FONSI), and to aid the Open Ocean TIG's compliance with NEPA (40 CFR § 1500.3, 40 CFR § 1501.12), relevant information from existing plans, studies, and other materials has been incorporated by reference. Agencies should "focus on significant environmental issues" and, for issues that are not significant, there should be "only enough discussion to show why more study is not warranted" (40 CFR § 1502.2(b)). All source documents relied on for the NEPA analyses are available and references are provided in the environmental consequences discussion where applicable (Appendix B).

4.1.1 Overview of the Approach for Projects Occurring in Locations Outside of the Jurisdiction of the United States

The NEPA Supporting Documentation Report provided in Appendix A and the conclusions provided in this chapter include an analysis of the environmental effects of four projects[22] included in the reasonable range of alternatives that would partially or wholly occur outside the jurisdiction of the U.S., and, therefore, include actions that are not subject to NEPA. Executive Order (EO) 12114, "Environmental Effects Abroad of Major Federal Actions" (1979) furthers the purpose of NEPA, the Marine Protection Research and Sanctuaries Act, and the Deepwater Port Act for actions taken by U.S. federal agencies with respect to the environment outside the U.S., its territories, and possessions. However, "actions not having a significant effect on the environment outside the United States as determined by the agency" are exempt from this Order (EO 12114, January 4, 1979).

Through the preparation of this RP4/EA, NOAA, as the federal NEPA lead, does not anticipate any major adverse impacts from the four projects that would occur partially or wholly outside of the jurisdiction of the U.S. However, to aid in its decision making under OPA, the Open Ocean TIG has prepared a comparable environmental review for these projects to better understand the potential effects of each alternative and to remain consistent with the level of environmental analysis completed for projects across the DWH NRDA program. These NEPA analyses do not provide for any regulatory or policy requirements of these projects' host nations. Implementing Trustee(s) and associated project partners would be responsible for complying with host nations' federal, provincial, and/or municipal statutory and regulatory requirements.

4.2 Consistency with the PDARP/PEIS

The NEPA analysis in this RP4/EA tiers from the PDARP/PEIS, where applicable. To ensure compliance with the FRA (42 U.S.C. § 4336b) and 40 CFR § 1501.11 in the preparation of this RP4/EA, the DWH Federal Trustees reevaluated the PDARP/PEIS analysis and its underlying assumptions and confirms its continued validity. Specifically, the Federal Trustees compared their assessment of each project's anticipated impacts on each resource analyzed with the impact intensity definitions (short- or long-term, minor, moderate, or major) found in Table 6.3-2 of the PDARP/PEIS (and in this RP4/EA as Appendix D), the impacts that the PDARP/PEIS forecasted for preliminary phases of restoration planning (Section 6.4.14, DWH Trustees, 2016), and the restoration approaches and techniques to protect and conserve FWCI and sea turtles (Sections 6.4.5 and 6.4.7, respectively, DWH Trustees 2016) proposed in this

[22] The four projects that would be implemented wholly or partially outside of the jurisdiction of the U.S. are the FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries) (preferred), FWCI2, Next Generation Fishing (preferred), FWCI6, Communication, Adaptive Management, Planning, and Integration (preferred), and ST5, Kemp's Ridley Nesting Enhancement in Mexico (non-preferred) projects.

RP4/EA (e.g., education and outreach, alternative gear testing and distribution, STSSN activities, sea turtle nesting habitat acquisition).

For preliminary restoration planning activities such as desktop-based data analyses, Section 6.4.14 of the PDARP/PEIS found that some activities would cause direct, short-term, minor adverse impacts to physical and biological resources through associated fieldwork, but that those disturbances would be temporary and localized to the project site. The PDARP/PEIS found that the Restoration Approaches relevant to the projects proposed in this RP4/EA would be likely to cause the following environmental consequences:

Physical Resources: Depending on the project type, there could be short-term, negligible-to-minor adverse impacts and long-term benefits to geology, substrates, hydrology, water quality, air quality, and noise during project implementation. Short-term, minor impacts to geology and substrates and noise may occur as a result of vehicle or equipment use during surveys and transportation or as a result of nest relocation. However, many short-term adverse impacts would be minimized by implementing best practices. Long-term benefits to geology and substrates are anticipated from nesting habitat conservation.

Biological Resources: Depending on the techniques implemented, short-term, minor-to-moderate adverse impacts and long-term benefits to biological resources may be anticipated during project implementation. For example, stranding response activities and protection of nesting habitats may cause short- to long-term, minor adverse impacts due to human activity and vehicle traffic on beaches during project activities. Nest protection may cause short- to long-term, minor adverse impacts from nest handling. Benefits to biological resources such as invertebrates, fishes, marine mammals, and sea turtles could result from improved environmental quality, habitat protection, improved survivorship of hatchlings or rehabilitated turtles, and improved fishing practices.

Socioeconomic Resources: Project activities could result in minor, short-term adverse economic impacts and long-term economic benefits related to restoration efforts. For example, voluntary conservation actions to reduce FWCI post-release mortality or FWCI and sea turtle bycatch may cause short-term, minor-to-moderate adverse impacts if there are reductions in efficiency in fishery operations and catch. Long-term, minor adverse impacts may arise from habitat acquisition due to lost development opportunity; however, willing transfers or conservation easements are not anticipated to produce adverse impacts. Long-term, minor adverse effects to recreational beach use may arise from increased human and vehicle traffic for stranding response activities or to boating due to voluntary conservation measures to reduce vessel strikes. However, long-term benefits are anticipated from increased fishing opportunities resulting from restored species; benefits to tourism and recreation from increased public health and safety; long-term benefits to socioeconomics and fisheries and aquaculture associated with enhanced training programs; and from job opportunities associated with stranding networks. No effects are anticipated to cultural resources or infrastructure.

The DWH Trustees for the Open Ocean TIG find that the resource impacts as forecasted in the PDARP/PEIS are consistent with the impacts anticipated from the projects analyzed in this RP4/EA, and thus, the Open Ocean TIG affirms the applicability of the PDARP/PEIS' NEPA analysis to this RP4/EA. Additional analyses regarding the specific activities proposed in this RP4/EA are below.

4.3 Overview of the Action Area

4.3.1 Gulf of Mexico

The Gulf is an oceanic basin connected to the Atlantic Ocean and Caribbean Sea and is bordered by the U.S., Mexico, and Cuba. The Gulf features a highly varied continental shelf and significant bathymetric features such as reefs, canyons, and salt domes. It contains significant reserves of petroleum and natural

gas, along with other mineral resources (Geyer et al., 2022). Oil exploration has led to numerous spills, including the Taylor Energy MC20 spill (NOAA Damage Assessment, Remediation, and Restoration Program, n.d.). The coastal regions near Texas, Louisiana, and the Bay of Campeche in Mexico are key areas for oil production (Geyer et al., 2022; Mexico Business News, n.d.).

The Gulf is host to a number of highly diverse and productive habitats, including coastal dunes, wetlands, seagrass beds, coral reefs, and deep-sea zones, each supporting unique species and ecological roles. However, the Gulf also has a large annual hypoxic dead zone from excess nutrients flowing down the Mississippi River drainage basin (NOAA, 2024b). The region supports a wide variety of marine fish and invertebrates, including commercially valuable species including shrimps, tunas, snappers, groupers, and mackerels. Bird diversity is high, as the Gulf is positioned along major migratory corridors with varied climates and diverse habitats. The Gulf also contains nesting, foraging, and refuge habitat used throughout various life stages by the five sea turtle species found in the region, all of which are listed under the ESA (National Marine Fisheries Service [NMFS], n.d. [b]). Many other protected species are also found in Gulf waters and shorelines, as well as critical habitat and essential fish habitat (EFH) for a multitude of species.

The U.S. Gulf Coast contains around 15.8 million people, with diverse population centers and industries (U.S. Census Bureau, 2019). The U.S. Gulf's "ocean economy" employs over 800,000 people across various sectors, contributing an estimated $117 billion to the U.S. gross domestic product. Key industries include oil and gas production, marine transportation, tourism, and fishing, with the Gulf accounting for half of the U.S.' oil production (McKinney et al., 2021), approximately a quarter of the country's commercial seafood, and 40 percent of recreational harvest (Ward and Tunnell, 2017). In Mexico, the Gulf Coast includes six states with a 2015 population of 18.4 million (Azuz-Adeath et al., 2019). Oil, tourism, and fishing are also vital to the Mexican Gulf Coast economy and local livelihoods.

4.3.2 Western Atlantic Basin

The U.S. Atlantic coastline stretches over 26,000 miles (41,800 kilometers) from to the Gulf of Maine to southern Florida. The northeastern continental shelf is generally wide and narrows at Cape Hatteras. The southeastern shelf from Cape Hatteras to southern Florida is characterized by the broad, flat Blake Plateau. Key bathymetric features include the deep basins of the Gulf of Maine, the broad, shallow Georges Bank, the Mid Atlantic Bight, and the complex topography of the Blake Plateau and Ridge. Sediments throughout the Atlantic range from sand and gravel to clay and silt.

The coastal estuaries, nearshore waters, and continental shelf of the U.S. Atlantic support diverse marine life, with high primary productivity fueling the food web and sustaining ecologically, commercially, and recreationally valuable species. Habitats include hard-bottom communities like corals and oyster reefs, seagrasses, and softbottom environments augmented by artificial reefs and shipwrecks. These habitats provide essential refuge, nursery, and foraging grounds for a variety of marine organisms, including many species with population connectivity to the Gulf, particularly HMS. This region of the Atlantic also contains many protected species, critical habitat, and EFH. The Archie Carr and Hobe Sound NWRs in Florida contain important nesting grounds for many sea turtles that may spend a significant portion of their lives in the Gulf, including crucial nesting grounds for loggerhead and green sea turtles, as well as nesting habitat for leatherback sea turtles.

The U.S. Atlantic Coast is home to 44.4 million people, more than any other coastline in the U.S (U.S. Census Bureau, 2019). Key coastal industries include commercial and recreational fishing, aquaculture, tourism, and offshore resource extraction. The U.S. Atlantic region contributes significantly to the U.S. economy, generating 40 percent of the nation's commercial seafood value and 60 percent of the recreational fishing catch (NMFS, 2020c). In 2022, the Atlantic's seafood industry employed hundreds of

thousands and contributed billions in revenue (NMFS, 2024a). Additionally, the Atlantic region is focusing on expanding newer coastal industries, such as wind energy (U.S. Department of Energy [DOE], 2024).

In Canada and in nations of northern South America along the Atlantic, such as Guyana, Suriname, French Guiana, and northern Brazil, the Atlantic coastline is home to many millions more, many of whom rely on commercial or small-scale fishing for food and for income.

4.3.3 Caribbean Sea

The Caribbean Sea is a subtropical oceanic basin spanning more than 1 million square miles (2,750,000 square kilometers). It is bordered by South America, Central America, and a chain of volcanic islands including the Greater and Lesser Antilles. Its bathymetry features five elliptical sub-basins separated by submerged ridges, with a relatively narrow continental shelf. Coastal areas in U.S. territories, such as Puerto Rico and the U.S. Virgin Islands, include a mix of sandy beaches, coral reefs, and rock reefs, with varying sediments from red clays in deep basins to ooze from microorganisms on rises and ridges.

The Caribbean Sea boasts a diverse patchwork of habitats such as coral reefs, seagrass beds, and mangroves, which are crucial for marine life and local economies. Coral reefs, vital for storm protection and supporting fisheries and tourism, have declined significantly due to various threats. Seagrass beds and mangroves offer essential habitat and stabilization for marine ecosystems. These habitats support an extremely diverse assemblage of species, including a high proportion of endemic species, and many commercially valuable species such as tunas, groupers, and snappers. The Caribbean contains key breeding, nursery, foraging, and refuge habitat for many migratory fish, sea turtle, and bird species that also spend parts of their lives in the Gulf. While much of the Caribbean is not within U.S. jurisdiction, and therefore not within the authority of U.S. protected species and fisheries regulations, many protected species migrate between U.S. and non-U.S. waters within this region. Critical habitat and EFH for many species, particularly corals, are designated within Puerto Rico and the U.S. Virgin Islands.

With a population of nearly 49 million people (United Nations, 2024), Caribbean nations rely heavily on fishing and tourism. While the Caribbean fishing industry is a key sector for the region's economy and food security, employing approximately 350,000 individuals across 17 nations (Caribbean Natural Resources Institute [CANARI], 2020), its fisheries face challenges with overexploitation, leading many nations to seek economic diversification into renewable energy, aquaculture, and other industries (Rustomjee, 2016). Tourism also plays a significant role in the region's economy, relying upon the Caribbean's natural resources for activities such as beachgoing, snorkeling and diving, and recreational fishing.

4.4 Summary of Environmental Consequences

4.4.1 Fish and Water Column Invertebrates Restoration Type Alternatives

The analysis of environmental consequences for each FWCI alternative in this RP4/EA can be found in the NEPA Supporting Documentation Report (Appendix A). Table 4-1 summarizes the direct and indirect impacts of each alternative and the No Action Alternatives. The environmental analysis demonstrated that there would primarily be short-term and minor adverse impacts as well as environmental benefits from implementation of the RP4/EA FWCI alternatives.

In general, implementation of the RP4/EA FWCI alternatives would result in negligible-to-minor, short-term adverse impacts to physical resources including geology and substrates, air quality, noise, and hydrology and water quality. Physical resources would also benefit from project activities that improve

overall environmental quality, fishing practices, and result in the removal of marine debris and invasive species.

Biological resources would primarily experience short-term, minor adverse impacts from human-related disturbance (e.g., vessel traffic, data collection, use of fishing gear) associated with project implementation. The use of fishing gear and equipment to collect data may interact with habitats, wildlife, and marine, estuarine, or protected species; however, the implementation of BMPs would minimize adverse impacts, and impacts would largely be within the range of those already experienced by permitted fisheries. Biological resources would also experience long-term benefits from improved environmental conditions and fishing practices. The Open Ocean TIG has initiated technical assistance reviews with relevant regulatory agencies regarding potential adverse impacts to protected species and habitats for each preferred alternative for which implementation is proposed. See Table 5-1 for the environmental compliance status of each alternative. Some of these projects will have phased compliance, which is described below in Chapter 5. For these projects, compliance may need to be reevaluated after initial planning has occurred and locations and methodologies for the work are determined. Throughout the compliance review process, 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 processes, and other relevant regulatory requirements.

The RP4/EA FWCI alternatives would result in short-term, negligible-to-minor adverse impacts to socioeconomics, environmental justice, infrastructure, land and marine management, tourism and recreation, fisheries and aquaculture, marine transportation, aesthetics and visual resources, and public health and safety. No long-term adverse impacts are anticipated. Further, most projects in this RP4/EA would result in short- and long-term benefits to socioeconomic resources, in particular, socioeconomics, land and marine management, tourism and recreation, aesthetics and visual resources, and public health and safety. Further, fisheries are anticipated to benefit from improved fishing practices and environmental conditions.

The No Action Alternative is anticipated to result in long-term, minor-to-moderate adverse impacts from the delayed adoption of enhanced fishing practices (e.g., using venting tools exclusively instead of using descending devices for fish experiencing barotrauma) and best practices, from a lack of additional data collection (e.g., data on spawning aggregation locations) to improve understanding of fisheries and fisheries management, from the invasive species and marine debris that are not removed, and from other negative environmental conditions that would not be improved.

4.4.2 Sea Turtles Restoration Type Alternatives

The analysis of environmental consequences for each ST alternative in this RP4/EA can be found in the NEPA Supporting Documentation Report in Appendix A. Table 4-1 summarizes direct and indirect impacts of each alternative and the No Action Alternative. The environmental analysis demonstrated that there would primarily be short-term and minor adverse impacts as well as environmental benefits from implementation of the RP4/EA ST Restoration Type alternatives.

In general, implementation of the RP4/EA ST alternatives would result in short-term, minor adverse impacts to physical resources including geology and substrates, air quality, and hydrology and water quality. Some short-term, moderate adverse impacts to geology and substrates would be anticipated from the implementation of the ST1 alternative. However, there would be no long-term adverse impacts to physical resources. The ST1 alternative would result in benefits to geology and substrates addressing sources of anthropogenic impacts on terrestrial sediments.

Biological resources would experience short-term, minor-to-moderate adverse impacts from human- and construction-related disturbance (e.g., foot traffic, human presence) associated with project implementation (e.g., structure demolition, STSSN response and rehabilitation). No alternatives would have long-term adverse impacts on biological resources. The Open Ocean TIG has initiated technical assistance reviews with relevant regulatory agencies regarding potential adverse impacts to protected species and habitats for each preferred alternative for which implementation is proposed. See Table 5-1 for environmental compliance status of each alternative. 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 processes, and other relevant regulatory requirements. Biological resources (in particular, sea turtles) would experience long-term benefits from improved habitat quality and long-term protection, the use of more selective fishing gear, reduction in vessel strikes, and stranding response.

The RP4/EA alternatives would result in some short- or long-term, negligible-to-minor adverse impacts to socioeconomics and aesthetics and visual resources. All projects in this RP4/EA would result in short- and long-term benefits to socioeconomic resources, in particular, socioeconomics, land and marine management, tourism and recreation, fisheries and aquaculture, aesthetics and visual resources, and public health and safety.

The No Action Alternative is anticipated to result in long-term, minor-to-major adverse impacts if existing natural and anthropogenic threats to sea turtles are not addressed through the implementation of the ST Restoration Type alternatives.

Table 4-1 Summary of the Direct and Indirect Impacts of the Reasonable Range of Restoration Alternatives

Project	Physical Resources	Biological Resources	Socioeconomic Resources
FWCI Restoration Type			
No Action - FWCI	Geology and Substrates: no effect. Hydrology and Water Quality: no effect. Air Quality: no effect. Noise: no effect.	Habitats: long-term, minor adverse impacts from continued environmental deterioration from unaddressed anthropogenic stressors such as marine debris and invasive species. Wildlife Species: long-term, moderate adverse impacts from continued environmental deterioration from unaddressed anthropogenic stressors such as marine debris, delayed adoption of enhanced fishing practices, and continued illegal fishing practices. Marine and Estuarine Fauna: long-term, moderate adverse impacts from continued environmental deterioration from unaddressed anthropogenic stressors, delayed adoption of enhanced fishing practices, and continued illegal fishing practices. Protected Species: long-term, moderate adverse impacts from continued environmental deterioration from unaddressed anthropogenic stressors, delayed adoption of enhanced fishing practices, and continued illegal fishing practices.	Socioeconomics and Environmental Justice: long-term, moderate adverse impacts from delayed adoption of enhanced fishing practices and continued illegal fishing practices resulting in decreased fish biomass and potentially decreased commercial and recreational catch. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: no effect. Tourism and Recreational Use: no effect. Fisheries and Aquaculture: long-term, moderate adverse impacts from delayed adoption of enhanced fishing practices and continued illegal fishing practices resulting in decreased fish biomass and potentially decreased commercial and recreational catch. Marine Transportation: no effect. Aesthetics and Visual Resources: no effect. Public Health and Safety: no effect.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries)	Geology and Substrates: no effect. Hydrology and Water Quality: short-term, minor adverse impacts from increased vessel use and use of fishing gear and equipment to collect data. Air Quality: short-term, minor adverse impacts from increased vessel use. Noise: short-term, minor adverse impacts from increased vessel use.	Habitats: short-term, minor adverse impacts from use of fishing gear and equipment to collect data; long-term benefits from improved fishing practices. Wildlife Species: short-term, minor adverse impacts from use of fishing gear and equipment to collect data; long-term benefits from improved fishing and handling practices. Marine and Estuarine Fauna: short-term, minor adverse impacts from use of fishing gear and equipment to collect data; long-term benefits from improved fishing and handling practices. Protected Species: short-term, minor adverse impacts from use of fishing gear and equipment to collect data; long-term benefits from improved fishing and handling practices.	Socioeconomics and Environmental Justice: long-term benefits from improved fishing practices, increased fish biomass, and potentially increased commercial and recreational catch. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: long-term benefits from improved fishing practices and benefits to fisheries. Tourism and Recreational Use: long-term benefits from improved fishing practices, increased fish biomass, and potentially increased recreational catch. Fisheries and Aquaculture: long-term benefits from improved fishing practices, increased fish biomass, and potentially increased commercial and recreational catch. Marine Transportation: no effect. Aesthetics and Visual Resources: long-term benefits from improved fishing practices. Public Health and Safety: long-term benefits from improved fishing practices.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
FWCI2, Next Generation Fishing	Geology and Substrates: no effect. Hydrology and Water Quality: short-term, minor adverse impacts from use of fishing gear. Air Quality: short-term, minor adverse impacts from increased vessel use. Noise: short-term, minor adverse impacts from increased vessel use.	Habitats: no effect. Wildlife Species: short-term, minor adverse impacts from use of fishing gear; long-term benefits from improved fishing and handling practices. Marine and Estuarine Fauna: short-term, minor adverse impacts from use of fishing gear; long-term benefits from improved fishing and handling practices. Protected Species: short-term, minor adverse impacts from use of fishing gear; long-term benefits from improved fishing and handling practices.	Socioeconomics and Environmental Justice: long-term benefits from improved fishing practices, increased fish biomass, and potentially increased commercial and recreational catch. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: long-term benefits from improved fishing practices and benefits to fisheries. Tourism and Recreational Use: long-term benefits from reduced sources of fish mortality, increased fish biomass, and potentially increased recreational catch. Fisheries and Aquaculture: long-term benefits from improved fishing practices and increased fish biomass and potentially increased commercial and recreational catch. Marine Transportation: no effect. Aesthetics and Visual Resources: long-term benefits from improved fishing practices. Public Health and Safety: long-term benefits from improved fishing practices.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality	Geology and Substrates: no effect. Hydrology and Water Quality: short-term, minor adverse impacts from increased vessel use and use of equipment to collect data. Air Quality: short-term, minor adverse impacts from increased vessel use. Noise: short-term, minor adverse impacts from increased vessel use.	Habitats: no effect. Wildlife Species: short-term, minor adverse impacts from use of equipment to collect data; long-term benefits from decreased fish mortality, decreased depredation by sharks, and decreased adverse interactions between fishing activities and depredating species. Marine and Estuarine Fauna: short-term, minor adverse impacts from use of equipment to collect data; long-term benefits from decreased fish mortality. Protected Species: short-term, minor adverse impacts from use of equipment to collect data; long-term benefits from decreased fish mortality and decreased adverse interactions between fishing activities and depredating species.	Socioeconomics and Environmental Justice: long-term benefits from decreased fish mortality, increased fish biomass, and potentially increased commercial and recreational catch. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: long-term benefits from decreased fish mortality and benefits to fisheries. Tourism and Recreational Use: long-term benefits from decreased fish mortality, increased fish biomass, and potentially increased recreational catch. Fisheries and Aquaculture: long-term benefits from decreased fish mortality, increased fish biomass, and potentially increased commercial and recreational catch. Marine Transportation: no effect. Aesthetics and Visual Resources: long-term benefits from decreased fish mortality. Public Health and Safety: long-term benefits from improved fishing practices.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates Gulf	Geology and Substrates: short-term, minor adverse impacts from removal of marine debris and invasive species, implementation of conservation strategies during energy development activities, and water quality improvement activities; long-term benefits from marine debris removal, energy development conservation strategies, and water quality improvements. Hydrology and Water Quality: short-term, minor adverse impacts from increased vessel use from, removal of marine debris and invasive species, implementation of conservation strategies during energy development activities, and water quality improvement activities; long-term benefits from removal, energy development conservation strategies, and water quality improvements. Air Quality: short-term, minor adverse impacts from increased vessel use. Noise: short-term, minor adverse impacts from increased vessel use and activities associated with removal of marine debris and invasive species, energy development conservation strategies, and water quality improvements.	Habitats: short-term, minor adverse impacts from use of vessels and equipment to remove marine debris and invasive species, implementation of conservation strategies during energy development activities, and water quality improvement activities; long-term benefits from marine debris and invasive species removal, energy development conservation strategies, and water quality improvements. Wildlife Species: short-term, minor adverse impacts from use of vessels and equipment to remove marine debris and invasive species, implementation of conservation strategies during energy development activities, and water quality improvement activities; long-term benefits from marine debris and invasive species removal, energy development conservation strategies, and water quality improvements. Marine and Estuarine Fauna: short-term, minor adverse impacts from use of vessels and equipment to remove marine debris and invasive species, implementation of conservation strategies during energy development activities, and water quality improvement activities; long-term benefits from marine debris and invasive species removal, energy	Socioeconomics and Environmental Justice: long-term benefits from improved water quality, reduced mortality of fish from energy development, and removal of marine debris and invasive species, resulting in decreased incidence of entanglement and damage to gear, and decreased encounters with invasive species. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: long-term benefits from improved water quality, reduced mortality of fish from energy development, and removal of marine debris and invasive species. Tourism and Recreational Use: long-term benefits from improved water quality, reduced mortality of fish from energy development, and removal of marine debris and invasive species, resulting in decreased incidence of entanglement and damage to gear, and decreased encounters with invasive species. Fisheries and Aquaculture: long-term benefits from improved water quality, reduced mortality of fish from energy development, and removal of marine debris and invasive species, resulting in decreased incidence of entanglement and damage to gear,

Project	Physical Resources	Biological Resources	Socioeconomic Resources
		development conservation strategies, and water quality improvements. Protected Species: short-term, minor adverse impacts from use of vessels and equipment to remove marine debris and invasive species, implementation of conservation strategies during energy development activities, and water quality improvement activities; long-term benefits from marine debris and invasive species removal, energy development conservation strategies, and water quality improvements.	and decreased encounters with invasive species. Marine Transportation: no effect. Aesthetics and Visual Resources: long-term benefits from improved water quality, reduced mortality of fish from energy development, and removal of marine debris and invasive species, resulting in decreased incidence of entanglement and damage to gear, and decreased encounters with invasive species. Public Health and Safety: long-term benefits from improved water quality, reduced mortality of fish from energy development, and removal of marine debris and invasive species, resulting in decreased incidence of entanglement and damage to gear, and decreased encounters with invasive species.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
FWCI5, Education and Stewardship Partnerships with Charter Anglers	Geology and Substrates: long-term benefits from improved fishing practices. Hydrology and Water Quality: long-term benefits from improved fishing practices. Air Quality: no effect. Noise: no effect.	Habitats: long-term benefits from improved fishing practices and reduced illegal charter fishing practices. Wildlife Species: long-term benefits from improved fishing practices and reduced illegal charter fishing practices. Marine and Estuarine Fauna: long-term benefits from improved fishing and handling practices, and reduced illegal charter fishing practices. Protected Species: long-term benefits from improved fishing practices and reduced illegal charter fishing practices.	Socioeconomics and Environmental Justice: long-term benefits from improved fishing practices, increased fish biomass, and potentially increased commercial and recreational catch. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: long-term benefits from improved fishing practices, reduced illegal charter fishing practices, and benefits to fisheries. Tourism and Recreational Use: long-term benefits from improved fishing practices, reduced illegal charter fishing practices, increased fish biomass, and potentially increased recreational catch. Fisheries and Aquaculture: long-term benefits from improved fishing practices, reduced illegal charter fishing practices, increased fish biomass, and potentially increased commercial and recreational catch. Marine Transportation: no effect. Aesthetics and Visual Resources: long-term benefits from improved fishing practices. Public Health and Safety: long-term benefits from improved fishing practices and reduced illegal charter fishing practices.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
FWCI6, Communication, Adaptive Management, Planning, and Integration	Geology and Substrates: no effect. Hydrology and Water Quality: short-term, minor adverse impacts from increased vessel use and use of equipment to collect data. Air Quality: short-term, minor adverse impacts from increased vessel use. Noise: short-term, minor adverse impacts from increased vessel use.	Habitats: no effect. Wildlife Species: short-term, minor adverse impacts from use of equipment, including tagging and tracking fish, to collect data; long-term benefits from improved understanding of ecosystem dynamics and threats. Marine and Estuarine Fauna: short-term, minor adverse impacts from use of equipment, including tagging and tracking fish, to collect data; long-term benefits from improved understanding of ecosystem dynamics and threats. Protected Species: short-term, minor adverse impacts from use of equipment, including tagging and tracking fish, to collect data; long-term benefits from improved understanding of ecosystem dynamics and threats.	Socioeconomics and Environmental Justice: long-term benefits from improved understanding of ecosystem dynamics and threats to fish, increased fish biomass and potentially increased commercial and recreational catch. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: long-term benefits from decreased fish mortality and benefits to fisheries. Tourism and Recreational Use: long-term benefits from improved understanding of ecosystem dynamics and threats to fish. Fisheries and Aquaculture: long-term benefits from improved understanding of ecosystem dynamics and threats to fish. Marine Transportation: no effect. Aesthetics and Visual Resources: long-term benefits from improved understanding of ecosystem dynamics and threats to fish. Public Health and Safety: long-term benefits from increased observer coverage increasing fishing vessel safety in cases of emergencies at sea.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
FWCI7, Reducing Fish Mortality from Depredation	Geology and Substrates: no effect. Hydrology and Water Quality: short-term, minor adverse impacts from increased vessel use and use of fishing gear. Air Quality: short-term, minor adverse impacts from increased vessel use. Noise: short-term, minor adverse impacts from increased vessel use.	Habitats: short-term, minor adverse impacts from use of fishing gear; long-term benefits from improved fishing practices. Wildlife Species: short-term, minor adverse impacts from use of fishing gear; long-term benefits from improved fishing practices and decreased adverse interactions between fishing activities and depredating species. Marine and Estuarine Fauna: short-term, minor adverse impacts from use of fishing gear; long-term benefits from improved fishing practices and decreased adverse interactions between fishing activities and depredating species. Protected Species: short-term, minor adverse impacts from use of fishing gear; long-term benefits from improved fishing practices, decreased depredation by sharks, and decreased adverse interactions between fishing activities and depredating species.	Socioeconomics and Environmental Justice: long-term benefits from improved fishing practices, decreased depredation, increased fish biomass, and potentially increased commercial and recreational catch. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: long-term benefits from improved fishing practices and benefits to fisheries. Tourism and Recreational Use: long-term benefits from improved fishing practices, decreased depredation, increased fish biomass, and potentially increased recreational catch. Fisheries and Aquaculture: long-term benefits from improved fishing practices, decreased depredation, increased fish biomass, and potentially increased commercial and recreational catch. Marine Transportation: no effect. Aesthetics and Visual Resources: long-term benefits from improved fishing practices. Public Health and Safety: long-term benefits from improved fishing practices and decreased depredation.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
ST Restoration Type			
No Action - ST	Geology and Substrates: long-term, minor adverse impacts from continued development risk and deterioration of derelict structures. Hydrology and Water Quality: no effect. Air Quality: no effect. Noise: no effect.	Habitats: long-term, minor adverse impacts from continued development risk and deterioration of derelict structures. Wildlife Species: long-term, moderate adverse impacts from continued development risk and deterioration of derelict structures. Marine and Estuarine Fauna: long-term, moderate adverse impacts from continued development risk. Protected Species: long-term, major adverse impacts from unaddressed anthropogenic and natural sources of injuries to sea turtles, mortality to sea turtles, and decreasing nesting habitat.	Socioeconomics and Environmental Justice: no effect. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: long-term, minor adverse impacts from decreased support for land and marine management programs. Tourism and Recreational Use: long-term, minor adverse impacts from declining sea turtle populations and resulting decrease to nature-based tourism. Fisheries and Aquaculture: long-term, minor adverse impacts from decreased support in meeting commercial fishery bycatch requirements. Marine Transportation: no effect. Aesthetics and Visual Resources: long-term, minor adverse impacts from reduced ecological health. Public Health and Safety: long-term, minor adverse impacts from continued deterioration of derelict structures, increased shoreline armoring or development, and continued recreational vessel strikes to sea turtles.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles)	Geology and Substrates: short-term, minor adverse impacts from construction to remove derelict structures; long-term benefits from habitat protection, reduction in development risk, and return to a more natural geomorphological system. Hydrology and Water Quality: short-term, minor adverse impacts from increased localized turbidity during derelict structure removal. Air Quality: short-term, minor adverse impacts from operation of construction equipment. Noise: short-term, minor adverse impacts from operation of construction equipment.	Habitats: short-term, moderate adverse impacts from construction to remove derelict structures; long-term benefits from habitat protection, reduction in development risk, and return to a more natural beach habitat. Wildlife Species: short-term, moderate adverse impacts from construction to remove derelict structures; long-term benefits from habitat protection, reduction in development risk, and return to a more natural beach habitat. Marine and Estuarine Fauna: long-term benefits from habitat protection. Protected Species: short-term, moderate adverse impacts from construction to remove derelict structures; long-term benefits from habitat protection, reduction in development risk, and return to a more natural beach habitat.	Socioeconomics and Environmental Justice: long-term, minor adverse impacts from reduced tax base from private parcel acquisition; short-term benefits from increased local job opportunities during construction. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: long-term benefits from enhanced land management and protection of coastal habitats in perpetuity. Tourism and Recreational Use: long-term benefits from enhanced wildlife populations and access to beachfront in perpetuity. Fisheries and Aquaculture: no effect. Marine Transportation: no effect. Aesthetics and Visual Resources: short-term, minor adverse impacts from construction equipment; long-term benefits from removal of derelict structures. Public Health and Safety: long-term benefits from removal of derelict structures and reduced losses of natural shorelines.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
ST2, Gulf-Wide Sea Turtle Bycatch Reduction	Geology and Substrates: short-term, minor adverse impacts to benthic substrates during use of alternative fishing gear. Hydrology and Water Quality: no effect. Air Quality: short-term, minor adverse impacts from increased vessel or vehicle use during implementation. Noise: short-term, minor adverse impacts from increased vessel or vehicle use during implementation.	Habitats: no effect. Wildlife Species: no effect. Marine and Estuarine Fauna: no effect. Protected Species: long-term benefits to sea turtles from reduced bycatch.	Socioeconomics and Environmental Justice: no effect. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: no effect. Tourism and Recreational Use: long-term benefits from enhanced wildlife populations. Fisheries and Aquaculture: long-term benefits from education and training to improve compliance with existing sea turtle bycatch requirements. Marine Transportation: no effect. Aesthetics and Visual Resources: long-term benefits from enhanced wildlife populations. Public Health and Safety: no effect.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction	Geology and Substrates: no effect. Hydrology and Water Quality: no effect. Air Quality: short-term, minor adverse impacts from vehicle or vessel use during field studies. Noise: short-term, minor adverse impacts from vehicle or vessel use during field studies.	Habitats: no effect. Wildlife Species: short-term, minor adverse impacts during field studies. Marine and Estuarine Fauna: short-term, minor adverse impacts during field studies. Protected Species: short-term, minor adverse impacts during field studies; long-term benefits from improved recreational boating practices.	Socioeconomics and Environmental Justice: no effect. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: no effect. Tourism and Recreational Use: long-term benefits from enhanced wildlife populations. Fisheries and Aquaculture: no effect. Marine Transportation: no effect. Aesthetics and Visual Resources: long-term benefits from enhanced wildlife populations. Public Health and Safety: long-term benefits from reduced recreational boating interactions with sea turtles.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements	Geology and Substrates: short-term, minor adverse impacts during STSSN response. Hydrology and Water Quality: short-term, minor adverse impacts during STSSN response. Air Quality: short-term, minor adverse impacts during STSSN response. Noise: short-term, minor adverse impacts during STSSN response.	Habitats: short-term, minor adverse impacts during STSSN response. Wildlife Species: short-term, minor adverse impacts during STSSN response. Marine and Estuarine Fauna: short-term, minor adverse impacts during STSSN response. Protected Species: short-term, minor-to-moderate adverse impacts during STSSN response and from handling stranded sea turtles; long-term benefits to sea turtle populations from improved data collection and rehabilitation.	Socioeconomics and Environmental Justice: short-term benefits to response organizations from project support. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: no effect. Tourism and Recreational Use: long-term benefits from enhanced wildlife populations. Fisheries and Aquaculture: no effect. Marine Transportation: no effect. Aesthetics and Visual Resources: short-term, minor adverse impacts during sea turtle strandings; long-term benefits from enhanced wildlife populations. Public Health and Safety: no effect.

Project	Physical Resources	Biological Resources	Socioeconomic Resources
ST5, Kemp's Ridley Nesting Enhancement in Mexico	Geology and Substrates: short-term, minor-to-moderate adverse impacts from beach patrols and maintenance of/repairs to existing facilities. Hydrology and Water Quality: short-term, minor adverse impacts from increased localized turbidity during structure maintenance/repair. Air Quality: short-term, minor adverse impacts from operation of construction and nest monitoring equipment. Noise: short-term, minor adverse impacts from operation of construction and nest monitoring equipment.	Habitats: short-term, minor-to-moderate adverse impacts from beach patrols and maintenance of or repairs to existing facilities; long-term benefits from repaired structures. Wildlife Species: short-term, minor-to-moderate adverse impacts from beach patrols and maintenance of or repairs to existing facilities; long-term benefits from repaired structures. Marine and Estuarine Fauna: no effect. Protected Species: short-term, minor-to-moderate adverse impacts from beach patrols (including sea turtle egg handling) and maintenance of or repairs to existing facilities; long-term benefits from repaired structures and sea turtle nest and egg protection.	Socioeconomics and Environmental Justice: short-term benefits from increased local employment opportunities for maintenance of or repairs to existing facilities. Cultural Resources: no effect. Infrastructure: no effect. Land and Marine Management: long-term benefits from increased support to meet land management objectives. Tourism and Recreational Use: long-term benefits from enhanced wildlife populations. Fisheries and Aquaculture: no effect. Marine Transportation: no effect. Aesthetics and Visual Resources: long-term benefits from enhanced wildlife populations. Public Health and Safety: long-term benefits from maintenance of or repairs to existing facilities.

5 Compliance with Other Environmental Laws and Regulations

The Open Ocean TIG will ensure compliance with all applicable state and local laws and other applicable federal laws and regulations relevant to the proposed restoration alternatives. The TIG has completed technical assistance reviews with relevant agencies for protected species and their habitats under the ESA, Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act; which defines EFH), Marine Mammal Protection Act (MMPA), and other federal statutes, where appropriate. Technical assistance reviews for cultural resources, and any necessary consultations with state and tribal historic offices under the National Historic Preservation Act (NHPA), will be completed prior to implementation of activities with the potential to impact cultural resources. Finally, NOAA, as the federal NEPA lead, has submitted consistency determinations in accordance with the Coastal Zone Management Act (CZMA) to Alabama, Florida, Louisiana, Mississippi, and Texas for the preferred alternatives.

The current compliance status for each preferred alternative at the time of this RP4/EA is provided below in Table 5-1. The status of each statute by project is sorted into the following categories:

- Complete (C): indicates that the requirements have been met and a response was received from the appropriate agency(ies).
- In Progress (IP): indicates that compliance reviews have been requested but an answer has not yet been received from the regulatory agency(ies).
- No Effect (NE): indicates that, through technical assistance reviews, the relevant agency(ies) determined there is no effect from the preferred alternative to species or habitats protected under the applicable statute.
- Phased Compliance (Ph): indicates that for a preferred alternative, compliance will need to be reevaluated after initial planning has occurred and locations and methodologies for the work are determined. At that time, the Open Ocean TIG will have the information necessary to fully evaluate the potential effects.
- Not Applicable (N/A): indicates that the statute is not applicable to a preferred alternative, often due to the scope and/or location of the activities to be carried out under the alternative.

Wherever existing consultations or permits are present, they will be reviewed to determine if the consultations/permits are still valid or if re-initiation of any consultations or permits are necessary. Implementing Trustees are required to implement alternative-specific mitigation measures (including BMPs) identified in this RP4/EA, biological evaluation forms, and completed consultations/permits. Oversight, provided by the Implementing Trustees, would include due diligence to ensure that no unanticipated effects to listed species and habitats occur, including ensuring that BMPs are implemented and continue to function as intended.

Federal environmental compliance responsibilities and procedures will follow the Trustee Council's SOPs, specifically Section 9.4.6 (DWH Trustees, 2021). Following these SOPs, the Implementing Trustees for each alternative will ensure that the status of environmental compliance (e.g., completed, in progress) is tracked through DIVER. The Implementing Trustees will keep a record of compliance documents (e.g., ESA letters, permits) and ensure that they are submitted for inclusion in the Administrative Record. Additional information specific to each preferred alternative regarding the environmental compliance requirements and their status is provided in Appendix A.

Table 5-1 Current Status of Federal Regulatory Compliance Reviews and Approvals of Preferred Alternatives at Release of this RP4/EA

Preferred Alternatives	CZMA	ESA Section 7 (NMFS)	ESA Section 7 (USFWS)	EFH (NMFS)	MMPA (NMFS)	MMPA (USFWS)	NHPA	RHA/ CWA	BGEPA	MBTA	CBRA
FWCI Restoration Type											
FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries)	IP	C-NE	C-Ph	C-NE	C	N/A	IP	N/A	N/A	N/A	N/A
FWCI2, Next Generation Fishing	IP	C-Ph	C-Ph	C-Ph	C-Ph	N/A	IP	N/A	N/A	N/A	N/A
FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality	IP	C-NE	C-NE	C-NE	C	N/A	IP	N/A	N/A	N/A	N/A
FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates	IP	C-Ph	C-Ph	C-Ph	C-Ph	N/A	IP	IP-Ph	N/A	N/A	N/A
FWCI5, Education and Stewardship Partnerships with Charter Anglers	IP	C-Ph	C-NE	C-Ph	C-Ph	N/A	IP	N/A	N/A	N/A	N/A
FWCI6, Communication, Adaptive Management, Planning, and Integration	IP	C-NE	C-Ph	C-NE	C	N/A	IP	IP-Ph	N/A	N/A	N/A

C: Complete
C-EC: Complete, covered by existing compliance
C-NE: Complete, no effect
C-NLAA: Complete, not likely to adversely affect
C-Ph: Complete, phased compliance

IP: In progress
IP-NE: In progress, no effect
IP-NLAA: In progress, not likely to adversely affect
IP-Ph: In progress, phased compliance
N/A: Not Applicable

CZMA: Coastal Zone Management Act
ESA: Endangered Species Act
EFH: Essential Fish Habitat (Magnuson-Stevens Act)
MMPA: Marine Mammal Protection Act
NHPA: National Historic Preservation Act

RHA/CWA: Rivers and Harbors Act / Clean Water Act
BGEPA: Bald and Gold Eagle Protection Act
MBTA: Migratory Bird Treaty Act
CBRA: Coastal Barrier Resources Act

Preferred Alternatives	CZMA	ESA Section 7 (NMFS)	ESA Section 7 (USFWS)	EFH (NMFS)	MMPA (NMFS)	MMPA (USFWS)	NHPA	RHA/ CWA	BGEPA	MBTA	CBRA
ST Restoration Type											
ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles)	IP	N/A	C-Ph	N/A	N/A	N/A	IP	N/A	N/A	N/A	N/A
ST2, Gulf-Wide Sea Turtle Bycatch Reduction	IP	C-NE	IP-NLAA	C-NE	IP	IP	IP	N/A	NE	NE	N/A
ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction	IP	C-Ph, EC	IP-Ph, NLAA	C-NE	IP	IP	IP	N/A	NE	NE	N/A
ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements	IP	C-EC	IP-NLAA	C-NE	IP	IP	IP	N/A	NE	NE	N/A

C: Complete
C-EC: Complete, covered by existing compliance
C-NE: Complete, no effect
C-NLAA: Complete, not likely to adversely affect
C-Ph: Complete, phased compliance

IP: In progress
IP-NE: In progress, no effect
IP-NLAA: In progress, not likely to adversely affect
IP-Ph: In progress, phased compliance
N/A: Not Applicable

CZMA: Coastal Zone Management Act
ESA: Endangered Species Act
EFH: Essential Fish Habitat (Magnuson-Stevens Act)
MMPA: Marine Mammal Protection Act
NHPA: National Historic Preservation Act

RHA/CWA: Rivers and Harbors Act / Clean Water Act
BGEPA: Bald and Gold Eagle Protection Act
MBTA: Migratory Bird Treaty Act
CBRA: Coastal Barrier Resources Act

5.1 Additional Laws

Examples of applicable laws or EOs include, but are not necessarily limited to, those listed below. Additional detail on each of these can be found in the PDARP/PEIS (Chapter 6; DWH Trustees, 2016). Additional federal laws may apply to the preferred alternatives considered in this RP4/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.

- 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 (Clean Water Act, 33 U.S.C. §§ 1251 *et seq*.)
- Rivers and Harbors Act (33 U.S.C. §§ 401 *et seq*.)
- Marine Protection, Research, and Sanctuaries Act (16 U.S.C. §§ 1431 *et seq*. and 33 U.S.C. §§ 1401 *et seq*.)
- Estuary Protection Act (16 U.S.C. §§ 1221–1226)
- Archaeological Resource Protection Act (16 U.S.C. §§ 470aa–470mm)
- National Marine Sanctuaries Act (16 U.S.C. §§ 1431 *et seq*.)
- Farmland Protection Policy Act (7 U.S.C. §§ 4201–4209)
- EO 11988: Floodplain Management (May 24, 1977), as amended
- EO 11990: Protection of Wetlands (May 24, 1977), as amended
- EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (Feb. 11, 1994), as amended
- EO 12962: Recreational Fisheries (June 7, 1995), as amended
- EO 13007: Indian Sacred Sites
- EO 13045: Protection of Children from Environmental Health Risks and Safety Risks (Apr. 23, 1997), as amended
- EO 13112: Safeguarding the Nation from the Impacts of Invasive Species (Feb. 3, 1999), as amended
- EO 13175: Consultation and Coordination with Indian Tribal Governments (Nov. 6, 2000)
- EO 13186: Responsibilities of Federal Agencies to Protect Migratory Birds (Jan. 10, 2001)
- EO 13693: Planning for Federal Sustainability in the Next Decade
- EO 13985: Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (Jan. 20, 2021)
- EO 13990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (Jan. 20, 2021)
- EO 14008: Tackling the Climate Crisis at Home and Abroad (Jan. 27, 2021)
- EO 14072: Strengthening the Nation's Forests, Communities, and Local Economies (Apr. 22, 2022)
- EO 14096: Revitalizing Our Nation's Commitment to Environmental Justice for All (Apr. 21, 2023)

Appendix A. National Environmental Policy Act Supporting Documentation Report

This appendix contains the National Environmental Policy Act (NEPA) supporting documentation that informs the NEPA analysis presented in Chapter 4. Table A-1 directs readers to the locations of detailed analysis for each project's impacts to physical, biological, and socioeconomic resources within this Restoration Plan 4 and Environmental Assessment (RP4/EA). The remainder of this appendix is organized as follows.

Table A-1 Location of NEPA Analyses by Resource for Alternatives in Appendix A of this RP4/EA

Project	Physical Resources	Biological Resources	Socioeconomic Resources
Fish and Water Column Invertebrates (FWCI) Restoration Type			
FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries)	Geology and Substrates: A.2.1 (outreach/education/data gathering) & A.5.1.1.1 (alternative gear distribution, field studies) Hydrology and Water Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.1 (alternative gear distribution, field studies) Air Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.2 (alternative gear distribution, field studies) Noise: A.2.1 (outreach/education/data gathering) & A.3.1.1.3 (alternative gear distribution, field studies)	Habitats: A.2.1 (outreach/education/data gathering) & A.5.1.1.2 (alternative gear distribution, field studies) Wildlife Species: A.2.1 (outreach/education/data gathering) & A.5.1.1.2 (alternative gear distribution, field studies) Marine and Estuarine Fauna: A.2.1 (outreach/education/data gathering) & A.5.1.1.2 (alternative gear distribution, field studies) Protected Species: A.2.1 (outreach/education/data gathering) & A.5.1.1.2 (alternative gear distribution, field studies)	Socioeconomics and Environmental Justice: A.2.1 (Socioeconomics; outreach/education/data gathering), A.5.1.1.3 (Socioeconomics; alternative gear distribution, field studies) and A.3.1.3.1 (Environmental Justice) Cultural Resources: A.3.1.3.2 Infrastructure: A.3.1.3.3 Land and Marine Management: A.3.1.3.4 Tourism and Recreational Use: A.3.1.3.5 Fisheries and Aquaculture: A.3.1.3.6 Marine Transportation: A.3.1.3.7 Aesthetics and Visual Resources: A.3.1.3.8 Public Health and Safety: A.3.1.3.9
FWCI2, Next Generation Fishing	Geology and Substrates: A.2.1 (outreach/education/data gathering) & A.5.1.2.1 (alternative gear distribution) Hydrology and Water Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.1 (alternative gear distribution) Air Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.2 (alternative gear distribution) Noise: A.2.1 (outreach/education/data gathering) & A.3.1.1.3 (alternative gear distribution)	Habitats: A.2.1 (outreach/education/data gathering) & A.5.1.2.2 (alternative gear distribution) Wildlife Species: A.2.1 (outreach/education/data gathering) & A.5.1.2.2 (alternative gear distribution) Marine and Estuarine Fauna: A.2.1 (outreach/education/data gathering) & A.5.1.2.2 (alternative gear distribution) Protected Species: A.2.1 (outreach/education/data gathering) & A.5.1.2.2 (alternative gear distribution)	Socioeconomics and Environmental Justice: A.2.1 (Socioeconomics; outreach/education/data gathering), A.5.1.2.3 (Socioeconomics; alternative gear distribution), & A.3.1.3.1 (Environmental Justice) Cultural Resources: A.3.1.3.2 Infrastructure: A.3.1.3.3 Land and Marine Management: A.3.1.3.4 Tourism and Recreational Use: A.3.1.3.5 Fisheries and Aquaculture: A.3.1.3.6 Marine Transportation: A.3.1.3.7 Aesthetics and Visual Resources: A.3.1.3.8 Public Health and Safety: A.3.1.3.9

Project	Physical Resources	Biological Resources	Socioeconomic Resources
FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality	Geology and Substrates: A.2.1 (outreach/education/data gathering) & A.5.1.3.1 (in-situ data collection) Hydrology and Water Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.1 (in-situ data collection) Air Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.2 (in-situ data collection) Noise: A.2.1 (outreach/education/data gathering) & A.3.1.1.3 (in-situ data collection)	Habitats: A.2.1 (outreach/education/data gathering) & A.5.1.3.2 (in-situ data collection) Wildlife Species: A.2.1 (outreach/education/data gathering) & A.5.1.3.2 (in-situ data collection) Marine and Estuarine Fauna: A.2.1 (outreach/education/data gathering) & A.5.1.3.2 (in-situ data collection) Protected Species: A.2.1 (outreach/education/data gathering) & A.5.1.3.2 (in-situ data collection)	Socioeconomics and Environmental Justice: A.2.1 (Socioeconomics; outreach/education/data gathering), A.5.1.3.3 (Socioeconomics; in-situ data collection), & A.3.1.3.1 (Environmental Justice) Cultural Resources: A.3.1.3.2 Infrastructure: A.3.1.3.3 Land and Marine Management: A.3.1.3.4 Tourism and Recreational Use: A.3.1.3.5 Fisheries and Aquaculture: A.3.1.3.6 Marine Transportation: A.3.1.3.7 Aesthetics and Visual Resources: A.3.1.3.8 Public Health and Safety: A.3.1.3.9
FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates	Geology and Substrates: A.2.1 (outreach/education/data gathering) & A.5.1.4.1 (marine debris and invasive species removal) Hydrology and Water Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.1 (marine debris and invasive species removal) Air Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.2 (marine debris and invasive species removal) Noise: A.2.1 (outreach/education/data gathering) & A.3.1.1.3 (marine debris and invasive species removal)	Habitats: A.2.1 (outreach/education/data gathering) & A.5.1.4.2 (marine debris and invasive species removal) Wildlife Species: A.2.1 (outreach/education/data gathering) & A.5.1.4.2 (marine debris and invasive species removal) Marine and Estuarine Fauna: A.2.1 (outreach/education/data gathering) & A.5.1.4.2 (marine debris and invasive species removal) Protected Species: A.2.1 (outreach/education/data gathering) & A.5.1.4.2 (marine debris and invasive species removal)	Socioeconomics and Environmental Justice: A.2.1 (Socioeconomics; outreach/education/data gathering); A.5.1.4.3 (Socioeconomics; marine debris and invasive species removal), & A.3.1.3.1 (Environmental Justice) Cultural Resources: A.3.1.3.2 Infrastructure: A.3.1.3.3 Land and Marine Management: A.3.1.3.4 Tourism and Recreational Use: A.3.1.3.5 Fisheries and Aquaculture: A.3.1.3.6 Marine Transportation: A.3.1.3.7 Aesthetics and Visual Resources: A.3.1.3.8 Public Health and Safety: A.3.1.3.9

Project	Physical Resources	Biological Resources	Socioeconomic Resources
FWCI5, Education and Stewardship Partnerships with Charter Anglers	Geology and Substrates: A.2.1 (outreach/education/data gathering) Hydrology and Water Quality: A.2.1 (outreach/education/data gathering) Air Quality: A.2.1 (outreach/education/data gathering) Noise: A.2.1 (outreach/education/data gathering)	Habitats: A.2.1 (outreach/education/data gathering) Wildlife Species: A.2.1 (outreach/education/data gathering) Marine and Estuarine Fauna: A.2.1 (outreach/education/data gathering) Protected Species: A.2.1 (outreach/education/data gathering)	Socioeconomics and Environmental Justice: A.2.1 (Socioeconomics; outreach/education/data gathering) & A.3.1.3.1 (Environmental Justice) Cultural Resources: A.3.1.3.2 Infrastructure: A.3.1.3.3 Land and Marine Management: A.3.1.3.4 Tourism and Recreational Use: A.3.1.3.5 Fisheries and Aquaculture: A.3.1.3.6 Marine Transportation: A.3.1.3.7 Aesthetics and Visual Resources: A.3.1.3.8 Public Health and Safety: A.3.1.3.9
FWCI6, Communication, Adaptive Management, Planning, and Integration	Geology and Substrates: A.2.1 (outreach/education/data gathering) & A.5.1.5.1 (in-situ data collection) Hydrology and Water Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.1 (in-situ data collection) Air Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.2 (in-situ data collection) Noise: A.2.1 (outreach/education/data gathering) & A.3.1.1.3 (in-situ data collection)	Habitats: A.2.1 (outreach/education/data gathering) & A.5.1.5.2 (in-situ data collection) Wildlife Species: A.2.1 (outreach/education/data gathering) & A.5.1.5.2 (in-situ data collection) Marine and Estuarine Fauna: A.2.1 (outreach/education/data gathering) & A.5.1.5.2 (in-situ data collection) Protected Species: A.2.1 (outreach/education/data gathering) & A.5.1.5.2 (in-situ data collection)	Socioeconomics and Environmental Justice: A.2.1 (Socioeconomics; outreach/education/data gathering), A.5.1.5.3 (Socioeconomics; in-situ data collection), & A.3.1.3.1 (Environmental Justice) Cultural Resources: A.3.1.3.2 Infrastructure: A.3.1.3.3 Land and Marine Management: A.3.1.3.4 Tourism and Recreational Use: A.3.1.3.5 Fisheries and Aquaculture: A.3.1.3.6 Marine Transportation: A.3.1.3.7 Aesthetics and Visual Resources: A.3.1.3.8 Public Health and Safety: A.3.1.3.9

Project	Physical Resources	Biological Resources	Socioeconomic Resources
FWCI7, Reduction in Fish Post-Release Mortality from Depredation	Geology and Substrates: A.2.1 (outreach/education/data gathering) & A.5.1.6.1 (alternative gear distribution, field studies) Hydrology and Water Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.1 (alternative gear distribution, field studies) Air Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.2 (alternative gear distribution, field studies) Noise: A.2.1 (outreach/education/data gathering) & A.3.1.1.3 (alternative gear distribution, field studies)	Habitats: A.2.1 (outreach/education/data gathering) & A.5.1.6.2 (alternative gear distribution, field studies) Wildlife Species: A.2.1 (outreach/education/data gathering) & A.5.1.6.2 (alternative gear distribution, field studies) Marine and Estuarine Fauna: A.2.1 (outreach/education/data gathering) & A.5.1.6.2 (alternative gear distribution, field studies) Protected Species: A.2.1 (outreach/education/data gathering) & A.5.1.6.2 (alternative gear distribution, field studies)	Socioeconomics and Environmental Justice: A.2.1 (Socioeconomics; outreach/education/data gathering), A.5.1.6.3 (Socioeconomics; alternative gear distribution, field studies), & A.3.1.3.1 (Environmental Justice) Cultural Resources: A.3.1.3.2 Infrastructure: A.3.1.3.3 Land and Marine Management: A.3.1.3.4 Tourism and Recreational Use: A.3.1.3.5 Fisheries and Aquaculture: A.3.1.3.6 Marine Transportation: A.3.1.3.7 Aesthetics and Visual Resources: A.3.1.3.8 Public Health and Safety: A.3.1.3.9
Sea Turtles (ST) Restoration Type			
ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles)	Geology and Substrates: A.5.2.1.1 Hydrology and Water Quality: A.3.1.1.1 Air Quality: A.3.1.1.2 Noise: A.3.1.1.3	Habitats: A.5.2.1.2 Wildlife Species: A.5.2.1.2 Marine and Estuarine Fauna: A.5.2.1.2 Protected Species: A.5.2.1.2	Socioeconomics and Environmental Justice: A.5.2.1.3 (Socioeconomics) & A.3.1.3.1 (Environmental Justice) Cultural Resources: A.3.1.3.2 Infrastructure: A.3.1.3.3 Land and Marine Management: A.3.1.3.4 Tourism and Recreational Use: A.3.1.3.5 Fisheries and Aquaculture: A.3.1.3.6 Marine Transportation: A.3.1.3.7 Aesthetics and Visual Resources: A.3.1.3.8 Public Health and Safety: A.3.1.3.9

Project	Physical Resources	Biological Resources	Socioeconomic Resources
ST2, Gulf-Wide Sea Turtle Bycatch Reduction	Geology and Substrates: A.2.1 (outreach/education/data gathering) & A.5.2.2.1 (alternative gear distribution) Hydrology and Water Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.1 (alternative gear distribution) Air Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.2 (alternative gear distribution) Noise: A.2.1 (outreach/education/data gathering) & A.3.1.1.3 (alternative gear distribution)	Habitats: A.2.1 (outreach/education/data gathering) & A.5.2.2.2 (alternative gear distribution) Wildlife Species: A.2.1 (outreach/education/data gathering) & A.5.2.2.2 (alternative gear distribution) Marine and Estuarine Fauna: A.2.1 (outreach/education/data gathering) & A.5.2.2.2 (alternative gear distribution) Protected Species: A.2.1 (outreach/education/data gathering) & A.5.2.2.2 (alternative gear distribution)	Socioeconomics and Environmental Justice: A.2.1 (Socioeconomics; outreach/education/data gathering), A.5.2.2.3 (Socioeconomics; alternative gear distribution), & A.3.1.3.1 (Environmental Justice) Cultural Resources: A.3.1.3.2 Infrastructure: A.3.1.3.3 Land and Marine Management: A.3.1.3.4 Tourism and Recreational Use: A.3.1.3.5 Fisheries and Aquaculture: A.3.1.3.6 Marine Transportation: A.3.1.3.7 Aesthetics and Visual Resources: A.3.1.3.8 Public Health and Safety: A.3.1.3.9
ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction	Geology and Substrates: A.2.1 (outreach/education/data gathering) & A.5.2.3.1 (in-situ data collection) Hydrology and Water Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.1 (in-situ data collection) Air Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.2 (in-situ data collection) Noise: A.2.1 (outreach/education/data gathering) & A.3.1.1.3 (in-situ data collection)	Habitats: A.2.1 (outreach/education/data gathering) & A.5.2.3.2 (in-situ data collection) Wildlife Species: A.2.1 (outreach/education/data gathering) & A.5.2.3.2 (in-situ data collection) Marine and Estuarine Fauna: A.2.1 (outreach/education/data gathering) & A.5.2.3.2 (in-situ data collection) Protected Species: A.2.1 (outreach/education/data gathering) & A.5.2.3.2 (in-situ data collection)	Socioeconomics and Environmental Justice: A.2.1 (Socioeconomics; outreach/education/data gathering), A.5.2.3.3 (Socioeconomics; in-situ data collection), & A.3.1.3.1 (Environmental Justice) Cultural Resources: A.3.1.3.2 Infrastructure: A.3.1.3.3 Land and Marine Management: A.3.1.3.4 Tourism and Recreational Use: A.3.1.3.5 Fisheries and Aquaculture: A.3.1.3.6 Marine Transportation: A.3.1.3.7 Aesthetics and Visual Resources: A.3.1.3.8 Public Health and Safety: A.3.1.3.9

Project	Physical Resources	Biological Resources	Socioeconomic Resources
ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements	Geology and Substrates: A.2.1 (outreach/education/data gathering) & A.5.2.4.1 (sea turtle stranding response) Hydrology and Water Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.1 (sea turtle stranding response) Air Quality: A.2.1 (outreach/education/data gathering) & A.3.1.1.2 (sea turtle stranding response) Noise: A.2.1 (outreach/education/data gathering) & A.3.1.1.3 (sea turtle stranding response)	Habitats: A.2.1 (outreach/education/data gathering) & A.5.2.4.2 (sea turtle stranding response) Wildlife Species: A.2.1 (outreach/education/data gathering) & A.5.2.4.2 (sea turtle stranding response) Marine and Estuarine Fauna: A.2.1 (outreach/education/data gathering) & A.5.2.4.2 (sea turtle stranding response) Protected Species: A.2.1 (outreach/education/data gathering) & A.5.2.4.2 (sea turtle stranding response)	Socioeconomics and Environmental Justice: A.2.1 (Socioeconomics; outreach/education/data gathering), A.5.2.4.3 (Socioeconomics; sea turtle stranding response), & A.3.1.3.1 (Environmental Justice) Cultural Resources: A.3.1.3.2 Infrastructure: A.3.1.3.3 Land and Marine Management: A.3.1.3.4 Tourism and Recreational Use: A.3.1.3.5 Fisheries and Aquaculture: A.3.1.3.6 Marine Transportation: A.3.1.3.7 Aesthetics and Visual Resources: A.3.1.3.8 Public Health and Safety: A.3.1.3.9
ST5, Kemp's Ridley Nesting Enhancement in Mexico	Geology and Substrates: A.5.2.1.1 (structure demolition) & A.5.2.5.1 (nest patrols, structure maintenance) Hydrology and Water Quality: A.3.1.1.1 Air Quality: A.3.1.1.2 Noise: A.3.1.1.3	Habitats: A.5.2.1.2 (structure demolition) & A.5.2.5.2 (nest patrols, structure maintenance) Wildlife Species: A.5.2.1.2 (structure demolition) & A.5.2.5.2 (nest patrols, structure maintenance) Marine and Estuarine Fauna: A.5.2.1.2 (structure demolition) & A.5.2.5.2 (nest patrols, structure maintenance) Protected Species: A.5.2.1.2 (structure demolition) & A.5.2.5.2 (nest patrols, structure maintenance)	Socioeconomics and Environmental Justice: A.5.2.1.3 (Socioeconomics; structure demolition), A.5.2.5.3 (Socioeconomics; nest patrols, structure maintenance), & A.3.1.3.1 (Environmental Justice) Cultural Resources: A.3.1.3.2 Infrastructure: A.3.1.3.3 Land and Marine Management: A.3.1.3.4 Tourism and Recreational Use: A.3.1.3.5 Fisheries and Aquaculture: A.3.1.3.6 Marine Transportation: A.3.1.3.7 Aesthetics and Visual Resources: A.3.1.3.8 Public Health and Safety: A.3.1.3.9

A.1 Overview of the Approach for Projects Occurring in Locations Outside of the Jurisdiction of the United States

This NEPA Supporting Documentation Report includes an analysis of the environmental impacts of four projects[23] included in the reasonable range of alternatives that would partially or wholly occur outside the jurisdiction of the U.S. Executive Order (EO) 12114, "Environmental Effects Abroad of Major Federal Actions" (1979) furthers the purpose of NEPA, the Marine Protection Research and Sanctuaries Act, and the Deepwater Port Act for actions taken by U.S. federal agencies with respect to the environment outside the U.S., its territories, and its possessions. However, "actions not having a significant effect on the environment outside the United States as determined by the agency" are exempt from this Order (EO 12114, January 4, 1979).

Through the preparation of this RP4/EA, the National Oceanic and Atmospheric Administration (NOAA), as the federal NEPA lead, does not anticipate any major adverse impacts from the four projects that would occur wholly or partially outside of the jurisdiction of the U.S. However, to aid in its decision making under the Oil Pollution Act (OPA), the Open Ocean Trustee Implementation Group (Open Ocean TIG or the TIG) has prepared comparable environmental reviews for these projects to better understand the potential impacts of each alternative and to remain consistent with the level of environmental analysis completed for projects across the *Deepwater Horizon* (DWH) Natural Resource Damage Assessment (NRDA) program. These NEPA analyses do not provide for any regulatory or policy requirements of these projects' host nations. Implementing Trustee(s) and associated project partners would be responsible for complying with host nations' federal, provincial, and/or municipal statutory and regulatory requirements.

A.2 Planning, Education/Outreach, and Data Activities That Do Not Require Further NEPA Analysis

This section summarizes impacts from project activities, including planning activities, education and outreach, and/or data-related tasks such as gathering, compiling, and evaluating information, that are fully analyzed in the *Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan/Programmatic Environmental Impact Statement* (PDARP/PEIS; Chapter 6) and require no additional NEPA analysis. Project planning activities are intended to improve understanding of natural resources, site characteristics, and project implementation details, and in turn, inform and maximize efficacy of restoration efforts. The Open Ocean TIG proposes several projects in this RP4/EA that include planning, education/outreach, or data activities that fall within the scope of activities evaluated in Chapter 6 of the PDARP/PEIS. These are summarized for each alternative below.

The following project includes planning, education and outreach, and desktop-based data gathering activities only, and as such, is not analyzed further in subsequent sections:

- FWCI5, Education and Stewardship Partnerships with Charter Anglers (preferred)

[23] The four projects that would be implemented wholly or partially outside of the jurisdiction of the U.S. are the FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries) (preferred); FWCI2, Next Generation Fishing (preferred); FWCI6, Communication, Adaptive Management, Planning, and Integration (preferred); and ST5, Kemp's Ridley Nesting Enhancement in Mexico (non-preferred) projects.

  - Desktop-based planning and developing communications plans and analysis of charter fishing activities.
  - Education and outreach including developing materials, signage, videos and media campaigns, and community outreach.
  - Desktop-based data collection on angler behavior and fishing activities.

The following projects include planning, education and outreach, and/or data-related activities among others. The remaining project activities beyond the scope of those evaluated in Chapter 6 of the PDARP/PEIS are analyzed in the project-specific sections below in Section A.5.

- FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries) (preferred)
  - Education and outreach on best release practices, distribute release gear for recreational fisheries, maintaining and expanding Return 'Em Right outreach activities, and developing educational materials, a communications plan, and an implementation strategy.
  - Desktop-based studies on angler behavior to assess the efficacy of best management practices (BMPs) and to estimate post-release mortality, surveys and data collection on angler attitudes and awareness, and developing and supporting data sharing tools.
  - Workshops with resource experts, resource managers, and commercial fishing communities.
- FWCI2, Next Generation Fishing (preferred)
  - Desktop-based planning, developing an implementation plan, coordinating funding opportunities, and supporting data collection, analysis, and information sharing tools.
  - Education and outreach including developing and implementing a training program and promoting new gear and techniques.
- FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality (preferred)
  - Desktop-based analysis of existing data and identification of data gaps, developing ecosystem and dynamic species distribution models, and developing bycatch communication networks.
  - Spawning expert workgroup meetings.
  - Desktop-based data collection, including analysis of data gathered from other project and programs and for sharing via communication networks.
- FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates (preferred)
  - Desktop-based planning and implementation of restoration activities.
- FWCI6, Communication, Adaptive Management, Planning, and Integration (preferred)
  - Desktop-based evaluations and strategy building.
  - Education and outreach including engagement with industry partners.
  - Workshops.
  - Desktop-based data collection involving gathering of information from existing programs, analysis of fishery observations, and predictive modeling.
- FWCI7, Reduction in Fish Post-Release Mortality from Depredation (non-preferred)
  - Desktop-based data collection and data analysis and planning and strategy development.
  - Education and outreach on best practices.
- ST2, Gulf-Wide Sea Turtle Bycatch Reduction (preferred):
  - Education and outreach with commercial shrimp trawl and commercial hook-and-line fisheries to complete voluntary inspections of fishing gear, educate fishing communities on turtle excluder device (TED) requirements, and encourage alternative, permitted fishing methods to reduce the risk of bycatch.

- ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction (preferred)
    - Desktop-based analyses of existing datasets and modeling of hotspots of sea turtle-vessel interactions.
    - Field data collection of sea turtle and vessel interactions (visual observation by boat and land; surveys of boater behavior).
    - Education and outreach campaigns on voluntary conservation measures that boaters can implement to reduce the risk of vessel strikes to sea turtles.
- ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements (preferred)
    - Coordination with Sea Turtle Stranding and Salvage Network (STSSN) state coordinators and partner organizations.
    - Desktop-based analyses of existing STSSN datasets.
    - Creation and maintenance of a STSSN database.

A.2.1 Environmental Consequences

The planning, education/outreach, and data-related activities included in the alternatives listed above are expected to maximize the effectiveness of Fish and Water Column Invertebrates (FWCI) and Sea Turtle (ST) restoration activities and to enhance understanding of sources of risk to FWCI and sea turtles in the project areas. Implementation of these restoration activities is anticipated to result in long-term benefits to biological resources.

Geology and substrates could experience short-term, minor adverse impacts from ground disturbance resulting from field work; hydrology and water quality could experience short-term, minor adverse impacts from increased, localized turbidity; noise (i.e., the soundscape) could experience short-term, minor adverse impacts from increased human activity during implementation of field activities; and air quality could experience short-term, minor adverse impacts from vehicle and vessel emissions during implementation.

Temporary adverse impacts to habitats, wildlife, marine and estuarine fauna, and protected species could include short-term, minor disturbance from human presence during field work. Biological resources (primarily marine and estuarine fauna) would benefit from the implementation of fish and sea turtle restoration activities.

Data compilation, desktop analyses, and education/outreach activities are typically conducted from existing facilities and have minimal impacts to the environment. No adverse impacts are anticipated for socioeconomic resources. Tourism and recreational use, fisheries and aquaculture, aesthetics and visual resources, and public health and safety would experience indirect benefits from the implementation of restoration activities.

After review, the Open Ocean TIG determined that the environmental consequences that may occur from project planning, education/outreach, and desktop-based, data-related activities in the alternatives considered in this RP4/EA fall within the range of impacts described in Section 6.4.14 of the PDARP/PEIS. As such, no additional analysis of the environmental consequences of these activities is necessary. NEPA analyses of effects from additional project implementation activities are in Section A.5.

A.3 Resources Analyzed in this RP4/EA

To avoid redundancy, the restoration alternatives in this RP4/EA were reviewed to determine whether any resources would experience no impacts, negligible impacts, or similar, minor adverse impacts across all alternatives such that the resource would not require detailed analysis. To reduce redundancy, the subset

of resource categories that experience no impacts to minor adverse impacts similarly across all alternatives are described below in Section A.3.1:

- **Physical Resources** – Hydrology and water quality, air quality, noise.
- **Socioeconomic Resources** – 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.

Resource categories that are analyzed in greater detail (where applicable) include those resources where impacts are distinct and specific to the individual alternatives. These resource categories are listed below and are described in the respective subsection for each alternative (Section A.5).

- **Physical Resources** – Geology and substrates.
- **Biological Resources** – Habitats, wildlife (including birds), marine and estuarine fauna, protected species.
- **Socioeconomic Resources** – Socioeconomics.

A.3.1 Resources with Similar Impacts Common to All Alternatives

This section includes an analysis of the environmental consequences for the subset of resource categories that experience no impacts to minor adverse impacts similarly across all alternatives. Section A.4 describes the Affected Environment for all alternatives.

A.3.1.1 Physical Resources

A.3.1.1.1 Hydrology and Water Quality

Adverse impacts to hydrology and water quality are defined as alterations to an area's hydrology (e.g., surface or groundwater flows) or detectable changes to water quality above state water quality standards. Floodplains and wetlands are a subset of the hydrology and water quality resource category. Adverse impacts to floodplains are defined as detectable changes to the natural and beneficial floodplain and an increased risk of flood loss, including impacts on human safety, health, and welfare. Adverse impacts to wetlands are defined as measurable impacts on the size, integrity, or connectivity of wetlands and wetland function. Chapter 6 of the PDARP/PEIS found that short-term, minor adverse impacts to hydrology and water quality may occur during implementation associated with projects under the FWCI (Section 6.4.5) and Sea Turtle (ST; Section 6.4.7) Restoration Types. Past project-specific NEPA evaluations of DWH FWCI and ST Restoration Type projects similar to those proposed in this RP4/EA found that project impacts would be consistent with the PDARP/PEIS findings (e.g., Open Ocean TIG RP2/EA).

For this RP4/EA, all FWCI alternatives would have short-term, negligible-to-minor adverse impacts to hydrology and water quality from slight increases in commercial fishing vessel operations to support project activities where needed. For FWCI1, FWCI2, and FWCI7, alternative fishing gear may be tested and/or distributed; while these gear are not anticipated to increase fishing effort, they could disrupt localized benthos that could contribute to temporary turbidity in the project areas. For FWCI4, water quality improvement projects may have short-term, minor adverse impacts to water quality during implementation, depending on the specific project type; however, any adverse impacts would be reduced through the use of BMPs, and the project would provide long-term benefits to water quality by addressing sources of marine debris and pollution in coastal and nearshore environments.

For the ST Restoration Type alternatives in this RP4/EA, short-term, minor adverse impacts to hydrology and water quality may occur during the implementation of ST1, ST4, and ST5 due to localized increases in turbidity during the demolition of derelict structures and response to stranded sea turtles. However, these impacts would be highly localized, and conditions would return to baseline quickly. No impacts to

water quality are anticipated from ST2 and ST3, as these projects would operate within existing commercial fishery and recreational boating activities.

A.3.1.1.2 Air Quality

The United States Environmental Protection Agency (USEPA) defines ambient air in 40 Code of Federal Regulations (CFR) Part 50 as "that portion of the atmosphere, external to buildings, to which the general public has access" 40 CFR 50.1(e). In compliance with the 1970 Clean Air Act (CAA) and the 1977 and 1990 CAA Amendments, USEPA 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, USEPA has issued NAAQS for seven criteria pollutants: carbon monoxide, sulfur dioxide, particles with a diameter less than or equal to a nominal 10 microns, particles with a diameter less than or equal to a nominal 2.5 microns, ozone, nitrogen dioxide, and lead. Individual states may promulgate their own ambient air quality standards for these criteria pollutants if they are at least as stringent as the federal standards. Multiple projects evaluated in this RP4/EA would occur across the Gulf of Mexico (Gulf) and the U.S. Atlantic coasts. These projects could occur in the following counties that are currently listed on USEPA's nonattainment counties for any criteria pollutant (USEPA, 2024):

- Texas: Brazoria, Chambers, or Galveston Counties (all listed for ozone)
- Louisiana: St. Bernard Parish (sulfur dioxide)
- Delaware: Sussex County (ozone)
- New Jersey: Atlantic, Cape May, Monmouth, or Ocean Counties (all listed for ozone)
- New York: Suffolk County (ozone)
- Massachusetts: Dukes County (ozone)

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

- Carbon dioxide enters the atmosphere through the burning of fossil fuels (coal, natural gas, and oil), solid waste, trees, and wood products, or results from certain chemical reactions (e.g., cement manufacturing). Carbon dioxide is removed from the atmosphere (i.e., sequestered) when it is absorbed by plants as part of the biological carbon cycle.
- Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.
- Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydrochlorofluorocarbons, halons). Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful GHGs that are emitted from a variety of industrial processes.

Chapter 6 of the PDARP/PEIS found that short-term, minor adverse impacts to air quality may occur during implementation associated with projects under the FWCI and ST Restoration Types. Past project-specific NEPA evaluations of DWH FWCI and ST Restoration Type projects similar to those proposed in this RP4/EA found that project impacts would be consistent with the PDARP/PEIS findings. For the FWCI Restoration Type alternatives, short-term, minor adverse impacts to air quality may occur from the operation of additional fishing or data-gathering vessels. For ST Restoration Type alternatives, short-

term, minor adverse impacts to air quality may occur from the operation of construction equipment for the demolition and maintenance of structures (e.g., for alternatives ST1 and ST5) and from the operation of project vessels and vehicles for bycatch outreach (ST2), in-field vessel strike observations (ST3), and the STSSN (ST4).

A.3.1.1.3 Noise

The PDARP/PEIS (Chapter 6) states that the primary sources of terrestrial noise in coastal environment are transportation and construction-related activities, which is consistent with areas affected by this RP4/EA. The primary sources of ambient (background) noise in the project areas for this RP4/EA are vehicle operations, city-based ambient noise, recreational boating vessels, commercial fishing vessels, oil and gas infrastructure, and natural sounds such as wind and wildlife. The level of noise in the project areas varies depending on the season, time of day, number and types of noise sources, and distance from the noise source.

The PDARP/PEIS found that adverse impacts to ambient noise associated with the Restoration Approaches relevant to this RP4/EA would be short-term and minor. Consistent with the PDARP/PEIS and past evaluations of DWH NRDA restoration projects in the open ocean, projects in this RP4/EA would result in short-term, minor adverse impacts to the soundscape from implementation equipment (e.g., vehicles, vessels, construction equipment) and human presence during implementation. Implementation-related noise would conclude once implementation is completed.

A.3.1.2 Socioeconomic Resources

A.3.1.3.1 Environmental Justice

The intent of an environmental justice evaluation under Executive Order (EO) 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All* (2023), is to "provide opportunities for early and meaningful involvement in the environmental review process by communities with environmental justice concerns potentially affected by a proposed action." The purpose of EO 14096 is to advance environmental justice through the analysis of direct and indirect effects of federal actions on communities with environmental justice concerns.

Table A-2 presents general demographic data for the states (U.S. Census Bureau, n.d.) and countries (for projects partially or wholly occurring in locations outside of the jurisdiction of the U.S.) in which the reasonable range of alternatives are planned, including employment, income, and poverty status. U.S. national-level data are included for comparison. Alternatives analyzed in this RP4/EA span coastal, nearshore, and offshore locations of all five Gulf states (Texas to Florida), nearshore and offshore locations of 12 U.S. Atlantic states (Florida to Maine), nearshore and offshore locations of U.S. Caribbean territories (Puerto Rico and the U.S. Virgin Islands), and nearshore and offshore locations of seven non-U.S. countries.

Communities with environmental justice concerns were identified using methods outlined in the USEPA's *Promising Practices for EJ Methodologies in NEPA Reviews* (USEPA, 2016). First, U.S. states and non-U.S. countries with high proportions of minority populations were identified as those with more than 50 percent minority populations. These locations were then compared to the U.S. national average to evaluate which states and/or non-U.S. countries have meaningfully greater minority populations (i.e., those with a percentage of minority population that is at least 10 percent greater than the U.S. national average). Second, states and/or non-U.S. countries with high proportions of low-income populations were identified as those with a percentage of individuals in poverty that is greater than or equal to the U.S. national poverty level. Based on these steps, 22 states, U.S. territories, and non-U.S. countries were identified as containing either minority or low-income populations (indicated with gray shading in Table

A-2): Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina, New York, Puerto Rico, the U.S. Virgin Islands, the Mexican States of Tamaulipas, Veracruz, Yucatán, and Quintana Roo, the Bahamas, Turks and Caicos Islands, Jamaica, Haiti, and the Dominican Republic.

Table A-2 County, State, and National Demographic Information (minority or low-income populations indicated with gray shading)

Location	Population Estimate (2023)	Percent Minority Population (2021)	Percent of population age 25 or older with high school education or higher (2018-2022)	Percent of population age 16 or older in civilian labor force (2018-2022)	Median household income, 2022 dollars (2018-2022)	Percent of persons in poverty (2021)
Texas	30,503,301	23.2	85.2	64.6	$73,035	14
Louisiana	4,573,749	37.4	86.7	58.7	$57,852	18.6
Mississippi	2,939,690	41.3	86.2	56.7	$52,985	19.1
Alabama	5,108,468	31.1	87.8	57.6	$59,609	16.2
Florida	22,610,726	23.3	89.3	59	$67,917	12.7
Georgia	11,029,227	41.3	88.7	62.9	$71,355	12.7
South Carolina	5,373,555	31	89.3	59.5	$63,623	14
North Carolina	10,835,491	30.2	89.4	61.4	$66,186	12.8
Virginia	8,715,698	31.7	91.1	63.8	$87,249	10.6
Maryland	6,180,253	42.8	91	66.6	$98,461	9.6
Delaware	1,031,890	32.4	91.2	61.9	$79,325	9.4
New Jersey	9,290,841	29.6	90.6	65.9	$97,126	9.7
New York	19,571,216	31.5	87.6	62.8	$81,386	14.3
Rhode Island	1,095,962	17.6	89.4	64.5	$81,370	10.8
Massachusetts	7,001,399	21	91.2	67	$96,505	10.4
Maine	1,395,722	7.3	94.1	62	$68,251	10.8
Puerto Rico	3,205,691	56.4	79.5	44.8	$24,002	41.7
U.S. Virgin Islands [a]	87,146 (2020)	86.7	78.3	56.5	$41,747	22.8
Mexico – Tamaulipas [b]	3,527,735 (2020)	1.2 (2020)	11.4 (2020)	41.7 (2020; age 12 or older)	Not Available	26.8
Mexico – Veracruz [b]	8,062,579 (2020)	2.7 (2020)	61.5 (2020)	38.9 (2020; age 12 or older)	Not Available	51.7
Mexico – Yucatán [b]	3,320,898 (2020)	3 (2020)	10.8 (2020)	30.9 (2020; age 12 or older)	Not Available	38.8

Location	Population Estimate (2023)	Percent Minority Population (2021)	Percent of population age 25 or older with high school education or higher (2018-2022)	Percent of population age 16 or older in civilian labor force (2018-2022)	Median household income, 2022 dollars (2018-2022)	Percent of persons in poverty (2021)
Mexico – Quintana Roo [b]	1,857,985 (2020)	2.8 (2020)	41.5 (2020)	46.1 (2020; age 12 or older)	Not Available	27
Canada – New Brunswick [c]	775,610 (2021)	5.7 (2021)	24.9 (2021)	50.2 (2021; age 15 or older)	$37,600 (2020; CA$)	5.6
Canada – Nova Scotia [c]	969,383 (2021)	9.6 (2021)	22.7 (2021)	50.3 (2021; age 15 or older)	$38,000 (2020; CA$)	6.5
The Bahamas [d]	399,314 (2022)	92 (2010 est.)	Not Available	59.6 (2022 est.)	Not Available	9.3 (2010 est.)
Turks and Caicos [e]	60,439 (2024)	90 (2006 est.)	Not Available	Not Available	Not Available	Not Available
Jamaica [f]	2,823,713 (2024)	97 (2011 est.)	Not Available	53.7 (2022 est.)	Not Available	17.1 (2016 est.)
Haiti [g]	11,753,943 (2024)	95	Not Available	43.8 (2022 est.)	Not Available	58.5 (2012 est.)
Dominican Republic [h]	10,815,857 (2024)	85 (2014 est.)	Not Available	47.8 (2022 est.)	Not Available	23.9
U.S. National	**334,914,895**	**24.7**	**89.1**	**63**	**$75,149**	**11.5**

[a] U.S. Census Bureau, 2022

[b] INEGI, 2021 and Statistica Research Department, 2024

[c] Government of Canada, 2023 and Government of Canada, 2024

[d] Commonwealth of the Bahamas, 2023 and CIA, 2024d

[e] CIA, 2024e

[f] CIA, 2024c

[g] CIA, 2024b

[h] CIA, 2024a

The Open Ocean TIG determined whether project impacts would cause disproportionate adverse impacts to communities with environmental justice concerns using the following multistep process. This determination is based on whether short- or long-term adverse impacts would remain after accounting for BMPs and other potential mitigation measures.

1. Evaluated each alternative's impacts to physical, biological, and socioeconomic resources to identify impacts to the general population.
2. Evaluated if the distribution of impacts for each alternative would differ significantly between the general U.S. state and country populations and communities with environmental justice concerns. Specifically, the TIG considered whether human health and environmental impacts would be:
    - Predominantly borne by communities with environmental justice concerns;

- Above generally accepted norms;
- Likely to appreciably exceed the risk or rate to the general population;
- Occurring in populations affected by cumulative or multiple adverse exposures from environmental hazards; and
- Identified as significant and adverse.

3. Evaluated BMPs and other relevant mitigation measures for effectiveness in avoiding or reducing adverse impacts identified in the above steps.
4. Analyzed opportunities for the meaningful engagement of persons and communities with environmental justice concerns given the following considerations:
    - Timely opportunities for members of the public to share information or concerns and participate in the decision-making process was provided;
    - Public input was fully considered as a part of the decision-making process; and
    - Persons and communities affected by federal activities were sought out and their involvement was encouraged.
5. When appropriate, the Open Ocean TIG evaluated alternatives for their potential to support the creation of high-quality and well-paying jobs for people who are part of communities with environmental justice concerns.

Due to the limited duration and magnitude of impacts of proposed alternatives, adverse impacts associated with alternatives would not disproportionately burden communities with environmental justice concerns. While some long-term, minor adverse impacts to socioeconomic resources are anticipated, these adverse effects would not be predominantly borne by communities with environmental justice concerns. Long-term, minor adverse impacts to socioeconomics resources are anticipated to occur along the east coast of Florida due to the acquisition of private parcels and incorporation into publicly managed lands (for alternative ST1). While the property tax base would experience long-term, minor adverse impacts, the local economy would benefit from increased nature-based tourism from expanded beach access and enhanced sea turtle populations. Further, the projects in this RP4/EA would provide direct and indirect benefits to marine resources, which would, in turn, provide long-term benefits to communities with environmental justice concerns that rely on these resources (e.g., for subsistence or economics).

In summary, projects proposed in this RP4/EA are not anticipated to result in disproportionate adverse impacts to communities with environmental justice concerns.

A.3.1.3.2 Cultural Resources

Cultural resources are evidence of past human activity and encompass a range of traditional, archaeological, and built assets, including culturally important landscapes and present-day culturally significant uses of the environment. In the U.S., cultural resources include historic properties listed in, or eligible for listing in the National Register of Historic Places (36 C.F.R 60 [(a-d]). The National Historic Preservation Act of 1966 (NHPA), as amended (16 U.S.C. 470(1)), defines a historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register [of Historic Places]." Historic properties include built resources (bridges, buildings, piers, etc.), archaeological sites, and traditional cultural properties that are significant for their association with practices or beliefs of a living community that are both fundamental to that community's history and a piece of the community's cultural identity. Although often associated with Tribal traditions, these properties also may be important for their significance to other ethnic groups or communities. Historic properties also include submerged resources.

As stated in the PDARP/PEIS, all projects implemented under subsequent restoration plans and tiered NEPA analyses consistent with the PDARP/PEIS 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. For some projects in this RP4/EA, the action would involve a study, analysis, or program that would not have the potential to affect cultural resources. For any activities with the potential to affect cultural resources, NHPA Section 106 consultations would be completed before those activities would occur. The status of compliance reviews for preferred projects, as of the publication of this RP4/EA, is provided in Table 5-1.

Project areas will be surveyed as needed, and any appropriate avoidance measures for cultural resources will be developed through consultation with the State Historic Preservation Office and all interested Tribes. As a result, project activities are not anticipated to have adverse impacts on cultural resources.

A.3.1.3.3 Infrastructure

Infrastructure includes public services and utilities, such as traffic and transportation patterns on public roadways. Project activities would conduct education and outreach with commercial fishing and recreational boating communities, evaluate existing data and gather new data, test and/or distribute alternative fishing gear, acquire sea turtle nesting habitat, and enhance STSSN activities. Most of these activities would occur from existing, private facilities or in coordination with private operations. Project implementation may result in a slight increase of vessel or vehicular use; however, these increases would be highly localized, temporary, and would not disrupt local traffic patterns. As such, alternatives in this RP4/EA would have negligible adverse impacts to public infrastructure.

A.3.1.3.4 Land and Marine Management

Project activities proposed in this RP4/EA would not require variances or zoning changes or amendments to land use, area comprehensive, or management plans; thus, no adverse impacts to overall land and marine use or management are expected. FWCI Restoration Type alternatives would provide outreach and education to commercial fishing communities to voluntarily implement conservation measures that would support existing fishery management and conservation objectives. As such, these projects would provide long-term benefits to land and marine management. The ST1 alternative would acquire and incorporate land parcels into publicly managed lands to support sea turtle nesting in perpetuity, and the ST5 alternative would enhance sea turtle nest protection efforts on public beaches in Mexico. These two projects are consistent with management objectives in these project areas and, as such, would have long-term benefits for land and marine management.

A.3.1.3.5 Tourism and Recreational Use

Project activities proposed in this RP4/EA would largely not adversely impact tourism and recreation due to the scope of project activities and locations (e.g., existing facilities, nearshore and offshore environments). One project (FWCI1) would conduct education and outreach activities with recreational fishing communities to reduce post-release mortality of recreationally caught fish. Recreational anglers would voluntarily implement conservation measures (e.g., alternative gear), and as such, no restrictions would be placed on recreational fisheries. A second project (ST3) would conduct education and outreach activities with boating communities to reduce instances of vessel strikes to sea turtles. Boaters would voluntarily implement conservation measures (e.g., slow speeds), and as such, no restrictions would be placed on boating.

All alternatives in this RP4/EA would provide long-term benefits through restored marine resources (specifically fish, water column invertebrates, and sea turtles) which support vibrant nature-based tourism and recreation in the Gulf. All alternatives would provide long-term benefits to tourism and recreational use by enhancing populations on which these activities rely. Finally, specifically for ST1, project

activities would provide long-term benefits for tourism and recreational use by acquiring private parcels and incorporating them into publicly managed areas, which would allow these spaces to be used by the public in perpetuity.

A.3.1.3.6 Fisheries and Aquaculture

Chapter 6 of the PDARP/PEIS (Section 6.4.5.4.3) found that impacts from projects intended to incentivize Gulf of Mexico commercial fishing communities to increase gear selectivity and environmental stewardship could result in benefits and minor-to-moderate, short- to long-term adverse impacts to socioeconomic resources. Additional analyses of the project specific activities indicated that adverse impacts to socioeconomics are not anticipated; rather, benefits should occur.

FWCI1, FWCI2, FWCI3, FWCI5, FWCI6, FWCI7, and ST2 would conduct outreach and education with commercial fishing communities to distribute and encourage the use of more selective gear, to encourage the implementation of BMPs to reduce bycatch and reduce post-release mortality, and/or to collect data. These projects would operate within existing, permitted commercial fishery operations, and some activities may be conducted under scientific research permits or other authorities. Project activities would support commercial fishing communities with meeting existing requirements and reduce existing fishery impacts on marine species. For example, the ST2 alternative would provide outreach through the NOAA Gear Monitoring Team (GMT) to assist commercial fishing vessels with voluntary inspections of turtle excluder devices (TEDs) to meet existing TED requirements. Since participation in any project activities (e.g., implementation of BMPs or alternative gear) would be voluntary, no adverse impacts on fisheries or aquaculture associated with these projects are expected. Fisheries and aquaculture would benefit over the long term from the implementation of these alternatives from improved fish populations.

All other alternatives would have no impacts to fisheries or aquaculture due to the project location or scope of activities. Recreational fisheries are analyzed as part of Section A.3.1.3.5.

A.3.1.3.7 Marine Transportation

Project activities would occur in nearshore and offshore environments and could co-occur with marine transportation channels (e.g., recreational passes, shipping channels). Where project activities overlap with marine transportation (e.g., during data gathering), projects would comply with posted transportation channels. As such, the Open Ocean TIG does not anticipate any adverse impacts to marine transportation from any alternative in this RP4/EA.

A.3.1.3.8 Aesthetics and Visual Resources

Proposed restoration activities would restore FWCI and sea turtle resources and are not expected to have adverse impacts on aesthetics or visual resources. All FWCI Restoration Type alternatives would occur within the open ocean or from existing facilities, away from the aesthetics and visual resources of the coast or nearshore waters of the Gulf. ST Restoration Type alternatives would occur along the coast within sight of residents and tourists. ST1 and ST5 could have short-term, negligible-to-minor adverse impacts to aesthetics and visual resources during the removal and/or repair of derelict structures due to the presence of construction equipment. ST4 could have short-term, minor adverse impacts to aesthetics and visual resources during stranding response events if sea turtles strand in public areas. However, for these three alternatives, these adverse impacts would be temporary and localized. The viewscape would have long-term benefits from the implementation of all alternatives from improved marine resource populations and associated indirect improvements to ecological health.

A.3.1.3.9 Public Health and Safety, Including Flood and Shoreline Protection

Proposed project activities are unlikely to adversely affect public health and safety. Most proposed activities would be implemented in partnership with commercial and recreational fishing communities

through voluntary participation. Participation in these project alternatives would be managed to prevent impacts to health and safety and make participants aware of the potential for injury. Potential public health and safety issues would be addressed through disclaimers and waivers, would follow appropriate safety requirements, and/or would be coupled with training and educational events to ensure proper use of equipment. Public health and safety would benefit from all seven FWCI alternatives and ST1, ST3, and ST5 alternatives by addressing sources of and removing marine debris and invasive species, addressing sources of water quality impairment, advancing improved fishing practices, reducing illegal charter fishing, increasing at-sea observer coverage, decreasing depredation, removing/repairing derelict structures, and reducing recreational vessel strikes.

A.4 Affected Environment

As noted in Section A.3, projects addressed in this RP4/EA were reviewed to determine whether any resources would experience no impacts, negligible impacts, or similar minor adverse impacts common to all alternatives such that the resource would not require detailed analysis. The subset of resource categories that experience no impacts to minor adverse impacts similarly across all alternatives are described in Appendix A.3.1, rather than being repeated for each alternative. As such, this Section A.4 focuses on a description of the physical, biological, and socioeconomic resources that could have unique impacts from each alternative. These resources are listed below and are described for each geographic region where project activities would occur.

- **Physical Resources** – Geology and substrates.
- **Biological Resources** – Habitats, wildlife, marine and estuarine fauna, and protected species.
- **Socioeconomic Resources** – Socioeconomics.

A.4.1 Gulf of Mexico

With the exception of ST1 and ST5, all projects contained in this RP4/EA would occur at least partially in the northern Gulf within state and/or federal waters. Four projects (FWCI1, FWCI2, FWCI6, and ST5) would also occur in the Mexican Gulf (for more detail, see project descriptions and maps in Section 2.4).

Primary FWCI restoration activities in the Gulf would involve onshore outreach, education and data analysis; voluntary adoption of methods and gear to reduce FWCI bycatch and post-release mortality; in-situ studies to assess efficacy of gear and best practices or conduct monitoring using tagging, tracking, and remote sensing methods; enhanced at-sea observer coverage; marine debris and invasive species prevention and removal; reduction of negative effects associated with water quality; and reduction of negative effects from energy development activities. The species groups of focus for these restoration activities include reef fish and reef-associated fish, highly migratory species (HMS), coastal migratory pelagic species, and other species such as flounders, menhaden, drums, jacks, sea trout, forage fish, demersal species, crabs and lobsters, and water column invertebrates. These species collectively occur throughout the Gulf in nearshore, continental shelf, continental slope, and deep-water open ocean habitats.

Primary sea turtle restoration activities in the Gulf would involve onshore outreach, education, and data analysis; voluntary adoption of methods and gear to reduce sea turtle bycatch; in-situ studies to assess boater behavior, gear efficacy, or as part of observational studies; monitoring activities using tagging, tracking, and remote sensing methods; sea turtle stranding response, rehabilitation, and necropsies; and nest monitoring, protection, and egg relocation (specifically on nesting beaches in Tamaulipas, Mexico). The fisheries of focus for bycatch reduction methods are the U.S. Gulf shrimp trawl (otter/skimmer) and commercial hook-and-line (reef fish, BLL, and pelagic longline) fisheries. These fisheries occur throughout the U.S. Gulf in nearshore, continental shelf, continental slope, and deep-water habitats.

The following evaluation of the affected environment for this RP4/EA incorporates by reference previous DWH affected environment assessments, including the Open Ocean TIG RP2/EA (Open Ocean TIG, 2019), the Open Ocean TIG RP3/EA (Section 4.4.7.1) (Open Ocean TIG, 2023), and the DWH Phase IV Early Restoration Plan and Environmental Assessment (DWH Trustees, 2015). These RP/EAs evaluated proposed restoration activities across the northern Gulf and describe the region's physical, biological, and socioeconomic resources. This RP4/EA Affected Environment description incorporates these RP/EAs by reference and summarizes the most pertinent information about the affected environments for the projects evaluated in this RP4/EA. In addition, this section provides supplementary information for physical, biological, or socioeconomic resources that have changed since the publishing of these incorporated RP/EAs and provides new information for areas that were not previously evaluated, such as the Mexican Gulf.

Additionally, the affected environments relevant to the Gulf fisheries of focus for this RP4/EA have been analyzed under the fishery management plans (FMPs) and associated amendments for these fisheries. These include, but are not limited to, the *Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan* (NOAA, 2024a), the *Gulf of Mexico and South Atlantic Coastal Migratory Pelagic Fishery Management Plan* (Gulf of Mexico Fishery Management Council [GOMFMC], 1983), the *Gulf of Mexico Red Drum Fishery Management Plan* (GOMFMC, 1981), the *Gulf of Mexico Reef Fish Fishery Management Plan* (GOMFMC, 1984), the fishery management plan for Atlantic menhaden, which is contained in Amendment 3 to the *Interstate Fishery Management Plan* (Atlantic States Marine Fisheries Commission, 2017), the *Gulf of Mexico Shrimp Management Plan* (GOMFMC, 1981), and the associated amendments. These FMPs and amendments provide extensive and regularly updated information about the physical, biological, and socioeconomic resources within these fisheries and are incorporated by reference herein.

A.4.1.1 Physical Resources

A.4.1.1.1 Geology and Substrates

The Gulf is a semi-enclosed oceanic basin covering approximately 615,000 square miles (1.6 million square kilometers). It is bounded by the U.S. to the north, Mexico to the west and south, and Cuba to the southeast, and connects to the Atlantic Ocean through the Straits of Florida and the Caribbean Sea through the Yucatán Channel. The Gulf contains several geomorphological zones. Along approximately 3,700 miles (approximately 6,000 kilometers) (U.S. Fish and Wildlife Service [USFWS], n.d.) of coastline in the U.S., Mexico, and Cuba, the coastal transition zone contains bays, estuaries, barrier islands, and extensive wetland ecosystems including salt marshes and mangroves. These nearshore substrates are diverse, with sand, silt, clay, hard bottoms, and submerged vegetation. Around the Gulf basin's rim, the continental shelf and slope vary drastically. In the northern Gulf, the continental shelf is much broader, extending up to its widest point of 124 miles (200 kilometers) along the West Florida Shelf. In contrast, the continental shelf throughout northern and central Mexico is much narrower, reaching its narrowest point of approximately 24 miles (40 kilometers) (NOAA National Centers for Environmental Information, n.d.) before broadening eastward to the Campeche Bank along the northern Yucatán peninsula. Geologically, the eastern Gulf's continental shelf is mainly composed of carbonate sands (Geyer et al., 2022). To the south, the Campeche Bank is composed of carbonates very similar to those found in the West Florida Shelf, suggesting that the two formations were once connected (USFWS, 2015). In contrast, the western and central shelves, including near the state of Tamaulipas in northern Mexico, are composed of mixed sediments, including sand, silt, and clay. At the center of the Gulf basin, the flat Sigsbee Abyssal Plain reaches depths of more than 9,800 feet (3,000 meters) (Ward and Tunnell, 2017).

Along the northern and western continental shelf of Louisiana, Texas, and Mexico, the continental shelf and slope contains many important bathymetric features. These formations include reefs, such as Flower Garden Banks National Marine Sanctuary in the north and Campeche Bank Reefs in the south; canyons, such as the Mississippi Canyon in the north and Campeche Canyon in the south; and salt domes, such as the Sigsbee Knolls in the central Sigsbee Abyssal Plain and Campeche Knolls in the Bay of Campeche. These structural complexities, found at a wide range of depths along the continental slope, are critical biological and socioeconomic resources and form the basis for a multitude of benthic environments (described below in Section A.4.1.2.1). These continental shelves also contain large deposits of mineral resources such as petroleum, natural gas, sulfur, and calcium carbonate (Geyer et al., 2022), supporting extractive activities (described below in Section A.4.1.3.1).

Notably, abundant oil exploration and extraction activities in the Gulf have resulted in numerous oil spills. In addition to the DWH oil spill, one of the largest is the Taylor Energy MC20 oil spill near the Mississippi River Delta, which has been releasing crude oil into Gulf waters since the production platform collapsed during Hurricane Ivan in 2004 (NOAA Damage Assessment, Remediation, and Restoration Program, n.d.). Although the total volume of oil released by this spill is not known, detailed flow rate monitoring indicated a release rate of approximately 900 gallons per day in 2018, and more than 1 million gallons have been collected by the containment system installed in 2019 (NOAA Office of Response and Restoration, n.d.). While this containment system is considered highly effective, a small portion of the oil is not captured and is still being released from the site (NOAA Damage Assessment, Remediation, and Restoration Program, n.d.). Oil exploration is also common in the Bay of Campeche, particularly in a region known as the Sureste Basin. This region is responsible for much of Mexico's oil production and contains the Cantarell Oil Field, once one of the largest oil reservoirs in the world, and the Ku-Maloob-Zaap Oil Fields, which have since overtaken Cantarell in production volume (Mexico Business News, n.d.). While the Bay of Campeche has also been impacted by large oil spills (such as the multi-million-barrel *Ixtoc I* spill in 1979), this region of the Gulf was found to have comparatively lower levels of PAH exposure than areas in the northern Gulf (Pulster et al., 2020).

A.4.1.2 Biological Resources

A.4.1.2.1 Habitats

The Gulf features a variety of habitats, including coastal dunes, barrier islands, salt marshes and mangroves, nearshore seagrass beds and coral reefs, soft and hard bottom habitats in the mesophotic and deep-sea zones, and the open ocean. Each habitat supports a unique assemblage of species and plays a key role in the overall ecological balance and productivity of the Gulf region.

In the northern Gulf, shoreline habitats are dominated by salt marshes, oyster reefs, and seagrass beds. To the west and south throughout Mexico where climates are more tropical, sandy beaches, seagrass beds, and mangrove swamps are plentiful. Along the southern shore of Texas and northern shore of Mexico, arid environments resulting from low precipitation and high evapotranspiration result in hypersaline conditions and typically contain less vegetation than other regions of the Gulf. The state of Tamaulipas, along the northern shore of Mexico, contains the Laguna Madre, a rare hypersaline lagoon with clay dunes and shallow seagrass beds (Ward and Tunnell, 2017). Importantly, the beaches along the coastline of Tamaulipas contain primary nesting habitat for more than 95 percent of Kemp's Ridley sea turtles (*Lepidochelys kempii*) worldwide (described further in section A.4.1.2.4 below) (National Marine Fisherires Service [NMFS], n.d.[a]).

Further offshore, the continental shelf is home to several coral reef systems, most notably the Florida Keys, Flower Garden Banks National Marine Sanctuary, Northern and Southern Veracruz, and Campeche Bank reef systems. These reef systems support a productive community of invertebrates, fishes, marine

mammals, sea turtles, and seabirds, as described further below. As described in Sections 3.5.3 and 4.5 of the PDARP/PEIS, soft and hard bottom habitats, including artificial hard bottom habitat such as artificial reefs or oil and gas platforms, support an array of invertebrates, fishes, and other marine life, with unique species assemblages occuring at various depths and environmental conditions. These communities include mesophotic corals, sponges, and algae, as well as deep-sea coral communities. Similarly, the Gulf's estuarine, continental shelf, and offshore water column support a diversity of organisms across the epipelagic, mesopelagic, and bathypelagic zones.

While much of the Gulf is considered highly productive habitat, an exception to this is the annually recurring "dead zone," a hypoxic area covering an average of more than 5,000 miles (8,000 kilometers) off the coast of Texas and Louisiana near the Missisippi River drainage basin (NOAA, 2024b). The Gulf dead zone typically appears in spring through late summer and is the second largest in the world (Rabalais et al., 2002). This dead zone, primarily caused by nutrient pollution within the Mississippi-Atchafalaya watershed, was grew larger than average in the summer of 2024, spanning around 6,700 square miles (17,300 kilometers), an area approximately the size of New Jersey (NOAA, 2024b). While some organisms may survive the dead zone, many either emigrate from the region or die from hypoxia (Rabalais et al., 2002).

A.4.1.2.2 Marine and Estuarine Fauna

The Gulf's complex benthic environment, as well as the water column, provide habitat for a diverse assemblage of marine fish and invertebrates. Smaller organisms support the food web and contribute to production of ecologically, recreationally, and commercially valuable fish species. Commercially important species managed by Gulf of Mexico Fishery Management Council include shrimp, reef fish such as red snapper (*Lutjanus campechanus*) and red grouper (*Epinephelus morio*), and coastal migratory pelagic species such as king mackerel (*Scomberomorus cavalla*). Commercially important HMS managed through the *Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan and Amendments* (NOAA, 2024a) include Atlantic tunas (*Thunnus spp.*), sharks, swordfish (*Xiphias gladius*), and billfishes. Additional species that are recreationally important to the region include spotted sea trout (*Cynoscion nebulosus*) and flounder (*Paralichthys spp*.).

An additional marine species of note in the Gulf is the invasive lionfish (*Pterois spp.*), which has quickly spread throughout Gulf reef habitats since the 1980s. As voracious predators, lionfish harm reef communities by outcompeting native, commerically important reef fish such as snappers and groupers, and simultaneously reducing populations of herbivores that typically control algal growth on reefs (NMFS, n.d.[c]). As a result, a single lionfish may reduce reef fish recruitment at a reef by up to 79 percent (Albins and Hixon, 2008). The Gulf of Mexico's lionfish population increased drastically from 2011 to 2014, coinciding with the first years of recovery following the DWH oil spill, and studies estimate that the detrimental impact of these invasive lionfish to fish biomass and diversity may have inhibited ecosystem recovery (Chagaris et al., 2020; Lewis et al., 2020).

The Gulf contains essential fish habitat (EFH) designations for at least six species groups, including red drum (*Sciaenops ocellatus*), reef fish, coastal migratory pelagic species, shrimp, spiny lobster, and coral (NMFS, n.d.[b]).

A.4.1.2.3 Wildlife Species

Due to its position along major migratory corridors, diversity of climates, and complex array of habitats, including salt marshes, sandy beaches, nesting islands, and open ocean, the Gulf is a hotspot for bird diversity. Nearly 400 species have been reported to rely on this region for feeding, breeding, and migration (Ward and Tunnell, 2017). Seabirds in the Gulf spend the majority of their lives roosting and feeding in open marine waters, only briefly returning to nesting areas on islands or coastlines during

breeding season. In Mexico, many of these nesting islands occur off the coasts of the Yucatán and Campeche (Gallardo et al., 2004). Seabirds frequently occurring in open ocean areas include terns, storm petrels, shearwaters, and jaegers.

The Gulf coastline also constitutes highly important shorebird nesting habitat, with many shorebirds using this habitat for overwintering, as a migration stopover, or for beach nesting. Shorebird species frequently occurring along the Gulf coast include plovers, oystercatchers (*Haemoptopus spp.*), avocets (*Recuvirostra spp.*) and stilts (*Himantopus spp.*), and sandpipers. Many migratory species winter along the northeastern coastline of Mexico, including Tamaulipas, where they make use of beaches and coastal lagoons (Gallardo et al., 2004). Endangered Species Act (ESA)-listed bird species in the region are described further below in Section A.4.1.2.4.

A.4.1.2.4 Protected Species

The Gulf contains numerous species protected by various conservation laws and agreements, including the ESA and Marine Mammal Protection Act (MMPA).

Five species of sea turtles occur throughout the Gulf: loggerhead, North Atlantic Distinct Population Segment (DPS) (*Caretta caretta*); green, North Atlantic DPS (*Chelonia mydas*); hawksbill (*Eretmochelys imbricata*); leatherback (*Dermochelys coriacea*); and Kemp's ridley sea turtles, all of which are federally protected under the ESA (NMFS, n.d.[b]). These sea turtle species rely on many different habitat types throughout the Gulf for nesting, foraging, and refuge throughout their life stages. In addition, nearly all the Kemp's ridley sea turtle's global nesting habitat occurs in northern Mexico and southern Texas (NMFS, n.d.[a]).

Protected bird species in the Gulf include the black-capped petrel (*Pterodroma hasitata*), roseate tern (*Sterna dougallii*), piping plover (*Charadrius melodus*), and Rufa red knot (*Calidris canutus*). Critical habitat is designated for the piping plover along many of the barrier islands and beaches of the U.S. Gulf coast.

Federally protected fish species such as Gulf sturgeon (*Acipenser oxyrinchus desotoi*) and smalltooth sawfish (*Pristis pectinata*) inhabit nearshore coastal waters of the Gulf. Nearshore waters along the Gulf coast are designated critical habitat for Gulf sturgeon, and nearshore waters along the coast of the southwestern Florida peninsula are designated critical habitat for smalltooth sawfish. Additional protected fish species in the Gulf include the Nassau grouper (*Epinephelus striatus*), oceanic whitetip shark (*Carcharhinus longimanus*), giant manta ray (*Manta birostris*), and queen conch (*Lobatus gigas*). Seven protected species of coral also occur in the Gulf: elkhorn coral (*Acropora palmata*), staghorn coral (*Acropora cervicornis*), boulder star coral (*Orbicella franksi*), mountainous star coral (*Orbicella faveolata*), lobed star coral (*Orbicella annularis*), rough cactus coral (*Mycetophyllia ferox*), and pillar coral (*Dendrogyra cylindrus*).

Several marine mammals occur in the Gulf, including ESA-listed species such as the West Indian manatee (*Trichechus manatus*), which occurs primarily along the Florida peninsula, and the sperm (*Physeter macrocephalus*) and Rice's (*Balaenoptera ricei*) whales, which occur primarily along the continental shelf or in deeper waters. Many additional marine mammals protected by the MMPA occur throughout the Gulf, including several species of beaked whales and delphinids, notably the common bottlenose dolphin (*Tursiops truncatus*).

A.4.1.3 Socioeconomic Resources

A.4.1.3.1 Socioeconomics

In the northern Gulf, the coastal areas vary significantly in population density, economic status, and industry. In 2017, the Gulf coastal population was approximately 15.8 million, and was the fastest-growing coastal population in the U.S. (U.S. Census Bureau, 2019). While much of the Gulf coastline is rural, urban centers such as New Orleans, Louisiana, and Houston, Texas, are highly populous and economically diverse.

Across the five Gulf states, more than 800,000 people are employed by the "ocean economy," which includes natural resource extraction, marine construction, ship building, marine transportation, tourism, and recreation; and the gross domestic product associated with these industries is an estimated $117 billion (McKinney et al., 2021). A higher percentage of the Gulf population is employed in the "Natural Resources, Construction Industries, and Maintenance Occupations" category than any other area in the U.S. (10.2 percent in the Gulf, as compared to 9.1 percent national average) (U.S. Census Bureau, 2019). Key industry sectors for the Gulf states include oil and gas, marine transportation, tourism, and fishing. In Texas and Louisiana, oil and gas and marine transportation are key industries. Including activities in both state and federal waters, Gulf oil production accounts for more than half of all U.S. oil production (McKinney et al., 2021). Furthermore, the Houston, Southern Louisiana, and Corpus Christi ports were the three largest ports in the U.S. in 2021 as rated by total tonnage. Out of the top ten largest ports in this ranking, six were in Texas or Louisiana (Bureau of Transportation Statistics, 2024). In contrast, the State of Florida relies more heavily on tourism, including boating, swimming, snorkeling and scuba diving, beach use, and recreational fishing.

Both commercial and recreational fishing are economically important industries in the U.S. Gulf. NOAA estimates that Gulf commercial fish landings generated more than $912 million in 2022 (NMFS, 2024a) and employed more than 63,320 individuals (NMFS, 2024b). Shrimp and Gulf menhaden were the most commercially important fisheries, with Louisiana responsible for the largest proportion of the catch; however, over the last decade, the Gulf shrimp industry has faced challenges due to global imports (Ward and Tunnell, 2017). Recreational fishing, on the other hand, is a growing industry in the Gulf and was estimated to have employed more than 44,500 individuals in 2022 and generated more than $5.1 billion in expenditures (NMFS, 2024a). In total, around 25 percent of U.S. commercial fish landings and 40 percent of recreational harvest may be attributed to the Gulf (Ward and Tunnell, 2017).

In the Mexican Gulf, the coastal geography consists of six states: Tamaulipas, Veracruz, Tabasco, Campeche, Yucatán, and Quintana Roo. With a total population of 18.4 million in 2015, the Mexican Gulf coastline's most populated counties occur at the northernmost edge of Tamaulipas, near Mexico City, and on the Yucatán near Cancún. Population growth in these coastal areas is more mixed than in the U.S. Gulf, with some counties experiencing population decline, and others exhibiting 10 to 30 percent growth between 2010 and 2015 (Azuz-Adeath, et al., 2019).

Similar to the U.S. Gulf, oil and gas, tourism, and fishing industries are also important components of the Mexican Gulf economy. Mexico is one of the largest oil producers in the world, and oil earnings accounted for nearly 20 percent of Mexico's revenue in 2022 (International Trade Administration, 2023). The country plans to invest in an array of new exploration, extraction, and production projects throughout the Gulf (International Trade Administration, 2023). Tourism in the Mexican Gulf is concentrated primarily in the state of Quintana Roo (Data México, 2024).

Commercial fishing in the Mexican Gulf is responsible for approximately 20 percent of Mexico's total national catch; however, a significant portion of this catch is generated by small-scale fishing operations targeting profitable species, such as red grouper or snapper. In addition to widespread subsistence fishing,

much of the catch is sold to local markets; in small-to-medium scale operations, catch is sold to local markets or middlemen for domestic and international markets. While the investment per capita into fishing gear and boat equipment is relatively low, improvements to fishing gear and technology are on the rise. Most frequently targeted catch species include groupers, particularly red grouper, snappers, porgies, grunts, and tilefish. In addition to finfish, other Mexican Gulf fisheries include shrimp, octopus, sharks and rays, and lobster (Fernández et al. 2011).

A.4.2 Western Atlantic Basin

In this RP4/EA, four FWCI restoration projects (FWCI1, FWCI2, FWCI6, and FWCI7) would occur partially in the U.S. Atlantic, and two FWCI restoration projects (FWCI2 and FWCI6) may occur partially in Atlantic waters of Canada, northern South America, and the high seas. Only one ST restoration project, ST1, would occur entirely in the south U.S. Atlantic (for more detail, see project descriptions and maps in Section 2.4.).

FWCI restoration activities in the Atlantic waters of the U.S., Canada, northern South America, and the high seas would involve onshore outreach, education, and data analysis; voluntary adoption of methods and gear to reduce FWCI bycatch and post-release mortality; in-situ studies to assess gear efficacy or conduct monitoring using tagging, tracking, and remote sensing methods; and enhance at-sea observer coverage. The species groups of focus for these restoration activities include reef fish and reef-associated fish, HMS, coastal migratory pelagic species, and other species such as flounders, menhaden, drums, sea trout. These species collectively occur in the Atlantic waters of the U.S., Canada, or northern South America in nearshore, continental shelf, continental slope, or deep-water open ocean habitats.

Sea turtle restoration activities in the U.S. Atlantic would involve acquisition and protection of priority sea turtle nesting habitat at Archie Carr and Hobe Sound National Wildlife Refuges (NWR), as well as possible demolition or removal of any derelict structures or barriers on these parcels that may block sea turtle access. Restoration activities associated with this project would occur entirely on terrestrial beach nesting habitat within the approved acquisition boundaries of these NWRs.

The following description of the affected environment for this RP4/EA incorporates by reference previous DWH affected environment assessments, including the Open Ocean TIG RP2/EA (Section 4.3.3.3.5) (Open Ocean TIG, 2019) and the Open Ocean TIG RP3/EA (Sections 4.4.6.1 and 4.4.7.1) (Open Ocean TIG, 2023). These RP/EAs evaluated proposed restoration activities within select areas of the Atlantic, specifically Archie Carr NWR, the U.S. Atlantic, and the northeast U.S. Atlantic offshore of Massachusetts and Canada, and thus describe many of the region's physical, biological, and socioeconomic resources. This RP4/EA affected environment description incorporates by reference these RP/EAs, summarizing the most pertinent information about the affected environments for the projects evaluated in this RP4/EA. In addition, this section provides supplementary information where physical, biological, or socioeconomic resources have changed since the publishing of these incorporated RP/EAs and provides new information for areas that were not previously evaluated.

Additionally, the affected environments relevant to the Atlantic fisheries of focus for this plan have been analyzed under the FMPs and associated amendments for these fisheries. These include, but are not limited to, the *Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan* (NOAA, 2024a), the *Gulf of Mexico and South Atlantic Coastal Migratory Pelagic Fishery Management Plan* (GOMFMC, 1983), the FMP for Atlantic menhaden (*Brevoortia tyrannus*), which is contained in Amendment 3 to the *Interstate Fishery Management Plan* (ASMFC, 2024), and associated amendments. These FMPs and amendments provide extensive information about the physical, biological, and socioeconomic resources within these fisheries and are incorporated by reference herein.

A.4.2.1 Physical Resources

A.4.2.1.1 Geology and Substrates

The Western Atlantic Basin extends from Canada, through the U.S. and Caribbean, to northern South America (including waters of Venezuela, Guyana, Suriname, French Guiana, and Brazil). The U.S. Atlantic coastline extends along more than 26,000 miles (41,800 kilometers) (NOAA Office for Coastal Management, n.d.) from the Gulf of Maine in the north to the tip of southern Florida. The continental shelf is widest in the north, where it extends more than 120 miles (200 kilometers) from shore in the Gulf of Maine (Sautter, n.d.). From there, the northeastern Atlantic U.S. continental shelf steadily narrows to an average of around 60 miles (100 kilometers) at the Mid-Atlantic Bight (NOAA, 2024a), where the shelf reaches its narrowest point at Cape Hatteras, North Carolina, where the shelf extends just 18 miles (30 kilometers) from shore. The southeast Atlantic U.S. continental shelf, which extends from Cape Hatteras to southern Florida, is more terrace-like, with the initial continental slope giving way to a broad, relatively flat region called the Blake Plateau, which extends over 230 miles (375 kilometers) from shore before sloping gradually to the abyssal plain (Sautter, n.d.).

The northern U.S. Atlantic shelf and slope contain several key bathymetric features, including the Gulf of Maine, a semi-enclosed sea containing several deep basins; a wide, shallow submarine plateau off the coast of Cape Cod, Massachusetts, known as Georges Bank; and the Mid Atlantic Bight. Sediments in the Gulf of Maine reflect the complex bathymetry of this region, with a mix of boulders, rocky outcrops, and muds, whereas the Georges Bank region is primarily composed of sand. Along the Mid Atlantic Bight, the continental shelf contains primarily sands and gravels, with finer clay and silt particles occurring further out to sea, particularly at the continental slope (Boesch and Rabalais, 1987). Hard substrates are commonplace from the Gulf of Maine to Long Island, providing the foundation for complex habitat structure (described below in Section A.4.2.2.1), while the Mid Atlantic Bight contains less natural hard-bottom habitat(Steimle and Zetlin, 2000).

In the south U.S. Atlantic, key bathymetric features include the Blake Plateau, as described above; the Charleston Bump, an area of complex topography at the northern edge of the otherwise relatively flat Blake Plateau; and the Blake Ridge, a ridge that extends seaward from the shelf near South Carolina more than 372 miles (600 kilometers) into the Atlantic. Nearshore benthic substrates generally consist of sand, silt, clay, and hard bottom habitats (Sautter, n.d.).

A.4.2.2 Biological Resources

A.4.2.2.1 Habitats

The coastal estuaries, nearshore, and continental shelf and slope of the U.S. Atlantic support a diverse array of marine life. High primary productivity, particularly in colder northern waters, support the food web and contribute to production of ecologically, commerically, and recreationally valuable species. Habitat types include hardbottom communities such as warm and coldwater corals, oyster reefs, seagrasses, and unconsolidated sediments. Each of these environments provide valuable habitat for animals as refuge, nursery, nesting, and/or foraging grounds.

As described above, the Atlantic seafloor environment throughout New England contains significant hard-bottom substrate, creating complex habitat structure. Subtidal seagrasses, coldwater corals, and oyster reefs are common in the northern Atlantic region. While Cape Cod creates a minor zoogeographic division between warm and cool temperate waters and biota, the region may host a range of subtropical, tropical, temperate, and arctic taxa throughout the year. New England benthic habitats may consist of cold-water corals, oyster reefs, seagrasses, and unconsolidated soft sediments, which support a productive community of invertebrates, fish, marine mammals, sea turtles, and seabirds (NEFMC, 1985).

Throughout the Mid Atlantic, vast unconsolidated sediments support epibenthic and infaunal organisms, and natural hardbottom communities are augmented with artificial reefs and shipwrecks (NOAA National Centers for Coastal Ocean Science, n.d.). As this region represents a transition zone between the warmer waters to the south of Cape Hatteras and colder waters to the north of Cape Cod, the Mid Atlantic is home to more migratory species than the other regions. Shoreline habitat in the Mid Atlantic region consists predominantly of salt marshes, and the Mid Atlantic contains many significant bays and estuaries, such as Delaware and Chesapeake Bays (NOAA, 2024a).

In the south U.S. Atlantic, soft bottom environments are interspersed with hardbottom substrates that support oyster and coral reefs, including the Florida Reef Tract. Similar to Cape Cod, Cape Hatteras in North Carolina forms a zoogeographic boundary for many species' distribution (NOAA, 2024a), and the natural hardbottom communities in the south U.S. Atlantic coast are augmented with artificial reefs and shipwrecks (NOAA National Centers for Coastal Ocean Science, n.d.). The Charleston Gyre, a persistent oceanographic gyre that forms where the Gulf Stream currents meet the Charleston Bump, is a particularly productive nursery ground for larval HMS such as swordfish (NOAA, 2024a). Artificial reef structures include intentionally-sunk ships, planes, or concrete structures designed to provide habitat for reef fish and predators (NOAA National Centers for Coastal Ocean Science, n.d.). In this region, shoreline environments also consist predominantly of salt marshes, and many significant estuaries occur throughout the Carolinas, including Pamlico Sound, which is partially enclosed by the Outer Banks barrier islands. An additional habitat feature occurring in the south U.S. Atlantic is large, floating pelagic *Sargassum* mats that support a diverse array of invertebrates, fishes, birds, and sea turtles. For HMS and others, *Sargassum* mats provide food and shelter and may act as habitat for fish eggs and larvae (NOAA, 2024a).

A.4.2.2.1.1 Archie Carr and Hobe Sound NWRs

Terrestrial environments along the U.S. Atlantic Coast that are relevant for this RP4/EA include Archie Carr and Hobe Sound NWRs in Florida. The Archie Carr NWR was described in the Open Ocean RP2/EA (Section 4.3.3.3.5), which is incorporated by reference herein and summarized below. Additionally, the *Archie Carr Comprehensive Conservation Plan* and *Hobe Sound National Wildlife Refuge Comprehensive Conservation Plan* discuss in further detail the physical, biological, and socioeconomic environments of these two protected regions, as well as their administration and management, and are incorporated by reference (USFWS, 2006; USFWS, 2008).

Established in 1991, the Archie Carr NWR is located across approximately 20.5 linear miles (approximately 33 kilometers) of Florida's Atlantic Coast. The Archie Carr NWR is managed by the USFWS as part of the Everglades Headwaters NWR Complex and was established to conserve threatened and endangered species, particularly sea turtles. The Refuge operates through partnerships with various government and private entities and offers wildlife observation programs, school trips, and recreational activities such as photography, kayaking, and fishing. While it is home to over 245 species, the refuge is crucial for sea turtle conservation. It contains about 25 percent of global loggerhead and 10 percent of North Atlantic green sea turtle nests. This region provides the world's most important nesting beach for loggerhead sea turtles, nesting ground for green sea turtles in North America, and significant nesting habitat for leatherback sea turtles. The three species may collectively produce more than 29,000 nests at Archie Carr NWR each year (USFWS, 2008).

The Nathaniel P. Reed Hobe Sound NWR, or Hobe Sound NWR, was established in 1969 as a sanctuary for numerous wildlife species, including loggerhead sea turtles, which nest at the Refuge's beaches. The Refuge contains more than 1,000 acres (more than 4 square kilometers) of diverse habitat, including dunes, pine scrub, mangroves, and one of the largest contiguous areas of undeveloped beach in southeastern Florida. The Refuge contains two primary tracts: the Jupiter Island tract, which contains

roughly 70 percent of the Refuge's area, and the Mainland Tract, which contains the other 30 percent. Like Archie Carr NWR, Hobe Sound NWR is managed by the USFWS and offers both environmental education programs and recreational opportunities such as hiking and wildlife observation. As with the Archie Carr NWR, Hobe Sound NWR also provides significant nesting grounds for loggerhead, green, and leatherback sea turtles, and the three species may collectively produce more than 3,000 nests at Hobe Sound NWR each year (USFWS, 2006).

A.4.2.2.2 Marine and Estuarine Fauna

The diverse array of habitats and high primary productivity of the Atlantic support a diverse assemblage of marine fish and invertebrates, including phytoplankton and zooplankton, schooling fish, and predators such as sharks, tunas, swordfish, and billfish.

Commercially important fish species managed by the New England Fishery Management Council include Atlantic cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), pollock (*Pollachius pollachius*), and several species of hake and flounder. Other managed species in the northeast area include the Atlantic sea scallop (*Placopecten magellanicus*), the Atlantic mackerel (*Scomber scombrus*), and summer flounder (*Paralichthys dentatus*). The American lobster (*Homarus americanus*) and Atlantic menhaden are among the most commercially valuable species in the region and are cooperatively managed by the states and NMFS through the ASMFC (ASMFC, n.d.). Commercially important fish species managed by the South Atlantic Fishery Management Council (SAFMC) include coastal migratory pelagic species such as king mackerel, Spanish mackerel (*Scomberomorus spp.*), and cobia (*Rachycentron canadum*); shrimp; snappers and groupers; and spiny lobsters (SAFMC, n.d). Additional recreational species of importance in the southeastern U.S. Atlantic include red snapper and tarpon (*Megalops atlanticus*) (NMFS, 2024a).

The Atlantic habitat for HMS spans from the coastline to the U.S. Exclusive Economic Zone, from Canada to southern Florida. The bathymetric features of the Atlantic coast described above in Section A.4.2.1.1, combined with riverine inputs and the interactions of the Labrador Current from the north and the Gulf Stream from the south, influence the movement of hydrographic fronts that determine HMS distribution throughout the year. While HMS and coastal migratory pelagic species are broadly distributed as adults, many species may move inshore for spawning and make use of nearshore habitats, including estuaries, for early life stages (NOAA, 2024a). Commercially important species managed by the Atlantic HMS FMP include Atlantic tunas, sharks, swordfish, and Atlantic billfishes. Spotted sea trout, flounders, and striped bass (*Morone saxatilis*) are among the species frequently caught in the recreational fishery.

The Atlantic contains designated EFH for numerous species groups. In New England and the Mid-Atlantic, EFH is designated for species including black sea bass, Atlantic herring, red hake, flounders, and skates, among others. The southeast U.S. Atlantic contains EFH for managed fisheries, including the coastal migratory pelagic species, golden crab (*Chaceon fenneri*), spiny lobster, snappers and groupers, dolphinfish, wahoo, coral, and shrimp fisheries. For HMS, the U.S. Atlantic coast contains EFH for several tunas, white (*Kajikia albida*) and blue (*Makaira nigricans*) marlin, shortfin (*Isurus oxyrinchus*) and longfin (*Isurus paucus*) mako shark, and others (NMFS, n.d.[b]).

Invasive lionfish are widespread throughout the U.S. Atlantic. For more information about the impact of invasive lionfish on reefs, see Section A.4.1.2.2.

A.4.2.2.3 Wildlife Species

The U.S. Atlantic coast and open ocean contain a variety of habitats for wildlife foraging, breeding, and migration. Several hundred bird species use the Atlantic flyway region as a migration corridor, and the region is also home to many resident bird species (Atlantic Flyway Shorebird Initiative, 2016).

More than 50 species of residential and migratory seabirds depend on the waters of the U.S. Atlantic continental shelf and further offshore. These avian groups include sea ducks, gulls, terns, auks, and petrels. Example species include the Atlantic puffin (*Fratercula arctica*), common eider (*Somateria mollissima*), herring gull (*Larus argentatus*), least tern (*Sternula antillarum*), Wilson's storm-petrel (*Oceanites oceanicus*), and double-crested cormorant (*Nannopterum auritum*) (Winship et al., 2023).

Numerous species of shorebirds also make use of the U.S. Atlantic coast, and 370 species may be found in Cape Cod alone. Along the Atlantic coast, these shorebirds use coastal beach, dune, and wetland ecosystems for feeding, nesting and raising their young, migration, and overwintering. These avian groups include sandpipers, plovers, avocets, and waders such as herons and egrets. Example species include the piping plover, least sandpiper (*Calidris minutilla*), American avocet (*Recurvirostra americana*), and tricolored heron (*Egretta tricolor*) (Atlantic Flyway Shorebird Initiative, 2016).

A.4.2.2.4 Protected Species

The U.S. Atlantic contains numerous species protected by various conservation laws and agreements, including the ESA and MMPA.

Terrestrial protected species occurring at Archie Carr and Hobe Sound NWRs include beach mice (*Peromyscus polionotus tryssyllepsis)*, Florida scrub jays (*Aphelocoma coerulescens*), and gopher tortoises (*Gopherus polyphemus*) (USFWS, 2006; USFWS, 2008). Additional protected species in the southeast marine environment include queen conch and several species of coral, such as staghorn, elkhorn, boulder star, mountainous star, rough cactus, and pillar corals (NMFS, n.d.[b]). Critical habitat is designated for these coral species throughout southeastern Florida.

Five species of sea turtles occur in the U.S. Atlantic: loggerhead (NW Atlantic DPS), green (North Atlantic DPS), Kemp's ridley, hawksbill, and leatherback, all of which are federally protected under the ESA (NMFS, n.d.[b]). Green, leatherback, Kemp's ridley, and loggerhead turtles may occur throughout the U.S. Atlantic, though sea turtles predominantly only occur in New England during summer months. Hawksbill sea turtles are less likely to occur in the northern U.S. Atlantic. As described above in Section A.4.2.2.1.1, the beaches of the southeastern U.S. Atlantic, particularly Florida, contain significant nesting grounds for the loggerhead, green, and leatherback sea turtles, and loggerhead sea turtles have critical habitat designated throughout the southeastern U.S.

Many federally protected seabirds may be found in the U.S. Atlantic, including the black-capped petrel, piping plover, roseate tern, and Rufa red knot (USFWS, 2024).

Federally protected fish species occurring throughout the U.S. Atlantic include Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), oceanic whitetip shark, giant manta ray, and shortnose sturgeon (*Acipenser brevirostrom*). Atlantic salmon (*Salmo salar*) may occur in New England and the Mid Atlantic and have critical habitat designated in many estuaries of Maine. Federally protected fish species of the southeast U.S. Atlantic include Nassau grouper, scalloped hammerhead shark (*Sphyrna lewini*), and smalltooth sawfish (NMFS, n.d.[b]).

Many marine mammals occur in the U.S. Atlantic, including species protected by both the ESA and MMPA. Throughout the U.S. Atlantic, ESA-listed marine mammals include the blue (*Balaenoptera musculus*), fin (*Balaenoptera physalus*), North Atlantic right (*Eubalaena glacialis*), sei (*Balaenoptera borealis*), and sperm whales. Critical habitat is designated for the North Atlantic right whale in the Gulf of Maine and Georges Bank. In the southeast U.S. Atlantic, additional listed marine mammal species include the Rice's whale and West Indian manatee (NMFS, n.d.[b]). Marine mammals occurring in the Atlantic protected by the MMPA include more than 30 species of whales and dolphins, such as the humpback whale (*Megaptera novaeangliae*) and common bottlenose dolphin (Hayes et al., 2021).

A.4.2.3 Socioeconomic Resources

A.4.2.3.1 Socioeconomics

In Canada, nearly 2.5 million people inhabit the Atlantic provinces, and many of these provinces are experiencing immense population growth (Statistics Canada, 2022). Fishing is a key industry in this region, as the Atlantic region was responsible for nearly 90 percent of the total value of landings in Canada for 2022 (Fisheries and Oceans Canada, 2024). In Atlantic regions of northern South America, particularly in Guyana, Suriname, French Guiana, and northern Brazil, populations are sparse and are most densely concentrated around the coasts, and fishing is a key part of the economy (Editors of the Encyclopedia Brittanica, 2023).

The U.S.Atlantic coast is home to 44.4 million people, or nearly 14 percent of the U.S. population, and its inhabitats are socially and economically diverse. While this coastline is the most highly populated in the U.S., its population is experiencing the slowest growth, at 13.2 percent (as compared to the nationwide average of 15.7 percent) (U.S. Census Bureau, 2019). Highly populated urban centers along the U.S. Atlantic coast include (from north to south) Boston, Massachusetts; New York City, New York; Philadelphia, Pennsylvania; Baltimore, Maryland; Washington, D.C., Virginia Beach, Virginia; Jacksonville, Florida; and Miami, Florida. Economies of the U.S. Atlantic coast are supported by a combination of commercial and recreational fishing, aquaculture, tourism, and other offshore resource extraction (e.g., oil and gas, sand and gravel, wind and wave energy).

Commercial and recreational fishing and aquaculture are key industries along the U.S. Atlantic coast. In addition to supporting the fishers themselves, the commercial and recreational fishing industries support employment at fishing gear suppliers, docks, and marinas. The commercial fishing industry also supports the seafood production chain, which includes fish processors, wholesale distributors, fish retail, and restaurants.

Not only is commercial fishing important to the communities of the U.S. Atlantic, but the Atlantic fishing industry is also important to the U.S. economy. In 2020, although the U.S. Atlantic was responsible for only 14 percent of seafood landings across the U.S., the region accounted for 40 percent of the nation's seafood value. At the same time, the U.S. Atlantic also accounted for 40 percent of the nation's aquaculture value (NMFS, 2020c). In 2022, the New England seafood industry employed more than 289,000 individuals, primarily in Massachusetts, and contributed to over $1.4 billion in revenue. The vast majority of this revenue is attributed to shellfish and other species, with the remainder attributed to finfish (NMFS, 2024a). In the Cape Cod region, it is estimated that commercial fishing and aquaculture contribute 12 percent of jobs and 11 percent of gross revenues (Cape Cod Commission, 2020). In the Mid Atlantic, NOAA estimates that the 2022 commercial fishing industry employed more than 200,000 people and generated almost $444 million in revenue (NMFS, 2024a). Similarly, the southeastern U.S. Atlantic commercial fishery is estimated to have employed more than 40,000 individuals in 2022 and generated nearly $174 million in revenue (NMFS, 2024a).

Tourism drawn by coastal resources, including recreational fishing, also supports local economies. In the Northeast, coastal tourism is a particularly important industry in the summer months. In contrast, coastal tourism in the Southeast is extremely popular in the winter months. Throughout the U.S. Atlantic coast, coastal recreational attractions include fishing, beachgoing, recreational watersports and swimming, wildlife viewing, and the consumption of locally harvested seafood.

Recreational fishing is also a key industry in the U.S. Atlantic. In 2020, the U.S. Atlantic coast accounted for 68 percent of nationwide recreational fishing trips and catch (NMFS, 2020c). Florida is of noteworthy importance in the recreational fishing industry and accounted for nearly half of all national recreational finfish landings in 2020 (NMFS, 2020c). In New England, recreational fishing, predominantly for shore

and private boat fishing, totalled around $584 million in expenditures and employed an estimated 3,190 people in 2022 (NMFS, 2024a). In the Mid-Atlantic, 2022 recreational fishing expenditures totaled around $2.3 billion and employed more than 11,000 people (NMFS, 2024a). Finally, in the southeast, recreational fishing generated more than $3.5 billion and employed around 27,000 people (NMFS, 2024a).

Finally, other coastal industries reliant on the U.S. Atlantic's natural resources include oil and gas, sand and gravel extraction, and wind and wave energy. Wind energy is a key area of focus with significant developments anticipated in future decades. In 2024, the DOE released the *Action Plan for Offshore Wind Transmission Development in the U.S. Atlantic Region*, an implementation plan for expanding and connecting 85 gigawatts of wind energy developments along the Atlantic coast from Maine to South Carolina by 2050 (DOE, 2024).

A.4.3 Caribbean Sea

In this RP4/EA, three FWCI restoration projects, FWCI1, FWCI2, and FWCI6 would occur partially in waters of the U.S. and international Caribbean. No Sea Turtle restoration projects would occur in the Caribbean.

FWCI restoration activities in Caribbean waters would involve onshore outreach, education and data analysis; voluntary adoption of methods and gear to reduce FWCI bycatch and post-release mortality; in-situ studies to assess gear efficacy or conduct monitoring using tagging and tracking; and enhance at-sea observer coverage. The species groups of focus for these restoration activities include reef fish, HMS, coastal migratory pelagic species, and other species such as menhaden, flounders, drums, and sea trout. These species collectively occur in the Caribbean in nearshore, continental shelf, continental slope, and deep-water open ocean habitats.

The following description of the affected environment for this RP4/EA incorporates by reference previous DWH affected environment assessments, including the Open Ocean TIG RP3/EA assessments of Mona Island (Section 4.4.1.1), Culebra National Wildlife Refuge (Section 4.4.2.1), Desecheo National Wildlife Refuge (Section 4.4.3.1), Battowia and the Pillories (Section 4.5.3.1), and the Bahamas (Section 4.5.2.1; Open Ocean TIG, 2023). The RP3/EA describes many of the Caribbean's physical, biological, and socioeconomic resources. This RP4/EA affected environment description incorporates by reference this RP3/EA, summarizing the most pertinent information about the affected environments for the projects evaluated in this RP4/EA. In addition, this section provides supplementary information where physical, biological, or socioeconomic resources have changed and provides new information for areas that were not previously evaluated.

Additionally, the affected environments relevant to the Caribbean fisheries of focus for this plan have been analyzed under the FMPs and associated amendments for these fisheries as developed and managed by the Caribbean Fishery Management Council (CFMC) and Atlantic Highly Migratory Species Management Division of NOAA Fisheries. These include, but are not limited to, the *Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan* (NOAA, 2024a), the *Caribbean Reef Fish Fishery Management Plan* (CFMC, 1985), and the associated amendments. These FMPs and amendments provide extensive information about the physical, biological, and socioeconomic resources within these fisheries and are incorporated by reference herein.

A.4.3.1 Physical Resources

A.4.3.1.1 Geology and Substrates

The Caribbean Sea is a tropical suboceanic basin covering more than 1 million square miles (2,750,000 square kilometers). It is bounded to the south by the coastline of South America, including Venezuela and Colombia; to the west by central America, including Panama, Costa Rica, Nicaragua, Honduras, Guatemala, Belize, and Mexico; and to the north and east by several island nations. These include, but are not limited to, Cuba, Hispaniola, Puerto Rico, the British and U.S. Virgin Islands, Dominica, St. Lucia, St. Vincent and the Grenadines, and Grenada (Menzies and Ogden, 2024). U.S. territories in this region include Puerto Rico and the U.S. Virgin Islands and their surrounding waters (NOAA, 2024a).

The bathymetry of the Caribbean Sea is extremely varied. The region contains five elliptical sub-basins separated by submerged ridges, the largest of which is the Nicaraguan Rise, which extends from the Honduras and Nicaragua toward Jamaica (Menzies and Ogden, 2024). Much of the continental shelf surrounding the Caribbean is extremely narrow (less than 1.8 miles, or 3 kilometers, in places) with a few exceptions, including the Nicaraguan Rise and Venezuela (NOAA, 2024a). In the U.S. territories of Puerto Rico and the U.S. Virgin Islands, northern coastal shorelines predominantly consist of a mixture of sandy beaches, coral reefs, and rock reefs (NOAA, 2024a). These islands' southern coastlines are dominated by hard or sand-algal bottoms with emergent coral reefs and seagrass beds (NOAA, 2024a). Throughout the Caribbean, sediments vary with bathymetry. Whereas deep basins and trenches contain primarily red clays, the Caribbean's rises, ridges, and shelfs are composed of globigerina and pteropod ooze, or sediments comprised of the tiny shells of microorganisms (Menzies and Ogden, 2024).

A.4.3.2 Biological Resources

A.4.3.2.1 Habitats

The Caribbean region contains a high diversity of habitats and species. The most productive Caribbean habitats include coral reefs, seagrass beds, and mangroves. Coral reefs, which fringe most of the Caribbean's shores, are one of the most ecologically and economically important habitats in this region, acting as storm barriers and habitat for marine life that support the ecological food web, local fisheries, and tourism (NOAA, 2024a). NOAA estimates that the Caribbean contains 10 percent of global coral reefs (NOAA, n.d.). However, studies have indicated that Caribbean corals have experienced a more than 50 percent decline over the last half-century due to a combination of disease, overfishing, pollution, and climate change (Jackson et al., 2014). Seagrass beds are extensive and highly productive, particularly to the north near the Florida Keys. Seagrass beds stabilize sediments and provide food and shelter for a diverse assemblage of marine life. Mangrove forests similarly provide complex habitat structure and act as food, forage grounds, and shelter for a variety of marine life. Three species of mangrove, red (*Rhizopohora mangle*), black (*Aveicennia germinans*), and white (*Laguncularia racemosa*), grow at a variety of depths and salinities in the Caribbean. Coral reefs, seagrass beds and mangroves collectively support a diverse range of algae, fishes, and invertebrates, including sponges, tunicates, and shellfish (NOAA, 2024a).

In addition to the above habitats, the Caribbean contains many rocky shores and reefs, as well as salt ponds, algal plains, and sandy beaches. Soft bottom habitats support sponge and algal communities. Mesophotic and deepwater corals have also been found in the Caribbean at depths of up to 6,500 feet (about 2,000 meters) (Auscavitch, n.d.).

A.4.3.2.2 Marine and Estuarine Fauna

The complex structure of the Caribbean's reefs, seagrass beds, mangrove forests, and other ecosystems provide habitat for a diverse assemblage of marine fishes and invertebrates. More than 3,000 species of

mollusks, 2,900 species of crustaceans, and 1,300 species of fishes have been identified in the Caribbean. Approximately 45 percent of these fish species are endemic to the region (Miloslavich et al., 2010).

Coral reefs, seagrasses, and mangroves support diverse marine communities that include ecologically, recreationally, and commercially valuable fish species. Numerous megafauna migrate to and inhabit the Caribbean, including squids, sharks, and rays. Commercially important HMS managed by the *Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan* and amendments in the Caribbean include yellowfin tuna (*Thunnus albacares*), bigeye tuna (*Thunnus obesus*), and swordfish (NOAA, 2024a). Commercially important reef fish managed by the CFMC include grunts, groupers, goatfishes, parrotfishes, snappers, triggerfishes, squirrelfishes, and porgies (CFMC, 1985). Additional fish and invertebrate species managed by the CFMC include corals, queen conch, and spiny lobster.

U.S. waters surrounding Puerto Rico and the U.S. Virgin Islands contain EFH designations for a variety of species. HMS with designated EFH include yellowfin tuna; billfishes such as blue and white marlin, longbill spearfish (*Tetrapturus pfluegeri*), and swordfish; and sharks such as the Caribbean reef shark (*Carcharhinus perezi*) and oceanic whitetip shark. EFH is also designated for reef fish, queen conch, spiny lobster, and corals (NMFS, n.d.[b]).

Invasive lionfish are widespread throughout the Caribbean. For more information about the impact of invasive lionfish upon native reefs, see Section A.4.1.2.2.

A.4.3.2.3 Wildlife Species

The Caribbean's extensive sand banks, beaches, sheltered bays and lagoons, mangrove forests, and freshwater wetlands provide important habitat for many resident species, as well as migratory species traveling along the Atlantic Flyway. The region is home to an estimated 700 bird species, 180 of which are endemic (Birds Caribbean, n.d.).

Resident beach-nesting shorebirds in the Caribbean include American oystercatchers (*Haematopus palliatus*), snowy plovers (*Anarhynchus nivosus*), and Wilson's plovers (*Anarhynchus wilsonia*; Atlantic Flyway Shorebird Initiative, n.d.). Many migratory shorebird species utilize the Caribbean as overwintering habitat, including piping plover and Rufa red knot. Others may use the region as staging habitat while traveling further south or north (Atlantic Flyway Shorebird Initiative, n.d.).

The Caribbean also contains important foraging, nesting, and roosting habitat for many seabirds, including several resident species such as red-footed boobies (*Sula sula*), magnificent frigatebirds (*Fregata magnificens*), and brown pelican (*Pelecanus occidentalis*). Threats to Caribbean seabirds include sea level rise, bycatch, and predation of eggs by wildlife and humans (Birds Caribbean, n.d.).

A.4.3.2.4 Protected Species

The Caribbean contains numerous species protected by various conservation laws and agreements, including the ESA and MMPA. Although the vast majority of the Caribbean is not under U.S. jurisdiction, many species protected by U.S. laws occur throughout Caribbean waters.

Five species of sea turtles occur throughout the Caribbean, including green, hawksbill, leatherback, loggerhead, and olive ridley (*Lepidochelys olivacea*) sea turtles (USFWS, 2024; NMFS, n.d.[b]). The Caribbean coast of Costa Rica is highly important nesting habitat for green sea turtles and hosts an average of 30,000 nesting females each year (NMFS, n.d.[d]).

Many federally protected fish species may occur in the Caribbean, including Nassau grouper, oceanic whitetip shark, giant manta ray, and queen conch. In the U.S. territories, critical habitat is designated for Nassau grouper. In addition, critical habitat is designated for seven protected species of coral, namely elkhorn, staghorn, boulder star, mountainous star, lobed star, rough cactus, and pillar corals (USFWS,

2024). These corals are vital reef-building species throughout the Caribbean and once dominated its reefs but have been impacted heavily by warming waters and disease (Jackson et al., 2014).

The U.S. Caribbean territories contain at least nine bird species protected by the ESA, including the black-capped petrel, roseate tern, and Puerto Rican broad-winged hawk (*Buteo playtpterus brunnescens*). Other ESA-protected bird species, such as the piping plover and brown pelican, may also be found in the region, as described above in Section A.4.3.2.3.

Endangered marine mammal species occurring in U.S. waters of the Caribbean include humpback whale, sperm whale, and West Indian manatee (Caribbean FMC, 1985). As in the Gulf, more than 30 species of marine mammals occur across the Caribbean (United Nations Environment Programme, n.d.).

A.4.3.3 Socioeconomic Resources

A.4.3.3.1 Socioeconomics

The combined population of the Caribbean region is nearly 49 million people, around 3.3 million of whom reside in the U.S. Virgin Islands and Puerto Rico (United Nations, 2024). Fishing and tourism are key economic sectors for much of this region, placing great importance on the natural resources or services provided by the Caribbean.

In 2014, the Caribbean fishing industry was valued at over $420 million and was estimated to employ around 350,000 people across 17 nations (Rustomjee, 2016). The majority of these fishing operations are small-scale and provide an important source of employment for socioeconomically disadvantaged populations, including the least educated, rural poor, and women (Caribbean Natural Resources Institute [CANARI], 2020). In addition to providing a source of employment, poverty alleviation, and foreign exchange, fisheries are a key source of food security for many Caribbean nations, as small island states may consume up to four times more fish per capita than the global average (Rustomjee, 2016). However, the Food and Agriculture Organization of the United Nations has classified fisheries of the wider Caribbean as the most overexploited in the world, with 55 percent of commercially harvested fishery stocks considered overexploited or depleted, and 40 percent of stocks considered fully exploited (CANARI, 2020). As a result, many Caribbean nations are seeking ways to diversify their ocean-based economies, including through renewable energy, marine biotechnologies, aquaculture, and increased tourism (Rustomjee, 2016).

Tourism is another key economic sector in the Caribbean that is dependent upon natural resources and services. Major tourism draws include beachgoing, snorkeling and diving, and recreational fishing, particularly for large international fishing tournaments. Puerto Rico recorded approximately 337,500 recreational fishing trips in 2017 (NMFS, 2019). Some islands may rely on tourism for a third of employment and nearly half of gross domestic product (Rustomjee, 2016). In 2019, the Caribbean Tourism Organization estimates that the region received approximately 32 million international tourist arrivals (Caribbean Tourism Organization, n.d.). In Puerto Rico, leisure and hospitality services are estimated to provide nearly 100,000 jobs (U.S. Bureau of Labor Statistics, n.d.).

A.5 Environmental Consequences

This section includes an analysis of the environmental consequences for the remaining resource categories for each alternative, organized by Restoration Type.

The Open Ocean TIG has completed technical assistance reviews with relevant regulatory agencies regarding potential adverse impacts to protected species and habitat for each preferred alternative. For FWCI7 and ST5 (the non-preferred alternatives), the Open Ocean TIG would coordinate and complete consultation with relevant regulatory agencies, if necessary, regarding potential adverse impacts to

protected species and habitats prior to project implementation. See Chapter 5, Table 4-1 for the environmental compliance status of each alternative.

Several projects in the reasonable range of alternatives evaluated in this RP4/EA include activities that would be wholly or partially implemented in locations outside of the jurisdiction of the U.S. Where project activities would be conducted outside of the U.S., activities have been developed in coordination with project partners who will participate in implementation. Implementing Trustees and project partners will coordinate as needed with regulatory agencies of the associated countries to ensure compliance with all relevant laws, regulations, and requirements. Compliance will be completed prior to project implementation.

A.5.1 Fish and Water Column Invertebrates Restoration Type Alternatives

A.5.1.1 FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries) (preferred)

This project aims to restore recreationally important fish populations adversely affected by the DWH oil spill by reducing the mortality from regulatory discards, shark depredation, catch-and-release fishing, and barotrauma. Project activities most relevant to the assessment of environmental consequences include:

- **Distribution and adoption of alternative fishing gear.** Through the continuation of the existing Return 'Em Right program, this project would continue and expand activities that involve collaborating with fishing equipment manufacturers to develop cost-effective gear that reduce mortality such as predator avoidance tools, other tools for dehooking and handling fish, and descending tools.
- **Field studies to collect data on gear use and best practices.** This project would involve the collection of data to validate the effectiveness of program activities, which may include capture-tag-recapture, telemetry, collection of underwater videos, and other methods. At-sea observer coverage would be enhanced to collect data about fishing effort and recapture rates to validate use of best practices and results of self-reporting studies. Studies may also be designed to develop and test new technologies or practices to reduce depredation and post-release predation of released fish.

The expansion of the Return 'Em Right project would be implemented in the U.S. and Mexican Gulf of Mexico, Caribbean Sea, and U.S. Atlantic. As noted in Section 2.4.1.1, specific sites for the distribution of alternative fishing gear and field studies on gear use and best practices activities have not yet been identified. Field data collection activities such as tagging and collection of physical environmental and biological data would be identified through further implementation planning. Once specific sites and activities are identified, any additional environmental review would occur during implementation planning. The Implementing Trustee would review and affirm that the site-specific conditions are consistent with those described in this RP4/EA. If the site-specific conditions indicate that the impacts would not be consistent with those described in this RP4/EA, the Implementing Trustee, in coordination with project partners and regulatory agencies (as needed), would determine whether to undertake additional site-specific environmental review, consistent with NEPA and other environmental compliance requirements, or forego implementation at that location.

Impacts of recreational fisheries have been analyzed under their respective Recreational Fishery Implementation Plans (RFIPs) and FMPs and published amendments (e.g., *Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan* [NOAA, 2024a], *National Saltwater Recreational Fisheries Implementation Plan* [NMFS, 2023]). In addition, several other programmatic EAs,

environmental impact statements (EISs), and permits have been prepared by NOAA to evaluate the impacts of research involving activities conducted for fisheries research that include activities similar to those proposed for this and other projects in this RP4/EA (e.g., *Programmatic Environmental Assessment for Fisheries and Ecosystem Research* [NMFS, 2021], *Environmental Assessment: Issuance of a Scientific Research Permit to the National Marine Fisheries Service Southeast Fisheries Science Center for Resource Assessment Surveys and Conservation Engineering Research* [NMFS, 2015], *Categorical Exclusion for the FY2023 Bycatch Reduction Engineering Program (BREP), Saltonstall-Kennedy Research and Development Program Programmatic Environmental Impact Statement* [NOAA, 2022], *Draft Programmatic Environmental Assessment for Fisheries Research Conducted and Funded by the Northeast Fisheries Science Center* [NMFS, 2020a]). These analyses are incorporated by reference herein.

The following evaluation of the environmental consequences of this proposed project incorporates by reference previous DWH environmental assessments, including the PDARP/PEIS Section 6.4.5.6 and the Open Ocean TIG RP2/EA *Reduction of Postrelease Mortality from Barotrauma in the Gulf of Mexico Reef Fish Recreational Fisheries* project (Open Ocean TIG, 2019). These analyses concluded that activities associated with the distribution of fish descender devices and data collection to evaluate the effectiveness of gear would have no adverse impacts to physical resources and either minor adverse impacts or benefits on socioeconomic resources. The analysis concluded that short-term, minor adverse impacts to biological resources could occur as a result of potential interactions between the fish descender devices and other biological resources; however, other impacts from the project are expected to be largely beneficial.

Table A-1 directs readers to the location of detailed analyses of this project's impacts on physical, biological, and socioeconomic resources within this RP4/EA.

A.5.1.1.1 Physical Resources

As described in Section 6.4.5.6.1 of the PDARP/PEIS, recreational fishing activities using gear and the BMPs included in this project (e.g., hooks, tackle, landing tools, descending devices) would not involve gear being permanently deployed and gear would not disturb sediments or other geological resources. Impacts from this project, which is intended to reduce post-release mortality of reef fish, HMS, coastal migratory pelagic species, other species such as flounders, drums, and sea trout, and additional reef fish, such as deepwater grouper and tilefish in the Gulf, would be consistent with those findings. Furthermore, the potential impacts of the Return 'Em Right program were evaluated in the Open Ocean RP2/EA (Open Ocean TIG, 2019), which concluded the project activities would have no effect on physical resources. While the scope of the Return 'Em Right program would be expanded to target additional recreational fisheries and locations, the potential impacts to geological resources are consistent. Equipment for the project would not be permanently deployed and would not interact with the seafloor; thus, impacts to physical resources, including geology and substrates, are not anticipated.

In summary, no impacts to physical resources are anticipated.

A.5.1.1.2 Biological Resources

As described in Section 6.4.5.6.2 of the PDARP/PEIS, impacts from projects intended to reduce post-release mortality of fish in recreational fisheries have the potential to cause short-term, minor adverse impacts and short- and long-term benefits to biological resources. While the scope of the Return 'Em Right program would be expanded to prioritize additional recreational fisheries and locations, the potential impacts to biological resources are consistent with the findings described previously in the Open Ocean RP2/EA (Open Ocean TIG, 2019). Short-term, minor adverse impacts to habitat, marine and estuarine fauna and protected species, and wildlife could occur from potential interactions with fishing

gear or from monitoring activities. For example, benthic (e.g., coral) or other pelagic (e.g., fish) resources may interact with fishing gear; however, increased education and training of anglers on best practices to reduce the likelihood of interactions between benthic and other pelagic resources and fishing gear may minimize this potential impact. The proper use of gear with best practices would minimize potential disturbance of habitats, marine and protected species, and wildlife. Short- and long-term project activities are anticipated to have positive impacts on biological resources. Priority fish populations are expected to benefit through increased survival.

In summary, short-term, minor adverse impacts and short- and long-term benefits to biological resources are anticipated.

A.5.1.1.3 Socioeconomic Resources

As described in Section 6.4.5.6.3 of the PDARP/PEIS, impacts from projects intended to reduce post-release mortality in recreational fisheries were described as potentially having short-term, minor adverse impacts or benefits on socioeconomic resources. Additionally, the potential impacts of the Return 'Em Right program were evaluated in the Open Ocean RP2/EA (Open Ocean TIG, 2019), which concluded the project activities would have no effect on socioeconomic resources. The scope of the Return 'Em Right program would be expanded for this project to prioritize additional recreational fisheries and locations; however, the potential impacts to socioeconomic resources are consistent with the previous findings.

Fishing gear would be distributed equitably at no or limited cost to qualified anglers, and participation in the program including use of gear, application of new techniques, and other activities would be voluntary; thus, the project would not adversely and/or disproportionately affect minority or low-income populations and its implementation would likely benefit surrounding communities equally. Furthermore, any increases in fish biomass that result from decreasing post-release mortality would provide long-term benefits to recreational anglers; therefore, no adverse impacts are anticipated for socioeconomic resources.

In summary, no adverse impacts and long-term benefits to socioeconomic resources are anticipated.

A.5.1.2 FWCI2, Next Generation Fishing (preferred)

This project would restore FWCI resources by implementing strategies to reduce bycatch or prevent the increase of bycatch in commercial fishing fleets that target fish in the Gulf or with connectivity to injured populations. Project activities most relevant to the assessment of environmental consequences include:

- **Encouraging the adoption of new fishing gear.** This project would involve collaborating with commercial fishing communities to participate in the application of new gear, best practices, and techniques that reduce bycatch and fish mortality.

The Next Generation Fishing project would be implemented in the U.S. Gulf, U.S. Caribbean Sea, and U.S. Atlantic Ocean, and potentially the Mexican Gulf, the Caribbean, and Atlantic waters of Canada and northern South America. As noted in Section 2.4.1.2 above, specific sites for the adoption of alternative fishing gear have not yet been identified. Once specific sites are identified, any additional environmental review would occur during implementation planning. The Implementing Trustee would review and affirm that the site-specific conditions are consistent with those described in this RP4/EA. If the site-specific conditions indicate that the impacts would not be consistent with those described in this RP4/EA, the Implementing Trustee, in coordination with project partners and regulatory agencies (as needed), would determine whether to undertake additional site-specific environmental review, consistent with NEPA and other environmental compliance requirements, or forego implementation at that location.

Impacts of commercial fisheries have been analyzed under their respective FMPs and published amendments (e.g., *Gulf of Mexico Reef Fish Fishery Management Plan* [GOMFMC, 1984], *Final*

Consolidated Atlantic Highly Migratory Species Management Plan [NOAA, 2024a], *Gulf of Mexico and South Atlantic Coastal Migratory Pelagic Fishery Management Plan* [GOMFMC, 1983], *Gulf of Mexico Red Drum Fishery Management Plan* [GOMFMC, 1986], *Fishery Management Plan for Atlantic Menhaden* [ASMFC, 2024]). In addition, several other programmatic EAs, EISs, and permits have been prepared by NOAA to evaluate the impacts of fisheries research that include activities similar to those proposed for this and other projects in this RP4/EA. Those references are cited in Section A.5.1.1 above but similarly incorporated by reference herein.

The following evaluation of the environmental consequences of this proposed project incorporates by reference previous DWH environmental assessments, including the PDARP/PEIS Section 6.4.5.2. These analyses concluded that activities associated with promoting the use of new fishing gear to reduce bycatch-related mortality may have short-term, minor adverse impacts to physical resources, long-term, minor-to-moderate adverse impacts to biological resources, and short-term, minor-to-moderate adverse impacts to socioeconomic resources; however, activities under this alternative are expected to be beneficial in the long term, particularly for biological and socioeconomic resources.

Table A-1 directs readers to the location of detailed analyses of this project's impacts on physical, biological, and socioeconomic resources within this RP4/EA.

A.5.1.2.1 Physical Resources

As described in Section 6.4.5.2.1 of the PDARP/PEIS, encouraging the adoption of new gear within commercial fisheries addressed by the Next Generation Fishing project may result in small shifts in the number and behavior of fishing vessels; thus, potential impacts to physical resources related to gear use may increase or decrease. However, the Next Generation Fishing project would not increase or change current effort in the existing fisheries. Project activities would not involve gear being permanently deployed and gear would not disturb sediments or other geological resources. All project activities would be conducted in accordance with existing and applicable FMPs, NEPA evaluations, and permits. Impacts to geology and substrates, therefore, are not anticipated.

In summary, no impacts to physical resources are anticipated.

A.5.1.2.2 Biological Resources

As described in Section 6.4.5.2.2 of the PDARP/PEIS, promoting the use of new gear within the commercial fisheries targeted by the Next Generation Fishing project may result in long-term, minor-to-moderate adverse impacts to biological resources. For example, biological resources including invertebrates, fishes, sea turtles, and marine mammals may interact with fishing gear; however, increased education and training of fishers on best practices to reduce the likelihood of interactions between benthic and other pelagic resources and fishing gear may minimize this potential impact. This project would involve activities designed to reduce bycatch in commercial fisheries by supporting the development of a modernized fleet using Next Generation gear, best practices, and techniques. Activities that would involve use of fishing gear would take place on existing vessels during regular fishing efforts. This project would not increase or change current effort in the existing fisheries. There are no anticipated impacts to habitats associated with this offshore project. Because this project primarily involves demonstrations of gear and fishing practice modifications, short-term, negligible-to-minor adverse impacts to marine and protected species and wildlife are anticipated. Long-term benefits for biological resources, including wildlife, marine and estuarine fauna, and protected species, are anticipated due to the reduction of bycatch from modified fishing practices.

There is potential for short-term, minor adverse impacts resulting from modifications that are determined to not be effective (e.g., they increase bycatch); however, these impacts would be identified, and these fishing modifications could be stopped or changed to minimize identified impacts. Long-term benefits to

biological resources, including commercially important fishes, sea turtles, marine mammals, and birds are expected due to the reduction of bycatch.

In summary, short-term, minor adverse impacts and long-term benefits to biological resources are anticipated.

A.5.1.2.3 Socioeconomic Resources

As described in Section 6.4.5.2.3 of the PDARP/PEIS, promoting the use of new gear within the commercial fisheries targeted by the Next Generation Fishing project may result in minor-to-moderate, short-term adverse impacts on commercial fishers if the alternative gear results in reduced catch. However, long-term benefits may include increased biomass and increased catch. Implementation of the Next Generation Fishing project is not anticipated to adversely impact total catch that could, in turn, affect the socioeconomic output of individual fishers or fishing communities. There is the potential for gear modifications to be less efficient than traditional practices; however, participation would be voluntary. Modified practices encouraged through the project would need to result in comparable catch per unit effort (e.g., not increase travel times/cost to reach fishing grounds) to be included as an acceptable practice for this project. As such, no adverse impacts are anticipated for socioeconomics. Benefits to fish populations resulting from reduced bycatch would benefit the fishing community in the long term.

In summary, no adverse impacts and long-term benefits to socioeconomic resources are anticipated.

A.5.1.3 FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality (preferred)

This project would restore FWCI resources by implementing strategies to reduce direct sources of mortality and increase the health of fisheries by providing fishing communities with methodologies and incentives to reduce impacts of bycatch and depredation on fishery resources and to protect spawning aggregations. Project activities most relevant to the assessment of environmental consequences include:

- **Collecting data.** This project would include the collection of data from existing programs and through cooperative research with fishing communities, managers, and scientists, including monitoring and at-sea observer programs, surveys, and remote sensing.

This project would be implemented in the U.S. Gulf. As noted in Section 2.4.1.3 above, specific sites for collecting data have not yet been identified. Field data collection activities such as collecting physical environmental and biological data would be identified through further implementation planning. Once specific sites and activities are identified, any additional environmental review would occur during implementation planning. Project activities may initially focus on the Eastern Gulf of Mexico, with participation from recreational fishing vessels from Texas. The spawning aggregation work may occur wherever the initial planning phase expert workgroup determines these activities would be best targeted in and around the Gulf. A Gulf of Mexico Coastal Ocean Observing System (GCOOS)-RESTORE-funded project[24] has identified reef fish spawning sites in the U.S. Gulf at the mouths of rivers and embayments, around mid-continental shelf structures such as radio towers and shipwrecks, and at the edge of the continental shelf. Once specific sites are identified, as needed, any additional environmental review would occur during implementation planning. The Implementing Trustee would review and affirm that the site-specific conditions are consistent with those described in this RP4/EA. If the site-specific conditions

[24] See https://geo.gcoos.org/restore/

indicate that the impacts would not be consistent with those described in this RP4/EA, the Implementing Trustee, in coordination with project partners and regulatory agencies (as needed), would determine whether to undertake additional site-specific environmental review, consistent with NEPA and other environmental compliance requirements, or forego implementation at that location.

Impacts of commercial and recreational fisheries have been analyzed under their respective RFIPs and FMPs and published amendments (e.g., *Gulf of Mexico Reef Fish Fishery Management Plan* [GOMFMC, 1984]). These analyses are incorporated by reference herein. In addition, several other programmatic EAs, EISs, and permits have been prepared by NOAA to evaluate the impacts of fisheries research that include activities similar to those proposed for this and other projects in this RP4/EA. Those references are cited in Section A.5.1.1 above but are similarly incorporated by reference herein.

The initial planning phase of this project was evaluated in Open Ocean TIG RP2/EA *Communication Networks and Mapping Tools to Reduce Bycatch – Phase 1* (Open Ocean TIG, 2019; Section 4.2.1.1). As discussed above in Section A.2, projects that include data-related tasks such as gathering, compiling, and evaluating information to improve understanding of natural resources and to inform future restoration planning were evaluated in the PDARP/PEIS Chapter 6 and require no additional NEPA analysis. However, data gathering activities that involve field work with vessel-based, in-water, or other active data collection activities with potential impacts to physical, biological, and socioeconomic resources are evaluated further herein. Activities similar to those included in this project—namely, conducting cooperative research with fishing communities, managers, and scientists; monitoring; surveys; and remote sensing—have been evaluated for other DWH EAs, including the Open Ocean TIG RP2/EA (e.g., *Mapping, Ground-truthing, and Predictive Habitat Modeling*; *Habitat Assessment and Evaluation*; *Active Management and Protection* projects) (Open Ocean TIG, 2019; Sections 4.4.6.1, 4.4.6.2, and 4.4.6.4). These analyses are also incorporated by reference herein.

Table A-1 directs readers to the location of detailed analyses of this project's impacts on physical, biological, and socioeconomic resources within this RP4/EA.

A.5.1.3.1 Physical Resources

This project includes activities that were not evaluated in the PDARP/PEIS; however, similar activities were evaluated in Open Ocean TIG RP2/EA for projects intended to benefit Mesophotic and Deep Benthic Communities (MDBC) (Open Ocean TIG, 2019; Sections 4.4.6.1, 4.4.6.2, and 4.4.6.4). Generally, these activities were found to have beneficial impacts to physical resources, and any potential short-term, minor adverse impacts may be reduced or eliminated through the implementation of BMPs. Based on additional analysis of this project's specific activities, which would only include the use of vessels at the sea surface and survey equipment in the water column, impacts to geology and substrates are not anticipated.

In summary, no impacts to physical resources are anticipated.

A.5.1.3.2 Biological Resources

This project includes activities that were not evaluated in the PDARP/PEIS; however, similar activities were evaluated in Open Ocean TIG RP2/EA for projects intended to benefit MDBC (Open Ocean TIG, 2019; Sections 4.4.6.1, 4.4.6.2, and 4.4.6.4). Generally, these data collection activities were found to have beneficial impacts to biological resources, and any potential short-term, minor adverse impacts may be reduced or eliminated through use of BMPs. Based on additional analysis of this project's specific activities, some vessel-based activities conducted to collect data, including the use of survey equipment and any acoustic data collection, may disturb marine and estuarine fauna and protected resources, namely fishes, sea turtles, and marine mammals. However, these impacts would be short-term and minor, and consistent with the PDARP/PEIS and Open Ocean TIG RP2/EA, these activities are anticipated to have

long-term benefits by reducing bycatch, depredation, and protecting spawning aggregations. No adverse impacts to habitat are anticipated.

In summary, short-term, minor adverse impacts and long-term benefits to biological resources are anticipated.

A.5.1.3.3 Socioeconomic Resources

This project includes activities that were not evaluated in the PDARP/PEIS; however, similar activities were evaluated in Open Ocean TIG RP2/EA for projects intended to benefit MDBC (Open Ocean TIG, 2019; Sections 4.4.6.1, 4.4.6.2, and 4.4.6.4). Generally, these activities were found to have beneficial impacts to socioeconomic resources, and any potential short-term, minor adverse impacts may be reduced or eliminated through use of BMPs. Based on additional analysis of this project's specific activities, which would not be anticipated to impact the fishing community's use of resources and would only include voluntary participation from the public in collaborative monitoring programs, adverse impacts to socioeconomic resources are not anticipated. Benefits to fish populations resulting from reduced mortality would benefit the fishing community in the long-term.

In summary, no adverse impacts and long-term benefits to socioeconomic resources are anticipated.

A.5.1.4 FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates (preferred)

This project would restore FWCI resources by addressing diverse threats such as marine debris, invasive species, changes in water quality, and impacts from energy development and energy production to improve environmental conditions in the Gulf. Project activities most relevant to the assessment of environmental consequences include:

- **Removing marine debris.** This project would include the removal of marine debris such as abandoned or derelict fishing gear and may also include the installation of technologies proven to prevent or intercept marine debris, including plastics and microplastics, near known marine debris pathways.
- **Removing invasive aquatic species.** This project would include removal of invasive species, including lionfish.
- **Improving water quality.** This project would include activities designed to improve water quality and reduce nutrient influx to address sources of pollution impacting FWCI (including locations such as marinas, marine parks, or shoreline public access sites).
- **Implementing conservation best practices for energy development.** This project would include activities designed to implement voluntary conservation best practices to reduce fish mortality during energy development and production activities.

This project would be implemented in the U.S. Gulf. As noted in Section 2.4.1.4 above, specific sites for removal of marine debris and invasive species, improving water quality, and implementing conservation best practices for energy development have not yet been identified. Once specific sites are identified, any additional environmental review would occur during implementation planning. The Implementing Trustee would review and affirm that the site-specific conditions are consistent with those described in this RP4/EA. If the site-specific conditions indicate that the impacts would not be consistent with those described in this RP4/EA, the Implementing Trustee, in coordination with project partners and regulatory agencies (as needed), would determine whether to undertake additional site-specific environmental review, consistent with NEPA and other environmental compliance requirements, or forego implementation at that location.

Impacts of commercial and recreational fisheries have been analyzed under their respective RFIPs and FMPs and published amendments (e.g., *Gulf of Mexico Reef Fish Fishery Management Plan* [GOMFMC, 1984], *Final Consolidated Atlantic Highly Migratory Species Management Plan* [NOAA, 2024a]). These analyses are incorporated by reference herein. In addition, several other programmatic EAs, EISs, and permits have been prepared by NOAA to evaluate the impacts of fisheries research that include activities similar to those proposed for this and other projects in this RP4/EA. Those references are cited in Section A.5.1.1 above and are similarly incorporated by reference herein.

The following evaluation of the environmental consequences of this proposed project incorporates by reference previous DWH environmental assessments, including the PDARP/PEIS Section 6.4.4, 6.4.5.1, and 6.6.5 and Open Ocean TIG RP2/EA *Active Management and Protection* project (Open Ocean TIG, 2019; Section 4.4.6.4).

Regarding marine debris removal, the PDARP/PEIS analyses presented in Section 6.4.5.1 concluded that activities associated with removal of marine debris to reduce bycatch may have short-term, minor adverse impacts to physical resources, short-term, minor adverse impacts to biological resources, and no adverse impacts to socioeconomic resources. These activities are expected to be beneficial in the long term, particularly for biological and socioeconomic resources.

Regarding invasive species removal, the Open Ocean TIG RP2/EA (2019) analysis of the *Active Management and Protection* project concluded that lionfish and other invasive species removal would have largely beneficial impacts, with some short- and long-term, minor adverse impacts to physical resources, short- and long-term, minor adverse impacts to biological resources, and long-term, minor adverse impacts to socioeconomic resources.

Regarding water quality improvement activities, the PDARP/PEIS analyses presented in Section 6.4.4 describe the potential impacts of multiple approaches for restoration of water quality, including reducing nutrient influx sources of pollution. These analyses concluded that water quality improvement activities may have some short-term, minor adverse impacts to natural resources; however, improving water quality is expected to have long-term benefits to physical, biological, and socioeconomic resources.

Regarding energy production, the PDARP/PEIS did not evaluate the impacts of restoration activities intended to implement conservation best practices to reduce fish mortality during energy development and production activities; however, Section 6.6.5 of the PDARP/PEIS considered the impacts of energy production on physical, biological, and socioeconomic resources in the cumulative impacts analysis. Ongoing energy production activities may have long-term adverse impacts on substrates, water quality, habitat, protected species, wildlife, estuarine and marine fauna, and socioeconomic resources; however, this project's activities would include the implementation of conservation best practices to reduce fish mortality during energy development and production activities, which are intended to reduce or minimize their potential adverse impacts to natural resources. These conclusions are consistent with the Open Ocean TIG RP2/EA (2019) analysis of the *Active Management and Protection* project, which included activities to assess and remediate risks associated with energy production infrastructure.

Table A-1 directs readers to the location of detailed analyses of this project's impacts on physical, biological, and socioeconomic resources within this RP4/EA.

A.5.1.4.1 Physical Resources

As described in Section 6.4.5.1.1 of the PDARP/PEIS, removal of marine debris may have short-term, minor adverse impacts to geology and substrates during gear removal. Derelict gear that is on the seafloor (e.g., traps) or entangled with benthic substrates (e.g., fishing gear) may cause short-term, minor disturbance during the gear removal actions; however, physical resources would benefit from the removal of derelict gear.

As described in Section 4.4.6.4.1 of Open Ocean RP2/EA (Open Ocean TIG, 2019), analysis of invasive species removal activities may result in short- and long-term, minor adverse impacts to physical resources. However, based on additional analysis of this project's specific activities—which would include diver-assisted removal, use of lionfish aggregating devices, and traps, among others—impacts to physical resources, including geology and substrates, are not anticipated. BMPs would be implemented to minimize any potential impacts to geology and substrates if divers or equipment would interact with or be placed on or near the seafloor.

As described in Section 6.4.4 of the PDARP/PEIS, depending on the specific project type, activities intended to improve water quality may have short-term, minor adverse impacts to geology and substrates during implementation, particularly if construction of water quality structures impact substrates or implementation causes temporary changes in water quality (e.g., a short-term release of contaminants). Water quality improvement projects would result in long-term benefits to physical resources. For this project, the specific water quality activities would be identified and refined through project planning, and as noted above, additional environmental review would occur during implementation planning; however, the impacts are anticipated to be consistent with the PDARP/PEIS analyses.

Depending on the specific project type, activities intended to implement conservation best practices to reduce fish mortality during energy development and production activities may have short-term, minor adverse impacts to geology and substrates during implementation, particularly if activities involve energy infrastructure in contact with substrates or implementation causes temporary changes in water quality (e.g., a short-term release of oil). These activities would result in long-term benefits to physical resources. This finding is consistent with the Open Ocean TIG RP2/EA (2019) analysis of the *Active Management and Protection* project that evaluated impacts associated with assessing and remediating risks associated with energy production infrastructure. For this project, the specific conservation projects for energy production activities would be identified and refined through project planning, and as noted above, additional environmental review would occur during implementation planning.

In summary, short-term, minor adverse impacts and long-term benefits to physical resources are anticipated.

A.5.1.4.2 Biological Resources

As described in Section 6.4.5.1.2 of the PDARP/PEIS, removal of marine debris may have short-term, minor adverse impacts to biological resources during gear removal. Habitat and benthic resources may be disturbed during the removal of derelict gear that is on or associated with the seafloor. Other marine and estuarine fauna and protected species may be disturbed by marine debris removal operations that occur in the water column and at the sea surface; however, these impacts are expected to be minor and short-term in duration. Removal of marine debris would result in long-term benefits to biological resources by minimizing future interactions and potential entanglement between derelict gear and sensitive resources including invertebrates, fishes, sea turtles, marine mammals, and seabirds.

As described in Section 4.4.6.4.2 of Open Ocean RP2/EA (Open Ocean TIG, 2019), analysis of invasive species removal activities may result in short- and long-term, minor adverse impacts to biological resources. For this project, divers and equipment used to remove invasive species may interact with biological resources only temporarily during removal activities. During project planning, the specific invasive species removal techniques would be evaluated and BMPs would be implemented to minimize impacts to habitat, marine and estuarine fauna, wildlife, and protected species.

As described in Section 6.4.4 of the PDARP/PEIS, depending on the specific project type, activities intended to improve water quality may have short-term, minor adverse impacts to biological resources during implementation, particularly if construction of water quality structures impact habitat or

implementation causes temporary changes in water quality (e.g., a short-term increase in contaminants) that could impact habitat, wildlife, protected species, or marine and estuarine fauna. Water quality improvement projects would result in long-term benefits to biological resources. For this project, the specific water quality activities would be identified and refined through project planning, and as noted above, additional environmental review would occur during implementation planning; however, the impacts are anticipated to be consistent with the PDARP/PEIS analyses.

Depending on the specific project type, activities intended to implement conservation best practices to reduce fish mortality during energy development and production activities may have short-term, minor adverse impacts to biological resources during implementation, particularly if activities involve energy infrastructure in contact with habitat or implementation causes temporary changes in water quality (e.g., a short-term release of oil) that could impact habitat, wildlife, protected species, or marine and estuarine fauna. These activities would result in long-term benefits to physical resources, particularly if the implementation of conservation strategies reduces fish mortality and other adverse impacts of energy production on biological resources. This finding is consistent with the Open Ocean TIG RP2/EA (2019) analysis of the *Active Management and Protection* project that evaluated impacts associated with assessing and remediating risks associated with energy production infrastructure. For this project, the specific conservation projects for energy production activities would be identified and refined through project planning, and as noted above, additional environmental review would occur during implementation planning.

In summary, short-term, minor adverse impacts and long-term benefits to biological resources are anticipated.

A.5.1.4.3 Socioeconomic Resources

As described in Section 6.4.5.1.3 of the PDARP/PEIS, removal of marine debris is not anticipated to have any adverse impacts to socioeconomic resources. Marine debris removal may result in long-term benefits for commercial fishers and recreational anglers by decreasing their encounters with marine debris, which can damage vessels and fishing gear and cause potentially costly repairs.

As described in Section 4.4.6.4.3 of Open Ocean RP2/EA (Open Ocean TIG, 2019), analysis of invasive species removal activities may result in long-term, minor adverse impacts to socioeconomic resources. However, based on additional analysis of this project's specific activities which are limited to invasive species removal, adverse impacts to socioeconomic resources are not anticipated. Benefits to fish populations resulting from improved environmental conditions would benefit the fishing community in the long-term.

As described in Section 6.4.4 of the PDARP/PEIS, depending on the specific project type, activities intended to improve water quality may have short-term, minor adverse impacts to socioeconomic resources during implementation, particularly if impacts to water infrastructure impact recreational use of an area and the economy. Water quality improvement projects would result in long-term benefits to socioeconomic resources; in particular, public health and safety would be improved, and there may be reduced pressure on public infrastructure. For this project, the specific water quality activities would be identified and refined through project planning, and as noted above, additional environmental review would occur during implementation planning; however, the impacts are anticipated to be consistent with the PDARP/PEIS analyses.

Depending on the specific project type, activities intended to implement conservation best practices to reduce fish mortality during energy development and production activities may have short-term, minor adverse impacts to socioeconomic resources during implementation, particularly if activities impact recreational use of an area and the economy. These activities would result in long-term benefits to

socioeconomic resources, particularly if the implementation of conservation strategies benefit biological resources that may improve recreational opportunities and benefit recreational and commercial fisheries. This finding is consistent with the Open Ocean TIG RP2/EA (2019) analysis of the *Active Management and Protection* project that evaluated impacts associated with assessing and remediating risks associated with energy production infrastructure. For this project, the specific conservation projects for energy production activities would be identified and refined through project planning, and as noted above, additional environmental review would occur during implementation planning.

In summary, no adverse impacts and long-term benefits to socioeconomic resources are anticipated.

A.5.1.5 FWCI6, Communication, Adaptive Management, Planning, and Integration (preferred)

This project would restore FWCI resources by improving understanding of high-priority fisheries and species' spatial distribution, abundance, habitat characteristics, trophic dynamics, and the threats they face using various methods such as observation, electronic monitoring, tagging, mapping, ground-truthing, and predictive modeling, and to coordinate efforts across the portfolio of ongoing and proposed FWCI restoration projects. Project activities would be conducted in any area where FWCI restoration projects are being conducted. Project activities most relevant to the assessment of environmental consequences include:

- **Collecting data.** This project would include the collection of observations, including electronic monitoring, animal tagging and tracking, and ground-truthing to inform population characterizations for high-priority species in the Gulf and throughout species' ranges. At-sea observer coverage would be enhanced to enhance monitoring support.

This project would be implemented in the U.S. Gulf, U.S. Caribbean Sea, and U.S. Atlantic Ocean and potentially the Mexican Gulf, the Caribbean, and Atlantic waters of Canada and northern South America. As noted in Section 2.4.1.6 above, specific sites for collecting data have not yet been identified. Field data collection activities such as tagging and collection of physical environmental and biological data would be identified through further implementation planning. Once specific sites and activities are identified, additional environmental review would occur during implementation planning. The Implementing Trustee would review and affirm that the site-specific conditions are consistent with those described in this RP4/EA. If the site-specific conditions indicate that the impacts would not be consistent with those described in this RP4/EA, the Implementing Trustee, in coordination with project partners and regulatory agencies (as needed), would determine whether to undertake additional site-specific environmental review, consistent with NEPA and other environmental compliance requirements, or forego implementation at that location.

Several programmatic EAs, EISs, and permits have been prepared by NOAA to evaluate the impacts of fisheries research that include activities similar to those proposed for this and other projects in this RP4/EA. Those references are cited in Section A.5.1.1 above, not repeated here, but similarly incorporated by reference herein.

As discussed above in Section A.2, projects that include data-related tasks such as gathering, compiling, and evaluating information to improve understanding of natural resources and to inform future restoration planning were evaluated in the PDARP/PEIS Chapter 6 and require no additional NEPA analysis. However, data gathering activities that involve field work with vessel-based, in-water, or other active data collection activities with potential impacts to physical, biological, and socioeconomic resources are evaluated further herein. Activities similar to those included in this project, namely, conducting electronic monitoring, and animal tagging and tracking have been evaluated for other DWH EAs, including the Open Ocean TIG RP2/EA (e.g., *Mapping, Ground-truthing, and Predictive Habitat Modeling*; *Habitat*

Assessment and Evaluation; *Active Management and Protection* projects) (Open Ocean TIG, 2019; Sections 4.4.6.1, 4.4.6.2, and 4.4.6.4) and in the *Final Programmatic Environmental Assessment for Fisheries and Ecosystem Research Conducted and Funded by the Southeast Fisheries Science Center* (NMFS, 2020b). These analyses are also incorporated by reference herein.

Table A-1 directs readers to the location of detailed analyses of this project's impacts on physical, biological, and socioeconomic resources within this RP4/EA.

A.5.1.5.1 Physical Resources

This project includes activities that were not evaluated in the PDARP/PEIS; however, a subset of similar activities was evaluated in Open Ocean TIG RP2/EA for projects intended to benefit MDBC (Open Ocean TIG, 2019; Sections 4.4.6.1, 4.4.6.2, and 4.4.6.4). Generally, these activities were found to have beneficial impacts to physical resources, and any potential minor adverse impacts may be reduced or eliminated through use of BMPs. Based on additional analysis of this project's specific activities, which would only include the use of vessels at the sea surface and survey and monitoring equipment in the water column, impacts to geology and substrates are not anticipated.

In summary, no impacts to physical resources are anticipated.

A.5.1.5.2 Biological Resources

This project includes activities that were not evaluated in the PDARP/PEIS; however, similar activities were evaluated in Open Ocean TIG RP2/EA for projects intended to benefit MDBC (Open Ocean TIG, 2019; Sections 4.4.6.1, 4.4.6.2, and 4.4.6.4). Generally, these data collection activities and observations at sea were found to have beneficial impacts to biological resources, and any potential minor adverse impacts may be reduced or eliminated through the implementation of BMPs.

Based on additional analysis of this project's specific activities, some vessel-based activities conducted to collect data, including the use of survey equipment and acoustic data collection, may disturb marine and estuarine fauna and protected resources, namely fishes, sea turtles, and marine mammals. However, these impacts would be short-term and minor. Fish tagging may include developing new electronic tagging techniques. Tagging activities may involve the use of nets and rod and reel to collect fish for tagging, which may have short-term, minor adverse impacts on marine and estuarine fauna and wildlife, including invertebrates, fishes, sea turtles, marine mammals, and seabirds. The application of the tags to fish may also have short-term, minor adverse impacts. These activities have been evaluated previously by NOAA for the research-focused PEIS and EAs described above. NOAA (2022), for example, indicated that individual fish could be subject to behavioral modifications and killed; however, due to the temporary nature of the tags and associated monitoring equipment and the limited scope of these studies, these impacts would be minor (see *Saltonstall-Kennedy Research and Development Program Programmatic Environmental Impact Statement* [NOAA, 2022]). No adverse impacts to habitat are anticipated. The collection of additional information to fill critical uncertainties on fish resources would improve management and protection, which would benefit high-priority species and fisheries in the long-term.

In summary, short-term, minor adverse impacts and long-term benefits to biological resources are anticipated.

A.5.1.5.3 Socioeconomic Resources

This project includes activities that were not evaluated in the PDARP/PEIS; however, similar activities were evaluated in Open Ocean TIG RP2/EA for projects intended to benefit MDBC (Open Ocean TIG, 2019; Sections 4.4.6.1, 4.4.6.2, and 4.4.6.4). Generally, these activities were found to have beneficial impacts to socioeconomic resources, and any potential minor adverse impacts may be reduced or eliminated through use of BMPs.

Based on additional analysis of this project's specific activities, which would not be anticipated to impact the fishing community's use of resources, impacts to socioeconomic resources are not anticipated. Benefits to fish populations resulting from the reduction of threats to high-priority species and fisheries would benefit the fishing community in the long-term.

In summary, no adverse impacts and long-term benefits to socioeconomic resources are anticipated.

A.5.1.6 FWCI7, Reduction in Fish Post-release Mortality from Depredation (non-preferred)

This project would restore FWCI resources by reducing fish mortality from depredation in commercial and recreational fisheries by working cooperatively with fishers, anglers, and other partners to test and implement depredation reduction strategies and improve understanding of fish depredation. Project activities most relevant to the assessment of environmental consequences include:

- **Testing shark deterrent devices.** This project would include the purchasing, distribution, and testing of commercially available depredation devices (e.g., tackle, electric pulse device) to collect data and to evaluate effectiveness.

This project would be implemented in the U.S. Gulf and South U.S. Atlantic. As noted in Section 2.4.1.7, specific sites for collecting data have not yet been identified. Once specific sites are identified, any additional environmental review would occur during implementation planning. The Implementing Trustee would review and affirm that the site-specific conditions are consistent with those described in this RP4/EA. If the site-specific conditions indicate that the impacts would not be consistent with those described in this RP4/EA, the Implementing Trustee, in coordination with project partners and regulatory agencies (as needed), would determine whether to undertake additional site-specific environmental review, consistent with NEPA and other environmental compliance requirements, or forego implementation at that location.

Impacts of commercial and recreational fisheries have been analyzed under their respective RFIPs and FMPs and published amendments (e.g., *Gulf of Mexico Reef Fish Fishery Management Plan* [GOMFMC, 1984], *Final Consolidated Atlantic Highly Migratory Species Management Plan* [NOAA, 2024a]). These analyses are incorporated by reference herein. In addition, several other programmatic EAs, EISs, and permits have been prepared by NOAA to evaluate the impacts of fisheries research that include activities similar to those proposed for this and other projects in this RP4/EA. Those references are cited in Section A.5.1.1 above but are similarly incorporated by reference herein.

The following evaluation of the environmental consequences of this proposed project incorporates by reference previous DWH environmental assessments, including the PDARP/PEIS Section 6.4.5.6 and the Open Ocean TIG RP2/EA *Reduction of Postrelease Mortality from Barotrauma in the Gulf of Mexico Reef Fish Recreational Fisheries* project (Open Ocean TIG, 2019). These analyses concluded that activities associated with the distribution of fish descender devices and data collection to evaluate the effectiveness of gear would have no adverse impacts to physical resources and either minor adverse or positive impacts on socioeconomic resources. The analysis concluded that short-term, minor adverse impacts to biological resources could occur as a result of potential interactions between the fish descender devices and other biological resources; however, other impacts from the project are expected to be largely beneficial. While the use of depredation equipment in conjunction with other fishing gear is different from the goals and objectives of PDARP/PEIS Section 6.4.5.6 and the Open Ocean TIG RP2/EA *Reduction of Postrelease Mortality from Barotrauma in the Gulf of Mexico Reef Fish Recreational Fisheries* project, the activities and associated environmental consequences are similar; thus, these analyses are also incorporated by reference herein.

Table A-1 directs readers to the location of detailed analyses of this project's impacts on physical, biological, and socioeconomic resources within this RP4/EA.

A.5.1.6.1 Physical Resources

As described in Section 6.4.5.6.1 of the PDARP/PEIS, recreational fishing activities using gear and the best practices included in this project (e.g., tackle) would not involve gear being permanently deployed and gear would not disturb sediments or other geological resources. Impacts from this project, which is intended to reduce shark depredation of reef fish and HMS in the Gulf and U.S. Atlantic, would be consistent with those findings. Furthermore, the potential impacts of similar activities were evaluated in the Open Ocean RP2/EA (Open Ocean TIG, 2019), which concluded the project activities would have no effect on physical resources. While the specific goals and methods for this depredation-focused work are different from the Return 'Em Right program and FWCI1 (see Section A.5.1.1 above), the project activities and potential impacts to geological resources are consistent. Equipment for the project would not be permanently deployed and would not interact with the seafloor; thus, impacts to physical resources, including geology and substrates, are not anticipated.

In summary, no impacts to physical resources are anticipated.

A.5.1.6.2 Biological Resources

As described in Section 6.4.5.6.2 of the PDARP/PEIS, impacts from projects intended to reduce post-release mortality of fish in recreational fisheries have the potential to cause short-term, minor adverse impacts and short- and long-term benefits to biological resources. While this project seeks to reduce depredation of fish by sharks during fishing, the potential impacts to biological resources are consistent with the findings described previously in the Open Ocean RP2/EA (Open Ocean TIG, 2019). The depredation gear would be added to the fishing gear already permitted for use. Short-term, minor adverse impacts to habitats, wildlife, marine and estuarine species, and protected species could occur from potential interactions with fishing gear. For example, fishing gear may interact with benthic (e.g., coral) or other pelagic (e.g., other fish) resources. Furthermore, there may be interactions with sharks and marine mammals through depredation; however, BMPs would minimize the impacts and project performance monitoring may inform gear changes of technique adjustments that may minimize the impacts during project implementation. Increased education and training may also minimize these potential impacts to biological resources. The proper use of gear is not anticipated to result in disruption to habitats, marine and estuarine fauna, protected resources, or other wildlife. Short- and long-term project activities are anticipated to have positive impacts on biological resources. Priority fish populations are expected to benefit through decreasing rates of depredation and increasing survival. Sharks and marine mammals may also benefit from the project in the long-term, particularly if techniques and gear successfully reduce depredation, the instances of sharks and marine mammals interacting with gear would be reduced.

In summary, short-term, minor adverse impacts and short- and long-term benefits to biological resources are anticipated.

A.5.1.6.3 Socioeconomic Resources

As described in Section 6.4.5.6.3 of the PDARP/PEIS, impacts from projects intended to reduce post-release mortality in recreational fisheries were described as potentially having minor adverse or positive impacts on socioeconomic resources. Furthermore, the potential impacts of the Return 'Em Right program were evaluated in the Open Ocean RP2/EA (Open Ocean TIG, 2019), which concluded the project activities would have no effect on socioeconomic resources. While the scope of this project seeks to reduce depredation of fish by sharks during fishing, the potential impacts to socioeconomic resources are consistent with these findings.

Depredation gear would be distributed equitably at no cost to commercial fishers, and participation in the program, including use of gear, would be voluntary; thus, the project would not adversely impact individual fishers or commercial fishing communities. Project implementation would likely benefit surrounding communities equally. Furthermore, any increases in fish biomass that results from decreased depredation would benefit the community of fishers; therefore, no adverse impacts are anticipated for socioeconomic resources.

In summary, no adverse impacts and long-term benefits to socioeconomic resources are anticipated.

A.5.2 Sea Turtles Restoration Type Alternatives

A.5.2.1 ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles) (preferred)

This project would prevent the loss of high-density sea turtle nesting beach habitat by acquiring high-density sea turtle nesting habitat for protection in perpetuity. Project activities most relevant to the assessment of environmental consequences include:

- **Land acquisition.** Priority parcels would be acquired from willing sellers within the approved acquisition boundaries of Archie Carr and Hobe Sound NWRs. Over 90 priority parcels have been identified for future analysis for project suitability. Priority parcels include undeveloped parcels or parcels with at-risk structures that, through acquisition, would help protect and/or provide the ability to create contiguous protected nesting habitat. All parcels would be acquired by a third-party land trust and would be donated to either the USFWS, the State of Florida, or Brevard, Indian River, Martin, or St. Lucie Counties. Up to two parcels are anticipated to be acquired, each averaging approximately 0.5 acres in size.
- **Derelict structure removal.** As needed, derelict structures that pose risks to nesting sea turtles and hatchlings would be demolished and removed from acquired parcels. Such structures may include, but are not limited to, disused, single-family homes, seawalls, boardwalks, or parking lots. “At-risk” structures would be those that could entrap or entangle sea turtles and/or hatchlings as they transit the beach or those that are in danger of imminent collapse (and therefore could crush sea turtles and/or hatchlings). Up to 0.25 acres or 1,000 linear feet of shoreline could be disturbed from the removal of these structures.

The removal of derelict structures could be implemented at several potential land acquisition sites within the Archie Carr and Hobe Sound NWR approved acquisition boundaries depending on identified restoration needs. As noted in the project description in Section 2.4.2.1 and above, specific sites for these structure removal activities have not yet been identified. Once specific sites are identified, any additional environmental review would occur during implementation planning. The Implementing Trustee would review and affirm that the site-specific conditions are consistent with those described in this RP4/EA. If the site-specific conditions indicate that the impacts would not be consistent with those described in this RP4/EA (e.g., a greater area would be disturbed during the removal of derelict structures), the Implementing Trustee, in coordination with project partners and regulatory agencies (as needed), would determine whether to undertake additional site-specific environmental review, consistent with NEPA and other environmental compliance requirements, or forego implementation at that location.

The following evaluation of the environmental consequences of this proposed project incorporates by reference previous DWH environmental assessments, including the Open Ocean TIG RP2/EA *Long Term Nesting Habitat Protection for Sea Turtles* project (Open Ocean TIG, 2019). This analysis concluded that the project, which included land acquisitions within the approved acquisition boundary of the Archie Carr NWR, would have wholly beneficial impacts to physical and biological resources. The analysis also

concluded that the project could have long-term, minor adverse impacts to socioeconomics due to a reduced tax base. However, all other socioeconomic resources were anticipated to benefit from land acquisitions. This analysis is incorporated by reference herein.

The Florida TIG previously analyzed the removal of barriers from sea turtle nesting beaches in its *Restoration Plan 2 and Environmental Assessment: Habitat Projects on Federally Managed Lands, Sea Turtles, Marine Mammals, Birds, and Provide and Enhance Recreational Opportunities* (herein referred to as FL RP2/EA; Florida TIG, 2021). Section 4.6.4.3 concluded that these activities would have short-term, minor adverse impacts during barrier removal and long-term benefits to physical resources; short-term, minor-to-moderate adverse impacts to biological resources during barrier removal and long-term benefits to biological resources; and short-term, minor adverse impacts to socioeconomic resources. This analysis is incorporated by reference herein.

Table A-1 directs readers to the location of detailed analyses of this project's impacts on physical, biological, and socioeconomic resources within this RP4/EA.

A.5.2.1.1 Physical Resources

Consistent with the Open Ocean RP2/EA analysis (Open Ocean TIG, 2019), proposed land acquisition activities would have wholly beneficial effects on geology and substrates by reducing the risk of development and thereby reducing the risk of coastal erosion.

Demolition and removal of derelict structures on nesting beaches may involve pedestrian foot traffic, vehicles (e.g., dump trucks), and the use of medium-to-heavy equipment such as jackhammers, backhoes, excavators, and bulldozers. Moving these materials to and around the project site may disturb localized geology and substrates; however, most of these geology and substrates would have been previously disturbed during the construction of the associated structure. Depending on the structure to be removed, localized digging may occur to remove concrete, asphalt, or structural anchors. Up to 0.25 acres or 1,000 linear feet of geology and substrates may be disturbed during the removal of the derelict structures. Disturbance would be highly localized to the structure and immediate vicinity. To the extent practicable, erosion control measures would be implemented to reduce sediment run off from the project site. As such, and consistent with the FL RP2/EA analysis (Florida TIG, 2021), these activities would have short-term, minor adverse impacts to geology and substrates. The removal of derelict structures would have long-term benefits on geology and substrates due to the return of a more natural geologic cycling system.

In summary, this project would have short-term, minor adverse impacts and long-term benefits to physical resources.

A.5.2.1.2 Biological Resources

Consistent with the Open Ocean RP2/EA analysis (Open Ocean TIG, 2019), land acquisition activities would have wholly beneficial effects on biological resources (habitats, wildlife species, and protected species) by preserving coastal habitats in perpetuity. Terrestrial fauna such as birds, beach-dwelling mammals and reptiles, and protected species such as sea turtles would benefit from the reduced threat of development on these coastal parcels and improved continuity of high-quality resting, foraging, and reproductive habitat.

Consistent with the FL RP2/EA analysis (Florida TIG, 2021), demolition and removal of derelict structures may result in short-term, minor-to-moderate adverse impacts on habitats and terrestrial wildlife due to disturbance from foot traffic, vehicle use, or demolition equipment. The extent to which biological resources are adversely impacted would depend on the materials being removed and the method by which removal occurs. However, adverse impacts would be highly localized and temporary, and conditions would improve to above baseline, due to the removal of anthropogenic structures and return to more

natural barrier island-sandy beach habitat. Barrier removal would occur outside of beach-nesting bird and sea turtle nesting seasons to minimize impacts to wildlife and protected species. Human and demolition equipment presence and operation could result in minor disturbances to and localized flushing of wildlife, but wildlife activity would return to baseline at the conclusion of demolition activities.

Removing derelict structures would result in long-term benefits to barrier island-sandy beach habitats and associated wildlife and protected species. Removing these structures would allow the site to return to more natural habitat states that can be used by wildlife for foraging, resting, and reproduction. In particular, the removal of barriers on nesting beaches is expected to provide long-term benefits to sea turtles by increasing nesting success and hatchling survivorship.

In summary, this project would have short-term, minor-to-moderate adverse impacts and long-term benefits to biological resources.

A.5.2.1.3 Socioeconomic Resources

Consistent with the Open Ocean RP2/EA analysis (Open Ocean TIG, 2019), land acquisition activities could have long-term, minor adverse impacts to socioeconomics due to changes in development activities and local/municipal spending and taxes. Parcels would be acquired from willing sellers and, as such, are not expected to adversely impact individuals who willingly engage in the sale. However, local tax bases could benefit over the long-term from potential increased revenues from nature-based tourism. The removal of derelict structures could also result in short-term benefits to socioeconomics by providing employment opportunities to local demolition companies.

In summary, this project would have long-term, minor adverse impacts and short- and long-term benefits to socioeconomic resources.

A.5.2.2 ST2, Gulf-Wide Sea Turtle Bycatch Reduction (preferred)

This project would provide outreach, education, and gear to Gulf commercial fishing communities to reduce fishery interactions with sea turtles. Section A.2 analyzes the environmental consequences of education and outreach campaigns and training activities. Project activities most relevant to the assessment of environmental consequences include:

- **Distribution and adoption of alternative fishing gear.** Small-bar TEDs (i.e., those with 2.5-inch bar spacing) would be manufactured and installed on participating vessels. Current South U.S. Atlantic and Gulf shrimp otter trawl fisheries require that vessels use TEDs with 4-inch maximum bar spacing. Participating vessels would be equipped with two to four small-bar TEDs to reduce bycatch of smaller sea turtles while maintaining target catch rates. Project partners would collaborate with net shops and coordinate with commercial fishers to distribute and install the new TEDs on up to 100 vessels operating in the Southeastern U.S. Atlantic or Gulf shrimp trawl fisheries.

Impacts of the South U.S. Atlantic and Gulf shrimp trawl fisheries have been analyzed under their respective FMPs (South Atlantic Fishery Management Council [SAFMC], 1993; GOMFMC, 1981) and published amendments. These analyses are incorporated by reference herein. Implementation of the FMPs has also undergone ESA Section 7 consultations (NMFS, 2021).

The following evaluation of the environmental consequences of this proposed project incorporates by reference previous DWH environmental assessments, including the PDARP/PEIS Section 6.4.7.1.1 and the Open Ocean TIG RP2/EA *Reducing Sea Turtle Bycatch in the Southeast Otter Trawl Shrimp Fishery through Development of Reduced Bar Spacing Turtle Excluder Devices (TEDs)* project (Open Ocean TIG, 2019). This analysis concluded that the project, which developed and pilot tested the small-bar TEDs,

would have minimal impacts above those already experienced in the regulated fishery. For the specific project, the RP2/EA concluded that the small-bar TEDs would have short-term, minor adverse impacts to physical resources (specifically, benthic substrates); short-term, minor adverse impacts to habitats and marine and estuarine fauna; long-term benefits to marine and estuarine fauna and protected species (specifically, sea turtles); and no impacts to socioeconomic resources because of the voluntary nature of project activities. This analysis is incorporated by reference herein.

Table A-1 directs readers to the location of detailed analyses of this project's impacts on physical, biological, and socioeconomic resources within this RP4/EA.

A.5.2.2.1 Physical Resources

Fishing practices for shrimp otter trawls involve deploying and hauling gear and generally avoid hard benthic geology and substrates. The distribution and adoption of alternative fishing gear would supplement existing commercial fishing practices, which primarily occur over sandy soft bottom areas. Since trawl fisheries operate within the water column, marine geology and substrates could be indirectly affected by water shear changes induced from dragging nets. As such, and consistent with the Open Ocean RP2/EA analysis, these adverse impacts would be short-term, minor, and localized to the locations where shrimp trawls are operating.

In summary, this project would have short-term, minor adverse impacts to physical resources.

A.5.2.2.2 Biological Resources

This project would occur within an existing range of operations (geographic scope and scale) for U.S. Atlantic and Gulf commercial shrimp fisheries. No additional fishing trips or longer fishing trips would occur. As such, impacts to biological resources from this project fall within the range of those evaluated under the FMPs and published amendments (GOMFMC, 1981; SAFMC, 1993), and this project specifically would have no additional adverse impacts to habitats, wildlife, marine and estuarine fauna, or protected species.

Existing shrimp commercial fishery operations result in "take" of sea turtles under the ESA (NMFS, 2021). Conservation recommendations include the use of small-bar TEDs to reduce the risk of incidental bycatch and mortality of small sea turtles that pass through the bars of currently required four-inch-spaced TEDs (NMFS, 2021). As such, the voluntary adoption and implementation of the small-bar TEDs is consistent with permitted fisheries and management recommendations and would have long-term benefits for protected species (specifically, sea turtles).

In summary, this project would have long-term benefits for biological resources.

A.5.2.2.3 Socioeconomic Resources

Small-bar TEDs and other alternative gear would be distributed to participating commercial fishing communities and voluntarily implemented in existing fisheries. Individuals could continue to fish with existing, four-inch-spaced TEDs as required by existing regulations or choose to adopt the small-bar TEDs that also comply with existing fishery regulations. Individuals who adopt small-bar TEDs may choose to stop using the small-bar TEDs at any time. As such, and consistent with the OO RP2/EA analysis, this project would have negligible impacts on socioeconomics.

In summary, this project would have no impacts to socioeconomic resources.

A.5.2.3 ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction (preferred)

This project would seek to reduce vessel strikes to sea turtles in Gulf inlets and passes by taking a phased approach to evaluating existing information, collecting observational field data on sea turtle and vessel

interactions, and developing site-specific conservation measures to encourage voluntary adoption of practices that reduce the risk of vessel strikes. Section A.2 analyzes the environmental consequences of desktop-based data analyses, boat- and land-based field observations, and the implementation of education and outreach campaigns. Project activities most relevant to the assessment of environmental consequences include:

- **Uncrewed aircraft system (UAS or "drone") field studies.** Drone surveys would be conducted during Phase II field studies to collect data on boater behavior, sea turtle abundance/distribution in nearshore inlets and passes, and interactions between vessels and sea turtles. Drones would be staged from land-based infrastructure or a research vessel, depending on the site. If drones are used, the target altitude would be no higher than 400 feet above sea level, no lower than 50 feet above sea level (as required by permitting), and likely between 150 and 250 feet above sea level.

In-field drone surveys could occur at several nearshore inlets or passes along the Gulf coastline. As noted in the project description in Section 2.4.2.5 and above, specific sites for these drone surveys have not yet been identified. Once specific sites are identified, any additional environmental review would occur during implementation planning. The Implementing Trustee would review and affirm that the site-specific conditions are consistent with those described in this RP4/EA. If the site-specific conditions indicate that the impacts would not be consistent with those described in this RP4/EA, the Implementing Trustee, in coordination with project partners and regulatory agencies (as needed), would determine whether to undertake additional site-specific environmental review, consistent with NEPA and other environmental compliance requirements, or forego implementation at that location.

The following evaluation of the environmental consequences of this proposed project incorporates by reference previous DWH environmental assessments, including the Open Ocean TIG RP3/EA (Open Ocean TIG, 2023), which evaluated the use of drones for field studies and monitoring. The RP3/EA analysis concluded that the use of drones, with the implementation of BMPs, would have no impacts on physical resources, short-term, minor adverse impacts to biological resources (specifically, wildlife), and no impacts to socioeconomic resources. This analysis is incorporated by reference herein.

A.5.2.3.1 Physical Resources

Consistent with the Open Ocean RP3/EA analysis (Open Ocean TIG, 2023), since drones would be operated from existing land-based infrastructure or a research vessel, ground disturbance would not occur due to this activity, and as such, there would be no impacts to geology and substrates. In summary, this project would have no impacts to physical resources.

A.5.2.3.2 Biological Resources

Drones would be operated over land and nearshore inlets and passes to observe (via photographs or video) boater behavior, sea turtle abundance/distribution, and/or boater and sea turtle interactions. While this activity would have no impact to habitats, wildlife (in particular, birds), marine and estuarine fauna, and protected species could be disturbed by drone use. Drones can mimic predatory behavior when hovering over studied animals, and depending on the size and power, may emit noise that disturbs animals. In rare cases, drones may strike in-flight birds, which puts the bird at risk of injury or death. To the extent practicable, BMPs would be implemented during drone surveys to reduce wildlife disturbance and the risk of bird strikes (e.g., National Park Service [NPS], 2017; USFWS, 2017). Further, NMFS research permits would be obtained to conduct research on sea turtles using UAS. With the implementation of BMPs and research permit conditions, and consistent with the Open Ocean RP3/EA analysis, impacts from drone use are anticipated to be short-term and minor. Drone operation would provide important data on sea turtle and recreational vessel interactions at nearshore inlets and passes that would directly inform

education and outreach measures to be designed and implemented in Phase 3 of the project. As such, this activity would provide long-term benefits for sea turtles.

In summary, this project would have short-term, minor adverse impacts and long-term benefits to biological resources.

A.5.2.3.3 Socioeconomic Resources

Consistent with the Open Ocean RP3/EA analysis (Open Ocean TIG, 2023), since drones would be operated from existing land-based infrastructure or a research vessel, there would be no impacts to local or regional socioeconomics. In summary, this project would have no impacts to socioeconomic resources.

A.5.2.4 ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements (preferred)

This project would provide coordination support across the STSSN, including management and desktop analyses of Gulf-wide STSSN data. Section A.2 analyzes the environmental consequences of these coordination and data activities. Project activities most relevant to the assessment of environmental consequences include:

- **Providing STSSN support for emergency events.** Supplies, equipment, funding, or staffing would be provided to STSSN partner organizations to assist in response to emergency events (e.g., cold stun events). This support would aim to increase partner organizations' capacity and ability to respond to emergency sea turtle stranding events across the Gulf or provide supplemental support after these emergency stranding events. Emergency strandings could occur throughout the northern Gulf, in areas where the STSSN already operates.

NMFS and USFWS share federal jurisdiction for the conservation and recovery of sea turtles under ESA. In accordance with the 1977 Memorandum of Understanding between NMFS and USFWS regarding roles and responsibilities for sea turtle conservation, protection, and recovery, USFWS has lead responsibility on nesting beaches and NMFS has lead responsibility in the marine environment (NMFS and USFWS, 1977). Sea turtle stranding response and rehabilitation has traditionally operated with a shared jurisdictional responsibility between the two agencies. NMFS has the primary coordination role to ensure that data are collected in a manner sufficient for management, monitoring, and research purposes and to facilitate its use to meet recovery objectives.

USFWS authorizes the state wildlife agencies of Texas, Louisiana, Mississippi, and Florida to conduct terrestrial stranding response. The authorization is made under the ESA Section 6 delegation authority. These agencies subsequently authorize stranding responders, working under the State Coordinator, to respond to and document stranded turtles. In Alabama, USFWS issues ESA Section 10(a)(1)(A) permits directly to stranding responders. USFWS also codified regulations (found at 50 C.F.R. §17.21 and 17.31) authorizing USFWS and NMFS personnel to respond to strandings on land. NMFS has codified regulations authorizing the STSSN (federal and state agencies, and their agents) to aid sick, injured, or dead sea turtles in the marine environment, found at 50 C.F.R. §222.310 (for endangered turtles) and 50 C.F.R. §223.206 (for threatened turtles). Implementation of the STSSN has undergone ESA Section 7 consultation (NMFS, 2016).

The STSSN currently responds to and documents sick, injured, and dead sea turtles that are found in coastal areas under U.S. jurisdiction. The project would not change the types of activities the STSSN is conducting but would provide additional resources to enhance the capacity of the program. Numerous previous DWH environmental assessments have evaluated the environmental consequences for enhancing STSSN activities across the northern Gulf (e.g., Phase IV Early Restoration RP/EA). Most recently, these activities were analyzed in the Regionwide TIG RP1/EA (Regionwide TIG, 2021), which concluded that

enhancing the STSSN could have short-term, minor adverse impacts to physical resources; long-term, minor adverse impacts to biological resources and long-term benefits to protected species; and no impacts to socioeconomic resources. This analysis is incorporated by reference herein.

Table A-1 directs readers to the location of detailed analyses of this project's impacts on physical, biological, and socioeconomic resources within this RP4/EA.

A.5.2.4.1 Physical Resources

While responding to dead or stranded sea turtles, STSSN personnel would traverse coastal and nearshore habitats (e.g., sandy beaches) and occasionally bury decomposed sea turtle carcasses in sandy substrates. Improving the ability of STSSN partners to respond to emergency stranding events would lead to localized increases of foot traffic and potentially additional carcasses that would require burial. However, this increase would be highly localized (specific to a stranding/carcass recovery site) and would cease once the response is complete. As such, and consistent with the Regionwide TIG RP1/EA analysis, this project would have short-term, minor adverse impacts on geology and substrates.

In summary, this project would have short-term, minor adverse impacts to physical resources.

A.5.2.4.2 Biological Resources

Sea turtles can strand across a variety of habitat types along the northern Gulf. As such, STSSN personnel may traverse and transport equipment along terrestrial (e.g., sandy beach, marsh) and marine (e.g., soft bottom, seagrasses) habitats. Further, these habitats support a variety of terrestrial wildlife (e.g., beach-nesting birds), marine and estuarine fauna (e.g., fish), and protected resources (e.g., marine mammals, ESA-listed fish, sea turtles). Response activities may include foot, vehicular, or boat traffic, depending on the response site. Responding to stranded or dead sea turtles may result in disturbance to habitats and associated fauna. However, disturbance would be highly localized (i.e., restricted to the stranding/carcass recovery site) and temporary (i.e., restricted to the response event). To the extent practicable, BMPs would be implemented to reduce disturbance to habitats and fauna, such as implementation of the NMFS *Vessel Strike Avoidance Measures and Reporting for Mariners* (NMFS, 2008). As such, this project would result in short-term, minor adverse impacts to habitats, wildlife, marine and estuarine fauna, and protected species.

STSSN personnel may handle, treat, and transport injured or sick sea turtles to rehabilitation facilities for care and eventual release. These activities could result in short-term, moderate adverse impacts to sea turtles from increased stress during handling, treatment, or transportation. As noted above, these activities have been reviewed and permitted under the ESA (e.g., NMFS, 2016). However, the long-term benefits from enhancing responses to stranded and sick sea turtles is anticipated to outweigh the short-term increased stress. Further, sea turtles that are successfully rehabilitated and released could contribute to population health and resilience.

In summary, this project would have short-term, minor-to-moderate adverse impacts and long-term benefits to biological resources.

A.5.2.4.3 Socioeconomic Resources

The project would provide support, in the form of materials, equipment, staff, or funding for STSSN partner organizations to respond to emergency sea turtle stranding events. Emergency stranding events can often be challenging to budget due to uncertainties regarding the magnitude, frequency, and location of the emergency. Many of these partner organizations are small, non-profit organizations, so repeated emergency events can result in financial strain. STSSN support provided through this project would result in long-term benefits for local socioeconomics by addressing gaps in funding for these emergency events, thereby reducing uncertainties for these organizations.

In summary, this project would have long-term benefits for socioeconomic resources.

A.5.2.5 ST5, Kemp's Ridley Nesting Enhancement in Mexico (non-preferred)

This project aims to enhance sea turtle hatchling productivity by reducing sources of hatchling mortality at Kemp's ridley nesting beaches in Tamaulipas, Mexico. Project activities most relevant to the assessment of environmental consequences include:

- **Sea turtle nest monitoring patrols and nest protection.** Patrol personnel would conduct daily shoreline monitoring along Kemp's ridley nesting beaches in Tamaulipas, Mexico via foot and all-terrain vehicles (ATVs). Personnel would observe and document evidence of nests, nesting turtles, or turtle crawls. Found nests would be protected in-situ (e.g., by placing metal nesting exclosures over nests to prevent predation), or nests could be relocated and protected in corrals at monitoring camps.
- **Structure maintenance and/or replacement.** As needed, the six cabins and corrals that host nesting patrol personnel and relocated sea turtle nests would be maintained and/or replaced in-kind. Maintenance activities could include repairing and replacing walls, flooring, roofing, or fixtures within the cabins or repairing or replacing corral fencing and nest exclosures. Up to two cabins could be replaced in-kind.

The replacement of nesting cabins could be implemented at a combination of the six existing cabins along the Tamaulipas, Mexico coastline. As noted in the project description in Section 2.4.2.5 and above, specific sites for these structure replacement activities have not yet been identified. Once specific sites are identified, any additional environmental review would occur during implementation planning. The Implementing Trustee would review and affirm that the site-specific conditions are consistent with those described in this RP4/EA. If the site-specific conditions indicate that the impacts would not be consistent with those described in this RP4/EA, the Implementing Trustee, in coordination with project partners and regulatory agencies (as needed), would determine whether to undertake additional site-specific environmental review, consistent with NEPA and other environmental compliance requirements, or forego implementation at that location.

The following evaluation of the environmental consequences of this proposed project incorporates by reference previous DWH environmental assessments, including the Regionwide TIG RP1/EA *Restore and Enhance Sea Turtle Nest Productivity* (Regionwide TIG, 2021) and the Phase IV Early Restoration *Sea Turtle Early Restoration Project, Kemp's Ridley Sea Turtle Nest Detection and Enhancement* (DWH Trustees, 2015) projects. These analyses, which evaluated Kemp's ridley monitoring patrols and protection activities in Tamaulipas, Mexico, concluded that these activities would have short-term, minor adverse impacts to geology and substrates from minor ground disturbance from foot patrols and nest excavation; short-term, minor adverse impacts to terrestrial habitats and wildlife from foot traffic and nest relocation and long-term benefits from nest protection; and would have no effect on socioeconomic resources. These analyses are incorporated by reference herein.

Implementation of structure maintenance and/or replacement under this project is similar in nature to the derelict structure removal that would occur during implementation of the *ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection) (preferred)* project. It is anticipated that the environmental consequences to physical, biological, and socioeconomic resources from those activities would also be very similar. To reduce redundancy, the following discussion of environmental consequences is limited to those activities, techniques, and anticipated impacts that are unique to this project. Table A-1 directs readers to the location of detailed analyses of this project's impacts on physical, biological, and socioeconomic resources within this RP4/EA.

A.5.2.5.1 Physical Resources

Nest patrols and protection would include the use of ATVs along beaches and small-scale nest excavation. Substrates may be temporarily disturbed during transit of ATVs and personnel and during nest excavation. However, all substrates excavated for nest protection would be replaced once all eggs have been removed. Consistent with the Phase IV RP/EA (DWH Trustees, 2015) and Regionwide TIG RP1/EA (Regionwide TIG, 2021), these activities would have up to short-term, minor adverse impacts to geology and substrates.

Structure maintenance would involve the use of construction personnel, hand tools, and transport vehicles to transport maintenance materials to the beach and update infrastructure. Infrastructure replacement could involve the use of light-to-medium machinery, as described in Section A.5.2.1.1. Replacing cabins and/or corral infrastructure may require localized digging to remove and/or repair pads or anchors. However, these activities would occur in areas where physical resources were previously disturbed, so no long-term adverse impacts would be expected. To the extent practicable, erosion control measures would be implemented during construction. As such, and consistent with the evaluation in Section A.5.2.1.1, these activities would have short-term, minor-to-moderate adverse impacts to geology and substrates.

In summary, this project would have short-term, minor-to-moderate adverse impacts to physical resources.

A.5.2.5.2 Biological Resources

Nest patrols and protection activities could have short-term, minor adverse impacts to terrestrial habitats and associated wildlife from disturbance and localized flushing while project personnel traverse nesting beaches and excavate nests. However, conditions would return to baseline after project personnel leave nesting areas. As part of nest protection activities, project personnel may excavate Kemp's ridley nests, collect eggs, and transport them to protected corrals for further incubation and hatching. This process could result in harm to individual sea turtle eggs from handling and transport, resulting in short-term, moderate adverse impacts to individual eggs/hatchlings (DWH Trustees, 2015). However, the long-term benefits to the population from protecting eggs from poaching and predation, and the resulting increase in nesting success, is expected to outweigh these short-term risks.

Structure maintenance would result in, at most, short-term, minor adverse impacts to terrestrial habitats and wildlife from disturbance and localized flushing during the transport of hand tools, materials, and maintenance personnel to and from the nesting cabins. Infrastructure replacement could involve the use of light-to-medium machinery, as described in Section A.5.2.1.1. To minimize impacts to protected species (specifically, Kemp's ridley sea turtles), infrastructure replacement would only occur outside of sea turtle nesting season, and as such, this activity would have no more than short-term, minor adverse impacts to protected species. However, other terrestrial wildlife may be present in the area and disturbed by infrastructure replacement and, consistent with the evaluation in Section A.5.2.1.2, these activities would have short-term, minor-to-moderate adverse impacts to terrestrial habitats and wildlife (non-protected species).

In summary, this project would have short-term, minor-to-moderate adverse impacts and short- and long-term benefits to biological resources.

A.5.2.5.3 Socioeconomic Resources

Consistent with the Phase IV RP/EA (DWH Trustees, 2015) and Regionwide TIG RP1/EA analyses (Regionwide TIG, 2021), nest patrols and protection would have no adverse impacts on socioeconomic resources. Maintaining and/or replacing cabin infrastructure could provide short-term employment opportunities for local individuals or companies, providing short-term benefits to socioeconomics.

In summary, this project would have short-term benefits to socioeconomic resources.

A.6 No Action Alternative Analysis

Under the No Action Alternative, none of the proposed restoration alternatives would be pursued by the Open Ocean TIG. The affected resources identified in the prior sections would remain in their current conditions, including deteriorating conditions described in the affected environment (Section A.4) and below. The following subsections address the likely impacts to physical, biological, and socioeconomic resources for each of the Restoration Types analyzed in this RP4/EA if none of the proposed alternatives were to be implemented.

A.6.1 Fish and Water Column Invertebrates

Under the No Action Alternative, bycatch and post-release mortality would not be reduced, the overall health of fisheries would not be increased, spawning aggregation areas would not be protected, environmental conditions would not be improved, and improved fishing practices would not receive additional promotion.

Under the No Action Alternative, the following activities would not be conducted, including:

- The development of training programs
- Media campaigns and multi-media materials
- Workshops and working group coordination
- At-sea observer enhancements and data collection
- Reporting tool development and improved information sharing
- Conservation activities
- Desktop-based studies on angler behavior, efficacy of BMPs, post-release mortality, species distribution, and spawning aggregations
- Data gathering and analysis including field studies on gear use, use and efficacy of best practices, bycatch, post-release mortality, and species distribution and movement
- Marine debris and invasive species removal, and
- Distribution and testing of fishing gear and shark deterrent devices.

The activities currently in progress under the Return ‘Em Right program would continue through 2026 but would not be expanded into new locations or to new species groups, and the scope of activities would not be expanded. Current fishing practices that do not incorporate modern fishing gear and best practices would continue in areas where outreach is currently not occurring among recreational and commercial fishmen, which would continue to harm fish populations. Rates of bycatch and fish mortality from regulatory discards, depredation, and catch-and-release fishing would continue at current levels. Sources of fish mortality would continue to impact fish and fish populations at consistent levels. Environmental conditions that impact fish populations such as marine debris, invasive species, water quality, and energy development and production would continue to impact fish and invertebrate populations at consistent levels. No outreach or engagement would be conducted with communities or other interested parties and no other benefits from the proposed projects would be realized. Further, the Trustees would lose the ability to collect and evaluate data that provide insights to threats that could be addressed in future restoration efforts. If these activities are not conducted, individually, they could result in long-term, minor-to-moderate adverse impacts to terrestrial habitats, wildlife, and marine and protected species. Collectively, these local stressors would likely contribute to long-term, moderate-to-major adverse impacts to regional or global fish populations. These impacts may result in decreased fish biomass, impacting both commercial and recreational fish landings, which may contribute to additional long-term, minor-to-moderate adverse impacts to socioeconomic resources.

A.6.2 Sea Turtles

Under the No Action Alternative, nesting habitat acquisition and long-term protection would not occur. These parcels would be at increased risk of development, resulting in long-term, minor-to-moderate adverse impacts to geology and substrates.

Under the No Action Alternative, data gathering, outreach and education, nesting habitat acquisition, STSSN activities (including emergency event response), sea turtle bycatch reduction measures, vessel strike reduction measures, and nest protection activities would not be implemented. Existing land protection, STSSN, bycatch reduction, and nest protection projects would end, resulting in gaps in coverage of these activities. Beach-nesting habitats would be at risk of being developed or at risk of further harm from derelict structures. Sea turtles would continue to experience threats from terrestrial (e.g., nest predation and poaching, nesting habitat development and degradation) and marine (e.g., commercial fishery bycatch, recreational vessel strike, emergency stranding events) sources. Further, the Trustees would lose the ability to collect, assess, and manage critical STSSN data that provide insights to threats that could be addressed in future restoration efforts. If these activities are not conducted, individually, they could result in long-term, minor-to-moderate adverse impacts to terrestrial habitats, wildlife, and marine and protected species. Collectively, these local stressors would likely contribute to long-term, moderate-to-major adverse impacts to regional or global sea turtle populations.

Under the No Action Alternative, existing land and marine management programs would lose continued support (e.g., STSSN, nest patrol efforts in Mexico, NOAA GMT); wildlife-based tourism and aesthetic resources would suffer from declining sea turtle populations; and commercial fisheries would lose outreach support assisting them in complying with federal sea turtle TED regulations. Further, derelict structures would not be addressed and would continue to pose risks to public health and safety. If these activities are not conducted, these socioeconomic resources would experience long-term, minor adverse impacts.

A.7 NEPA Cumulative Impacts Analysis

The Council on Environmental Quality (CEQ) regulations for implementing NEPA require the assessment of cumulative impacts in the decision-making process. CEQ defines cumulative effects as "the effects on the environment which results from the incremental effects of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR §1508.1). As stated in the CEQ handbook, *Considering Cumulative Effects* (CEQ, 1997), cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on impacts that are truly meaningful. Cumulative impacts should be considered for all alternatives, including the No Action Alternative.

The PDARP/PEIS (Section 6.17.2) states that consideration of cumulative impacts of proposed alternatives in RP/EAs should build on the programmatic analyses and focus on site-specific issues (DWH Trustees, 2016). This is consistent with CEQ guidance regarding effective use of programmatic NEPA analysis. Section 6.6 and Appendix 6.B of the PDARP/PEIS are incorporated by reference herein, including the methodologies for assessing cumulative impacts, identification of affected resources, and the cumulative impacts scenario. The PDARP/PEIS found that implementation of restoration projects under the FWCI and ST Restoration Types would be consistent with the PDARP/PEIS Restoration Goals and would not be expected to contribute substantially to short- and long-term adverse cumulative impacts on physical, biological, or socioeconomic resources when analyzed in combination with other past, present, and reasonably foreseeable future actions.

Section 6.6.2 of the PDARP/PEIS outlines the following steps involved in a cumulative impact analysis: (1) identify the resources affected, (2) establish the boundaries of analysis, (3) identify the cumulative impacts scenario, and (4) conduct a cumulative impacts analysis.

Regarding identification of the resources affected, the CEQ handbook states that the analysis must first determine the realistic potential for the resource to sustain itself in the future and whether the proposed action would affect this potential; therefore, the baseline condition of the resource should include a description of how conditions have changed over time and how they are likely to change in the future if the proposed action is not implemented. The baseline condition should also include other ongoing actions, as discussed in Section 6.6.4 of the PDARP/PEIS (DWH Trustees, 2016).

To properly bound the cumulative impacts analysis, the CEQ handbook recommends determining appropriate spatial and temporal impact boundaries. The alternatives analyzed in this RP4/EA would have minor-to-moderate adverse impacts, most of which would be localized and short-term in duration (i.e., during implementation). Therefore, the Open Ocean TIG considered these short-term adverse impacts in concert with other present actions (i.e., actions with impacts that would overlap with the implementation stage of the alternatives), thus limiting the temporal boundary of the analysis to the construction/implementation phases. In determining the spatial boundary, the TIG considered the programmatic analysis of cumulative impacts in the PDARP/PEIS, which analyzed impacts on a regional, ecosystem scale (DWH Trustees, 2016). The spatial boundary of the cumulative impacts analysis in this RP4/EA is on a local scale. In summary, the analysis boundaries for this RP4/EA includes the Gulf of Mexico, Atlantic Ocean, and Caribbean Sea, including waters of the U.S., Mexico, Canada, and South America (with most alternatives estimated to take approximately 1 to 15 years for implementation).

To identify the cumulative impacts scenario, the PDARP/PEIS describes the affected environment and evaluates the impacts of restoration as well as programmatic development activities by considering cumulative impacts from implementation of DWH Early Restoration. The PDARP/PEIS analysis is incorporated by reference, where applicable (DWH Trustees, 2016). No significant cumulative impacts were concluded in this analysis. Where applicable, each RP/EA's cumulative impacts analysis should build on previous plans, incorporating only impacts not considered in previous analyses.

For past, present, and reasonably foreseeable future actions, past activities that have contributed to the current condition of resources are described and analyzed in Chapter 6 of the PDARP/PEIS and are not repeated in this analysis. The Open Ocean TIG identified relevant present and reasonably foreseeable future actions not analyzed in the previous documents and considered their potential impacts in the analysis (Table A-3). Applicable to the FWCI and ST Restoration Types, these include restoration related to the DWH oil spill such as restoration designed to benefit FWCI, sea turtles, and other natural resources (e.g., marine mammals, birds) and other ongoing activities such as military operations, marine transportation, energy activities, dredged material disposal, marine mineral mining, fisheries and aquaculture, tourism and recreation, and coastal development and land use. Where these actions are planned and/or ongoing, they may apply as present and reasonably foreseeable future actions.

Appendix A.5 analyzes the environmental consequences for each of the alternatives in this RP4/EA. The alternatives evaluated in this RP4/EA are designed to improve fish and sea turtle resources. Adverse effects would not be anticipated to extend beyond the implementation period for most projects. Some resource areas would be affected over the long term, some beneficially and some adversely. None of the projects included in this RP4/EA would result in any long-term adverse effects that rise above a minor adverse impact. For example, most of the projects would result in short-term, minor-to-moderate adverse impacts to geology and substrates, air quality, and hydrology and water quality during implementation activities, and short- and long-term, minor-to-moderate adverse impacts on habitat and wildlife. Biological resources would primarily experience short-term, minor adverse impacts from human

disturbance associated with project implementation. Socioeconomic resources would also experience short- or long-term, minor adverse impacts. Additionally, for many of the resources, projects are anticipated to result in no long-term adverse effects but do have long-term benefits.

As such, the Open Ocean TIG concluded that although some of the projects may have an incremental contribution to adverse cumulative impacts, the contribution would not be substantial over the long term. Many of the alternatives have the potential to provide long-term beneficial cumulative impacts to physical, biological, and socioeconomic resources. Thus, the TIG concludes that the FWCI and ST Restoration Type alternatives in this RP4/EA would not contribute substantially to adverse cumulative impacts when added to other past, present, or reasonably foreseeable future actions.

Table A-3 Summary of the Past, Present, and Reasonably Foreseeable Future Actions Considered in the Cumulative Impacts Analysis

Action Description	Key Resource Areas and Potential for Adverse Cumulative Impacts
Restoration Related to the DWH Oil Spill (funded by NRDA, National Fish and Wildlife Foundation's Gulf Environmental Benefit Fund [NFWF-GEBF], Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States [RESTORE] Act, Gulf of Mexico Research Initiative [GOMRI])	
Gulf of Mexico: Osprey Restoration in Coastal Alabama; Queen Bess Island Restoration Project; Rabbit Island Restoration Project; Isle au Pitre Restoration; Terrebonne HNC Island Restoration; Gomez Key Oyster Reef Expansion and Breakwaters for American Oystercatchers; Florida Shorebird and Seabird Stewardship and Habitat Management – 5 Years; Alabama Dune Restoration Cooperative Project; Analysis of Open Ocean Habitat Use, Threats, and Animal Movements; Bahia Grande Coastal Corridor Habitat Acquisition; Barrier Island System Management Program; Beach and Dune Habitat Protection at Gulf Islands National Seashore Beach Enhancement Project at Gulf Islands National Seashore; Bike and Pedestrian Use Enhancements Project, Davis Bayou, Mississippi District, Gulf Islands National Seashore; Bird Nesting and Foraging Area Stewardship; Bird Stewardship and Enhanced Monitoring in Mississippi; Bon Secour National Wildlife Refuge Recreation Enhancement - Mobile Street Boardwalk Restoration; Bon Secour National Wildlife Refuge Trail Enhancement Project; Characterizing Gulf Sturgeon Spawning Habitat, Habitat Use and Origins of Juvenile Sturgeon in the Pearl and Pascagoula River Systems; Characterizing the Barrier Island Geomorphic State; Coastal Alabama Sea Turtle (CAST) Habitat Usage and Population Dynamics; Colonial Nesting Wading Bird Tracking and Habitat Use Assessment—Two Species; Conceptual Model to Inform Open Ocean Ecosystem Indicators; Conservation and Enhancement of Nesting and Foraging Habitat for Birds; Dauphin Island West End Acquisition; Developing a Gulf-wide Comprehensive Plan for In-water Sea Turtle Data Collection; Documenting Sea Turtle Nesting in Louisiana; Egmont Key National Wildlife Refuge Vegetation Management and Dune Retention; Enhanced Management of Avian Breeding Habitat Injured by Response Activities in the Florida Panhandle, Alabama, and Mississippi; Essex Bayou Habitat Restoration Engineering; Evaluation Framework for Marine Mammal and Sea Turtle Restoration; Grand Bay Land Acquisition and Habitat Management; Graveline Bay Land Acquisition and Management; Gulf Islands National Seashore (Florida) Night Sky Restoration (Planning and Design); Gulf Islands National Seashore Ferry Project; Gulf of Mexico Sea Turtle Atlas; Gulf-wide Status of Nesting Sea Turtles and Beaches Data Inventory; Improve Native Habitat by Removing Marine Debris from Mississippi Barrier Islands; Improving Habitat Injured by Spill Response: Restoring the Night Sky; Informing Gulf Sturgeon Population Status and Trends as a Baseline to Evaluate Restoration; Invasive Plant Removal at Gulf Islands National Seashore; Johnson Beach Access Management and Habitat Protection; Jones Bay Oystercatcher Habitat Restoration; Juvenile Gulf Sturgeon - Gulf-wide Population Dynamics and Habitat Use; LA TIG-Lower Trophic Level Inventory; Laguna Atascosa Habitat Acquisition; Laguna Vista Rookery Island Habitat Protection; Lake Borgne Marsh Creation Project: Increment One; Large Scale Barataria Marsh Creation – Upper Barataria Component; Little Lagoon Living Shoreline; Louisiana Colonial Waterbird Aerial Photographic Surveys; Louisiana Interactive Lessons Learned Database; Louisiana Outer Coast Restoration; Lower Suwannee National Wildlife Refuge Hydrologic Restoration - Planning and Design; McFaddin Beach and Dune Restoration; Mesophotic and Deep Benthic Communities - Active Management and Protection; Mesophotic and Deep Benthic Communities - Coral Propagation Technique Development; Mesophotic and Deep Benthic Communities - Habitat Assessment and Evaluation; Mesophotic and Deep Benthic Communities - Mapping, Ground-truthing, and Predictive Habitat Modeling; Mid-Coast Habitat Acquisition; Modeling to Inform Sustainable Oyster Populations in Louisiana Estuaries; Monitoring the Effects of Coastal Wetland Restoration on Fish and Invertebrates; Pensacola Beach Fort Pickens Road Wildlife Lighting Retrofits; Perdido Key Sediment Placement; Quantifying Changes in Wetland Area and Habitat Types; Quantifying Restoration Impacts On Wetland Ecosystem Health and Carbon Export; Rattlesnake Bluff Road and Riverbank Restoration; Recreational Use Improvements at Barataria Preserve in Jefferson Parish - Jean Lafitte National Historic Park; Reducing Marine Debris Impacts on Birds and Sea Turtles; Rehabilitation of Okaloosa Unit Recreational Facilities at Gulf Islands	Geology and substrates; Hydrology and water quality; Habitats; Marine and estuarine fauna; Terrestrial wildlife; Protected species; EFH; Land and marine management; Fisheries and aquaculture.

Action Description	Key Resource Areas and Potential for Adverse Cumulative Impacts
National Seashore; Restore and Enhance Sea Turtle Nest Productivity; Restoring the Night Sky—Assessment, Training, and Outreach (E&D); RW TIG - Colonial Waterbird Monitoring; Sea Turtle Early Restoration Project; Sea Turtle Habitat Use and Abundance in Eastern Louisiana Waters; Seabird Nesting Colony Protection and Enhancement at Dry Tortugas National Park; Seagrass Recovery Project at Gulf Islands National Seashore, Florida District; Shoreline Protection at Jean Lafitte National Historical Park and Preserve; Southwestern Coffee Island Habitat Restoration Project—Phase I (E&D); St. Vincent National Wildlife Refuge Predator Control; Stewardship of Coastal Alabama Beach Nesting Bird Habitat; Strategic Approach for Bird Restoration Evaluation; Texas Breeding Shorebird and Seabird Stewardship Project; Texas Rookery Islands; Vessel Surveys for Abundance and Distribution of Marine Mammals and Seabirds (NRDA); Alabama Barrier Island Restoration Assessment; Improving Sea Turtle Hatchling Survivorship through Long-Term Predation Management; Little Dauphin Island Restoration Assessment; Panhandle Dune Restoration; Wulfert Bayous Bird Nesting Habitat Restoration (NFWF)	
Bayou L'Ours Marsh Terracing; Island Road Marsh Terracing; Mississippi Wetlands Conservation Initiative I; Mississippi Wetlands Conservation Initiative II; Glaciated Wetlands and Prairies of North Dakota and Minnesota - Phase IV; Tom's Bayou; Long Term Conservation of Key Wetlands in the Alvarado Lagoon System 1A; Establishment of the Gulf of Mexico Private Wetlands Conservation Network - Phase I; Glaciated Wetlands and Prairies of North Dakota and Minnesota – V; Golden Meadow Marsh; Enhancement of Habitat for Waterfowl in Northern Yucatan Peninsula; Allan/Dana Hills Landscape; Nicolet Marsh Restoration; Massettes Marsh Enhancement; Touchwood Hills/Conjuring Creek Landscape; Virden/Lightning Landscape; NCC Missouri Coteau, SK: Protecting Wetland and Upland Habitat; Atchafalaya River Basin I; Bayou Monnaie Marsh; Creole Marsh; MAV Wetlands Conservation I; Mid-Barataria Wetlands I; Lower Mississippi Delta Wetlands; Pine Pasture Wetlands Enhancement; White Acquisition - Salvador WMA; Rockefeller Refuge Unit 4 Wetlands Enhancement; Hydrological Restoration Of Key Wetland Habitats For Aquatic Migratory Birds; Atchafalaya River Basin II; Deep Lake Unit Marsh Enhancement; Phil's Cut Marsh Enhancement; Freshwater Bayou II; Live Oak Farm Bayou Sauvage Protection; Restoration & Enhancement of Freshwater Wetlands on the Coastal Plain of Tamaulipas: Rancho El Mezquite; Protection & Restoration in the Rio Bravo (Grande) Delta: Laguna Madre - Phase III; Enhancement of Wetlands for Habitat for Migratory Waterfowl on the Coastal Plain of Tamaulipas; Texas Gulf Coast XIII; Coastal Texas I; Restoration Of Freshwater Wetlands As Waterfowl Habitat: La Mezquitoza Ranch; Coastal Texas II; Follets Island; Enhancement of Freshwater Wetlands as Wintering Habitat for Waterfowl, Laguna Madre; Coastal Texas III; Central Flyway Migration Corridor; Texas Gulf Coast XI (NAWCA);	
A multiscale approach to understanding migratory land bird habitat use of functional stopover habitat types and management efforts; Fire Effects in Gulf of Mexico Marshes: Historical Perspectives, Management, and Monitoring of Mottled Ducks and Black and Yellow Rails; Assessment of coastal island restoration practices for the creation of brown pelican nesting habitat; Bahia Grande Coastal Corridor (BGCC) (Implementation); Gulf of Mexico Conservation Enhancement Grant Program; Restoration of Gulf of Mexico islands and beaches for wildlife: Reducing the uncertainty; Restoring coastal wetlands for shorebirds: Leveraging lessons learned to identify research priorities and strategies to maximize future success; Designing effective stewardship and post-restoration management plans through co-production to protect vulnerable Gulf of Mexico coastal birds; Gulf of Mexico Habitat Restoration via Conservation Corps Partnerships; Jean Lafitte Canal Backfilling; Plug Abandoned Oil and Gas Wells; Wind-Tidal Flat Restoration Pilot (RESTORE);	
Food Web Impacts of Deepwater Horizon Oil Spill on Coastal Alabama Waterfowl (GOMRI)	
Atlantic: Long Term Nesting Habitat Protection for Sea Turtles; Northeast Florida Coastal Predation Management; Northern Gannet Nesting Colony Restoration in Eastern Canada; Seabird Bycatch Reduction in Northeast U.S. and Atlantic Canada Fisheries (NRDA); Conservation of Shorebirds in the Gulf Region (NFWF)	
Caribbean: Invasive Goat Removal to Restore Seabird Nesting Habitat in St. Vincent and the Grenadines; Predator Removal and Seabird Nesting Colony Restoration at Mona Island; Seabird Nesting Colony Reestablishment and Protection at Desecheo National Wildlife Refuge (NRDA);	

Action Description	Key Resource Areas and Potential for Adverse Cumulative Impacts
Restoring Allen Cay for Shearwaters (NFWF)	
Military Operations	
The U.S. Air Force and U.S. Navy conduct military operations within federally designated areas for the purposes of personnel training, research, design, testing, and evaluation.	Geology and substrates; Hydrology and water quality; Habitats; Marine and estuarine fauna; EFH; Land and marine management; Fisheries and aquaculture.
Marine Transportation	
Marine Highway Corridors are used for port development; shipping and maritime services; and associated navigation, channel construction, and maintenance. Future actions are likely to occur along corridors or at ports as maritime traffic is expected to increase.	Hydrology and water quality; Habitats; Marine and estuarine fauna; EFH; Land and marine management; Fisheries and aquaculture.
Dredged Material Disposal	
Navigational channels, marinas, and other publicly used water bottoms are dredged as needed to maintain navigability. Dredged materials are either beneficially used as part of another project or deposited in a designated disposal location.	Geology and substrates; Hydrology and water quality; Habitats; Marine and estuarine fauna; Protected species; EFH; Land and marine management; Fisheries and aquaculture.
Marine Mineral Mining, Including Sand and Gravel Mining	
Oil and gas exploration and production and mining of minerals, gravel, and sand occurs on submerged marine lands offshore. Mining and extraction of these resources involves survey work, vessel operations, and other infrastructure in coastal and offshore areas.	Geology and substrates; Hydrology and water quality; Habitats; Marine and estuarine fauna; Protected species; EFH; Land and marine management; Fisheries and aquaculture.
Fisheries and Aquaculture	
Federal and state agencies are responsible for regulating recreational and commercial fishing as well as aquaculture activities within state and U.S. waters. Agencies provides licenses and permits; lease coastal submerged land for aquaculture; set catch limits, quotas, and seasons; regulate harvest and processing; and provide technical assistance.	Geology and substrates; Hydrology and water quality; Habitats; Marine and estuarine fauna; Protected species; EFH; Land and marine management; Fisheries and aquaculture.
Tourism and Recreation	
Examples include upgrades to boat ramps, improved access to fishing, and construction of artificial reefs.	Geology and substrates; Habitats; Terrestrial wildlife; Protected species; EFH; Land and marine management.
Coastal Development and Land Use	
Examples of coastal development activities include commercial, residential, and other development; roadway maintenance and improvement; structural and nonstructural risk reduction projects; marsh creation; sediment diversions; and hydrologic and ridge restoration.	Geology and substrates; Hydrology and water quality; Habitats; Marine and estuarine fauna; Terrestrial wildlife; Protected species; EFH; Land and marine management; Fisheries and aquaculture.

A.8 Comparison of Alternatives

The environmental analysis demonstrated that there would primarily be minor, but also some moderate, short-term adverse impacts as well as environmental benefits from implementation of the RP4/EA alternatives. In general, implementation of the RP4/EA alternatives would result in short-term, minor-to-moderate adverse impacts to physical resources including geology and substrates, air quality, and hydrology and water quality. There would be no long-term adverse impacts to physical resources. Some of the RP4/EA alternatives would result in benefits to geology and substrates and hydrology and water quality by addressing sources of anthropogenic impacts on terrestrial sediments and coastal and nearshore waters.

Biological resources would primarily experience short-term, minor-to-moderate adverse impacts from human- and construction-related disturbance (e.g., foot traffic, human presence) associated with project implementation (e.g., structure demolition, in-situ studies or alternative fishing gear use). No alternatives would have long-term adverse impacts on biological resources. 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 Section 6.15 and Appendix 6.A of the PDARP/PEIS (DWH Trustees, 2016). Biological resources would experience long-term benefits from improved habitat quality and the application of more selective fishing gear and methods.

Lastly, for socioeconomic resources, the RP4/EA alternatives would result in some short- or long-term, negligible-to-minor adverse impacts to socioeconomic sand aesthetics and visual resources. All projects in this RP4/EA would result in short- and long-term benefits to socioeconomic resources (in particular, socioeconomics, land and marine management, tourism and recreation, fisheries and aquaculture, aesthetics and visual resources, and public health and safety).

The No Action Alternatives are anticipated to result in long-term, minor-to-major adverse impacts. A summary of impacts for each restoration alternative and the No Action Alternatives is provided in Table A-4.

Table A-4 Summary of the Direct and Indirect Impacts of the Reasonable Range of Restoration Alternatives

Project	Geology and Substrates	Hydrology and Water Quality	Air Quality	Noise	Habitats	Wildlife Species	Marine and Estuarine Fauna	Protected Species	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
FWCI Restoration Type																	
No Action - FWCI	NE	NE	NE	NE	I	L	L	L	L	NE	NE	NE	NE	L	NE	NE	NE
FWCI1, Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries) (preferred)	NE	s	s	s	s,+	s,+	s,+	s,+	+	NE	NE	+	+	+	NE	+	+
FWCI2, Next Generation Fishing (preferred)	NE	s	s	s	NE	s,+	s,+	s,+	+	NE	NE	+	+	+	NE	+	+
FWCI3, Communication Networks and Mapping Tools to Reduce Fish Mortality (preferred)	NE	s	s	s	NE	s,+	s,+	s,+	+	NE	NE	+	+	+	NE	+	+
FWCI4, Reduction of Diverse Threats to Fish and Water Column Invertebrates (preferred)	s,+	s,+	s	s	s,+	s,+	s,+	s,+	+	NE	NE	+	+	+	NE	+	+
FWCI5, Education and Stewardship Partnerships with Charter Anglers (preferred)	+	+	NE	NE	+	+	+	+	+	NE	NE	+	+	+	NE	+	+
FWCI6, Communication, Adaptive Management, Planning, and Integration (preferred)	NE	s	s	s	NE	s,+	s,+	s,+	+	NE	NE	+	+	+	NE	+	+
FWCI7, Reducing Fish Mortality from Depredation (non-preferred)	NE	s	s	s	s,+	s,+	s,+	s,+	+	NE	NE	+	+	+	NE	+	+
ST Restoration Type																	
No Action – ST	I	NE	NE	NE	I	L	L	**L**	NE	NE	NE	I	I	I	NE	I	I

Project	Geology and Substrates	Hydrology and Water Quality	Air Quality	Noise	Habitats	Wildlife Species	Marine and Estuarine Fauna	Protected Species	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
ST1, Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles) (preferred)	s,+	s	s	s	S,+	S,+	+	S,+	l,+	NE	NE	+	+	NE	NE	s,+	+
ST2, Gulf-Wide Sea Turtle Bycatch Reduction (preferred)	s	NE	s	s	NE	NE	NE	+	NE	NE	NE	NE	+	+	NE	+	NE
ST3, Gulf-Wide Sea Turtle Vessel Strike Reduction (preferred)	NE	NE	s	s	NE	s	s	s,+	NE	NE	NE	NE	+	NE	NE	+	+
ST4, Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements (preferred)	s	s	s	s	s	s	s	S,+	+	NE	NE	NE	+	NE	NE	s,+	NE
ST5, Kemp's Ridley Nesting Enhancement in Mexico (non-preferred)	S	s	s	s	S,+	S,+	NE	S,+	+	NE	NE	+	+	NE	NE	s,+	+

+ 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

Appendix B. Literature Cited

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Appendix C. Project Monitoring and Adaptive Management Plans

Monitoring and adaptive management (MAM) plans for each of the preferred alternatives are provided below. Two of these plans, *Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Gulf of Mexico Reef Fish Recreational Fisheries)* and *Sea Turtle Nesting Habitat Protection Expansion in Florida (Long Term Nesting Habitat Protection for Sea Turtles)*, are revised versions of existing MAM plans to reflect the new components of existing projects proposed in this RP4/EA.

Return 'Em Right: Species and Area Expansion (Reduction of Postrelease Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries)

Prepared by: The National Oceanic and Atmospheric Administration (NOAA) and IEc

Draft Version Date: 10/6/2024

Introduction

This monitoring and adaptive management (MAM) plan follows guidance provided in the Final Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement (PDARP/PEIS; Deepwater Horizon [DWH] Natural Resource Damage Assessment [NRDA] Trustees, 2016) and the Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1 (MAM Manual; DWH NRDA Trustees, 2024) by identifying the monitoring needed to evaluate progress toward meeting project objectives and to support any necessary adaptive management of the project. Where applicable, it identifies key sources of uncertainty and incorporates monitoring data and decision points that address these uncertainties. As not all projects would have the same sources and degrees of uncertainty, this project-specific MAM plan is scaled according to the level of uncertainty, scope, scale, and Restoration Type associated with this project.

This plan was originally developed for the Open Ocean Trustee Implementation Group ("Open Ocean TIG") Final Restoration Plan/Environmental Assessment 2 project *Reduction of Postrelease Mortality from Barotrauma in the Gulf of Mexico Reef Fish Recreational Fisheries* in accordance with the MAM Manual Version 1.0 (DWH NRDA Trustees 2017), and was updated in September of 2024 to incorporate new information and details as a result of progress implementing the project and in accordance with Version 2.1 of the MAM Manual. This MAM Plan has been subsequently updated to incorporate new information and details for the *Return 'Em Right: Species and Area Expansion* component for the Open Ocean TIG Draft Restoration Plan 4/Environmental Assessment.

This plan is a living document and may be updated as needed to reflect changing conditions and/or new information. Any future revisions to this MAM plan would be made publicly available through the Data Integration Visualization Exploration and Reporting (DIVER) Explorer (www.diver.orr.noaa.gov) and accessible through the Trustees' website (www.gulfspillrestoration.noaa.gov).

Project Overview

This project aims to restore bottom-dwelling reef fish populations, as well as other species groups such as highly migratory species (HMS), coastal migratory pelagic species, and other species such as flounders, drums, and sea trout adversely affected by the DWH oil spill by reducing the mortality from regulatory discards, shark depredation, and catch-and-release fishing. Although fishing may be focused on catching and retaining fish, fish are also released for a variety of reasons such as season closures, bag limits being reached, or catching undersized fish. These fish are referred to as regulatory discards. A significant amount of mortality is associated with these discards and reducing this mortality would help restore populations. If the survivorship of released fish can be increased, then the survivors can contribute to the increase of a population. This project focuses on making recreational anglers aware of the problem, and providing the tools and education necessary for anglers to release fish in a way that improves survival.

The project is located across the Gulf of Mexico, the U.S. Atlantic, and Caribbean. Project activities include: (1) conducting outreach and education and distributing release gear; (2) monitoring gear use and progress toward use of best practices; (3) assessing the efficacy of best release practices and estimating post-release mortality; and (4) analyzing and distributing data to incorporate findings into programmatic

evaluations and educational programming, and to make results publicly available for interested parties. This project is intended to help restore reef fish, HMS, coastal migratory pelagic species, and other species such as flounders, drums, and sea trout injured by the DWH oil spill in the Gulf of Mexico, as well as populations in the U.S. Atlantic or Caribbean with connectivity to those Gulf of Mexico populations injured by the spill. This project may also provide enhanced recreation experiences.

The implementing agency is NOAA. Partner agencies include, but are not limited to, Fishery Management Councils, the Gulf States Marine Fisheries Commission, state fishery management partners in all five Gulf states, non-governmental organizations, and universities.

This project is being implemented as restoration for the DWH NRDA, consistent with the PDARP/PEIS.

- Programmatic goal: Replenish and protect living coastal and marine resources.
- Restoration type: Fish and Water Column Invertebrates (FWCI).
- Restoration approach: Reduce bycatch and post release mortality.
- Restoration technique: Reduce Post-Release Mortality of Red Snapper and Other Reef Fishes in the Gulf of Mexico Recreational Fishery Using Fish Descender Devices.[25]
- Trustee Implementation Group: Open Ocean TIG
- Restoration plan: Open Ocean TIG Restoration Plans 2 and 4.

Restoration Type Goals and Project Restoration Objectives

The overall goals for this Restoration Type relevant to this project, as identified in the PDARP, are to:

- Restore injured fish and invertebrate species across the range of coastal and oceanic zones by reducing direct sources of mortality.
- Increase the health of fisheries by providing fishing communities with methodologies and incentives to reduce impacts to fishery resources.

The specific restoration objectives for this project are to:

1. Provide tools (including appropriate hooks, tackle, landing tools, and descender devices) and training to Gulf of Mexico, U.S. Atlantic, and Caribbean recreational anglers and the angling community to reduce post-release mortality.
2. Measure use of tools (including appropriate hooks, tackle, landing tools, and descender devices), including prevalence and trends of use in the fishery.
3. Validate post-release mortality rates and effectiveness of best practices and tools (including appropriate hooks, tackle, landing tools, and descender devices) in a range of oceanographic conditions and across affected species.

Conceptual Setting

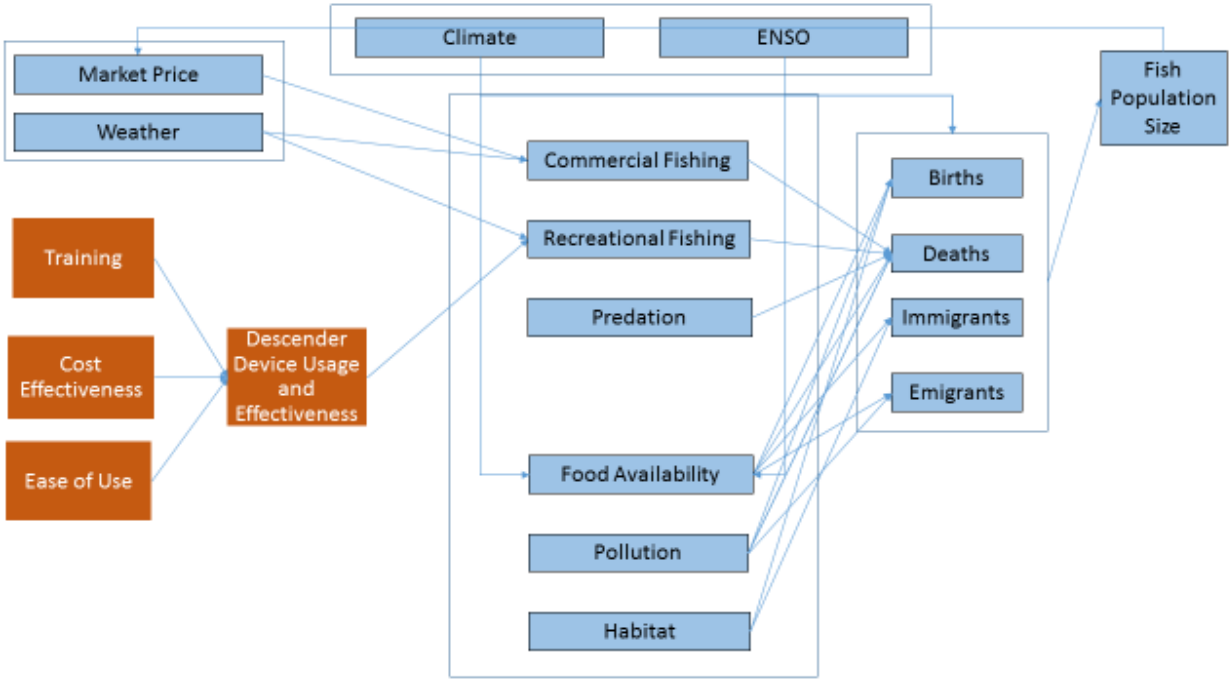
The conceptual setting identifies factors and interactions that may influence the project outcomes. This may include factors affecting whether the project is implemented as planned (e.g., the expected number of samples were obtained), cofactors that may have a significant effect on variance in the data, and factors that may alter the expected outcome of the restoration effort. Understanding the conceptual setting aids in

[25] This project expands beyond the scope of the Restoration Technique contained in the PDARP/PEIS, as it would apply to additional species (i.e., highly migratory species, coastal migratory pelagic species, other species such as flounders, drums, sea trout), and would conduct education and gear distribution for additional gear types (e.g., handling devices and other emerging fishing technologies).

adaptive management of the project, as well as future projects of a similar type by identifying some of these factors and providing the opportunity to anticipate their effects and plan for contingencies.

The influence diagram below (Figure 1) shows that use of appropriate hooks, tackle, landing tools, and descender devices affect fish populations through mortality rates. Usage of appropriate release tools and methods would depend upon training, cost effectiveness, and ease of use, and these factors may interact differently for the various types of recreational fishing boats (private, charter, headboat). For instance, using "fish elevator" type devices on headboats may be the only practical device given the volume of fish that could be caught. Besides recreational fishing, there are many factors influencing fish populations, including food availability, habitat, and predation. Large scale environmental drivers such as climate may affect all of these variables, and this must be kept in mind when assessing project performance.

Figure 1. Influence diagram for the descender device project



Potential Sources of Uncertainty

Potential sources of uncertainty are defined as those that may affect the ability of a project to achieve its restoration objectives. Sources of uncertainty, the degree of uncertainty, and the level of uncertainty associated with projects vary.

There are a number of potential sources of uncertainty that could affect project performance and success. Potential sources of uncertainty include:

- Potential fisheries management actions.
- Effects of large-scale environmental perturbations.
- Effectiveness of outreach actions.
- New technologies that influence monitoring and post-release methods.
- Willingness of institutions to add questions regarding post-release mortality to existing survey instruments.
- Identification of appropriate incentives to encourage behavior change.

- Ability to reach offshore recreational anglers with education/outreach strategies.
- Supply chain delays and/or manufacturing capacity issues to obtain appropriate hooks, tackle, landing tools, and descender devices/parts.

Project Monitoring, Performance Criteria, and Potential Corrective Actions

Performance monitoring is designed to determine if a project is meeting its restoration objective(s). Performance monitoring would also assist in determining the need for corrective actions and adaptive management. The proposed monitoring plan for this restoration project was developed to evaluate project performance, key uncertainties, and potential corrective actions, if needed. In addition to the performance monitoring parameters listed in Table 1, additional monitoring parameters/information may be reported to document project implementation progress. Examples of this type of additional information can be found in the Reporting section below.

Information on each monitoring parameter is provided below. The list of corrective actions provided below is not exhaustive; rather, it includes a list of potential actions to be considered if the project is not performing as expected once implemented. Other corrective actions may be identified post-implementation, as appropriate.

Restoration Objective 3, "Validate post-release mortality rates and the effectiveness of best practices and tools (including appropriate hooks, tackle, landing tools, and descender devices) in a range of oceanographic conditions and locations and across affected species", would involve monitoring (see Table 1 below) but would also be reported on during project implementation. For instance, MAM reports may document the type and amount of data collected during data-gathering efforts, the type of studies conducted to derive post-release mortality rates, and the utility of this data in determining the abundance of FWCI resources restored by project activities. MAM reports would assess data utility by documenting whether these release mortality studies improved understanding of priority topics related to barotrauma, including post-release mortality and depredation.

Table 1 Monitoring Parameters

Objective 1: Provide tools (including appropriate hooks, tackle, landing tools, and descender devices) and training to Gulf of Mexico, U.S. Atlantic, and Caribbean recreational anglers and the angling community to reduce post-release mortality.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Education or Outreach Effort (Materials Produced or Distributed by Type) *[number of for-hire and private recreational anglers that received release gear]* **completion of training is a pre-requisite to receive gear*	Performance Monitoring: Evaluate project performance by monitoring how many for-hire and private recreational anglers receive gear to reduce post-release mortality.	Completions and deliveries are tracked within the Return 'Em Right education module.	Annually	Training and gear are available to for-hire and private recreational offshore anglers that fish in the Gulf of Mexico, U.S. Atlantic, and Caribbean.	To be determined.	Develop alternative strategies and incentives to generate participation.
Education or Outreach Effort (Events Held or Attended) *[Number of outreach events where Return 'Em Right was represented. (events include opportunities for tabling/presenting info to anglers)]*	Additional Monitoring: Track how frequently Return 'Em Right is engaging with anglers in person.	Return 'Em Right team counts number of events.	Annually	Outreach events held throughout the Gulf of Mexico, U.S. Atlantic, and Caribbean.	To be determined.	Determine reasons why outreach event target was not achieved; identify solutions for the following year.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Education or Outreach Effort (Number of Recipients) *[Number of unique users on RER website]*	Additional Monitoring: Determine how many anglers are exposed to information on barotrauma and the opportunity to receive training and gear.	Return 'Em Right team tracks online.	Annually	All members of the public can access the website.	To be determined.	Modify the website's content; modify the program's advertising strategy.
Education or Outreach Effort (Number of Recipients) *[Social media reach/engagement (aggregated across platforms)]*	Additional Monitoring: Determine how many anglers are aware of the opportunity to receive training and gear to reduce post-release mortality.	Return 'Em Right team tracks on Sprout Social software.	Annually	All members of the public can access Return 'Em Right's social media posts.	To be determined.	Modify the project's content; adjust geo-targeting and promoted posts.
Education or Outreach Effort (Number of Participants or Organizations) *[Percent of anglers that support use of release tools or methods]*	Additional Monitoring: Measure the impact of the project's outreach and education efforts to inform anglers about release tools and methods and encourage their use.	Human dimensions survey.	Baseline survey with Follow-Up survey. Exact timing to be determined.	Survey participants are for-hire and private recreational anglers in the Gulf of Mexico, U.S. Atlantic, and Caribbean.	Statistically significant increase in positive perceptions release tools and methods.	Reevaluate outreach and education initiatives.

Objective 2: Measure use of tools (including appropriate hooks, tackle, landing tools, and descender devices), including prevalence and trends of use in the fishery.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Conservation Improvements (Number of Improvements Implemented by Activity) *[Number of private recreational trips, headboat trips, and charter for-hire trips using appropriate release tools or methods]*	Performance Monitoring: Evaluate project performance by measuring private angler, headboat captain, and for-hire captain use of release tools and methods.	For private anglers, State reef fish surveys and other analogous fisheries data for other species groups. For headboat captains, Southeast Regional Headboat Survey and other analogous headboat surveys. For charter for-hire, at-sea observer data and the Southeast For-hire Integrated Electronic Reporting Program, and other analogous reporting systems.	To be determined.	Anglers submitting information to state reef fish surveys, the Southeast Headboat Regional Survey, and the Southeast For-hire Integrated Electronic Reporting, as well as other analogous surveys and reporting systems for other species and geographic areas.	Increase of private recreational fishing trips, headboat fishing trips, and charter for-hire fishing trips using release tools and methods. Specific targets to be determined.	Reevaluate outreach and education initiatives.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Abundance, FWCI (Count by Taxon) *[Metric is derived from the following: a) # trips and # priority reef fish spp. released/trip/release method from above survey instruments; b) release mortality estimates from validation studies]*	Additional monitoring: Determine the number of fish not killed because of project.	Analyze survey data (Southeast Regional Headboat Survey, State reef fish surveys), at-sea observer data, and the revised mortality estimates.	To be determined.	Anglers submitting data through various survey instruments; anglers observed in at-sea observer trips.	N/A	N/A

Objective 3: Validate post-release mortality rates and the effectiveness of best practices and tools (including appropriate hooks, tackle, landing tools, and descender devices) in a range of oceanographic conditions and locations and across affected species.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Survival, FWCI (Survivorship Rate by Taxon) *[Fishery-wide post-release mortality rate derived from a) survey instruments; b) mortality validation studies]*	Additional monitoring: Determine the impact of the project on fish survival.	Analyze survey data (Southeast Regional Headboat Survey, State reef fish surveys), at-sea observer data and the revised mortality estimates.	Annually	N/A	N/A	N/A

Monitoring Schedule

Project monitoring would occur throughout project implementation. Table 2 identifies when during the project implementation cycle the parameters identified in Table 1 would be monitored.

Table 2 Monitoring Schedule

Monitoring Parameters	Pre-Implementation	Implementation	Post-Implementation
Education or Outreach Effort (Materials Produced or Distributed by Type)		X	
Education or Outreach Effort (Events Held or Attended)		X	
Education or Outreach Effort (Number of Recipients)		X	
Education or Outreach Effort (Number of Recipients)		X	
Education or Outreach Effort (Number of Participants or Organizations)	X	X	
Conservation Improvements (Number of Improvements Implemented by Activity)		X	
Abundance, FWCI (Count by Taxon)	X	X	
Survival, FWCI (Survivorship Rate by Taxon)	X	X	

Evaluation

Evaluation of project performance would be conducted to ensure the project is meeting the restoration objectives and inform the need for adaptive management or corrective actions. Specific analyses that would be conducted include:

Evaluation of Project Implementation and Outputs:

Project implementation would be evaluated annually and be based on factors such as:

- Education or Outreach Effort (Materials Produced or Distributed by Type): Number of gear packages distributed.
- Education or Outreach Effort (Events Held or Attended): Number of outreach events held throughout the Gulf of Mexico, U.S. Atlantic, and Caribbean.
- Education or Outreach Effort (Number of Recipients): Number of unique users on Return 'Em Right website.
- Education or Outreach Effort (Number of Recipients): Social media reach/engagement across aggregated platforms.
- Data Utility: Number of release mortality studies successfully completed.

Evaluation of Project Outcomes:

The Project would be evaluated as necessary based on factors such as:

- Education or Outreach Effort (Number of Participants or Organizations): Change in perception and attitudes towards post-release handling.
- Conservation Improvements (Number of Improvements Implemented by Activity): Change in prevalence of proper use of appropriate hooks, tackle, landing tools, and descender devices in the private recreational, headboat, and charter for-hire sectors.
- Abundance (FWCI Count by Taxon): Number of fish estimated to survive release because of the project.
- Survival, FWCI (Survivorship Rate by Taxon): Fishery-wide post-release mortality rate.

Adaptive Management

As discussed in the PDARP/PEIS, 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 with flexible decision-making, where adjustments are made to management approaches based on observed outcomes (NRC, 2004). Within the context of ecological restoration, adaptive management addresses key uncertainties by linking science to restoration decision-making (Steyer and Llewellyn, 2000; Thom et al., 2005). Performance may be evaluated in terms of implementation of the project plan, expected project outputs, or the ability of the project to achieve the desired restoration outcomes.

For this project, the principles of adaptive management would be applied in a number of areas and ways.

- Project would be initially implemented in a constrained geography and with a subset of recreational fishing sectors. The project would then be scaled up and broadened over time. This approach would allow Implementing Trustee to apply early lessons to subsequent phases.
- Information on angler sentiment collected through surveys would help to address training needs and knowledge gaps.
- Coordination and use of existing forums would allow Implementing Trustee to communicate with the angler community to get qualitative feedback on implementation.
- Project would be evaluated on an annual basis to determine if restoration targets are being achieved.

Evaluations of the MAM data are used to (1) determine whether the project, once implemented, has met its objectives, and (2) inform the need for potential corrective actions (see Table 1). The performance criteria and potential corrective actions described in Table 1 may be adjusted over time as the project is implemented.

Data Management

Data collection would occur on an ongoing basis across the Gulf of Mexico, U.S. Atlantic, and Caribbean. The data would be compiled within 18 to 24 months of collection.

To the extent practicable, all environmental and biological data generated during monitoring activities would be documented using standardized field datasheets.

All data would have proper metadata, including a data dictionary that defines codes and fields used in the dataset; a description of how data were collected; quality assurance (QA) and quality control (QC) procedures; detailed lineages for any data that are standardized, recoded, or otherwise transformed; and other information about the data such as meaning, relationships to other data, origin, usage, and format. Metadata for geospatial data would adhere to Federal Geographic Data Committee (FGDC) standards.

All collected data would undergo proper QA/QC protocols, following the process outlined in Section 3 of the MAM Manual Version 2.1. Specific QA/QC procedures would be described in a detailed data

management plan that would be available on request. Following QA/QC, NOAA will provide the other Open Ocean TIG members time to review the data before making the data publicly available.

This project would generate a wide variety of data, and would work with partners, including regional fisheries management bodies and state and federal observer programs to efficiently manage the data. Some data compiled and analyzed as part of this project would be managed using the DIVER Restoration Portal, and would be submitted to the portal no more than 2 years after the data are collected.

Data managed in other systems, e.g., recreational fishing data platforms and logbook platforms, would be accessible through a link maintained in the DIVER Restoration Portal.

Data would be made publicly available, in accordance with the Foundations for Evidence-Based Policymaking Act of 2018. Some of the data collected are protected from public disclosure under federal and state laws, including the Privacy Act and the Magnuson–Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and would only be publicly distributed in an aggregated form. In the event of a public records request related to data that are not already publicly available, the Trustee to whom the request is addressed would provide notice to the other Open Ocean TIG Trustees prior to releasing any project data that is the subject of the request.

Reporting

MAM activities would be reported in the DIVER Restoration Portal and updated annually to reflect the status of the MAM activities.

An interim monitoring report would be developed. The final monitoring report would be developed within 1 year of monitoring activities being concluded. To the extent practicable, the interim and final monitoring reports would follow the outline in the MAM Manual Version 2.1. These reports would be made publicly available through the DIVER Restoration Portal.

Annual reporting may include:

- A summary of project activities for the year, such as number of individuals educated and gear deployed or number of events held.
- Summarized monitoring data - synthesized data for all efforts during the year.
- Graphics, if applicable, and associated interpretations of the data.
- Comparisons of pre- and post-implementations conditions, as applicable.
- Any uncertainties with management actions.
- Potential data collection issues.
- Reporting on general MAM activities in the DIVER Restoration Portal on an annual basis.
- A Final MAM Report before a project is closed out.

Roles and Responsibilities

NOAA is the Implementing Trustee for this project and would be responsible for the management of all activities related to project monitoring and adaptive management in cooperation with the Open Ocean TIG.

MAM Plan Revision History

Version #	Revision Date	Changes Made	Reason for Change
3	October 2024	Project scope expanded to include additional reef fish species and geographies, as well as additional species management groups (HMS, coastal migratory pelagic species, and other species such as flounders, drums, and sea trout) and geographies (U.S. Atlantic and Caribbean). Scope of tools and methods also expanded beyond fish descender devices. Further revised organization and made minor editorial changes to improve consistency with Open Ocean RP4/EA MAM plans and incorporate guidance from the newly published MAM Manual Version 2.1.	New project component proposed in Open Ocean RP4/EA
2	June 2023	Updated to incorporate new information and details as a result of progress implementing the project, as well as revisions in accordance with Version 2.0 of the MAM Manual.	Alignment with project progress and updates to the MAM Manual
1	November 2019	Original MAM Plan published in Open Ocean RP2/EA	

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Next Generation Fishing

Prepared by: The National Oceanic and Atmospheric Administration (NOAA) and IEc

Draft Version Date: 8/14/2024

Introduction

This monitoring and adaptive management (MAM) plan follows guidance provided in the Final Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement (PDARP/PEIS; Deepwater Horizon [DWH] Natural Resource Damage Assessment [NRDA] Trustees, 2016) and the Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1 (MAM Manual; DWH NRDA Trustees, 2024) by identifying the monitoring needed to evaluate progress toward meeting project objectives and to support any necessary adaptive management of the project. Where applicable, it identifies key sources of uncertainty and incorporates monitoring data and decision points that address these uncertainties. As not all projects would have the same sources and degrees of uncertainty, this project-specific MAM plan is scaled according to the level of uncertainty, scope, scale, and Restoration Type associated with this project.

This plan is a living document and may be updated as needed to reflect changing conditions and/or new information. Any future revisions to this MAM plan would be made publicly available through the Data Integration Visualization Exploration and Reporting (DIVER) Explorer (www.diver.orr.noaa.gov) and accessible through the Trustees' website (www.gulfspillrestoration.noaa.gov).

Project Overview

This project would be implemented as restoration for the DWH oil spill NRDA, consistent with the PDARP/PEIS.

- Programmatic Goal: Replenish and Protect Living, Coastal, and Marine Resources
- Restoration Type: Fish and Water Column Invertebrates (FWCI)
- Restoration Approaches: Reduce mortality among highly migratory species and other oceanic fishes; Voluntary fisheries-related actions to increase fish biomass (PDARP/PEIS Appendix 5.D.3.2 and 5.D.3.5)
- Restoration Techniques: Emerging fishing technologies (PDARP/PEIS Appendix 5.D.3.5)

This restoration project would be implemented in the U.S. Gulf of Mexico, U.S. Caribbean Sea, and U.S. Atlantic Ocean; and potentially the Mexican Gulf of Mexico, the Caribbean, and Atlantic waters of Canada and northern South America. The project would seek to restore injured FWCI resources by implementing strategies in commercial fisheries to help fishing fleets adopt conservation techniques that reduce sources of mortality while also helping them adapt to changing conditions including climate change and globalization of fishing efforts. Restoration activities would include: (1) development of an implementation plan to conduct project activities, including workshops and engagement with interested parties; (2) conducting outreach and education to support the development of a "next generation" fishing fleet; (3) advancing the use of new gear, best practices, and techniques to reduce bycatch among the next generation of commercial fishers; and (4) supporting systems for collecting, analyzing, and sharing fishery-dependent data from the next generation fishing fleet. Educational training programs as part of education and outreach may be directed toward several entry points to the fishing industry (e.g., high school, community college, trade schools, industry associations events) and cover topics such as best practices for handling and releasing fish, identifying protected species, promoting entrepreneurship in the fishing industry, and navigating the regulatory system. To support new gear, technologies, and techniques, outreach and incentives would be used to engage fishing fleets in voluntary actions, including

fishery gear trials and demonstrations of how new gear, best practices, and techniques can reduce bycatch and fish mortality. Collected data would inform restoration efforts, fisheries science and management, and understanding of climate-induced changes to fisheries resources.

Restoration Type Goals and Project Restoration Objectives

The Restoration Type goals relevant to this project, as identified in the PDARP/PEIS, are:

- Restore injured fish and invertebrate species across the range of coastal and oceanic zones by reducing direct sources of mortality.
- Increase the health of fisheries by providing fishing communities with methodologies and incentives to reduce impacts to fishery resources.

The restoration objectives for this project are:

1. Conduct outreach and training to support the development and education of a "Next Generation" fishing fleet to reduce bycatch or prevent the increase of bycatch in commercial fishing fleets.
2. Provide outreach, education, enhanced fishing gear, and incentive programs to support the use of new gear, best practices, and techniques that would reduce bycatch in commercial fishing fleets.
3. Develop communications channels and data collection and distribution systems to collect, analyze, and share fishery-dependent data.

Performance criteria would be used to determine restoration success or the need for corrective action in accordance with 15 Code of Federal Regulations 900.55(b)(1)(vii). Specific, measurable performance criteria are defined, as applicable, for monitoring parameters associated with the restoration objectives in the Project Monitoring, Performance Criteria, and Potential Corrective Actions section below.

Conceptual Setting

The conceptual setting identifies factors and interactions that may influence the project outcomes. This may include factors affecting whether the project is implemented as planned (e.g., the expected number of samples were obtained), cofactors that may have a significant effect on variance in the data, and factors that may alter the expected outcome of the restoration effort. Understanding the conceptual setting would aid in adaptive management of the project, as well as future projects of a similar type by identifying some of these factors and providing the opportunity to anticipate their effects and plan for contingencies.

Bycatch and sources of fish mortality can be affected by several different factors. One such dynamic is the "local to global" shift in fishing effort, which is shifting seafood production toward global imports, which has been associated with higher rates of bycatch. This shift may be particularly impactful to highly migratory species (HMS), such as tunas, billfishes, and swordfish, which cross international boundaries and are managed internationally through a quota system. One cause of this shift in Gulf fisheries is the aging population structure of the current Gulf fishing fleet ("graying of the fleet"), by which aging Gulf fishers are retiring from the industry at a higher rate than they are replaced by new, young Gulf fishers. Instead, the catch formerly attributed to those aging fishers is replaced by international fisheries with higher rates of bycatch and post-release mortality than U.S-based fisheries. Climate change, an additional stressor, is expected to impact the distribution of fish species, including spawning and feeding grounds. To maintain catch levels, commercial fishing fleets may expend increased fishing effort over a wider area, which can result in higher rates of bycatch. Therefore, addressing these dynamics by developing strategies to reduce bycatch or prevent the increase of bycatch would protect and restore crucial FWCI resources injured by the DWH oil spill. To reduce or prevent the increase of bycatch, this project would provide fishing communities with methodologies and incentives to reduce impacts to fishery resources and support the development of a modern, conservation-minded fishing fleet equipped with modern and efficient gear, best practices, and techniques, and who are engaged in the fisheries management process.

Potential Sources of Uncertainty

Potential uncertainties may affect the likelihood that this project would be successful in achieving the project objective in a timely manner. Corrective actions may be necessary to address uncertainties and maximize project benefits. Potential sources of uncertainty include:

- Whether the project would be able to attract participants new to the fishing fleet and from within the existing fishing fleet.
- Whether practices would be successfully adopted by the commercial fishing fleet.
- What level of effort would be required to achieve fleet-wide reduction in bycatch and post-release mortality.
- What impact may arise from external factors that could affect participation, such as severe weather events or the market price for fish.

Project Monitoring, Performance Criteria, and Potential Corrective Actions

Performance monitoring is designed to determine if a project is meeting its restoration objective(s). Performance monitoring would also assist in determining the need for corrective actions and adaptive management. The proposed monitoring plan for this restoration project was developed to evaluate project performance, key uncertainties, and potential corrective actions, if needed. In addition to the performance monitoring parameters listed in Table 1, additional monitoring parameters/information may be reported on to document project implementation progress. Examples of this type of additional information can be found in the Reporting section below.

Information on each monitoring parameter is provided below. The list of corrective actions provided below is not exhaustive; rather, it includes a list of potential actions to be considered if the project is not performing as expected once implemented. Other corrective actions may be identified post-implementation, as appropriate.

Monitoring parameters for Objectives 1 and 2 are contained below in Table 1. Restoration Objective 3, "Develop communications channels and data collection and distribution systems to collect, analyze, and share fishery-dependent data," would not require monitoring and would instead be reported on during project implementation. For example, MAM reports may document the number, type, and use of any communications channels developed. MAM reports may also address the type and volume of data being collected, analyzed, and distributed across the communications network and how this data is used by the fleet. Additional information about project reporting can be found in the Reporting section below.

Table 1 Monitoring Parameters

Objective 1: Conduct outreach and training to support the development and education of a "Next Generation" fishing fleet to reduce bycatch or prevent the increase of bycatch in commercial fishing fleets.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Education or Outreach Effort (Events Held or Attended)	Document restoration actions.	Count the number and type of trainings within each fishery.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	N/A	N/A
Education or Outreach Effort (Number Educated)	Document restoration actions.	Count the number of participants in project programming (e.g., number attending trainings) within each fishery.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	To be determined.	Increase outreach efforts to draw participants and understand barriers to participation; adjust approaches as needed.
Bycatch, FWCI (Released Dead by Taxon)	Measure progress toward the restoration objective.	Calculate based upon observational studies and reports from fishery-dependent data.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	Reduce the total volume of bycatch and reduce mortality among remaining bycatch year over year for the lifetime of the project.	Increase education and outreach efforts to understand barriers to adoption of practices or gear; adjust approaches as needed.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Biomass, FWCI (Mortality Avoided by Taxon)	Measure progress toward the restoration objective.	Calculate based upon novel gear usage and its performance.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	Increase the biomass of surviving commercially caught fish (i.e., increase the biomass of avoided mortality year over year over the lifetime of the project).	Increase education and outreach efforts to understand barriers to adoption or improvements to gear; adjust approaches as needed.

Objective 2: Provide outreach, education, enhanced fishing gear, and incentive programs to support the use of new gear, best practices, and techniques that would reduce bycatch in commercial fishing fleets.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Conservation Improvements, FWCI (Agreements Executed by Activity)	Document restoration actions.	Count the number and type of agreements executed with partners by activity.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	N/A	N/A

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Equipment Enhancements, FWCI (Number Distributed or Deployed by Type)	Document restoration actions.	Count the number and type of gear distributed.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	Increase the amount of "Next Generation" gear distributed within the commercial fishery year over year over the lifetime of the project.	Increase education and outreach efforts to understand barriers to adoption; adjust approaches as needed.
Equipment Enhancements, FWCI (Number Used by Type)	Measure progress toward the restoration objective.	Calculate based upon self-reporting studies.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	Increase the amount of "Next Generation" gear used by fishers within the commercial fishery year over year over the lifetime of the project.	Increase education and outreach efforts to understand barriers to adoption; adjust approaches as needed.
Bycatch, FWCI (Released Dead by Taxon)	Measure progress toward the restoration objective.	Calculate based upon observational studies and reports from fishery-dependent data.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	Reduce the total volume of bycatch and reduce mortality among remaining bycatch year over year for the lifetime of the project.	Increase education and outreach efforts to understand barriers to adoption of practices or gear; adjust approaches as needed.
Biomass, FWCI (Mortality Avoided by Taxon)	Measure progress toward the restoration objective.	Calculate based upon novel gear usage and its performance.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	Increase the biomass of surviving commercially caught fish (i.e., increase avoided mortality) year over year over the lifetime of the project.	Increase education and outreach efforts to understand barriers to adoption or improvements to gear; adjust approaches as needed.

Monitoring Schedule

The schedule for project monitoring is shown in Table 2 by monitoring parameter.

Table 2 Monitoring Schedule

Monitoring Parameters	Pre-Implementation	Implementation	Post-Implementation
Education or Outreach Effort (Events Held or Attended)		X	
Education or Outreach Effort (Number Educated)		X	
Survival, FWCI (Survivorship Rate by Taxon)	X	X	
Biomass, FWCI (Mortality Avoided by Taxon)	X	X	
Conservation Improvements, FWCI (Agreements Executed by Activity)		X	
Equipment Enhancements, FWCI (Number Distributed or Deployed by Type)		X	
Equipment Enhancements, FWCI (Number Used by Type)		X	
Bycatch, FWCI (Released Dead by Taxon)	X	X	
Biomass, FWCI (Mortality Avoided by Taxon)	X	X	

Evaluation

Project monitoring data would be evaluated against baseline monitoring data collected by project partners. The Open Ocean Trustee Implementation Group ("Open Ocean TIG") anticipates evaluating project monitoring data (as described above) to help answer the following questions:

- Were outreach and education efforts able to reach target audiences to support the "Next Generation" commercial fishing fleet across all fisheries? If not, which fisheries were not engaged as effectively and why?
- Were target numbers of trainees reached? If not, why?
- Did rates of bycatch decrease over the lifetime of the project, and of remaining bycatch, was more released alive over the lifetime of the project? If not, why? Did some fisheries experience higher or lower rates of change than others?
- Was the project's restoration objective achieved? If not, is there a reason why it was not met?
- Did the project produce unanticipated results?
- Were there unanticipated events related to the project that potentially affected the monitoring results (e.g., fisheries closures)?
- Were any of the uncertainties identified prior to project implementation resolved?
- Were any new uncertainties identified?

Adaptive Management

The Open Ocean TIG anticipates utilizing adaptive management principles for this project to ensure project objectives are being met and allow for course adjustments if necessary to achieve project success. The Open Ocean TIG would identify corrective actions as necessary. This MAM Plan may be updated in the future to include additional details on adaptive management of this project.

This project would be implemented in an adaptive manner as education and outreach activities are conducted over time. The first phase of the project would involve engagement with interested parties, from subject matter experts and fisheries management councils to individuals within the fishing industry to apply knowledge and input from many levels to implementation planning. The project would also benefit from existing Open Ocean TIG knowledge of which outreach and training techniques have been most successful for the target audiences and which methods and gear would be most impactful to reduce mortality of FWCI resources. If monitoring criteria are not met, the Open Ocean TIG would identify and implement corrective actions as necessary to adjust outreach and educational approaches and attain restoration goals.

Data Management

Data Description

Data would be compiled within 12 months after collection. To the extent practicable, all environmental and biological data generated during monitoring activities would be documented using standardized field datasheets. If standardized datasheets are unavailable or not readily amendable to record project-specific data, then project-specific datasheets would be drafted prior to conducting any project monitoring activities. Original hardcopy datasheets and notebooks and photographs would be retained by NOAA.

Relevant project data that are handwritten on hardcopy datasheets or notebooks would be transcribed (entered) into standard digital format as per protocols. All field datasheets and notebook entries would be scanned to PDF files. Electronic data files would be named with the date on which the file was created and would include a ReadMe file that describes when the file was created and by whom, and any explanatory notes on the file contents. If a data file is revised, a new copy would be made and the original preserved.

All data would have properly documented Federal Geographic Data Committee/International Organization for Standardization (FGDC/ISO) metadata, a data dictionary (defines codes and fields used in the dataset), and/or a ReadMe file as appropriate (e.g., how data were collected, quality assurance/quality control [QA/QC] procedures, other information about data such as meaning, relationships to other data, origin, usage, and format).

Data Review and Clearance

After relevant project data are transcribed (entered) into standard digital format, electronic datasheets would be verified against the original hardcopy datasheets and/or notebooks and any corrections for transcription errors would be made as appropriate before data are used for any analyses or distributed. Implementing Trustees would verify and validate MAM data and information and would ensure that all data are: i) entered or converted into agreed on/commonly used digital format; ii) labeled with metadata following FGDC/ISO standards to the extent practicable and in accordance with NOAA requirements.

After all identified errors are addressed, data are considered to be QA/QC'ed. NOAA would give the other Open Ocean TIG members time to review the data before making such information publicly available (as described below). Before submitting the monitoring data and information package, co-Implementing Trustees shall confirm with one another that the package is approved for submission.

Data Storage and Accessibility

Once all data have been QA/QC'ed they would be submitted to the DIVER Restoration Portal. Trustees would provide DWH NRDA MAM data and information to the Restoration Portal as soon as possible and no more than 1 year from when data are collected.

Data Sharing

The monitoring data (if the data are not confidential or proprietary) and annual report would be made publicly available, in accordance with the Open, Public, Electronic and Necessary Government Data Act of 2019, through the DIVER Restoration Portal within 6 months of the end of each calendar year through project close-out.

Reporting

All reporting would occur annually. The data should be summarized in such a way that it is meaningful to the reader. Annual report may include:

- A summary of project activities for the year, such as number of trainings conducted, number of trainees, and the amount of gear distributed or deployed.
- Summarized monitoring data - synthesized data for all efforts during the year.
- Graphics, if applicable, and associated interpretations of the data.
- Comparisons of pre- and post-implementations conditions, as applicable.
- Any uncertainties with management actions.
- Potential data collection issues.
- Reporting on general MAM activities in the DIVER Restoration Portal on an annual basis.
- A Final MAM Report before a project is closed out.

Roles and Responsibilities

Monitoring data associated with this MAM plan would be collected, reviewed, and reported by NOAA.

References

DWH NRDA Trustees. 2016. *Deepwater Horizon* Oil Spill: Final Programmatic Damage Assessment and Restoration Plan (PDARP) and Final Programmatic Environmental Impact Statement (PEIS). Available: www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan

DWH NRDA Trustees. 2024. Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1. Appendix to the Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill. September. Available: https://www.fisheries.noaa.gov/s3//2024-09/DWH-NRDA-MAM-Manual-V2.1-Sept-2024.pdf

Communication Networks and Mapping Tools to Reduce Fish Mortality

Prepared by: The National Oceanic and Atmospheric Administration (NOAA) and IEc

Draft Version Date: 8/14/2024

Introduction

This monitoring and adaptive management (MAM) plan follows guidance provided in the Final Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement (PDARP/PEIS; Deepwater Horizon [DWH] Natural Resource Damage Assessment [NRDA] Trustees, 2016) and the Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1 (MAM Manual; DWH NRDA Trustees, 2024) by identifying the monitoring needed to evaluate progress toward meeting project objectives and to support any necessary adaptive management of the project. Where applicable, it identifies key sources of uncertainty and incorporates monitoring data and decision points that address these uncertainties. As not all projects would have the same sources and degrees of uncertainty, this project-specific MAM plan is scaled according to the level of uncertainty, scope, scale, and Restoration Type associated with this project.

This plan is a living document and may be updated as needed to reflect changing conditions and/or new information. Any future revisions to this MAM plan would be made publicly available through the Data Integration Visualization Exploration and Reporting (DIVER) Explorer (www.diver.orr.noaa.gov) and accessible through the Trustees' website (www.gulfspillrestoration.noaa.gov).

Project Overview

This project would be implemented as restoration for the DWH oil spill NRDA, consistent with the PDARP/PEIS.

- Programmatic Goal: Replenish and Protect Living, Coastal, and Marine Resources
- Restoration Type: Fish and Water Column Invertebrates (FWCI)
- Restoration Approaches: Voluntary fisheries-related management actions to increase fish biomass (PDARP/PEIS Appendix 5.D.3.5)
- Restoration Techniques: Emerging fishing technologies (PDARP/PEIS Appendix 5.D.3.5)

This restoration project would be implemented throughout the U.S. Gulf of Mexico to reduce sources of mortality for reef fish, HMS, and/or other high-priority fish species from bycatch, predation, and interactions with spawning aggregations by creating ecosystem models and communications networks for commercial fisheries. This project would build on the information gathered in the Open Ocean Trustee Implementation Group's ("Open Ocean TIG") Restoration Plan 2 and Environmental Assessment (RP2/EA) *Communication Networks and Mapping Tools to Reduce Bycatch – Phase I* project, which initiated the development of a bycatch hotspot identification system and communication network for commercial fisheries.

Restoration activities would include: (1) developing models for use in restoration planning and monitoring efforts for injured FWCI populations; (2) identifying and conserving spawning aggregation sites for FWCI populations; (3) enhancing at-sea observer coverage for the commercial reef fish fishery to gather data and monitor restoration project effectiveness in coordination with the Fish CAMPAIGN project (see FWCI6); and (4) developing bycatch communication networks to allow commercial and charter vessels to communicate data that would produce models of bycatch and depredation probability.

The Implementing Trustee of this project is NOAA, in coordination with private contractors, universities and research institutions, regional management bodies, and non-governmental organizations. Local fishing associations and licensed and permitted commercial and recreational anglers may also participate as project partners.

Restoration Type Goals and Project Restoration Objectives

The Restoration Type goals relevant to this project, as identified in the PDARP/PEIS, are:

- Restore injured fish and invertebrate species across the range of coastal and oceanic zones by reducing direct sources of mortality.
- Increase the health of fisheries by providing fishing communities with methodologies and incentives to reduce impacts to fishery resources.

The restoration objectives for this project are:

1. Develop ecosystem models to guide restoration and monitoring efforts for priority species.
2. Collaborate with the fishing community to identify spawning aggregations and develop a conservation strategy containing co-produced recommendations for voluntary measures and/or actions.
3. Reduce bycatch and depredation interactions by developing and implementing communication networks for commercial and charter vessels to enhance data collection and model sharing.

Performance criteria would be used to determine restoration success or the need for corrective action in accordance with 15 Code of Federal Regulations 900.55(b)(1)(vii). Specific, measurable performance criteria are defined, as applicable, for monitoring parameters associated with the restoration objectives in the "Project Monitoring, Performance Criteria, and Potential Corrective Actions" section below.

Conceptual Setting

The conceptual setting identifies factors and interactions that may influence the project outcomes. This may include factors affecting whether the project is implemented as planned (e.g., the expected number of samples were obtained), cofactors that may have a significant effect on variance in the data, and factors that may alter the expected outcome of the restoration effort. Understanding the conceptual setting would aid in adaptive management of the project, as well as future projects of a similar type by identifying some of these factors and providing the opportunity to anticipate their effects and plan for contingencies.

Unintended outcomes of fishing activities, including disruption of fish spawning aggregations or fish mortality from bycatch or depredation, may have undesired biological consequences and delay the recovery of species injured by the DWH oil spill. Creating and enhancing systems of data gathering, analysis, and information sharing would enable fishing effort to be directed to areas with higher probability of target catch, and lower probability of unwanted fisheries interactions with bycatch and predators. Additionally, working with commercial fisheries to co-produce strategies to improve in conservation and management of spawning aggregations is crucial to ensure the recovery of these species. Through the data gathering, information sharing, and strategy-building activities in this project, commercial fishing fleets may improve the economic efficiency of fishing effort while simultaneously protecting and improving Gulf fish populations.

Potential Sources of Uncertainty

Potential uncertainties may affect the likelihood that this project would be successful in achieving the project objective in a timely manner. Corrective actions may be necessary to address uncertainties and maximize project benefits. Potential sources of uncertainty include:

- Whether the program would be able to attract participants for the proposed data networks within the proposed fisheries.
- What the potential costs of proposed voluntary measures or management actions to protect spawning aggregations may be.
- Whether the models generated by the project would be of sufficient resolution and accuracy to predict bycatch and depredation rates or identify spawning aggregations.
- Whether participants would effectively utilize information generated by communications networks to avoid spawning aggregations or areas of high bycatch.
- What barrier to entry may exist that would reduce participation in communications networks or conservation strategy development.

Project Monitoring, Performance Criteria, and Potential Corrective Actions

Performance monitoring is designed to determine if a project is meeting its restoration objective(s). Performance monitoring would also assist in determining the need for corrective actions and adaptive management. The proposed monitoring plan for this restoration project was developed to evaluate project performance, key uncertainties, and potential corrective actions, if needed. In addition to the performance monitoring parameters listed in Table 1, additional monitoring parameters/information may be reported to document project implementation progress. Examples of this type of additional information can be found in the Reporting section below.

Information on each monitoring parameter is provided below. The list of corrective actions provided below is not exhaustive; rather, it includes a list of potential actions to be considered if the project is not performing as expected once implemented. Other corrective actions may be identified post-implementation, as appropriate.

The Restoration Objectives for this project all would involve monitoring (see Table 1 below) but would also be reported on during project implementation. For instance, MAM reports may document:

- The type and amount of data collected during data-gathering efforts and how this data is used to inform model development.
- The process and outcome of identifying spawning aggregations and developing a conservation strategy, including what type of data and which models were considered and how these results were incorporated into the development of measures for implementation.
- The development and use of communications networks, what data is collected and shared, and how this data is used by participants.

Restoration Objective 1, "Develop ecosystem models to guide restoration and monitoring efforts for priority species" would not require monitoring and would instead be reported on during project implementation. MAM reports may describe the approaches and progress with model development, how these models are analyzed and distributed across the communications network, and how this data is being used by the fleet.

Table 1 Monitoring Parameters

Objective 2: Collaborate with the fishing community to identify spawning aggregations and develop a conservation strategy containing co-produced recommendations for voluntary measures and/or actions.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Conservation Effort, FWCI (Number of Participants or Organizations)	Document restoration actions.	Count the number of participants and/or participating organizations in the identification of spawning aggregations and conservation strategy development.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	To be determined.	To be determined.
Conservation Improvements, FWCI (Agreements Executed by Activity)	Document restoration actions.	Count the number of agreements executed for the implementation of voluntary measures designed to protect of spawning aggregations.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	To be determined.	To be determined.
Education or Outreach Effort (Number Educated)	Document restoration actions.	Count the number of individuals educated on voluntary conservation measures for spawning aggregations.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	To be determined.	To be determined.

Objective 3: Reduce bycatch and depredation interactions by developing and implementing communication networks for commercial and charter vessels to enhance data collection and model sharing.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Conservation Effort, FWCI (Number of Participants or Organizations)	Document restoration actions.	Count the number of vessels in each communication network.	Annually.	All vessels within all communication networks developed.	Maintain or increase count of vessels participating in each network year over year for the project duration.	Assess barriers to adoption of the communication network and its data; adjust approaches as needed.
Bycatch, FWCI (Released Dead by Taxon)	Measure progress toward the restoration objective.	Calculate based upon observational studies and reports from fishery-dependent data.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	Reduce the total volume of bycatch and reduce mortality among remaining bycatch year over year for the lifetime of the project.	Assess barriers to adoption of the communication network and its data; adjust approaches as needed.
Biomass, FWCI (Mortality Avoided by Taxon)	Measure progress toward the restoration objective.	Calculate based upon communication network participation and reported bycatch rates.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	Increase the biomass of surviving caught fish (i.e., increase avoided mortality) year over year over the lifetime of the project.	Assess barriers to adoption of the communication network and its data; adjust approaches as needed.

Monitoring Schedule

The schedule for project monitoring is shown in Table 2 by monitoring parameter.

Table 2 Monitoring Schedule

Monitoring Parameters	Pre-Implementation	Implementation	Post-Implementation
Conservation Improvements, FWCI (Number of Improvements Implemented by Activity)		X	
Conservation Effort, FWCI (Number of Participants or Organizations)		X	
Conservation Improvements, FWCI (Agreements Executed by Activity)		X	
Education or Outreach Effort (Number Educated)		X	
Conservation Effort, FWCI (Number of Participants or Organizations)		X	
Bycatch, FWCI (Released Dead by Taxon)	X	X	
Biomass, FWCI (Mortality Avoided by Taxon)	X	X	

Evaluation

Project monitoring data would be evaluated against baseline monitoring data collected by project partners. The Open Ocean TIG anticipates evaluating project monitoring data (as described above) to help answer the following questions:

- Were data gathering and observer coverage successful in supporting project goals?
- Were population models able to be developed with the data gathered, and for which priority species? Were there species that did not generate sufficient data for modeling?
- How effective were models at predicting species distribution and bycatch rates? What improvements were made to these models to improve accuracy?
- Were communications networks successfully developed to enable data collection and sharing in a timely fashion among the different fisheries? Did certain fisheries adopt the communications networks more readily than others, or were there differences in how the fisheries used these networks?
- Were the project's restoration objectives achieved? If not, why?
- Did the project produce unanticipated results?
- Were there unanticipated events related to the project that potentially affected the monitoring results (e.g., hurricanes)?
- Were any of the uncertainties identified prior to project implementation resolved?
- Were any new uncertainties identified?

Adaptive Management

The Open Ocean TIG anticipates utilizing adaptive management principles for this project to ensure project objectives are being met and allow for course adjustments if necessary to achieve project success.

The Open Ocean TIG would identify corrective actions as necessary. This MAM Plan may be updated in the future to include additional details on adaptive management of this project.

This project would be implemented in an adaptive manner as data gathering, model and communications network development, and development and implementation of voluntary measures to conserve spawning aggregations would be implemented over time. As noted above, there is uncertainty regarding the potential to attract participants to communications networks and the ability of the models and data produced from this project to influence fishing behavior or locations. However, these uncertainties are expected to be lessened by the collaborative nature of these project activities. Information on spawning aggregations and bycatch would be collected in collaboration with commercial fishing fleets, and voluntary conservation measures to conserve spawning aggregations would be co-developed with interested parties. Development and pilot testing of communications networks with small groups of participants within select fisheries is intended to understand and improve such tools before they would be implemented at scale, improving likelihood of success. If monitoring criteria are not met, the Open Ocean TIG would identify and implement corrective actions as necessary to attain restoration goals.

Data Management

Data Description

Data would be compiled within 12 months after collection. To the extent practicable, all environmental and biological data generated during monitoring activities would be documented using standardized field datasheets. If standardized datasheets are unavailable or not readily amendable to record project-specific data, then project-specific datasheets would be drafted prior to conducting any project monitoring activities. Original hardcopy datasheets and notebooks and photographs would be retained by NOAA.

Relevant project data that are handwritten on hardcopy datasheets or notebooks would be transcribed (entered) into standard digital format as per protocols. All field datasheets and notebook entries would be scanned to PDF files. Electronic data files would be named with the date on which the file was created and would include a ReadMe file that describes when the file was created and by whom, and any explanatory notes on the file contents. If a data file is revised, a new copy would be made and the original preserved.

All data would have properly documented Federal Geographic Data Committee/International Organization for Standardization (FGDC/ISO) metadata, a data dictionary (defines codes and fields used in the dataset), and/or a ReadMe file as appropriate (e.g., how data were collected, quality assurance/quality control [QA/QC] procedures, other information about data such as meaning, relationships to other data, origin, usage, and format).

Data Review and Clearance

After relevant project data are transcribed (entered) into standard digital format, electronic datasheets would be verified against the original hardcopy datasheets and/or notebooks and any corrections for transcription errors would be made as appropriate before data are used for any analyses or distributed. Implementing Trustees would verify and validate MAM data and information and would ensure that all data are: i) entered or converted into agreed on/commonly used digital format; ii) labeled with metadata following FGDC/ISO standards to the extent practicable and in accordance with NOAA requirements.

After all identified errors are addressed, data are considered to be QA/QC'ed. NOAA would give the other Open Ocean TIG members time to review the data before making such information publicly available (as described below). Before submitting the monitoring data and information package, co-Implementing Trustees shall confirm with one another that the package is approved for submission.

Data Storage and Accessibility

Once all data have been QA/QC'ed they would be submitted to the DIVER Restoration Portal. Trustees would provide DWH NRDA MAM data and information to the Restoration Portal as soon as possible and no more than 1 year from when data are collected.

Data Sharing

The monitoring data (if not proprietary or confidential) and annual report would be made publicly available, in accordance with the Open, Public, Electronic and Necessary Government Data Act of 2019, through the DIVER Restoration Portal within 6 months of the end of each calendar year through project close-out.

Reporting

All reporting would occur annually. The data should be summarized in such a way that it is meaningful to the reader. Reports may include:

- A summary of project activities for the year, such as number of observer sea days, model performance, number of participants in voluntary spawning aggregation conservation measures, and number of participants in communication networks.
- Summarized monitoring data - synthesized data for all efforts during the year.
- Graphics, if applicable, and associated interpretations of the data.
- Comparisons of pre- and post-implementations conditions, as applicable.
- Any uncertainties with management actions.
- Potential data collection issues.
- Reporting on general MAM activities in the DIVER Restoration Portal on an annual basis.
- Developing a Final MAM Report before a project is closed out.

Roles and Responsibilities

Monitoring data associated with this MAM plan would be collected, reviewed, and reported by NOAA.

References

DWH NRDA Trustees. 2016. *Deepwater Horizon* Oil Spill: Final Programmatic Damage Assessment and Restoration Plan (PDARP) and Final Programmatic Environmental Impact Statement (PEIS). Available: www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan

DWH NRDA Trustees. 2024. Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1. Appendix to the Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill. September. Available: https://www.fisheries.noaa.gov/s3//2024-09/DWH-NRDA-MAM-Manual-V2.1-Sept-2024.pdf

Reduction of Diverse Threats to Fish and Water Column Invertebrates

Prepared by: The National Oceanic and Atmospheric Administration (NOAA) and IEc

Draft Version Date: 8/14/2024

Introduction

This monitoring and adaptive management (MAM) plan follows guidance provided in the Final Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement (PDARP/PEIS; Deepwater Horizon [DWH] Natural Resource Damage Assessment [NRDA] Trustees, 2016) and the MAM Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1 (MAM Manual; DWH NRDA Trustees, 2024) by identifying the monitoring needed to evaluate progress toward meeting project objectives and to support any necessary adaptive management of the project. Where applicable, it identifies key sources of uncertainty and incorporates monitoring data and decision points that address these uncertainties. As not all projects would have the same sources and degrees of uncertainty, this project-specific MAM plan is scaled according to the level of uncertainty, scope, scale, and Restoration Type associated with this project.

This plan is a living document and may be updated as needed to reflect changing conditions and/or new information. Any future revisions to this MAM plan would be made publicly available through the Data Integration Visualization Exploration and Reporting (DIVER) Explorer (www.diver.orr.noaa.gov) and accessible through the Trustees' website (www.gulfspillrestoration.noaa.gov).

Project Overview

This project would be implemented as restoration for the DWH oil spill NRDA, consistent with the PDARP/PEIS.

- Programmatic Goal: Replenish and Protect Living, Coastal, and Marine Resources
- Restoration Type: Fish and Water Column Invertebrates (FWCI)
- Restoration Approaches: Reduce impacts of ghost fishing through gear conversion and/or removal of derelict fishing gear; Protect and conserve marine, coastal, estuarine, and riparian habitats; Reduce pollution and hydrologic degradation to coastal watersheds (PDARP/PEIS Appendix 5.D.3.1, 5.D.1.7, and 5.D.5.2)
- Restoration Techniques: Implement contract and volunteer removal programs to collect existing derelict fishing gear; Develop and implement management actions in conservation areas and/or restoration projects; Reduce pollution and hydrologic degradation to coastal watersheds (PDARP/PEIS Appendix 5.D.3.1, 5.D.1.7, and 5.D.2.2)

This restoration project would be implemented throughout the U.S. Gulf of Mexico to reduce mortality to billfish, drums and sea trout, jacks, forage fish, sea basses and groupers, snappers, tunas and mackerels, demersal species, crabs and lobsters, and water column invertebrates by reducing diverse threats such as marine debris, impaired water quality, and impacts from energy development and production to improve environmental conditions. Priority species that would primarily benefit include billfishes, drums and sea trout, jacks, forage fish, sea basses and groupers, snappers, tunas and mackerels, demersal species, crabs and lobsters, and water column invertebrates. Project activities would include: (1) Conducting planning to identify conservation strategies and target areas for implementation; and (2) Implementing a range of conservation activities, including (but not limited to) preventing and removing marine debris, reducing negative effects from changes in water quality, preventing and removing invasive aquatic species, and reducing negative effects from energy infrastructure exploration, operation, and/or decommissioning.

During the initial planning stage, this project would collaborate with Gulf communities, resource managers, and subject matter experts to identify and prioritize areas for restoration activity implementation that would provide the greatest benefit to marine fish and invertebrates (e.g. sensitive fisheries habitat, nursery areas, etc.). Restoration activities would implement a range of conservation activities to reduce sources of direct and indirect FWCI mortality. These activities may include conducting studies to characterize the effects of these threats on FWCI resources, developing strategies to address threats in priority areas, conducting outreach and education regarding these threats and encouraging voluntary measures to reduce them; and directly conducting activities within the environment, such as prevention or removal of marine debris or invasive aquatic species.

The lead Implementing Trustee of this project is NOAA in coordination with co-implementing trustees, DOI, USEPA, and USDA, regional fisheries management bodies, and non-governmental organizations.

Restoration Type Goals and Project Restoration Objectives

The Restoration Type goals relevant to this project, as identified in the PDARP/PEIS, are:

- Restore injured fish and invertebrate species across the range of coastal and oceanic zones by reducing direct sources of mortality.

The restoration objectives for this project are:

1. Collaborate with Gulf communities, resource managers, and subject matter experts to identify and prioritize areas for restoration that would provide the greatest benefit to marine fish and invertebrates.
2. Implement a range of conservation strategies to reduce risks and impacts from marine debris, changes in water quality, invasive species, and activities related to energy development in priority restoration areas.

Performance criteria would be used to determine restoration success or the need for corrective action in accordance with 15 Code of Federal Regulations 900.55(b)(1)(vii). Specific, measurable performance criteria are defined, as applicable, for monitoring parameters associated with the restoration objectives in the Project Monitoring, Performance Criteria, and Potential Corrective Actions section below.

Conceptual Setting

The conceptual setting identifies factors and interactions that may influence the project outcomes. This may include factors affecting whether the project is implemented as planned (e.g., the expected number of samples were obtained), cofactors that may have a significant effect on variance in the data, and factors that may alter the expected outcome of the restoration effort. Understanding the conceptual setting would aid in adaptive management of the project, as well as future projects of a similar type by identifying some of these factors and providing the opportunity to anticipate their effects and plan for contingencies.

Threats to the marine environment from marine debris, changes in water quality, invasive species, and energy-related development and production activities may place additional pressure on fish and invertebrate populations injured by the DWH oil spill. Marine debris may entangle or trap animals, be ingested by animals, or transport pollutants. Chronic water quality conditions may harm fish resources by causing illness or death. Invasive species like lionfish may outcompete native fish for prey and disrupt sensitive ecological relationships. Finally, energy development may cause physical and chemical disturbances to habitats, disruption of normal behaviors, stress, hearing loss, and illness to fish resources. This project would implement voluntary strategies to reduce the pressure from these threats on injured fish populations in the Gulf of Mexico.

Potential Sources of Uncertainty

Potential uncertainties may affect the likelihood that this project would be successful in achieving the project objective in a timely manner. Corrective actions may be necessary to address uncertainties and maximize project benefits. Potential sources of uncertainty include:

- The quantity by which mortality risk would be reduced from activities addressing marine debris, water quality, invasive species, and energy production activities.
- Whether events may occur that would confound project monitoring and outcomes, such as extreme weather events that may increase presence of marine debris or worsen water quality.

Project Monitoring, Performance Criteria, and Potential Corrective Actions

Performance monitoring is designed to determine if a project is meeting its restoration objective(s). Performance monitoring would also assist in determining the need for corrective actions and adaptive management. The proposed monitoring plan for this restoration project was developed to evaluate project performance, key uncertainties, and potential corrective actions, if needed. In addition to the performance monitoring parameters listed in Table 1, additional monitoring parameters/information may be reported on to document project implementation progress. Examples of this type of additional information can be found in the Reporting section below.

Information on each monitoring parameter is provided below. As this project would be implemented in a phased manner, with the restoration activities to be determined during Phase I planning, exact monitoring parameters for each activity would also be determined during Phase I planning. Therefore, the list of monitoring parameters is not exhaustive and may be expanded during planning as additional parameters become relevant. Similarly, the list of corrective actions provided below is not exhaustive; rather, it includes a list of potential actions to be considered if the project is not performing as expected once implemented. Other corrective actions may be identified post-implementation, as appropriate.

Restoration Objective 1, "Collaborate with Gulf communities, resource managers, and subject matter experts to identify and prioritize areas for restoration that would provide the greatest benefit to marine fish and invertebrates", would not require monitoring and would instead be reported on during project implementation. For example, MAM reporting related to Objective 1 may contain information such as the types of data collected and the methods used to identify priority locations and activities, and how these data are used for decision making to inform implementation in Objective 2. The monitoring parameters for Objective 2 are contained in Table 1 below. Additional information on project reporting may be found in the "Reporting" section below.

Table 1 Monitoring Parameters

Objective 2: Implement a range of conservation strategies to reduce risks and impacts from marine debris, changes in water quality, invasive species, and activities related to energy development in priority restoration areas.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Conservation Improvements, FWCI (Number Implemented by activity)	Document restoration actions.	Document the type (e.g., marine debris removal, invasive species removal) and location of implemented conservation improvements.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	To be determined.	To be determined.
Biomass, FWCI (Mortality Avoided by Taxon)	Measure progress toward restoration objective.	Calculate estimated biomass of FWCI resources enhanced.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	Decreased threat of mortality from direct sources as compared to conditions before implementation.	Assess potential causes of results; adjust approach as needed.

Monitoring Schedule

The schedule for project monitoring is shown in Table 2 by monitoring parameter.

Table 2 Monitoring Schedule

Monitoring Parameters	Pre-Implementation	Implementation	Post-Implementation
Conservation Improvements, FWCI (Number Implemented by activity)		X	
Biomass, FWCI (Mortality Avoided by Taxon)		X	

Evaluation

Project monitoring data would be evaluated against baseline monitoring data collected by project partners. The Open Ocean Trustee Implementation Group ("Open Ocean TIG") anticipates evaluating project monitoring data (as described above) to help answer the following questions:

- What improvements were implemented and to what effect?
- Was the project's restoration objective achieved? If not, is there a reason why it was not met?
- Did the project produce unanticipated results?
- Were there unanticipated events related to the project that potentially affected the monitoring results (e.g., hurricanes)?
- Were any of the uncertainties identified prior to project implementation resolved?
- Were any new uncertainties identified?

Adaptive Management

The Open Ocean TIG anticipates utilizing adaptive management principles for this project to ensure project objectives are being met and allow for course adjustments if necessary to achieve project success. The Open Ocean TIG would identify corrective actions as necessary. This MAM Plan may be updated in the future to include additional details on adaptive management of this project.

This project would be implemented in a phased manner, as the first phase of the project would involve extensive planning to identify specific locations for implementation and specific restoration activities that would be most impactful in these areas. If monitoring criteria are not met, the Open Ocean TIG would identify and implement corrective actions as necessary to adjust implementation approaches and attain restoration goals.

Data Management

Data Description

Data would be compiled within 12 months after collection. To the extent practicable, all environmental and biological data generated during monitoring activities would be documented using standardized field datasheets. If standardized datasheets are unavailable or not readily amendable to record project-specific data, then project-specific datasheets would be drafted prior to conducting any project monitoring activities. Original hardcopy datasheets and notebooks and photographs would be retained by NOAA.

Relevant project data that are handwritten on hardcopy datasheets or notebooks would be transcribed (entered) into standard digital format as per protocols. All field datasheets and notebook entries would be

scanned to PDF files. Electronic data files would be named with the date on which the file was created and would include a ReadMe file that describes when the file was created and by whom, and any explanatory notes on the file contents. If a data file is revised, a new copy would be made and the original preserved.

All data would have properly documented Federal Geographic Data Committee/International Organization for Standardization (FGDC/ISO) metadata, a data dictionary (defines codes and fields used in the dataset), and/or a ReadMe file as appropriate (e.g., how data were collected, quality assurance/quality control [QA/QC] procedures, other information about data such as meaning, relationships to other data, origin, usage, and format).

Data Review and Clearance

After relevant project data are transcribed (entered) into standard digital format, electronic datasheets would be verified against the original hardcopy datasheets and/or notebooks and any corrections for transcription errors would be made as appropriate before data are used for any analyses or distributed. Implementing Trustees would verify and validate MAM data and information and would ensure that all data are: i) entered or converted into agreed on/commonly used digital format; ii) labeled with metadata following FGDC/ISO standards to the extent practicable and in accordance with NOAA requirements.

After all identified errors are addressed, data are considered to be QA/QC'ed. NOAA would give the other Open Ocean TIG members time to review the data before making such information publicly available (as described below). Before submitting the monitoring data and information package, co-Implementing Trustees shall confirm with one another that the package is approved for submission.

Data Storage and Accessibility

Once all data have been QA/QC'ed they would be submitted to the DIVER Restoration Portal. Trustees would provide DWH NRDA MAM data and information to the Restoration Portal as soon as possible and no more than 1 year from when data are collected.

Data Sharing

The monitoring data and annual report would be made publicly available, in accordance with the Open, Public, Electronic and Necessary Government Data Act of 2019, through the DIVER Restoration Portal within 6 months of the end of each calendar year through project close-out.

Reporting

All reporting would occur annually. The data should be summarized in such a way that it is meaningful to the reader. Annual reports may include:

- A summary of project activities for the year, such as such as how many invasive species (e.g., lionfish) were removed in how many locations; how many water quality improvement activities were implemented and any resulting improvements in water quality; how many pounds and types of marine debris were removed by location; etc.
- Summarized monitoring data - synthesized data for all efforts during the year.
- Graphics, if applicable, and associated interpretations of the data.
- Comparisons of pre- and post-implementations conditions, as applicable.
- Any uncertainties with management actions.
- Potential data collection issues.
- Reporting on general MAM activities in the DIVER Restoration Portal on an annual basis.
- Developing a Final MAM Report before a project is closed out.

Roles and Responsibilities

Monitoring data associated with this MAM plan would be collected, reviewed, and reported by NOAA in cooperation with co-implementing trustees.

References

DWH NRDA Trustees. 2016. *Deepwater Horizon* Oil Spill: Final Programmatic Damage Assessment and Restoration Plan (PDARP) and Final Programmatic Environmental Impact Statement (PEIS). Available: www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan

DWH NRDA Trustees. 2024. Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1. Appendix to the Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill. September. Available: https://www.fisheries.noaa.gov/s3//2024-09/DWH-NRDA-MAM-Manual-V2.1-Sept-2024.pdf

Education and Stewardship Partnerships with Charter Anglers

Prepared by: The National Oceanic and Atmospheric Administration (NOAA) and IEc

Draft Version Date: 8/14/2024

Introduction

This monitoring and adaptive management (MAM) plan follows guidance provided in the Final Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement (PDARP/PEIS; Deepwater Horizon [DWH] Natural Resource Damage Assessment [NRDA] Trustees, 2016) and the Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1 (MAM Manual; DWH NRDA Trustees, 2024) by identifying the monitoring needed to evaluate progress toward meeting project objectives and to support any necessary adaptive management of the project. Where applicable, it identifies key sources of uncertainty and incorporates monitoring data and decision points that address these uncertainties. As not all projects would have the same sources and degrees of uncertainty, this project-specific MAM plan is scaled according to the level of uncertainty, scope, scale, and Restoration Type associated with this project.

This plan is a living document and may be updated as needed to reflect changing conditions and/or new information. Any future revisions to this MAM plan would be made publicly available through the Data Integration Visualization Exploration and Reporting (DIVER) Explorer (www.diver.orr.noaa.gov) and accessible through the Trustees' website (www.gulfspillrestoration.noaa.gov).

Project Overview

This project would be implemented as restoration for the DWH oil spill NRDA, consistent with the PDARP/PEIS.

- Programmatic Goal: Replenish and Protect Living, Coastal, and Marine Resources
- Restoration Type: Fish and Water Column Invertebrates (FWCI)
- Restoration Approaches: Voluntary fisheries-related actions to increase fish biomass (PDARP/PEIS Appendix 5.D.3.5)
- Restoration Techniques: Illegal, unregulated, unreported (IUU) fishing (PDARP/PEIS Appendix 5.D.3.5)

This restoration project would be implemented throughout the U.S. Gulf of Mexico to reduce sources of mortality for reef fish, highly migratory species (HMS), and other oceanic fishes by reducing illegal fishing charters and educating the public on the benefits of legally permitted charters. Restoration activities include: (1) developing an implementation and communications plan; and (2) conducting outreach and education to enhance awareness of illegal fishing activities and their negative impacts to fish stocks and to deter unpermitted charter fishing. Initial implementation planning would coordinate with existing restoration activities and partners to develop a roadmap for project implementation and management. Outreach and education activities may include signage, translated materials, public service announcement videos, working with partners to identify common issues or misinterpretations, and media campaigns. Assessments would be conducted to understand the effectiveness of these campaigns and evaluate rates of change in illegal fishing practices in order to improve outreach and education efforts.

The Implementing Trustee of this project is NOAA in coordination with other government agencies, NOAA's Office of Law Enforcement, local fishing associations, and licensed and federally permitted recreational anglers.

Restoration Type Goals and Project Restoration Objectives

The Restoration Type goals relevant to this project, as identified in the PDARP/PEIS, are:

- Restore injured fish and invertebrate species across the range of coastal and oceanic zones by reducing direct sources of mortality.
- Increase the health of fisheries by providing fishing communities with methodologies and incentives to reduce impacts to fishery resources.

The restoration objectives for this project are:

1. Evaluate rates of change of illegal charter fishing activities in the Gulf of Mexico.
2. Reduce the number of illegal fishing charters in the Gulf of Mexico through education and outreach.

Performance criteria would be used to determine restoration success or the need for corrective action in accordance with 15 Code of Federal Regulations 900.55(b)(1)(vii). Specific, measurable performance criteria are defined, as applicable, for monitoring parameters associated with the restoration objectives in the Project Monitoring, Performance Criteria, and Potential Corrective Actions section below.

Conceptual Setting

The conceptual setting identifies factors and interactions that may influence the project outcomes. This may include factors affecting whether the project is implemented as planned (e.g., the expected number of samples were obtained), cofactors that may have a significant effect on variance in the data, and factors that may alter the expected outcome of the restoration effort. Understanding the conceptual setting would aid in adaptive management of the project, as well as future projects of a similar type by identifying some of these factors and providing the opportunity to anticipate their effects and plan for contingencies.

In addition to safety concerns and socioeconomic impacts to local fishing communities, illegal charter fishing practices place fish and other resources injured by the DWH spill at risk by contributing to overfishing, bycatch, and post-release mortality and causing habitat destruction. Catch from illegal charter fishing is usually unreported, meaning that these catches are not accounted for by fisheries managers in tracking annual quotas and are not considered when setting annual catch limits. Illegal charter fishing may result in higher bycatch and post-release mortality if proper techniques and gear such as venting tools, descender devices, and sea turtle conservation gear, are not used. Finally, illegal charter fishing may cause habitat destruction if appropriate precautions are not taken. Some boats in the Gulf of Mexico may advertise charter services but fail to meet federal regulations for charter vessels or hold Merchant Mariner Credentials issued by the U.S. Coast Guard. Therefore, by raising awareness of illegal charter fishing practices, conducting outreach to deter these practices from occurring, and gathering data to evaluate rates of illegal charters fishing activity, this project would aim to protect fish resources by addressing a source of overfishing, bycatch and post-release mortality, and habitat destruction in the Gulf of Mexico.

Potential Sources of Uncertainty

Potential uncertainties may affect the likelihood that this project would be successful in achieving the project objective in a timely manner. Corrective actions may be necessary to address uncertainties and maximize project benefits. Potential sources of uncertainty include:

- Whether education and outreach events will successfully attract participants.
- The degree to which individuals may alter behavior or influence behavior within their community based upon education activities.

Project Monitoring, Performance Criteria, and Potential Corrective Actions

Performance monitoring is designed to determine if a project is meeting its restoration objective(s). Performance monitoring would also assist in determining the need for corrective actions and adaptive management. The proposed monitoring plan for this restoration project was developed to evaluate project performance, key uncertainties, and potential corrective actions, if needed. In addition to the performance monitoring parameters listed in Table 1, additional monitoring parameters/information may be reported on to document project implementation progress. Examples of this type of additional information can be found in the "Reporting" section below.

Restoration Objective 1, "Evaluate rates of change of illegal charter fishing activities in the Gulf of Mexico," would not require monitoring parameters and would instead be reported on during project implementation. For example, MAM reporting related to Objective 1 may contain information such as the types of data collected and the methods used to identify illegal charters, the assessed rates of change in illegal charter fishing activity, and how these data are used to inform project education and outreach in Objective 2. The monitoring parameters for Objective 2 are contained in Table 1 below. Additional information on project reporting may be found in the "Reporting" section below.

Table 1 Monitoring Parameters

Objective 2: Reduce the number of illegal fishing charters in the Gulf of Mexico through education and outreach.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Education or Outreach Effort (Events Held or Attended)	Document restoration actions.	Count the number and type of trainings on illegal charter fishing.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	To be determined.	To be determined.
Education or Outreach Effort (Materials Produced or Distributed by Type)	Document restoration actions.	Count the number and type of educational materials produced and distributed.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	To be determined.	To be determined.
Education or Outreach Effort (Number Educated)	Document restoration actions.	Count the number of participants in project programming.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	To be determined.	Increase outreach efforts to draw participants and understand barriers to participation; adjust approaches as needed.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Biomass, FWCI (Mortality Avoided by Taxon)	Measure progress toward restoration objective.	Calculate estimated biomass of FWCI resources enhanced based upon education and outreach activities and monitored rates of illegal charter fishing activity.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	Decreased threat of mortality from illegal charter fishing as compared to conditions before implementation.	Assess potential causes of results; adjust approach as needed.

Monitoring Schedule

The schedule for project monitoring is shown in Table 2 by monitoring parameter.

Table 2 Monitoring Schedule

Monitoring Parameters	Pre-Implementation	Implementation	Post-Implementation
Education or Outreach Effort (Events Held or Attended)		X	
Education or Outreach Effort (Materials Produced or Distributed by Type)		X	
Education or Outreach Effort (Number Educated)		X	
Biomass, FWCI (Mortality Avoided by Taxon)		X	

Evaluation

Project monitoring data would be evaluated against baseline monitoring data collected by project partners. The Open Ocean Trustee Implementation Group ("Open Ocean TIG") anticipates evaluating project monitoring data (as described above) to help answer the following questions:

- Were rates of change in illegal charter fishing operations in the Gulf of Mexico able to be identified and tracked over time? Why or why not?
- How were the data gathered about illegal charter fishing used to inform education and outreach activities?
- Were education and outreach activities more highly attended or more effective in certain locations and fisheries? Why or why not?
- Was the project's restoration objective achieved? If not, is there a reason why it was not met?
- Did the project produce unanticipated results?
- Were there unanticipated events related to the project that potentially affected the monitoring results (e.g., hurricanes)?
- Were any of the uncertainties identified prior to project implementation resolved?
- Were any new uncertainties identified?

Adaptive Management

The Open Ocean TIG anticipates utilizing adaptive management principles for this project to ensure project objectives are being met and allow for course adjustments if necessary to achieve project success. The Open Ocean TIG would identify corrective actions as necessary. This MAM Plan may be updated in the future to include additional details on adaptive management of this project.

This project would conduct data synthesis and analysis and to inform the specific education and outreach locations, strategies, and materials that would be developed and applied. If site-specific strategies would not appear to be effective at a given location, NOAA, as the Implementing Trustee, may identify alternate methods or locations to maximize the likelihood of success. If monitoring criteria are not met, the Open Ocean TIG would identify and implement corrective actions as necessary to adjust outreach and educational approaches and attain restoration goals.

Data Management

Data Description

Data would be compiled within 12 months after collection. To the extent practicable, all environmental and biological data generated during monitoring activities would be documented using standardized field datasheets. If standardized datasheets are unavailable or not readily amendable to record project-specific data, then project-specific datasheets would be drafted prior to conducting any project monitoring activities. Original hardcopy datasheets and notebooks and photographs would be retained by NOAA.

Relevant project data that are handwritten on hardcopy datasheets or notebooks would be transcribed (entered) into standard digital format as per protocols. All field datasheets and notebook entries would be scanned to PDF files. Electronic data files would be named with the date on which the file was created and would include a ReadMe file that describes when the file was created and by whom, and any explanatory notes on the file contents. If a data file is revised, a new copy would be made and the original preserved.

All data would have properly documented Federal Geographic Data Committee/International Organization for Standardization (FGDC/ISO) metadata, a data dictionary (defines codes and fields used in the dataset), and/or a ReadMe file as appropriate (e.g., how data were collected, quality assurance/quality control [QA/QC] procedures, other information about data such as meaning, relationships to other data, origin, usage, and format).

Data Review and Clearance

After relevant project data are transcribed (entered) into standard digital format, electronic datasheets would be verified against the original hardcopy datasheets and/or notebooks and any corrections for transcription errors would be made as appropriate before data are used for any analyses or distributed. Implementing Trustees would verify and validate MAM data and information and would ensure that all data are: i) entered or converted into agreed on/commonly used digital format; ii) labeled with metadata following FGDC/ISO standards to the extent practicable and in accordance with NOAA requirements.

After all identified errors are addressed, data are considered to be QA/QC'ed. NOAA would give the other Open Ocean TIG members time to review the data before making such information publicly available (as described below). Before submitting the monitoring data and information package, co-Implementing Trustees shall confirm with one another that the package is approved for submission.

Data Storage and Accessibility

Once all data have been QA/QC'ed they would be submitted to the DIVER Restoration Portal. Trustees would provide DWH NRDA MAM data and information to the Restoration Portal as soon as possible and no more than 1 year from when data are collected.

Data Sharing

The monitoring data (if not proprietary or confidential) and annual report would be made publicly available, in accordance with the Open, Public, Electronic and Necessary Government Data Act of 2019, through the DIVER Restoration Portal within 6 months of the end of each calendar year through project close-out.

Reporting

All reporting would occur annually. The data should be summarized in such a way that it is meaningful to the reader. The annual report may include:

- A summary of project activities for the year, such as education and outreach events held, materials produced, or number of individuals educated on illegal fishing.
- Summarized monitoring data - synthesized data for all efforts during the year.
- Graphics, if applicable, and associated interpretations of the data.
- Comparisons of pre- and post-implementations conditions, as applicable.
- Any uncertainties with management actions.
- Potential data collection issues.
- Reporting on general MAM activities in the DIVER Restoration Portal on an annual basis.
- Developing a Final MAM Report before a project is closed out.

Roles and Responsibilities

Monitoring data associated with this MAM plan would be collected, reviewed, and reported by NOAA.

References

DWH NRDA Trustees. 2016. *Deepwater Horizon* Oil Spill: Final Programmatic Damage Assessment and Restoration Plan (PDARP) and Final Programmatic Environmental Impact Statement (PEIS). Available: www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan

DWH NRDA Trustees. 2024. Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1. Appendix to the Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill. September. Available: https://www.fisheries.noaa.gov/s3//2024-09/DWH-NRDA-MAM-Manual-V2.1-Sept-2024.pdf

Communication, Adaptive Management, Planning, and Integration

Prepared by: The National Oceanic and Atmospheric Administration (NOAA) and IEc

Draft Version Date: 8/14/2024

Introduction

This monitoring and adaptive management (MAM) plan follows guidance provided in the Final Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement (PDARP/PEIS; Deepwater Horizon [DWH] Natural Resource Damage Assessment [NRDA] Trustees, 2016) and the Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1 (MAM Manual; DWH NRDA Trustees, 2024) by identifying the monitoring needed to evaluate progress toward meeting project objectives and to support any necessary adaptive management of the project. Where applicable, it identifies key sources of uncertainty and incorporates monitoring data and decision points that address these uncertainties. As not all projects would have the same sources and degrees of uncertainty, this project-specific MAM plan is scaled according to the level of uncertainty, scope, scale, and Restoration Type associated with this project.

This plan is a living document and may be updated as needed to reflect changing conditions and/or new information. Any future revisions to this MAM plan would be made publicly available through the Data Integration Visualization Exploration and Reporting (DIVER) Explorer (www.diver.orr.noaa.gov) and accessible through the Trustees' website (www.gulfspillrestoration.noaa.gov).

Project Overview

This project would be implemented as restoration for the DWH oil spill NRDA, consistent with the PDARP/PEIS.

- Programmatic Goal: Replenish and Protect Living, Coastal, and Marine Resources
- Restoration Type: Fish and Water Column Invertebrates (FWCI)
- Restoration Approaches: Voluntary fisheries-related actions to increase fish biomass (PDARP/PEIS Appendix 5.D.3.5)
- Restoration Techniques: Resource-level monitoring and adaptive management to address critical uncertainties (i.e., increased observer coverage, electronic monitoring capacity, other forms of field data collection to support decision making)

This restoration project would be implemented throughout the U.S. Gulf of Mexico, U.S. Caribbean Sea, and U.S. Atlantic Ocean; and potentially the Mexican Gulf of Mexico, the Caribbean, and Atlantic waters of Canada and northern South America to support DWH FWCI Restoration Type-funded projects by addressing gaps in current understanding of high-priority FWCI resources that would enhance their restoration and management by facilitating coordination among DWH FWCI projects and expanding outreach to fishing communities to increase awareness of and engagement with DWH restoration activities. Restoration and MAM activities include: (1) enhancing monitoring support for FWCI restoration; and (2) facilitating communication and engagement across the multiple DWH FWCI restoration projects. Activities to enhance monitoring support may include enhancing at-sea observer coverage and electronic monitoring capacity, conducting workshops to review the status of existing tagging networks, and collecting and analyzing data to inform population characterizations, evaluate performance of management and restoration activities, conduct annual bycatch estimates, and model species abundance, distribution, and migration patterns. Activities to facilitate communication and industry engagement may include identification of and engagement with interested parties, enhancing cross-project coordination and strategy building across the DWH FWCI Restoration Type portfolio, and

conducting outreach and engagement with fishing communities to improve awareness of and engagement with the DWH restoration program.

The Implementing Trustee of this project is NOAA in coordination with cooperative institutes, private partners, and non-governmental organizations.

Restoration Type Goals and Project Restoration Objectives

The Restoration Type goals relevant to this project, as identified in the PDARP/PEIS, are:

- Restore injured fish and invertebrate species across the range of coastal and oceanic zones by reducing direct sources of mortality.
- Increase the health of fisheries by providing fishing communities with methodologies and incentives to reduce impacts to fishery resources.

The restoration objectives for this project are:

1. Perform enhanced fisheries and population characterization and support existing restoration projects through monitoring and data collection.
2. Support resource-level communication to enhance data sharing and coordination across restoration activities.

Performance criteria would be used to determine restoration success or the need for corrective action in accordance with 15 Code of Federal Regulations 900.55(b)(1)(vii). Specific, measurable performance criteria are defined, as applicable, for monitoring parameters associated with the restoration objectives in the Project Monitoring, Performance Criteria, and Potential Corrective Actions section below.

Conceptual Setting

The conceptual setting identifies factors and interactions that may influence the project outcomes. This may include factors affecting whether the project is implemented as planned (e.g., the expected number of samples were obtained), cofactors that may have a significant effect on variance in the data, and factors that may alter the expected outcome of the restoration effort. Understanding the conceptual setting would aid in adaptive management of the project, as well as future projects of a similar type by identifying some of these factors and providing the opportunity to anticipate their effects and plan for contingencies.

To enhance the recovery and long-term survival of fish resources, managers must fill knowledge gaps to understand species' spatial distribution, abundance, habitat characteristics, trophic dynamics, and the threats they face. This project would address uncertainties by conducting data collection and analysis for high-priority species. By coordinating these efforts across FWCI Restoration Type-funded projects, this project would improve resource-wide efficiency for common monitoring needs. Additional engagement with the Gulf of Mexico fishing community on a resource-wide level would improve the fishing community's awareness of and participation in DWH restoration projects. Additionally, by facilitating communication and strategy development across FWCI-funded projects, this project would aid in the development of co-developed restoration concepts and goals and ensure that FWCI projects are coordinated to maximize restoration benefits.

Potential Sources of Uncertainty

Potential uncertainties may affect the likelihood that this project would be successful in achieving the project objective in a timely manner. Corrective actions may be necessary to address uncertainties and maximize project benefits. Potential sources of uncertainty include:

- Whether sufficient participation may be achieved for outreach and education events such as workshops on monitoring networks or to support industry engagement across projects.

- The level of interest fishing community partners may have in engaging with DWH restoration work and what barriers, misconceptions, or knowledge gaps may need to be addressed to enhance this engagement.
- Logistical challenges related to expanding observer and/or electronic monitoring in various fisheries.

Project Monitoring, Performance Criteria, and Potential Corrective Actions

Performance monitoring is designed to determine if a project is meeting its restoration objective(s). Performance monitoring would also assist in determining the need for corrective actions and adaptive management. The proposed monitoring plan for this restoration project was developed to evaluate project performance, key uncertainties, and potential corrective actions, if needed. In addition to the performance monitoring parameters listed in Table 1, additional monitoring parameters/information may be reported on to document project implementation progress. Examples of this type of additional information can be found in the Reporting section below.

Information on each monitoring parameter is provided below. The list of corrective actions provided below is not exhaustive; rather, it includes a list of potential actions to be considered if the project is not performing as expected once implemented. Other corrective actions may be identified post-implementation, as appropriate.

Restoration Objective 1, "Perform enhanced fisheries and population characterization and support existing restoration projects through monitoring and data collection", would not require monitoring and would instead be reported on during project implementation. For example, MAM reports may contain information such as the type and volume of data collected, details of the monitoring activities enhanced and methods used, details of the population and fisheries characterizations completed, and how these data are used to support restoration implementation and the resource as a whole. Monitoring parameters for Objective 2 are contained in Table 1 below.

Table 1 Monitoring Parameters

Objective 2: Support resource-level communication to enhance data sharing and coordination across restoration activities.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Education or Outreach Effort (Events Held or Attended)	Document restoration actions.	Count the number and type of educational or outreach events held (e.g., workshops on monitoring networks).	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	To be determined.	To be determined.
Education or Outreach Effort (Programs Developed by Type)	Document restoration actions.	Count the number and type of educational and outreach programs developed.	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	To be determined.	To be determined.
Education or Outreach Effort (Number Educated)	Document restoration actions.	Count the number of participants in project programming (e.g., number attending outreach events).	Annually.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	To be determined.	Increase outreach efforts to draw participants and understand barriers to communication; adjust approaches as needed.

Monitoring Schedule

The schedule for project monitoring is shown in Table 2 by monitoring parameter.

Table 2 Monitoring Schedule

Monitoring Parameters	Pre-Implementation	Implementation	Post-Implementation
Education or Outreach Effort (Events Held or Attended)		X	
Education or Outreach Effort (Programs Developed by Type)		X	
Education or Outreach Effort (Number Educated)		X	

Evaluation

Project monitoring data would be evaluated against baseline monitoring data collected by project partners. The Open Ocean Trustee Implementation Group ("Open Ocean TIG") anticipates evaluating project monitoring data (as described above) to help answer the following questions:

- Was monitoring and data gathering coverage and capacity successfully enhanced across species and projects? Were certain types of monitoring (e.g., observer coverage, electronic monitoring) more difficult to enhance than others, or more impactful for the advancement of species modeling?
- Were industry partners successfully engaged in discussions about monitoring networks? Was a path for improvements to these networks developed and implemented? Why or why not?
- What strategies were identified and implemented for conducting outreach to fishing industry partners regarding opportunities to learn about and become involved in DWH restoration activities? Was engagement more successful in some fisheries or locations than others? Why or why not?
- Was the project's restoration objective achieved? If not, is there a reason why it was not met?
- Did the project produce unanticipated results?
- Were there unanticipated events related to the project that potentially affected the monitoring results (e.g., hurricanes)?
- Were any of the uncertainties identified prior to project implementation resolved?
- Were any new uncertainties identified?

Adaptive Management

The Open Ocean TIG anticipates utilizing adaptive management principles for this project to ensure project objectives are being met and allow for course adjustments if necessary to achieve project success. The Open Ocean TIG would identify corrective actions as necessary. This MAM Plan may be updated in the future to include additional details on adaptive management of this project.

This project would occur over many years and would build upon over a decade of past DWH restoration project data gathering, monitoring, and coordination both within NOAA DWH teams and with the broader fishing communities. Drawing from this experience would allow the lead Implementing Trustee, NOAA, to apply existing institutional knowledge to the management of this project and improve coordination across the FWCI restoration portfolio. In addition, the data collected and analyzed through this project, including from observer coverage or electronic monitoring networks, would inform

restoration leads and resource managers about threats to FWCI relevant to other DWH restoration projects' ability to adaptively manage projects throughout the Gulf of Mexico and beyond. If monitoring criteria are not met, the Open Ocean TIG would identify and implement corrective actions as necessary to adjust outreach and educational approaches and attain restoration goals.

Data Management

Data Description

Data would be compiled within 12 months after collection. To the extent practicable, all environmental and biological data generated during monitoring activities would be documented using standardized field datasheets. If standardized datasheets are unavailable or not readily amendable to record project-specific data, then project-specific datasheets would be drafted prior to conducting any project monitoring activities. Original hardcopy datasheets and notebooks and photographs would be retained by NOAA.

Relevant project data that are handwritten on hardcopy datasheets or notebooks would be transcribed (entered) into standard digital format as per protocols. All field datasheets and notebook entries would be scanned to PDF files. Electronic data files would be named with the date on which the file was created and would include a ReadMe file that describes when the file was created and by whom, and any explanatory notes on the file contents. If a data file is revised, a new copy would be made and the original preserved.

All data would have properly documented Federal Geographic Data Committee/International Organization for Standardization (FGDC/ISO) metadata, a data dictionary (defines codes and fields used in the dataset), and/or a ReadMe file as appropriate (e.g., how data were collected, quality assurance/quality control [QA/QC] procedures, other information about data such as meaning, relationships to other data, origin, usage, and format).

Data Review and Clearance

After relevant project data are transcribed (entered) into standard digital format, electronic datasheets would be verified against the original hardcopy datasheets and/or notebooks and any corrections for transcription errors would be made as appropriate before data are used for any analyses or distributed. Implementing Trustees would verify and validate MAM data and information and would ensure that all data are: i) entered or converted into agreed on/commonly used digital format; ii) labeled with metadata following FGDC/ISO standards to the extent practicable and in accordance with NOAA requirements.

After all identified errors are addressed, data are considered to be QA/QC'ed. NOAA would give the other Open Ocean TIG members time to review the data before making such information publicly available (as described below). Before submitting the monitoring data and information package, co-Implementing Trustees shall confirm with one another that the package is approved for submission.

Data Storage and Accessibility

Once all data have been QA/QC'ed they would be submitted to the DIVER Restoration Portal. Trustees would provide DWH NRDA MAM data and information to the Restoration Portal as soon as possible and no more than 1 year from when data are collected.

Data Sharing

The monitoring data (if not proprietary or confidential) and annual report would be made publicly available, in accordance with the Open, Public, Electronic and Necessary Government Data Act of 2019, through the DIVER Restoration Portal within 6 months of the end of each calendar year through project close-out.

Reporting

All reporting would occur annually. The data should be summarized in such a way that it is meaningful to the reader. Annual reports may include:

- A summary of project activities for the year, such as the number of events held, outreach programs developed, and individuals engaged in education activities.
- Summarized monitoring data - synthesized data for all efforts during the year.
- Graphics, if applicable, and associated interpretations of the data.
- Comparisons of pre- and post-implementations conditions, as applicable.
- Any uncertainties with management actions.
- Potential data collection issues.
- Reporting on general MAM activities in the DIVER Restoration Portal on an annual basis.
- Developing a Final MAM Report before a project is closed out.

Roles and Responsibilities

Monitoring data associated with this MAM plan would be collected, reviewed, and reported by NOAA.

References

DWH NRDA Trustees. 2016. *Deepwater Horizon* Oil Spill: Final Programmatic Damage Assessment and Restoration Plan (PDARP) and Final Programmatic Environmental Impact Statement (PEIS). Available: www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan

DWH NRDA Trustees. 2024. Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1. Appendix to the Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill. September. Available: https://www.fisheries.noaa.gov/s3//2024-09/DWH-NRDA-MAM-Manual-V2.1-Sept-2024.pdf

Long Term Nesting Habitat Protection for Sea Turtles

Prepared by: The U.S. Department of the Interior (DOI) and IEc

Revised Draft Version Date: 7/20/2024

Introduction

Monitoring, Adaptive Management, and Administrative Oversight was identified as one of the programmatic goals in the *Deepwater Horizon* (DWH) oil spill *Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement* (PDARP/PEIS). The DWH Natural Resource Damage Assessment (NRDA) monitoring and adaptive management (MAM) Framework (PDARP/PEIS Chapter 5, Appendix E) provides a flexible, science-based approach to support the effective and efficient implementation of restoration over several decades to provide long-term benefits to the resources and services injured by the spill. This project is designed to inform and enhance restoration and as such, this project MAM plan outlines objectives of the data collection effort, analysis methods, and monitoring schedule. It also outlines ways to evaluate progress toward meeting the overall project goal and identifies key sources of uncertainty and describes adaptive management considerations.

This MAM Plan is a living document and may be updated as needed to reflect changing conditions and/or 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 requires adjustment, or if any uncertainties are resolved or new uncertainties are identified during project implementation. Any future revisions to this document would be made publicly available through the Data Integration Visualization Exploration and Reporting (DIVER) Explorer (www.diver.orr.noaa.gov) and accessible through the Trustees' website (www.gulfspillrestoration.noaa.gov).

Project Overview

This project would be implemented as restoration for the DWH oil spill NRDA, consistent with the PDARP/PEIS.

- Programmatic Goal: Replenish and Protect Living, Coastal, and Marine Resources
- Restoration Type: Sea Turtles
- Restoration Approach: Enhance sea turtle hatchling productivity and restore and conserve nesting beach habitat (PDARP/PEIS Appendix 5.D.4.3)
- Restoration technique: Acquire lands for conservation of nesting beach habitat (PDARP/PEIS Appendix 5.D.4.3)

The goal of the project is to aid sea turtle restoration efforts through acquisition of priority nesting habitat either through fee-simple parcel acquisition or less-than-fee (perpetual) easement acquisition. Through a willing seller approach, priority parcels would be acquired to ensure the highest density sea turtle nesting beaches are protected in perpetuity. Priorities include undeveloped parcels within the approved acquisition boundaries of the Archie Carr and Hobe Sound National Wildlife Refuges (NWRs) adjacent to already protected lands and/or where strategic acquisition would benefit perpetual sea turtle nesting opportunities. Priority parcels may also include parcels with at-risk structures (potentially subject to armoring) that help protect and/or provide the ability to create contiguous protected nesting habitat over the long term. In addition, project partners and willing seller considerations would help guide parcel acquisition priorities.

The Implementing Trustee of this project would be DOI. Project partners could include Archie Carr and Hobe Sound NWRs, local governments, and non-governmental organizations. This project is anticipated as a 6-year project duration. Pre-implementation in Year 1 includes establishing a cooperative agreement

with the project partners, Years 2-5 include acquiring parcels, and Year 6 includes final reporting and project close-out activities.

Restoration Type Goals and Project Restoration Objectives

The Restoration Type goals relevant to this project, as identified in the PDARP/PEIS, are:

- Implement an integrated portfolio of restoration approaches to address all injured life stages (hatchling, juvenile, and adult) and species of sea turtles.
- Restore injuries by addressing primary threats to sea turtles in the marine and terrestrial environment such as bycatch in commercial and recreational fisheries, acute environmental changes (e.g., cold water temperatures), loss or degradation of nesting beach habitat (e.g., coastal armoring and artificial lighting), and other anthropogenic threats.
- Restore sea turtles in the various geographic and temporal areas within the Gulf of Mexico and Atlantic Ocean that are relevant to injured species and life stages.
- Support existing conservation efforts by ensuring consistency with recovery plans and recovery goals for each of the sea turtle species.

The restoration objective for this project is:

1. Prevent the loss of high-density sea turtle nesting beach habitat through acquisition using a willing seller approach and preservation of acquired habitat in perpetuity.

The primary objective of land acquisition is to protect sea turtle nesting habitat through fee-simple or perpetual easements of fee title acquisitions of beach front nesting habitat. This activity would provide direct protection of priority nesting areas and ensure future availability of nest sites and supporting habitat. High-priority nesting areas are those with high density of active nests which are currently threatened by human encroachment.

Conceptual Setting

Habitat loss and degradation of nesting beaches are primary threats to nesting sea turtles. Other threats include human disturbance, particularly from beachfront armoring and artificial light impacts. Land acquisition and conservation easements would help restore resources for sea turtles by employing techniques known to minimize threats to sea turtle survival and reproduction. Acquiring targeted beachfront shoreline parcels would facilitate direct protection of nesting sea turtles and would ensure future availability of nest sites and supporting habitat. Long-term habitat protection would ensure that these beaches are free from armoring and continue to support high-density nesting sea turtles. Protecting undeveloped beaches also reduces impacts caused by artificial light (U.S. Fish and Wildlife Service, 2008). Table 1 presents the key project activity, desired output, and anticipated long- and short-term outcomes.

Table 1 Project Activities and Anticipated Outcomes

Activity	Output	Short-term outcome	Long-term outcome
Implement acquisition activities to deter development and disturbance.	Protection and conservation of priority sea turtle nesting habitat.	Maintain or increase sea turtle nesting habitat.	Protection of key habitats in perpetuity.

Potential Sources of Uncertainty

The Open Ocean Trustee Implementation Group ("Open Ocean TIG") aims to propose and select projects that are feasible and have a high probability of success. In some instances, projects may have restoration techniques or project components that are more innovative which may result in a higher degree of uncertainty. Sources of uncertainty, the degree of uncertainty, and the level of uncertainty associated with projects would vary. Potential uncertainties are defined as those that may affect the ability to achieve project restoration objective(s). Monitoring can be used to inform these uncertainties and inform the selection of appropriate corrective actions in the event a project is not meeting its performance criteria. Table 2 outlines the key uncertainties associated with the project and strategies to solve them.

Table 2 Key Uncertainties and Strategies for Resolution

Uncertainty	Summary of Strategy to Resolve
Targeted habitats do not become available for purchase	Funding allocated for fee-simple purchases may be used for less-than-fee simple acquisition to implement habitat protection and long-term conservation.
Cost of parcels is higher than anticipated	Consider waiting for more favorable or economical purchase opportunities such as following storms.
Administrative processes delay acquisitions	Work with project partners for alternative acquisition holding opportunities to obtain the parcel.

Project Monitoring, Performance Criteria, and Potential Corrective Actions

Performance monitoring is designed to determine if a project is meeting its restoration objective(s). Performance monitoring would also assist in determining the need for corrective actions and adaptive management. The proposed monitoring plan for this restoration project was developed to evaluate project performance, key uncertainties, and potential corrective actions, if needed. In addition to the performance monitoring parameters listed in Table 3, additional monitoring parameters/information may be reported on to document project implementation progress. Examples of this type of additional information can be found in the "Reporting" section below.

Information on each monitoring parameter is provided below. The list of corrective actions provided below is not exhaustive; rather, it includes a list of potential actions to be considered if the project is not performing as expected once implemented. Other corrective actions may be identified post-implementation, as appropriate.

Table 3 Monitoring Parameters

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Habitat Length (Shoreline Acquired, Conserved, or Enhanced)	Document progress towards meeting the restoration objective.	Record the number and location of feet of shoreline acquired through purchase of parcels with high-priority nesting habitat. Information would be collected via remote sensing.	After each purchase and reported at the end of the project.	Acquired parcels and/or easements.	400 feet of beachfront habitat acquired	Increase investment of project resources and partner involvement into 1) parcel identification, and 2) opportunities to engage landowners through outreach.
Area (Project Footprint)	Evaluate potential parcels for acquisition.	Record the number and location of acres acquired through purchase of parcels with high-priority nesting habitat. Information would be collected via official property deeds.	After each purchase and reported at the end of the project.	Acquired parcels and/or easements.	2 acres	Increase investment of project resources and partner involvement into 1) parcel identification, and 2) opportunities to engage landowners through outreach.

Monitoring Schedule

The schedule for monitoring of this component is shown in Table 4 by monitoring parameter.

Table 4 Monitoring Schedule

Monitoring Parameters	Pre-Implementation	Implementation (Years 2-6)	Post-Implementation
Habitat Length (Shoreline Acquired, Conserved, or Enhanced)		X	
Area (Project Footprint)		X	

Evaluation

The Open Ocean TIG anticipates evaluating project monitoring data (as described above) to help answer the following questions:

- Was the project able to reduce fragmentation of sea turtle nesting beach habitat? If not, why?
- Did the project produce unanticipated results?
- Were any of the uncertainties identified prior to project implementation resolved?

Adaptive Management

As discussed in the PDARP/PEIS, 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 with flexible decision-making, where adjustments are made to management approaches based on observed outcomes (NRC 2004). Within the context of ecological restoration, adaptive management addresses key uncertainties by linking science to restoration decision-making (Steyer and Llewellyn 2000).

Although adaptive management is a critical component of the restoration plan, the need for adaptive management may vary on a project-by-project basis. Some projects may be well understood and not have uncertainties which warrant adaptive management. The MAM framework may be more robust for elements of the restoration plan with high degrees of uncertainty or where numerous restoration projects are planned within a given geographic area and/or for the benefit of a particular resource (Appendix 5.E.1, PDARP/PEIS). Under the Oil Pollution Act NRDA regulations, restoration projects clearly identify performance criteria that would be used to determine project success or the need for corrective action. For this project, adaptive management is integrated in the prioritization of additional properties/easements that may be targeted for acquisition in lieu of any property or easement for which negotiations could fail.

Data Management

Data Description

Data would be compiled within 12 months after collection. Electronic data files would be named with the date on which the file was created and would include a ReadMe file that describes when the file was created and by whom, and any explanatory notes on the file contents. If a data file is revised, a new copy would be made and the original preserved.

All data would have properly documented Federal Geographic Data Committee/International Organization for Standardization (FGDC/ISO) metadata, a data dictionary (defines codes and fields used in the dataset), and/or a ReadMe file as appropriate (e.g., how data were collected, quality

assurance/quality control [QA/QC] procedures, other information about data such as meaning, relationships to other data, origin, usage, and format).

Data Review and Clearance

Implementing Trustees would verify and validate MAM data and information and would ensure that all data are: i) entered or converted into agreed upon/commonly used digital format; ii) labeled with metadata following FGDC/ISO standards to the extent practicable and in accordance with NOAA requirements.

After all identified errors are addressed, data are considered to be QA/QC'ed. NOAA would give the other Open Ocean TIG members time to review the data before making such information publicly available (as described below). Before submitting the monitoring data and information package, co-Implementing Trustees shall confirm with one another that the package is approved for submission.

Data Storage and Accessibility

Once all data have been QA/QC'ed it would be submitted to the DIVER Restoration Portal. Trustees would provide DWH NRDA MAM data and information to the Restoration Portal as soon as possible and no more than 1 year from when data are collected.

Data Sharing

Monitoring data and annual reports would be made publicly available, in accordance with the Open, Public, Electronic and Necessary Government Data Act of 2019, through the DIVER Restoration Portal within 6 months of the end of each calendar year through project close-out.

Reporting

All reporting would occur at the end of the project. The data would be summarized in such a way that it is meaningful to the reader. Additionally, a final report would be completed that includes:

- A summary of project activities and monitoring data, such as size and area of parcels acquired, synthesized for benefits to nesting sea turtles.
- Graphics, if applicable, and associated interpretations of the data.
- Comparisons of pre- and post-implementations conditions, as applicable.
- Any uncertainties with management actions.
- Potential data collection issues.
- Potential acquisition process issues.
- Reporting on general MAM activities in the DIVER Restoration Portal on an annual basis.
- Developing a Final MAM Report before a project is closed out.

Roles and Responsibilities

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

MAM Plan Revision History

Version #	Revision Date	Changes Made	Reason for Change
2	June 21, 2024	Project scope expanded to include acquisition locations in Hobe Sound NWR; this location was added to the Project Overview section. Further revised organization and made minor editorial changes to improve consistency with Open Ocean RP4/EA MAM plans.	New project component proposed in Open Ocean RP4/EA
1	November 2019	Original MAM Plan published in Open Ocean RP2/EA	

References

DWH NRDA Trustees. 2016. *Deepwater Horizon* Oil Spill: Final Programmatic Damage Assessment and Restoration Plan (PDARP) and Final Programmatic Environmental Impact Statement (PEIS). Available: www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan

DWH NRDA Trustees. 2024. Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1. Appendix to the Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill. September. Available: https://www.fisheries.noaa.gov/s3//2024-09/DWH-NRDA-MAM-Manual-V2.1-Sept-2024.pdf

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Steyer, G.D. and Llewellyn, D.W. 2000. Coastal Wetlands Planning, Protection and Restoration Act: A programmatic application of adaptive management. Ecological Engineering, 26, 27-39.

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Williams, B.K. 2011. Adaptive management of natural resources — Framework and issues. *Journal of Environmental Management*, 92, 1346-1353.

Gulf-Wide Sea Turtle Bycatch Reduction

Prepared by: The National Oceanic and Atmospheric Administration (NOAA) and IEc

Draft Version Date: 9/09/2024

Introduction

This monitoring and adaptive management (MAM) plan follows guidance provided in the Final Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement (PDARP/PEIS; Deepwater Horizon [DWH] Natural Resource Damage Assessment [NRDA] Trustees, 2016) and the Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1 (MAM Manual; DWH NRDA Trustees, 2024) by identifying the monitoring needed to evaluate progress toward meeting project objectives and to support any necessary adaptive management of the project. Where applicable, it identifies key sources of uncertainty and incorporates monitoring data and decision points that address these uncertainties. As not all projects would have the same sources and degrees of uncertainty, this project-specific MAM plan is scaled according to the level of uncertainty, scope, scale, and Restoration Type associated with this project.

This plan is a living document and may be updated as needed to reflect changing conditions and/or new information. Any future revisions to this MAM plan would be made publicly available through the Data Integration Visualization Exploration and Reporting (DIVER) Explorer (www.diver.orr.noaa.gov) and accessible through the Trustees' website (www.gulfspillrestoration.noaa.gov).

Project Overview

This project would be implemented as restoration for the DWH oil spill NRDA, consistent with the PDARP/PEIS.

- Programmatic Goal: Replenish and Protect Living, Coastal, and Marine Resources
- Restoration Type: Sea Turtles
- Restoration Approaches: Reduce sea turtle bycatch in commercial fisheries through identification and implementation of conservation measures (PDARP/PEIS Appendix 5.D.4.1); Reduce sea turtle bycatch in commercial fisheries through enhanced training and outreach to the fishing community (PDARP/PEIS Appendix 5.D.4.2)
- Restoration Techniques: Identification of potential new measures, such as gear modifications (e.g., hook size and type), changes in fishing practices (e.g., reduced soak times), and/or temporal and spatial fishery management to reduce sea turtle bycatch in Gulf commercial fisheries (PDARP/PEIS Appendix 5.D.4.1); Expansion of the NOAA Gear Monitoring Team Program (PDARP/PEIS Appendix 5.D.4.2)

This restoration project would be implemented throughout the Gulf of Mexico in the shrimp trawl and commercial hook-and-line fisheries to reduce the risk of interactions between sea turtles and commercial fishing gear. Specific activities would include (1) continuing and expanding existing NOAA Gear Monitoring Team (GMT) efforts; and (2) encouraging the voluntary adoption of small-bar turtle excluder devices (TEDs) to prevent small sea turtles from being caught in shrimp otter trawls.

Existing NOAA GMT efforts, such as conducting courtesy dockside and at-sea inspections of required TEDs in the shrimp otter and skimmer trawl fishery, would be continued for 8 years beyond the remainder of the existing effort under the Early Restoration *Sea Turtle Early Restoration Project, Shrimp Trawl Bycatch Reduction component* project. In addition, the GMT would expand outreach and education efforts to commercial hook-and-line fisheries by providing education and outreach related to safe

handling and release requirements for sea turtles and the use of recommended gear. Education and outreach may be achieved by partnering with existing training programs.

Furthermore, this project would encourage the voluntary adoption of small-bar TED prototypes developed through the Open Ocean Trustee Implementation Group's ("Open Ocean TIG") *Reducing Juvenile Sea Turtle Bycatch through Development of Reduced Bar Spacing in Turtle Excluder Devices* project. This project would conduct industry outreach to support awareness and conduct a pilot program with up to 100 volunteers in the Gulf of Mexico commercial shrimp otter trawling fleet, funding the manufacture and installation small-bar TEDs on participating vessels.

The Implementing Trustee of this project would be NOAA. NOAA would coordinate closely with the U.S. Coast Guard, state law enforcement and fisheries agencies, and local fishing communities.

Restoration Type Goals and Project Restoration Objectives

The Restoration Type goals relevant to this project, as identified in the PDARP/PEIS, are:

- Implement an integrated portfolio of restoration approaches to address all injured life stages (hatchling, juvenile, and adult) and species of sea turtles.
- Restore injuries by addressing primary threats to sea turtles in the marine and terrestrial environment such as bycatch in commercial and recreational fisheries, acute environmental changes (e.g., cold water temperatures), loss or degradation of nesting beach habitat (e.g., coastal armoring and artificial lighting), and other anthropogenic threats.
- Restore sea turtles in the various geographic and temporal areas within the Gulf of Mexico and Atlantic Ocean that are relevant to injured species and life stages.
- Support existing conservation efforts by ensuring consistency with recovery plans and recovery goals for each of the sea turtle species.

The restoration objectives for this project are:

1. Provide targeted outreach and education to shrimp trawl (otter/skimmer) and commercial hook-and-line fisheries to encourage the proper use of existing methods and gear that reduce risk of sea turtle bycatch.
2. Purchase and provide alternative fishing gear for shrimp trawls (otter/skimmer), such as small-bar TEDs, to reduce the risk of sea turtle bycatch.

Performance criteria would be used to determine restoration success or the need for corrective action in accordance with 15 Code of Federal Regulations 900.55(b)(1)(vii). Specific, measurable performance criteria are defined, as applicable, for monitoring parameters associated with the restoration objectives in the Project Monitoring, Performance Criteria, and Potential Corrective Actions section below.

Conceptual Setting

The conceptual setting identifies factors and interactions that may influence the project outcomes. This may include factors affecting whether the project is implemented as planned (e.g., the expected number of samples were obtained), cofactors that may have a significant effect on variance in the data, and factors that may alter the expected outcome of the restoration effort. Understanding the conceptual setting would aid in adaptive management of the project, as well as future projects of a similar type by identifying some of these factors and providing the opportunity to anticipate their effects and plan for contingencies.

This project would build upon successful previous efforts to reduce sea turtle mortality from bycatch in the Gulf of Mexico by improving compliance with existing TED requirements in the shrimp trawl fishery and encouraging voluntary adoption of small-bar TEDs. Existing regulations require a maximum of 4-inch-spaced TEDs, and these have been effective at reducing sea turtle bycatch rates when used properly.

However, when used improperly, the device's efficacy sharply declines. Outreach, education, and courtesy dockside and at-sea inspections by the NOAA GMT would ensure that fishing communities are informed about proper use and that the devices are working in compliance with existing regulations. However, even with the existing 4-inch TEDs, some small, juvenile sea turtles may still be captured as bycatch. Small-bar TEDs deployed through this project were designed and tested through the Open Ocean TIG's *Reducing Juvenile Sea Turtle Bycatch through Development of Reduced Bar Spacing Turtle Excluder Devices* project to reduce mortality to sea turtles that are too small to be effectively excluded by 4-inch TEDs. In trials, the 2.5-inch small-bar TEDs were shown to be effective at excluding small, juvenile turtles while maintaining rates of target catch for the shrimp trawlers. This project would build upon the Open Ocean TIG's previous efforts by providing education and outreach regarding the availability of these new TEDs and by partnering with participating vessels to voluntarily install these new devices. Finally, the shrimp trawl fishery is not the only Gulf of Mexico fishery in which sea turtles may be captured as bycatch. To reduce sea turtle mortality as bycatch in other fisheries, this project would expand NOAA's outreach and education efforts to include commercial hook-and-line fisheries, such as reef fish and shark fisheries, to provide additional education and outreach opportunities on use of required resuscitation procedures and dehooking methods and gear, which would reduce the risk of sea turtle injury or mortality if accidentally caught.

As the gear and methods that would be encouraged by this project have been shown to be effective at reducing sea turtle mortality as bycatch, a key driver of project success would be the fishing community's willingness to voluntarily adopt the recommended practices and gear. The fishing community's willingness to participate may be influenced by perceptions of cost, logistical constraints, or industry hardships. For this reason, outreach and education efforts are a primary focus of this project to provide information about best practices, costs, catch retention, and bycatch reduction. In addition, working with project partners to fund the manufacture, distribution, and installation of new small-bar TEDs on participating vessels may increase the willingness of fishers to adopt the new gear.

Potential Sources of Uncertainty

Uncertainties may affect the likelihood that this project would be successful in achieving the identified objectives in a timely manner. Corrective actions may be necessary to address uncertainties and maximize project benefits. Potential sources of uncertainty include:

- The ability to attract voluntary participants to adopt small-bar TEDs.
- The ability to attract participants for training.
- The degree to which fishers would alter behavior or fishing practices in response to outreach/education, particularly regarding TED compliance and dehooking and resuscitation procedures.

Project Monitoring, Performance Criteria, and Potential Corrective Actions

Performance monitoring is designed to determine if a project is meeting its restoration objective(s). Performance monitoring would also assist in determining the need for corrective actions and adaptive management. The proposed monitoring plan for this restoration project was developed to evaluate project performance, key uncertainties, and potential corrective actions, if needed. In addition to the performance monitoring parameters listed in Table 1, additional monitoring parameters/information may be reported on to document project implementation progress. Examples of this type of additional information can be found in the Reporting section below.

Information on each monitoring parameter is provided below. The list of corrective actions provided below is not exhaustive; rather, it includes a list of potential actions to be considered if the project is not

performing as expected once implemented. Other corrective actions may be identified post-implementation, as appropriate.

Table 1 Monitoring Parameters

Objective 1: Provide targeted outreach and education to shrimp trawl and commercial hook-and-line fisheries to encourage methods and gear that reduce risk of sea turtle bycatch.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Conservation Effort, Sea Turtles (Trainings Offered by Type)	Document restoration actions within each fishery.	Count the number and type of trainings on gear and methods.	Once per year for project duration.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	The number of trainings offered on TEDs is the same or increased from previous years; voluntary trainings and/or training materials for commercial hook-and-line fisheries on resuscitation and dehooking methods are offered.	N/A
Education or Outreach Effort (Materials Produced or Distributed by Type)	Document restoration actions within each fishery.	Count the number and type of educational materials produced and distributed on gear and methods within each of the three fisheries.	Once per year for project duration.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	N/A	N/A

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Conservation Effort, Sea Turtles (Inspections Conducted)	Document restoration actions.	Count the number of courtesy dockside and at-sea inspections of TEDs conducted.	Quarterly for the life of the project.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	The number of inspections conducted is the same or increased proportional to the active fleet in comparison to prior years of the GMT.	N/A
Conservation Improvements, Sea Turtles (Percent Compliance)	Monitor progress towards meeting the restoration objective.	Calculate from data sourced from GMT and state and federal enforcement offices.	Quarterly for the life of the project.	All TED compliance data available Gulf-wide.	Rate of vessel compliance with TED regulations is the same or increased over baseline.	Adjust strategy for education, outreach, or inspections to improve compliance.
Equipment Enhancements, Sea Turtles (Percent Vessels Using Enhanced Equipment)	Monitor progress towards meeting the restoration objective.	Calculate from GMT and other fisheries data.	Quarterly for the life of the project.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	compliance with existing regulations and practices	Adjust strategy for education and outreach to improve compliance.

Objective 2: Purchase and provide alternative fishing gear for shrimp trawl (otter/skimmer) vessels, such as small-bar TEDs, to reduce the risk of sea turtle bycatch.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Education or Outreach Effort (Number Contacted)	Document restoration actions.	Count the number of potential participants contacted during outreach about new small-bar TEDs.	Once per year for project duration.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	N/A	N/A
Equipment Enhancements, Sea Turtles (Number Distributed or Deployed by Type)	Document progress towards meeting the restoration objective	Count the number of small-bar TEDs distributed and installed. Count the number of vessels actively using small-bar TEDs (determined during GMT voluntary inspections).	Annually for the life of the project.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	Commercial fishing vessels adopt and use small-bar TEDs and adoption and use increases over the life of the project.	Increase education and outreach efforts to understand barriers to adoption and adjust approaches as needed.

Monitoring Schedule

The schedule for project monitoring is shown in Table 2 by monitoring parameter.

Table 2 Monitoring Schedule

Monitoring Parameters	Pre-Implementation	Implementation	Post-Implementation
Conservation Effort, Sea Turtles (Trainings Offered by Type)		X	
Education or Outreach Effort (Materials Produced or Distributed by Type)		X	
Conservation Effort, Sea Turtles (Inspections Conducted)	X[26]	X	
Conservation Improvements, Sea Turtles (Percent Compliance)	X	X	
Equipment Enhancements, Sea Turtles (Percent Vessels Using Enhanced Equipment)	X	X	
Education or Outreach Effort (Number Contacted)		X	
Equipment Enhancements, Sea Turtles (Number Distributed or Deployed by Type)		X	

Evaluation

Project monitoring data would be evaluated against baseline monitoring data collected by project partners. The Open Ocean TIG anticipates conducting an evaluation of the project monitoring data (as described above) to help answer the following questions:

- Were outreach and education efforts able to reach target audiences across the fisheries? If so, what outreach and education methods were most popular among which groups? If not, which groups were not reached as effectively and why?
- Did rates of TED compliance endure or increase over the lifetime of the project? If not, why?
- Were target numbers of participants for small-bar TED adoption reached? If not, why?
- Did the project produce unanticipated results?
- Were there unanticipated events related to the project that potentially affected the monitoring results (e.g., hurricanes)?
- Were any of the uncertainties that were identified prior to project implementation resolved?
- Were any new uncertainties identified?

Adaptive Management

The Open Ocean TIG anticipates utilizing adaptive management principles for this project to ensure project objectives are being met and allow for course adjustments if necessary to achieve project success.

[26] As this restoration project would build upon previous projects, some pre-implementation data, such as baseline GMT inspections conducted and percent compliance with TED regulations, would be provided by these previously funded Early Restoration projects.

This MAM Plan may be updated in the future to include additional details on adaptive management of this project.

This project would be implemented in an adaptive manner as education and outreach activities are conducted over time. As noted above, there is uncertainty regarding the potential to attract volunteers to adopt small-bar TEDs. However, because this project builds upon existing restoration activities, the project would benefit from existing Open Ocean TIG knowledge of which outreach and engagement techniques have been most successful for the target audiences. If monitoring criteria are not met, the Open Ocean TIG would identify and implement corrective actions as necessary to adjust outreach and educational approaches and attain restoration goals.

Data Management

Data Description

Data would be compiled within 12 months after collection. To the extent practicable, all environmental and biological data generated during monitoring activities would be documented using standardized field datasheets. If standardized datasheets are unavailable or not readily amendable to record project-specific data, then project-specific datasheets would be drafted prior to conducting any project monitoring activities. Original hardcopy datasheets and notebooks and photographs would be retained by NOAA.

Relevant project data that are handwritten on hardcopy datasheets or notebooks would be transcribed (entered) into standard digital format as per protocols. All field datasheets and notebook entries would be scanned to PDF files. Electronic data files would be named with the date on which the file was created and would include a ReadMe file that describes when the file was created and by whom, and any explanatory notes on the file contents. If a data file is revised, a new copy would be made and the original preserved.

All data would have properly documented Federal Geographic Data Committee/International Organization for Standardization (FGDC/ISO) metadata, a data dictionary (defines codes and fields used in the dataset), and/or a ReadMe file as appropriate (e.g., how data were collected, quality assurance/quality control [QA/QC] procedures, other information about data such as meaning, relationships to other data, origin, usage, and format).

Data Review and Clearance

After relevant project data are transcribed (entered) into standard digital format, electronic datasheets would be verified against the original hardcopy datasheets and/or notebooks and any corrections for transcription errors would be made as appropriate before data are used for any analyses or distributed. Implementing Trustees would verify and validate MAM data and information and would ensure that all data are: i) entered or converted into agreed upon/commonly used digital format; ii) labeled with metadata following FGDC/ISO standards to the extent practicable and in accordance with NOAA requirements.

After all identified errors are addressed, data are considered to be QA/QC'ed. NOAA would give the other Open Ocean TIG members time to review the data before making such information publicly available (as described below). Before submitting the monitoring data and information package, co-Implementing Trustees shall confirm with one another that the package is approved for submission.

Data Storage and Accessibility

Once all data have been QA/QC'ed it would be submitted to the DIVER Restoration Portal. Trustees would provide DWH NRDA MAM data and information to the Restoration Portal as soon as possible and no more than 1 year from when data are collected.

Data Sharing

The monitoring data and annual report would be made publicly available, in accordance with the Open, Public, Electronic and Necessary Government Data Act of 2019, through the DIVER Restoration Portal within 6 months of the end of each calendar year through project close-out.

Reporting

All reporting would occur after field surveys are completed annually. This report would summarize the findings for the sampling period including all worksheets transferred into digital format and presented in tabular and graphical formats. The data would be summarized in such a way that it is meaningful to the reader. Additionally, an annual report would be completed that includes:

- A summary of project activities for the year, such as the number of training events conducted, number of participants contacted, TED inspections, or small-bar TEDs installed.
- Summarized monitoring data - synthesized data for all efforts during the year.
- Graphics, if applicable, and associated interpretations of the data.
- Comparisons of pre- and post-implementations conditions, as applicable.
- Any uncertainties with management actions.
- Potential data collection issues.
- Reporting on general MAM activities in the DIVER Restoration Portal on an annual basis.
- Developing a Final MAM Report before a project is closed out.

Roles and Responsibilities

Monitoring data associated with this MAM plan would be collected, reviewed, and reported by NOAA.

References

DWH NRDA Trustees. 2016. *Deepwater Horizon* Oil Spill: Final Programmatic Damage Assessment and Restoration Plan (PDARP) and Final Programmatic Environmental Impact Statement (PEIS). Available: www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan

DWH NRDA Trustees. 2024. Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1. Appendix to the Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill. September. Available: https://www.fisheries.noaa.gov/s3//2024-09/DWH-NRDA-MAM-Manual-V2.1-Sept-2024.pdf

Gulf-Wide Sea Turtle Vessel Strike Reduction

Prepared by: The National Oceanic and Atmospheric Administration (NOAA) and IEc

Draft Version Date: 7/20/2024

Introduction

This monitoring and adaptive management (MAM) plan follows guidance provided in the Final Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement (PDARP/PEIS; Deepwater Horizon [DWH] Natural Resource Damage Assessment [NRDA] Trustees, 2016) and the Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1 (MAM Manual; DWH NRDA Trustees, 2024) by identifying the monitoring needed to evaluate progress toward meeting project objectives and to support any necessary adaptive management of the project. Where applicable, it identifies key sources of uncertainty and incorporates monitoring data and decision points that address these uncertainties. As not all projects would have the same sources and degrees of uncertainty, this project-specific MAM plan is scaled according to the level of uncertainty, scope, scale, and Restoration Type associated with this project.

This plan is a living document and may be updated as needed to reflect changing conditions and/or new information. Any future revisions to this MAM plan would be made publicly available through the Data Integration Visualization Exploration and Reporting (DIVER) Explorer (www.diver.orr.noaa.gov) and accessible through the Trustees' website (www.gulfspillrestoration.noaa.gov).

Project Overview

This project would be implemented as restoration for the DWH oil spill NRDA, consistent with the PDARP/PEIS.

- Programmatic Goal: Replenish and Protect Living, Coastal, and Marine Resources
- Restoration Type: Sea Turtles
- Restoration Approaches: Reduce injury and mortality of sea turtles from vessel strikes (PDARP/PEIS Appendix 5.D.4.7)
- Restoration Techniques: Public outreach and education; enhanced understanding of the temporal and spatial distribution of vessel strikes; and Development of potential mechanisms to reduce the frequency of vessel strikes (PDARP/PEIS Appendix 5.D.4.7)

This restoration project would occur in nearshore inlets and passes of Alabama, Florida, Louisiana, Mississippi, and Texas. This project would seek to reduce the risk of vessel strikes to sea turtles by taking a phased approach to identify hotspots and areas of highest risk of vessel strikes, determine risk factors, and implement site-specific voluntary conservation measures to reduce risks of strikes to sea turtles. Phase 1 activities would include analyzing existing datasets to assess the temporal and spatial distribution of vessel strikes in the Gulf of Mexico and identifying areas of concern and hotspots. In Phase 2, in-situ studies would be conducted in areas of concern to understand local variables influencing turtle-vessel interactions, and lethal collision risk would be modeled and assessed. In Phase 3, site-specific, voluntary measures would be implemented at three or more hotspots to reduce collision risk. These measures may include public education and outreach campaigns to influence boater behavior.

The Implementing Trustee of this project is NOAA, in coordination with the Sea Turtle Stranding and Salvage Network (STSSN) State Coordinators, state Trustees, universities, researchers, and non-governmental organizations.

Restoration Type Goals and Project Restoration Objectives

The Restoration Type goals relevant to this project, as identified in the PDARP/PEIS, are:

- Implement an integrated portfolio of restoration approaches to address all injured life stages (hatchling, juvenile, and adult) and species of sea turtles.
- Restore injuries by addressing primary threats to sea turtles in the marine and terrestrial environment such as bycatch in commercial and recreational fisheries, acute environmental changes (e.g., cold water temperatures), loss or degradation of nesting beach habitat (e.g., coastal armoring and artificial lighting), and other anthropogenic threats.
- Restore sea turtles in the various geographic and temporal areas within the Gulf of Mexico and Atlantic Ocean that are relevant to injured species and life stages.
- Support existing conservation efforts by ensuring consistency with recovery plans and recovery goals for each of the sea turtle species.

The restoration objectives for this project are:

1. Identify spatial and temporal areas of concern for sea turtle vessel strikes in the Gulf of Mexico.
2. Examine specific locations within the areas of concern with high-risk vessel-turtle interactions to inform which restoration activities may be most impactful in each location.
3. Establish and support the adoption of voluntary site-specific measures in at least three areas of concern to reduce the risk of vessel strikes to sea turtles.

Performance criteria would be used to determine restoration success or the need for corrective action in accordance with 15 Code of Federal Regulations 900.55(b)(1)(vii). Specific, measurable performance criteria are defined, as applicable, for monitoring parameters associated with the restoration objectives in the Project Monitoring, Performance Criteria, and Potential Corrective Actions section below.

*Concep*tual Setting

The conceptual setting identifies factors and interactions that may influence the project outcomes. This may include factors affecting whether the project is implemented as planned (e.g., the expected number of samples were obtained), cofactors that may have a significant effect on variance in the data, and factors that may alter the expected outcome of the restoration effort. Understanding the conceptual setting would aid in adaptive management of the project, as well as future projects of a similar type by identifying some of these factors and providing the opportunity to anticipate their effects and plan for contingencies.

This project would conduct data analysis to enhance understanding of sea turtle and recreational vessel interactions in the Gulf of Mexico across space and time, examine these interactions on a local scale to determine location-specific drivers of risk, and implement tailored restoration actions to reduce this risk. While vessel strikes are a source of high mortality risk to sea turtles in the Gulf of Mexico, recreational boating activities that contribute to vessel strikes are also economically and socially important. Therefore, broad-scale mitigation of this risk is not feasible, and mitigation measures are most effective when targeted to specific, local conditions. External drivers that could influence project success include location-specific factors such as buy-in from the local community. For this reason, the in-situ studies in Phase 2, such as boater surveys, would be key in selecting locations and interventions that would maximize success.

Potential Sources of Uncertainty

Potential uncertainties may affect the likelihood that this project would be successful in achieving the project objective in a timely manner. Corrective actions may be necessary to address uncertainties and maximize project benefits. Potential sources of uncertainty include:

- Whether sufficient information can be gathered to develop accurate models of sea turtle and vessel interactions on a Gulf-wide and local scale.
- Whether strategies can be developed for localized, voluntary mitigation measures that recreational boaters could adopt without incentives.
- The degree to which boaters would change behavior as a result of voluntary restoration activities such as education and outreach.

Project Monitoring, Performance Criteria, and Potential Corrective Actions

Performance monitoring is designed to determine if a project is meeting its restoration objective(s). Performance monitoring would also assist in determining the need for corrective actions and adaptive management. The proposed monitoring plan for this restoration project was developed to evaluate project performance, key uncertainties, and potential corrective actions, if needed. In addition to the performance monitoring parameters listed in Table 1, additional monitoring parameters/information may be reported on to document project implementation progress. Examples of this type of additional information can be found in the Reporting section below.

Information on each monitoring parameter is provided below. The list of corrective actions provided below is not exhaustive; rather, it includes a list of potential actions to be considered if the project is not performing as expected once implemented. Other corrective actions may be identified during implementation, as appropriate.

Objective 1, "Identify spatial and temporal areas of concern for sea turtle vessel strikes in the Gulf of Mexico" requires no monitoring and would instead be reported on during project implementation. For example, MAM reports may document the existing data sources that are analyzed and the utility of these data for improving understanding of temporal and spatial areas of concern for sea turtle vessel strikes within the Gulf of Mexico. Objective 2, "Examine specific locations within the above-mentioned areas of concern with high-risk vessel-turtle interactions to inform which restoration activities may be most impactful in each location", requires monitoring (monitoring parameters are identified below in Table 1) but would also be reported on during project implementation. MAM reports may describe the number and types of studies conducted, the type of new or existing data that are collected and analyzed, the results of risk analyses in the identified locations, and the utility of these data for informing next steps for implementation. Table 1 includes monitoring parameters for Objective 3, "Create and support the adoption of boating conservation practices to reduce the risk of recreational vessel strikes to sea turtles". Additional information about project reporting can be found in the Reporting section below.

Table 1 Monitoring Parameters

Objective 2: Examine specific locations within the areas of concern with high-risk vessel-turtle interactions to inform which restoration activities may be most impactful in each location.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Samples, Sea Turtles (Sites Assessed by Activity)	Document the number and types of sites where in-situ studies occur.	Count the number of locations examined with in-situ studies and risk modeling.	Once during implementation.	At locations where project activities have been implemented (number and specific location to be determined).	Identify at least three areas to focus vessel strike reduction efforts.	Adjust approach until performance criteria are met.

Objective 3: Establish and support the adoption of voluntary site-specific measure in at least three areas of concern to reduce the risk of vessel strikes to sea turtles.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Education or Outreach Effort (Number Contacted)	Document restoration actions.	Count the number of boaters contacted within each location.	Once per year for project duration.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	N/A	N/A

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Education or Outreach Effort (Materials Produced or Distributed by Type)	Document restoration actions.	Count the number and type of educational materials produced and distributed within each location.	Once per year for project duration.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	N/A	N/A
Conservation Improvements, Sea Turtles (Number Implemented by Activity)	Document progress toward meeting restoration objectives.	Calculate changes in boater behavior from observational studies or existing recreational boating data sources.	Quarterly during project duration.	At locations where project activities have been implemented in the project area (number and specific location to be determined).	Voluntary implementation of restoration measures by recreational boaters.	Adjust education and outreach quantity or strategy to meet restoration objectives.

Monitoring Schedule

The schedule for project monitoring is shown in Table 2 by monitoring parameter.

Table 2 Monitoring Schedule

Monitoring Parameters	Pre-Implementation	Implementation	Post-Implementation
Samples, Sea Turtles (Sites Assessed by Activity)		X	
Education or Outreach Effort (Number Contacted)		X	
Education or Outreach Effort (Materials Produced or Distributed by Type)		X	
Conservation Effort, Sea Turtles (Trainings Offered by Type)		X	
Conservation Improvements, Sea Turtles (Percent Compliance)		X	X

Evaluation

Project monitoring data would be evaluated against baseline monitoring data collected for each site during Phase 2. The Open Ocean TIG anticipates evaluating project monitoring data (as described above) to help answer the following questions:

- Were Phase 1 data analyses able to identify areas of concern for sea turtle and vessel interactions? If not, why? If so, additional data is necessary to develop and inform predictive risk models?
- Were Phase 2 in-situ studies and risk analyses conducted in at least three locations of concern? If not, why?
- If the Phase 2 studies and risk analyses were successful, what variables were found to influence risk of turtle-vessel interactions? What variables were common determinants of predicted success for proposed restoration activities?
- Were any locations or proposed restoration activities found to have less likelihood of success during Phase 2 risk modeling? Why or why not?
- Which locations or restoration activities were most successful in implementation? Why might this be the case?
- Was the project's restoration objective achieved? If not, is there a reason why it was not met?
- Did the project produce unanticipated results?
- Were there unanticipated events related to the project that potentially affected the monitoring results (e.g., hurricanes)?
- Were any of the uncertainties identified prior to project implementation resolved?
- Were any new uncertainties identified?

Adaptive Management

The Open Ocean TIG anticipates utilizing adaptive management principles for this project to ensure project objectives are being met and allow for course adjustments if necessary to achieve project success. The Open Ocean TIG would identify corrective actions as necessary. This MAM Plan may be updated in the future to include additional details on adaptive management of this project.

This project is inherently adaptive in nature as it would take a phased approach to restoration implementation. This adaptive approach would be applied to all phases of the project but would be most apparent during the Phase 1 and 2 exploration of high-risk sea turtle and vessel interaction hotspots and in-situ exploration of the local factors that may influence this risk. During these steps, data synthesis and analysis and the collection of site-specific data would inform the targeted education and outreach strategies that would be identified and applied in Phase 3. If site-specific studies during Phase 2 indicate that certain outreach methods or messaging strategies would not be effective at a given location, NOAA, as the Implementing Trustee, may identify alternate methods or locations to maximize the likelihood of success. If monitoring criteria are not met, the Open Ocean TIG would identify and implement corrective actions as necessary to adjust outreach and educational approaches and attain restoration goals.

Data Management

Data Description

Data would be compiled within 12 months after collection. To the extent practicable, all environmental and biological data generated during monitoring activities would be documented using standardized field datasheets. If standardized datasheets are unavailable or not readily amendable to record project-specific data, then project-specific datasheets would be drafted prior to conducting any project monitoring activities. Original hardcopy datasheets and notebooks and photographs would be retained by NOAA.

Relevant project data that are handwritten on hardcopy datasheets or notebooks would be transcribed (entered) into standard digital format as per protocols. All field datasheets and notebook entries would be scanned to PDF files. Electronic data files would be named with the date on which the file was created and would include a ReadMe file that describes when the file was created and by whom, and any explanatory notes on the file contents. If a data file is revised, a new copy would be made and the original preserved.

All data would have properly documented Federal Geographic Data Committee/International Organization for Standardization (FGDC/ISO) metadata, a data dictionary (defines codes and fields used in the dataset), and/or a ReadMe file as appropriate (e.g., how data were collected, quality assurance/quality control [QA/QC] procedures, other information about data such as meaning, relationships to other data, origin, usage, and format).

Data Review and Clearance

After relevant project data are transcribed (entered) into standard digital format, electronic datasheets would be verified against the original hardcopy datasheets and/or notebooks and any corrections for transcription errors would be made as appropriate before data are used for any analyses or distributed. Implementing Trustees would verify and validate MAM data and information and would ensure that all data are: i) entered or converted into agreed on/commonly used digital format; ii) labeled with metadata following FGDC/ISO standards to the extent practicable and in accordance with NOAA requirements.

After all identified errors are addressed, data are considered to be QA/QC'ed. NOAA would give the other Open Ocean TIG members time to review the data before making such information publicly available (as described below). Before submitting the monitoring data and information package, co-Implementing Trustees shall confirm with one another that the package is approved for submission.

Data Storage and Accessibility

Once all data have been QA/QC'ed, they would be submitted to the DIVER Restoration Portal. Trustees would provide DWH NRDA MAM data and information to the Restoration Portal as soon as possible and no more than 1 year from when data are collected.

Data Sharing

Monitoring data and annual reports would be made publicly available, in accordance with the Open, Public, Electronic and Necessary Government Data Act of 2019, through the DIVER Restoration Portal within 6 months of the end of each calendar year through project close-out.

Reporting

All reporting would occur after field surveys are completed annually. This report would summarize the findings for the sampling period including all worksheets transferred into digital format and presented in tabular and graphical formats. The data would be summarized in such a way that it is meaningful to the reader. Additionally, an annual report would be completed that includes:

- A summary of project activities for the year, such as the areas of concern studied, number of educational events or trainings held, or materials distributed.
- Summarized monitoring data - synthesized data for all efforts during the year.
- Graphics, if applicable, and associated interpretations of the data.
- Comparisons of pre- and post-implementations conditions, as applicable.
- Any uncertainties with management actions.
- Potential data collection issues.
- Reporting on general MAM activities in the DIVER Restoration Portal on an annual basis.
- Developing a Final MAM Report before a project is closed out.

Roles and Responsibilities

Monitoring data associated with this MAM plan would be collected, reviewed, and reported by NOAA.

References

DWH NRDA Trustees. 2016. *Deepwater Horizon* Oil Spill: Final Programmatic Damage Assessment and Restoration Plan (PDARP) and Final Programmatic Environmental Impact Statement (PEIS). Available: www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan

DWH NRDA Trustees. 2024. Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1. Appendix to the Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill. September. Available: https://www.fisheries.noaa.gov/s3//2024-09/DWH-NRDA-MAM-Manual-V2.1-Sept-2024.pdf

Gulf-Wide Sea Turtle Stranding Network and Emergency Response Enhancements

Prepared by: The National Oceanic and Atmospheric Administration (NOAA) and IEc

Draft Version Date: 7/20/2024

Introduction

This monitoring and adaptive management (MAM) plan follows guidance provided in the Final Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement (PDARP/PEIS; Deepwater Horizon [DWH] Natural Resource Damage Assessment [NRDA] Trustees, 2016) and the Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1 (MAM Manual; DWH NRDA Trustees, 2024) by identifying the monitoring needed to evaluate progress toward meeting project objectives and to support any necessary adaptive management of the project. Where applicable, it identifies key sources of uncertainty and incorporates monitoring data and decision points that address these uncertainties. As not all projects would have the same sources and degrees of uncertainty, this project-specific MAM plan is scaled according to the level of uncertainty, scope, scale, and Restoration Type associated with this project.

This plan is a living document and may be updated as needed to reflect changing conditions and/or new information. Any future revisions to this MAM plan would be made publicly available through the Data Integration Visualization Exploration and Reporting (DIVER) Explorer (www.diver.orr.noaa.gov) and accessible through the Trustees' website (www.gulfspillrestoration.noaa.gov).

Project Overview

This project would be implemented as restoration for the DWH oil spill NRDA, consistent with the PDARP/PEIS.

- Programmatic Goal: Replenish and Protect Living, Coastal, and Marine Resources
- Restoration Type: Sea Turtles
- Restoration Approaches: Increase sea turtle survival through enhanced mortality investigation and early detection of and response to anthropogenic threats and emergency events (PDARP/PEIS Appendix 5.D.4.6)
- Restoration Techniques: Enhanced network response and coordination; Enhanced preparedness and response capacity for emergency events; Enhanced investigation of mortality sources; Enhanced data access and analysis; (PDARP/PEIS Appendix 5.D.4.6)

This restoration project would occur in coastal waters of Alabama, Florida, Louisiana, Mississippi, and Texas. This project would seek to increase the capacity of the existing Sea Turtle Stranding and Salvage Network (STSSN) to identify and monitor in-water threats to sea turtles and to support response and rehabilitation efforts during emergency events. The project would build upon existing restoration projects that also support the STSSN, including the Phase IV Early Restoration *Sea Turtle Early Restoration Project, Enhancement of the Sea Turtle Stranding and Salvage Network and Development of an Emergency Response* project component and the Regionwide Trustee Implementation Group (Regionwide TIG) *Regionwide Enhancements to the Sea Turtle Stranding and Salvage Network and Enhanced Rehabilitation* project. Specific project activities would include Restoration and MAM activities would include: (1) enhancing Gulf of Mexico-wide STSSN coordination, including continuing NOAA's role as the state STSSN Coordinator for Louisiana, Mississippi, and Alabama; (2) supporting sea turtle emergency response activities and enhancing emergency preparedness; and (3) enhancing STSSN data management and analysis, including conducting mortality investigations. In addition to the

implementation of on-the-ground restoration activities listed above, this project also incorporates MAM-focused activities. Specifically, these MAM activities would involve STSSN data collection, analysis, and management through maintenance and development of data tools, production and distribution of analyses, investigations into sea turtle mortality, and data sharing.

The Implementing Trustee of this project is NOAA in coordination with STSSN State Coordinators, the sea turtle research community, and non-governmental organizations.

Restoration Type Goals and Project Restoration Objectives

The Restoration Type goals relevant to this project, as identified in the PDARP/PEIS, are:

- Implement an integrated portfolio of restoration approaches to address all injured life stages (hatchling, juvenile, and adult) and species of sea turtles.
- Restore injuries by addressing primary threats to sea turtles in the marine and terrestrial environment such as bycatch in commercial and recreational fisheries, acute environmental changes (e.g., cold water temperatures), loss or degradation of nesting beach habitat (e.g., coastal armoring and artificial lighting), and other anthropogenic threats.
- Restore sea turtles in the various geographic and temporal areas within the Gulf of Mexico and Atlantic Ocean that are relevant to injured species and life stages.
- Support existing conservation efforts by ensuring consistency with recovery plans and recovery goals for each of the sea turtle species.

The restoration objectives for this project are:

1. Enhance STSSN activities and coordination among STSSN partners.
2. Support emergency response activities and preparedness.
3. Manage the Gulf of Mexico STSSN database and synthesize, analyze, and distribute data across the network.

Performance criteria would be used to determine restoration success or the need for corrective action in accordance with 15 Code of Federal Regulations 900.55(b)(1)(vii). Specific, measurable performance criteria are defined, as applicable, for monitoring parameters associated with the restoration objectives in the in the "Project Monitoring, Performance Criteria, and Potential Corrective Actions" section below.

Conceptual Setting

The conceptual setting identifies factors and interactions that may influence the project outcomes. This may include factors affecting whether the project is implemented as planned (e.g., the expected number of samples were obtained), cofactors that may have a significant effect on variance in the data, and factors that may alter the expected outcome of the restoration effort. Understanding the conceptual setting would aid in adaptive management of the project, as well as future projects of a similar type by identifying some of these factors and providing the opportunity to anticipate their effects and plan for contingencies.

Sea turtles of all species may become stranded throughout the Gulf of Mexico at any life stage and in all coastal habitats. Stressors that lead to stranding may be anthropogenic or natural, and include harmful algal blooms (HABs), cold stun events, vessel strikes, or entrapment. The STSSN is a network of federal, state, and permitted local partners that respond to and document reports of sea turtles found compromised or deceased along U.S. coastlines from Maine to Texas. In the Gulf of Mexico, the STSSN assists with rescues, rehabilitation, and releases of sick and stranded sea turtles, as well as necropsies on deceased turtles. These necropsies provide data that help to identify threats and target current and future restoration efforts. By funding the continuation and expansion of STSSN activities, this project is designed to improve the likelihood that stranded turtles can be located and successfully rehabilitated and that

restoration resources can be allocated toward locations and activities that present the most critical risks to sea turtles.

Potential Sources of Uncertainty

Potential uncertainties may affect the likelihood that this project would be successful in achieving the project objective in a timely manner. Corrective actions may be necessary to address uncertainties and maximize project benefits. Potential sources of uncertainty include:

- Variability and unpredictability in stranding events, such as mass stranding events which can overwhelm portions of the regionwide STSSN, regardless of capacity increases or any reasonable level of preparedness.
- Unpredictability of extreme weather events that can diminish the capacity of the STSSN to respond to strandings or could damage rehabilitation facilities, reducing the number of animals that may be successfully rehabilitated. These weather events could also coincide with stranding events, reducing the effectiveness of the stranding response.
- Unpredictability of economic conditions that may result in turnover of STSSN personnel and difficulty in finding replacements.
- Logistical constraints in the worldwide network of suppliers that could result in a shortage of supplies needed for stranding response regardless of whether funding is available to purchase supplies.

Project Monitoring, Performance Criteria, and Potential Corrective Actions

Performance monitoring is designed to determine if a project is meeting its restoration objective(s). Performance monitoring would also assist in determining the need for corrective actions and adaptive management. The proposed monitoring plan for this restoration project was developed to evaluate project performance, key uncertainties, and potential corrective actions, if needed. In addition to the performance monitoring parameters listed in Table 1, additional monitoring parameters/information may be reported on to document project implementation progress. Examples of this type of additional information can be found in the Reporting section below.

Information on each monitoring parameter is provided below. The list of corrective actions provided below is not exhaustive; rather, it includes a list of potential actions to be considered if the project is not performing as expected once implemented. Other corrective actions may be identified post-implementation, as appropriate.

Restoration Objective 3, “Manage the STSSN GOM database and synthesize, analyze, and distribute data across the network”, would not require monitoring and would instead be reported on during project implementation. For example, MAM reports may document the volume and type of sea turtle stranding and necropsy data gathered by the STSSN, the types of analyses performed on these data, and how these data were translated to reports, distributed across the network, the utility of these data in making management decisions. Additional information about project reporting can be found in the Reporting section below.

Table 1 Monitoring Parameters

Objective 1: Enhance STSSN activities and coordination among STSSN partners.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Conservation Improvements, Sea Turtles (Number Implemented by Activity)	Document progress toward meeting restoration objectives.	Count the number and type of capacity improvements such as enhancements to stranding networks, increased capacity for rehabilitation, or available staff.	Once per year for project duration.	At locations where project activities have been implemented (number and specific location to be determined).	Maintain or improve capacity of and coordination among the STSSN over project duration.	Adjust project management approach to improve communication, coordination, or available capacity as needed.
Equipment Enhancements, Sea Turtles (Number Acquired or Purchased by Type)	Document progress toward meeting restoration objectives.	Report the type of vehicles, equipment or supplies purchased to support STSSN activities and improve capacity.	Once per year for project duration.	At locations where project activities have been implemented (number and specific location to be determined).	Maintain or improve equipment, vehicles, or supplies available for the STSSN over project duration.	Adjust project management approach to improve equipment, vehicle, or supply availability as needed.
Necropsies, Sea Turtles (Number Conducted)	Document restoration actions.	Count the number and type of field necropsies or carcasses collected for laboratory necropsies.	Quarterly during project duration.	All necropsies conducted by the STSSN Gulf-wide.	N/A	N/A

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Stranding and Rehab, Sea Turtles (Number Stranded by Taxon)	Document restoration actions.	Count the number of stranded sea turtles by species.	Quarterly during project duration.	All strandings responded to by the STSSN Gulf-wide.	N/A	N/A
Stranding and Rehab, Sea Turtles (Injury Type)	Document restoration actions.	Log the number and type of injury documented for each stranded sea turtle.	Quarterly during project duration.	All strandings responded to by the STSSN Gulf-wide.	N/A	N/A
Stranding and Rehab, Sea Turtles (Number Admitted)	Document restoration actions.	Count the number and species of stranded sea turtles admitted for rehabilitation.	Quarterly during project duration.	All strandings responded to by the STSSN Gulf-wide.	N/A	N/A
Stranding and Rehab, Sea Turtles (Number Rehabilitated by Taxon)	Document restoration actions.	Count the number and species of stranded sea turtles successfully rehabilitated and released.	Quarterly during project duration.	All strandings responded to by the STSSN Gulf-wide.	N/A	N/A

Objective 2: Support emergency response activities and preparedness.

Monitoring Parameter (Parameter Detail)	Purpose	Method(s)	Timing, Frequency, Duration of Data Collection	Sample Size and Sites	Performance Criteria	Potential Corrective Action(s)
Conservation Improvements, Sea Turtles (Number Implemented by Activity)	Document progress toward meeting restoration objectives.	Count the number and type of capacity improvements supported by the emergency response funding.	Once per year for project duration.	At locations where project activities have been implemented (number and specific location to be determined).	Maintain or improve capacity and coordination of STSSN emergency response preparedness over project duration.	Adjust project management approach to improve communication, coordination, or available capacity as needed.
Equipment Enhancements, Sea Turtles (Number Acquired or Purchased by Type)	Document progress toward meeting restoration objectives.	Count the number and type of equipment or supplies supported by the emergency response funding.	Once per year for project duration.	At locations where project activities have been implemented (number and specific location to be determined).	Maintain or improve equipment, vehicles, or supplies available for the STSSN emergency response preparedness over project duration.	Adjust project management approach to improve equipment, vehicle, or supply availability as needed.

Monitoring Schedule

The schedule for project monitoring is shown in Table 2 by monitoring parameter.

Table 2 Monitoring Schedule

Monitoring Parameters	Pre-Implementation	Implementation	Post-Implementation
Conservation Improvements, Sea Turtles (Number Implemented by Activity)	X	X	
Equipment Enhancements, Sea Turtles (Number Acquired or Purchased by Type)	X	X	
Necropsies, Sea Turtles (Number Conducted)	X	X	
Stranding and Rehab, Sea Turtles (Number Stranded by Taxon)	X	X	
Stranding and Rehab, Sea Turtles (Injury Type)	X	X	
Stranding and Rehab, Sea Turtles (Response Time)	X	X	
Stranding and Rehab, Sea Turtles (Number Admitted)	X	X	
Stranding and Rehab, Sea Turtles (Number Rehabilitated by Taxon)	X	X	
Stranding and Rehab, Sea Turtles (Proportion Released)	X	X	
Stranding and Rehab, Sea Turtles (Rehabilitation Time)	X	X	

Evaluation

Project monitoring data would be evaluated against baseline monitoring data collected by project partners. The Open Ocean Trustee Implementation Group ("Open Ocean TIG") anticipates conducting an evaluation of the project monitoring data (as described above) to help answer the following questions:

- Has the STSSN's capacity to respond to stranding events been improved over the project duration? Why or why not?
- Has communication and coordination among the Gulf-wide STSSN leads, State Coordinators, and local partners improved due to the project activities? In what ways, and what were the results?
- Has the STSSN's emergency response program experienced increased response capacity due to the availability of emergency funding? If so, in what ways were this emergency funding used?
- Was data management, analysis, and sharing improved over the life of the project? What type of data reports were generated and circulated, and how were these used by managers?
- Was the project's restoration objective achieved? If not, is there a reason why it was not met?
- Did the project produce unanticipated results?
- Were there unanticipated events related to the project that potentially affected the monitoring results (e.g., hurricanes)?
- Were any of the uncertainties identified prior to project implementation resolved?
- Were any new uncertainties identified?

Adaptive Management

The Open Ocean TIG anticipates utilizing adaptive management principles for this project to ensure project objectives are being met and allow for course adjustments if necessary to achieve project success. The Open Ocean TIG would identify corrective actions as necessary. This MAM Plan may be updated in the future to include additional details on adaptive management of this project.

This project would occur over many years and would build upon over a decade of past DWH restoration project supporting STSSN activities, allowing the lead Implementing Trustee, NOAA, to apply existing institutional knowledge to the management of this project. In addition, the data collected and analyzed through this project, including the results of necropsy and stranding investigations, would inform restoration leads and resource managers about threats to sea turtles such as gear entanglement, vessel strikes, and bycatch, which would assist with informing other DWH restoration projects' ability to adaptively manage for various threats to sea turtles in the Gulf of Mexico.

Data Management

Data Description

Data would be compiled within 12 months after collection. To the extent practicable, all environmental and biological data generated during monitoring activities would be documented using standardized field datasheets. If standardized datasheets are unavailable or not readily amendable to record project-specific data, then project-specific datasheets would be drafted prior to conducting any project monitoring activities. Original hardcopy datasheets and notebooks and photographs would be retained by NOAA.

Relevant project data that are handwritten on hardcopy datasheets or notebooks would be transcribed (entered) into standard digital format as per protocols. All field datasheets and notebook entries would be scanned to PDF files. Electronic data files would be named with the date on which the file was created and would include a ReadMe file that describes when the file was created and by whom, and any explanatory notes on the file contents. If a data file is revised, a new copy would be made and the original preserved.

All data would have properly documented Federal Geographic Data Committee/International Organization for Standardization (FGDC/ISO) metadata, a data dictionary (defines codes and fields used in the dataset), and/or a ReadMe file as appropriate (e.g., how data was collected, quality assurance/quality control [QA/QC] procedures, other information about data such as meaning, relationships to other data, origin, usage, and format).

Data Review and Clearance

After relevant project data are transcribed (entered) into standard digital format, electronic datasheets would be verified against the original hardcopy datasheets and/or notebooks and any corrections for transcription errors would be made as appropriate before data are used for any analyses or distributed. Implementing Trustees would verify and validate MAM data and information and would ensure that all data are: i) entered or converted into agreed on/commonly used digital format; ii) labeled with metadata following FGDC/ISO standards to the extent practicable and in accordance with NOAA requirements.

After all identified errors are addressed, data are considered to be QA/QC'ed. NOAA would give the other Open Ocean TIG members time to review the data before making such information publicly available (as described below). Before submitting the monitoring data and information package, co-Implementing Trustees shall confirm with one another that the package is approved for submission.

Data Storage and Accessibility

Once all data have been QA/QC'ed they would be submitted to the DIVER Restoration Portal. Trustees would provide DWH NRDA MAM data and information to the Restoration Portal as soon as possible and no more than 1 year from when data are collected.

Data Sharing

Monitoring data and annual reports would be made publicly available, in accordance with the Open, Public, Electronic and Necessary Government Data Act of 2019, through the DIVER Restoration Portal within 6 months of the end of each calendar year through project close-out.

Reporting

All reporting would occur after field surveys are completed annually. This report would summarize the findings for the sampling period including all worksheets transferred into digital format and presented in tabular and graphical formats. The data would be summarized in such a way that it is meaningful to the reader. Additionally, an annual report would be completed that includes:

- A summary of project activities for the year, such as the number of strandings responded to, sea turtles successfully rehabilitated and released, and the number of necropsies performed.
- Summarized monitoring data - synthesized data for all efforts during the year.
- Graphics, if applicable, and associated interpretations of the data.
- Comparisons of pre- and post-implementations conditions, as applicable.
- Any uncertainties with management actions.
- Potential data collection issues.
- Reporting on general MAM activities in the DIVER Restoration Portal on an annual basis.
- Developing a Final MAM Report before a project is closed out.

Roles and Responsibilities

Monitoring data associated with this MAM plan would be collected, reviewed, and reported by NOAA.

References

DWH NRDA Trustees. 2016. *Deepwater Horizon* Oil Spill: Final Programmatic Damage Assessment and Restoration Plan (PDARP) and Final Programmatic Environmental Impact Statement (PEIS). Available: www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan

DWH NRDA Trustees. 2024. Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.1. Appendix to the Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill. September. Available: https://www.fisheries.noaa.gov/s3//2024-09/DWH-NRDA-MAM-Manual-V2.1-Sept-2024.pdf

Appendix D. Impact Intensity Definition

The intensity definitions used in the evaluation of potential environmental impacts from the reasonable range of alternatives considered in this RP4/EA are provided below. These definitions are also provided in Table 6.3-2 in the PDARP/PEIS.

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
Geology and Substrates	Short-term: During construction period. Long-term: Over the life of the project or longer.	Disturbance to geologic features or soils could be detectable but could be small and localized. There could be no changes to local geologic features or soil characteristics. Erosion and/or compaction could occur in localized areas.	Disturbance could occur over local and immediately adjacent areas. Impacts on geology or soils could be readily apparent and result in changes to the soil character or local geologic characteristics. Erosion and compaction impacts could occur over local and immediately adjacent areas.	Disturbance could occur over a widespread area. Impacts on geology or soils could be readily apparent and could result in changes to the character of the geology or soils over a widespread area. Erosion and compaction could occur over a widespread area. Disruptions to substrates or soils may be permanent.
Hydrology and Water Quality	Short-term: During construction period. Long-term: Over the life of the project or longer.	Hydrology: The effect on hydrology could be measurable, but it could be small and localized. The effect could only temporarily alter the area's hydrology, including surface and groundwater flows. Water quality: Impacts could result in a detectable change to water quality, but the change could be expected to be small and localized. Impacts could quickly become undetectable. State water quality standards as required by the Clean Water Act could not be exceeded. Floodplains: Impacts may result in a detectable change to natural and beneficial floodplain values, but the change could be expected to be small, and localized. There could be no appreciable increased risk of flood loss including impacts on human safety, health, and welfare. Wetlands: The effect on wetlands could be measurable but small in terms of area and the nature of the impact. A small impact on the size, integrity, or connectivity could occur; however, wetland function could not be affected and natural restoration could occur if left alone.	Hydrology: The effect on hydrology could be measurable, but small and limited to local and adjacent areas. The effect could permanently alter the area's hydrology, including surface and groundwater flows. Water quality: Impacts on water quality could be observable over a relatively large area. Impacts could result in a change to water quality that could be readily detectable and limited to local and adjacent areas. Change in water quality could persist; however, it could likely not exceed state water quality standards as required by the Clean Water Act. Floodplains: Impacts could result in a change to natural and beneficial floodplain values and could be readily detectable but limited to local and adjacent areas. Location of operations in floodplains could increase risk of flood loss, including impacts on human safety, health, and welfare. Wetlands: The action could cause a measurable effect on wetlands indicators (size, integrity, or connectivity) or could result in a permanent loss of wetland acreage across local and adjacent areas. However, wetland functions could only be permanently altered in limited areas.	Hydrology: The effect on hydrology could be measurable and widespread. The effect could permanently alter hydrologic patterns including surface and groundwater flows. Water quality: Impacts could likely result in a change to water quality that could be readily detectable and widespread. Impacts could likely result in exceedance of state water quality standards and/or could impair designated uses of a waterbody. Floodplains: Impacts could result in a change to natural and beneficial floodplain values that could have substantial consequences over a widespread area. Location of operations could increase risk of flood loss, including impacts on human safety, health, and welfare. Wetlands: The action could cause a permanent loss of wetlands across a widespread area. The character of the wetlands could be changed so that the functions typically provided by the wetland could be permanently lost.

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
Air Quality	Short-term: During construction period. Long-term: Over the life of the project or longer.	The impact on air quality may be measurable but could be localized and temporary, such that the emissions do not exceed USEPA's *de minimis* criteria for a general conformity determination under the Clean Air Act (40 CFR 93.153).	The impact on air quality could be measurable and limited to local and adjacent areas. Emissions of criteria pollutants could be at USEPA's *de minimis* criteria levels for general conformity determination.	The impact on air quality could be measurable over a widespread area. Emissions would be high, such that they could exceed USEPA's *de minimis* criteria for a general conformity determination.
Noise	Short-term: During construction period. Long-term: Over the life of the project.	Increased noise could attract attention, but its contribution to the soundscape would be localized and unlikely to affect current user activities.	Increased noise could attract attention and contribute to the soundscape, including in local areas and those adjacent to the action, but could not dominate. User activities could be affected.	Increased noise could attract attention and dominate the soundscape over widespread areas. Noise levels could eliminate or discourage user activities.
Habitats	Short-term: Lasting less than two growing seasons. Long-term: Lasting longer than two growing seasons.	Impacts on native vegetation may be detectable but could not alter natural conditions and could be limited to localized areas. Infrequent disturbance to individual plants could be expected but would not affect local or range-wide population stability. Infrequent or insignificant one-time disturbance to locally suitable habitat could occur, but sufficient habitat could remain functional at both the local and regional scales to maintain the viability of the species. Opportunity for increased spread of non-native species could be detectable but temporary and localized and could not displace native species populations and distributions.	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. Opportunity for increased spread of non-native species could be detectable and limited to local and adjacent areas but could only result in temporary changes to native species population and distributions.	Impacts on native 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. Actions could result in the widespread increase of non-native species and result in broad and permanent changes to native species populations and distributions.

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
Wildlife Species (including birds)	Short-term: Lasting up to two breeding seasons, depending on length of breeding season. Long-term: Lasting more than two breeding seasons.	Impacts on native species, their habitats, or the natural processes sustaining them could be detectable, but localized, and could not measurably alter natural conditions. Infrequent responses to disturbance by some individuals could be expected but without interference to feeding, reproduction, resting, migrating, or other factors affecting population levels. Small changes to local population numbers, population structure, and other demographic factors could occur. Sufficient habitat could remain functional at both the local and range-wide scales to maintain the viability of the species. Opportunity for increased spread of non-native species could be detectable but temporary and localized, and these species could not displace native species populations and distributions.	Impacts on native species, their habitats, or the natural processes sustaining them could be measurable but limited to local and adjacent areas. Occasional responses to disturbance by some individuals could be expected, with some adverse impacts on feeding, reproduction, resting, migrating, or other factors affecting local population levels. Some impacts might occur in key habitats. However, sufficient population numbers or habitat could retain function to maintain the viability of the species both locally and throughout its range. Opportunity for increased spread of non-native species could be detectable and limited to local and adjacent areas, but could only result in temporary changes to native species population and distributions.	Impacts on native species, their habitats, or the natural processes sustaining them could be detectable and widespread. Frequent responses to disturbance by some individuals could be expected, with adverse impacts on feeding, reproduction, migrating, or other factors resulting in a decrease in both local and range-wide population levels and habitat type. Impacts could occur during critical periods of reproduction or in key habitats and could result in direct mortality or loss of habitat that might affect the viability of a species. Local population numbers, population structure, and other demographic factors might experience large changes or declines. Actions could result in the widespread increase of non-native species and result in broad and permanent changes to native species populations and distributions.
Marine and Estuarine Fauna (fish, shellfish, benthic organisms)	Short-term: Lasting up to two spawning seasons, depending on length of season. Long-term: Lasting more than two spawning seasons.	Impacts could be detectable and localized but small. Disturbance of individual species could occur; however, there could be no change in the diversity or local populations of marine and estuarine species. Any disturbance could not interfere with key behaviors such as feeding and spawning. There could be no restriction of movements daily or seasonally. Opportunity for increased spread of non-native species could be detectable but temporary and localized and these species could not displace native species populations and distributions.	Impacts could be readily apparent and result in a change in marine and estuarine species populations in local and adjacent areas. Areas being disturbed may display a change in species diversity; however, overall populations could not be altered. Some key behaviors could be affected but not to the extent that species viability is affected. Some movements could be restricted seasonally. Opportunity for increased spread of non-native species could be detectable and limited to local and adjacent areas but could only result in temporary changes to native species population and distributions.	Impacts could be readily apparent and could substantially change marine and estuarine species populations over a wide-scale area, possibly river-basin-wide. Disturbances could result in a decrease in fish species diversity and populations. The viability of some species could be affected. Species movements could be seasonally constrained or eliminated. Actions could result in the widespread increase of non-native species and result in broad and permanent changes to native species populations and distributions.

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
Protected Species	Short-term: Lasting up to one breeding/growing season. Long-term: Lasting more than one breeding/ growing season.	Impacts on protected species, their habitats, or the natural processes sustaining them could be detectable, but small and localized, and could not measurably alter natural conditions. Impacts could likely result in a "may affect, not likely to adversely affect" determination for at least one listed species.	Impacts on protected species, their habitats, or the natural processes sustaining them could be detectable and some alteration in the numbers of protected species or occasional responses to disturbance by some individuals could be expected, with some negative impacts to feeding, reproduction, resting, migrating, or other factors affecting local and adjacent population levels. Impacts could occur in key habitats, but sufficient population numbers or habitat could remain functional to maintain the viability of the species both locally and throughout their range. Some disturbance to individuals or impacts to potential or designated critical habitat could occur. Impacts could likely result in a "may affect, likely to adversely affect" determination for at least one listed species. No adverse modification of critical habitat could be expected.	Impacts on protected species, their habitats, or the natural processes sustaining them could be detectable, widespread, and permanent. Substantial impacts to the population numbers of protected species, or interference with their survival, growth, or reproduction could be expected. There could be impacts to key habitat, resulting in substantial reductions in species numbers. Results in an "is likely to jeopardize proposed or listed species/adversely modify proposed or designated critical habitat (impairment)" determination for at least one listed species.
Socioeconomics and Environmental Justice	Short-term: During construction period. Long-term: Over the life of the project or longer.	A few individuals, groups, businesses, properties, or institutions could be affected. Impacts could be small and localized. These impacts are not expected to substantively alter social and/or economic conditions. Actions could not disproportionately affect minority and low-income populations.	Many individuals, groups, businesses, properties, or institutions could be affected. Impacts could be readily apparent and detectable in local and adjacent areas and could have a noticeable effect on social and/or economic conditions. Actions could disproportionately affect minority and low-income populations. However, the impact could be temporary and localized.	A large number of individuals, groups, businesses, properties, or institutions could be affected. Impacts could be readily detectable and observed, extend over a widespread area, and have a substantial influence on social and/or economic conditions. Actions could disproportionately affect minority and low-income populations, and this impact could be permanent and widespread.
Cultural Resources	Short-term: During construction period. Long-term: Over the life of the project or longer.	The disturbance of a site(s), building, structure, or object could be confined to a small area with little, if any, loss of important cultural information potential.	Disturbance of a site(s), building, structure, or object not expected to result in a substantial loss of important cultural information.	Disturbance of a site(s), building, structure, or object could be substantial and may result in the loss of most or all its potential to yield important cultural information.

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
Infrastructure	Short-term: During construction period. Long-term: Over the life of the project or longer.	The action could affect public services or utilities, but the impact could be localized and within operational capacities. There could be negligible increases in local daily traffic volumes resulting in perceived inconvenience to drivers but no actual disruptions to traffic.	The action could affect public services or utilities in local and adjacent areas, and the impact could require the acquisition of additional service providers or capacity. Detectable increase in daily traffic volumes (with slightly reduced speed of travel), resulting in slowed traffic and delays, but no change in level of service (LOS). Short service interruptions (temporary closure for a few hours) to roadway and railroad traffic could occur.	The action could affect public services or utilities over a widespread area resulting in the loss of certain services or necessary utilities. Extensive increase in daily traffic volumes (with reduced speed of travel) resulting in an adverse change in LOS to worsened conditions. Extensive service disruptions (temporary closure of one day or more) to roadways or railroad traffic could occur.
Land and Marine Management	Short-term: During construction period. Long-term: Over the life of the project or longer.	The action could require a variance or zoning change or an amendment to a land use, area comprehensive, or management plan but could not affect overall use and management beyond the local area.	The action could require a variance or zoning change or an amendment to a land use, area comprehensive, or management plan and could affect overall land use and management in local and adjacent areas.	The action could cause permanent changes to and conflict with land uses or management plans over a widespread area.
Tourism and Recreational Use	Short-term: During construction period. Long-term: Over the life of the project or longer.	There could be partial developed recreational site closures to protect public safety. The same site capacity and visitor experience could remain unchanged after construction. The impact could be detectable and/or could only affect some recreationists. Users could likely be aware of the action but changes in use could be slight. There could be partial closures to protect public safety. Impacts could be local. There could be a change in local recreational opportunities; however, it could affect relatively few visitors or could not affect any related recreational activities.	There could be complete site closures to protect public safety. However, the sites could be reopened after activities occur. There could be slightly reduced site capacity. The visitor experience could be slightly changed but still available. The impact could be readily apparent and/or could affect many recreationists locally and in adjacent areas. Users could be aware of the action. There could be complete closures to protect public safety. However, the areas could be reopened after activities occur. Some users could choose to pursue activities in other available local or regional areas.	All developed site capacity could be eliminated because developed facilities could be closed and removed. Visitors could be displaced to facilities over a widespread area, and visitor experiences could no longer be available in many locations. The impact could affect most recreationists over a widespread area. Users could be highly aware of the action. Users could choose to pursue activities in other available regional areas.
Fisheries and Aquaculture	Short-term: Lasting up to two spawning seasons, depending on length of season. Long-term: Lasting more than two spawning seasons.	A few individuals, groups, businesses, properties, or institutions could be affected. Impacts could be small and localized. These impacts are not expected to substantively alter social and/or economic conditions	Many individuals, groups, businesses, properties, or institutions could be affected. Impacts could be readily apparent and detectable in local and adjacent areas and could have a noticeable effect on social and/or economic conditions.	A large number of individuals, groups, businesses, properties, or institutions could be affected. Impacts could be readily detectable and observed, extend over a widespread area, and could have a substantial influence on social and/or economic conditions.

Resource	Impact Duration	Minor Intensity	Moderate Intensity	Major Intensity
Marine Transportation	Short-term: During construction period. Long-term: Over the life of the project or longer.	The action could affect public services or utilities, but the impact could be localized and within operational capacities. There could be negligible increases in local daily marine traffic volumes, resulting in perceived inconvenience to operators but no actual disruptions to transportation.	The action could affect public services or utilities in local and adjacent areas, and the impact could require the acquisition of additional service providers or capacity. Detectable increase in daily marine traffic volumes could occur (with slightly reduced speed of travel), resulting in slowed traffic and delays. Short service interruptions could occur (temporary delays for a few hours).	The action could affect public services utilities over a widespread area resulting in the loss of certain services or necessary utilities. Extensive increase in daily marine traffic volumes could occur (with reduced speed of travel), resulting in extensive service disruptions (temporary closure of one day or more).
Aesthetics and Visual Resources	Short-term: During construction period. Long-term: Over the life of the project or longer.	There could be a change in the viewshed that was readily apparent but could not attract attention, dominate the view, or detract from current user activities or experiences.	There could be a change in the viewshed that was readily apparent and attracts attention. Changes could not dominate the viewscape, although they could detract from the current user activities or experiences.	Changes to the characteristic views could dominate and detract from current user activities or experiences.
Public Health and Safety, Including Flood and Shoreline Protection	Short-term: During construction period. Long-term: Over the life of the project or longer.	Actions could not result in (1) soil, groundwater, and/or surface water contamination; (2) exposure of contaminated media to construction workers or transmission line operations personnel; and/or (3) mobilization and migration of contaminants currently in the soil, groundwater, or surface water at levels that could harm the workers or general public. Increased risk of potential hazards (e.g., increased likelihood of storm surge) to visitors, residents, and workers from decreased shoreline integrity could be temporary and localized.	Actions could result in (1) exposure, mobilization and/or migration of existing contaminated soil, groundwater, or surface water to an extent that requires mitigation; and/or (2) could introduce detectable levels of contaminants to soil, groundwater, and/or surface water in localized areas within the project boundaries such that mitigation/remediation is required to restore the affected area to the pre-construction conditions. Increased risk of potential hazards to visitors, residents, and workers from decreased shoreline integrity could be sufficient to cause a permanent change in use patterns and area avoidance in local and adjacent areas.	Actions could result in (1) soil, groundwater, and/or surface water contamination at levels exceeding federal, state, or local hazardous waste criteria, including those established by 40 CFR 261; (2) mobilization of contaminants currently in the soil, groundwater, or surface water, resulting in exposure of humans or other sensitive receptors such as plants and wildlife to contaminant levels that could result in health effects; and (3) the presence of contaminated soil, groundwater, or surface water within the project area, exposing workers and/or the public to contaminated or hazardous materials at levels exceeding those permitted by the federal OSHA in 29 CFR 1910. Increased risk of potential hazards to visitors, residents, and workers from decreased shoreline integrity could be substantial and could cause permanent changes in use patterns and area avoidance over a widespread area.

Appendix E. List of Preparers and Reviewers

Name	Position
National Oceanic and Atmospheric Administration	
Laurie Rounds	Marine Habitat Resource Specialist
Ramona Schreiber	Marine Habitat Resource Specialist
Christina Fellas	Marine Habitat Resource Specialist
Sara Wissmann	DWH Sea Turtle Restoration Coordinator
Amy Piko	Marine Habitat Resource Specialist
Jamie Reinhardt	DWH FWCI Restoration Coordinator
Eric Weissberger	Marine Habitat Resource Specialist
Branden Blum	Senior Counselor
Rebeccah Hazelkorn	Fishery Biologist
Lesley Stokes	Research Fishery Biologist
Patrick Opay	Southeast Sea Turtle Recovery Coordinator
Jennifer Cudney	Fishery Biologist
Richard Malinowski	Fishery Biologist
Read Hendon	Oceanic and Coastal Pelagics Branch Chief
U.S. Department of Agriculture	
Benjamin Battle	USDA Representative for the Open Ocean TIG
Craig Johnson	USDA Representative for the Open Ocean TIG
U.S. Department of the Interior	
Erin Chandler	Restoration Biologist
Amy Mathis	DOI DWH Restoration Planner
Dianne Ingram	Sea Turtle Biologist
Lisa Stevens	Attorney-Advisor
U.S. Environmental Protection Agency	
Danny Weigand	DWH NRDA Program Manager
Tim Landers	Life Scientist
Kaitlyn Brucker	Biologist
Amanetta Somerville	NEPA Coordinator
Industrial Economics, Incorporated (IEc)	
Gail Fricano	Principal
Jennifer Hart	Senior Technical Consultant
Emily Mazur	Senior Associate
Jaime Hodgdon	Associate

Name	Position
Erin Lyons	Communications Specialist
Katie DeGroot	Senior Research Analyst
Stantec	
Carl Ferrarro	Principal, Senior Environmental Scientist
Kelly Swindle	Senior Marine Biologist, Project Manager
Kelley Barfoot	Project Management Assistant

Appendix F. List of Repositories

State/Province, Country	Repository	Address	City	Zip
AL	Dauphin Island Sea Laboratory, Admin Building	101 Bienville Boulevard	Dauphin Island	36528
AL	Thomas B. Norton Public Library	221 West 19th Avenue	Gulf Shores	36542
AL	Mobile Public Library, West Regional Library	5555 Grelot Road	Mobile	36606
AL	Bayou La Batre Public Library	12747 Padgett Switch Road	Irvington	36544
FL	Okaloosa County Library	185 Miracle Strip Parkway, SE	Ft. Walton	32548
FL	Escambia Southwest Branch Library	12248 Gulf Beach Highway	Pensacola	32507
FL	Walton County Library, Coastal Branch	437 Greenway Trail	Santa Rosa Beach	32459
FL	Bay County Public Library	898 W. 11th Street	Panama City	32401
FL	Gulf County Public Library	110 Library Drive	Port St. Joe	32456
FL	Homosassa Public Library	4100 S. Grandmarch Avenue	Homosassa	34446
FL	Pinellas Public Library	1330 Cleveland Street	Clearwater	33755
FL	Jacaranda Public Library	4143 Woodmere Park Boulevard	Venice	34293
FL	Riverdale Branch Library	2421 Buckingham Road	Fort Myers	33905
FL	Archie Carr National Wildlife Refuge Barrier Island Visitor Center	4055 Wildlife Way	Vero Beach	32963
FL	Nathaniel P. Reed Hobe Sound National Wildlife Refuge Visitor Center	13640 SE Federal Highway	Hobe Sound	33455
LA	Terrebonne Parish Library	151 Library Drive	Houma	70360
LA	New Orleans Public Library, Main Branch	219 Loyola Avenue	New Orleans	70112
LA	Jefferson Parish Library	4747 W. Napoleon Avenue	Metairie	70001

State/Province, Country	Repository	Address	City	Zip
LA	Jefferson Parish Library	LA 2751 Manhattan Boulevard	Harvey	70058
LA	Plaquemines Parish Library	8442 Highway 23	Belle Chase	70037
LA	St. Bernard Parish Library	1125 E. St. Bernard Highway	Chalmette	70043
LA	Alex P. Allain Library	206 Iberia Street	Franklin	70538
LA	South Lafourche Public Library	16241 E. Main Street	Cut Off	70345
LA	Calcasieu Parish Public Library Central Branch	301 W. Claude Street	Lake Charles	70605
LA	Iberia Parish Library	445 E. Main Street	New Iberia	70560
MS	Biloxi Public Library, Local History and Genealogy Department	580 Howard Avenue	Biloxi	39530
MS	Hancock County Library System	312 Highway 90	Bay St. Louis	39520
MS	Gulfport Harrison County Library	1708 25th Avenue	Gulfport	39501
MS	Pascagoula Public Library	3214 Pascagoula Street	Pascagoula	39567
TX	Port Arthur Public Library	4615 9th Avenue	Port Arthur	77672
TX	Library, Texas A&M, Corpus Christi	6300 Ocean Drive	Corpus Christi	78412
TX	Rosenberg Library	2310 Sealy Street	Galveston	77550
Tamaulipas, Mexico	Biblioteca Central Tampico UAT	Sin Colonia, 89336	Tampico	89109