Deepwater Horizon Natural Resource Damage Assessment

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

June 2025

NEPA UIN: EAXX-006-48-1HC-1728074544

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This NEPA document has been assigned the NEPA Unique Identification Number EAXX-006-48-1HC-1728074544.

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 in the Gulf of America (formerly the Gulf of Mexico; herein referred to as "the Gulf").[1] Oil spread from the deep ocean to the surface and nearshore environment from Texas to Florida. Extensive response actions were undertaken 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,[2] 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),[2] 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.[3]

In the PDARP/PEIS, the DWH NRDA Trustees developed a set of Restoration Types, consistent with the desire to seek a range of projects providing benefits to a broad array of injured resources and services.

[1] The waterbody was renamed per Executive Order 14172 "Restoring Names That Honor American Greatness."

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

[3] 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 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.

Ultimately, this process resulted in the inclusion of 13 Restoration Types under the five programmatic Restoration Goals evaluated for restoration.[4]

The TIG has prepared this *Final Restoration 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 Code of Federal Regulations § 990.53). The Open Ocean TIG reviewed 87 restoration project ideas proposed by individual members of the public; local, state, and federal agencies; and other organizations, ultimately identifying 12 project alternatives for full evaluation in this document, as summarized in Table ES-1. The Draft RP4/EA was released for public review and comment on October 30, 2024. The Open Ocean TIG accepted public comments through December 16, 2024. The TIG also held public webinars on November 14 and November 20, 2024, to provide information about the Draft RP4/EA and to answer questions and receive public comment. The Open Ocean TIG considered the comments received, which informed the TIG's analysis of alternatives in this Final RP4/EA. A summary of the public comments received and the Open Ocean TIG's responses to those comments are included in Appendix G of this RP4/EA. Edits made between the Draft and Final RP4/EA were primarily editorial, minor technical revisions to improve clarity, updates based on information obtained after the release of the Draft RP4/EA, and edits made in compliance with other environmental laws and regulations. Based on information and analyses presented in this document, the Open Ocean TIG is selecting the ten project alternatives listed as preferred in Table ES-1 for funding and implementation, at a total estimated cost of $210,620,000 (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 RP4/EA.

[4] The PDARP/PEIS programmatic Restoration Goals are: 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. The Restoration Types are: 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.

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 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 the 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 the Open Ocean TIG's existing *Return 'Em Right* project. 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 voluntary 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 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 voluntary bycatch and depredation hotspot communication networks to reduce mortality of injured fish populations.	Preferred	$18,040,000
FWCI4, Reduction of Stressors to Fish and Water Column Invertebrates This project would reduce mortality of 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 stressors such as marine debris, invasive species, impaired water quality, and others on fishery resources. Restoration activities would include: (1) identifying conservation strategies and prioritizing areas for implementation; and (2) implementing a range of conservation strategies which may include preventing and removing marine debris, preventing and removing invasive species such as lionfish, and addressing water quality stressors such as reducing risks and impacts from harmful algal blooms (HABs); and/or improve understanding other potential stressors to FWCI.	Preferred	$14,600,000
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. 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 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
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, 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 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 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	$8,800,000
ST3, 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 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, Sea Turtle Stranding Network and Emergency Response Enhancements This project would improve capacity to identify and monitor in-water stressors 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 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 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. 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)	**$210,620,000**

Table ES-2 Summary of the Reasonably Foreseeable 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	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 (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 Stressors 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,+	+
ST2, Sea Turtle Bycatch Reduction (preferred)	s	NE	s	s	NE	NE	NE	+	NE	NE	NE	NE	+	+	NE	+	NE

Project	Geology and Substrates	Hydrology and Water Quality	Air Quality	Noise	Habitats	Wildlife Species	Marine and Estuarine Fauna	Protected Species	Socioeconomics	Cultural Resources	Infrastructure	Land and Marine Management	Tourism and Recreational Use	Fisheries and Aquaculture	Marine Transportation	Aesthetics and Visual Resources	Public Health and Safety
ST3, Sea Turtle Vessel Strike Reduction (preferred)	NE	NE	s	s	NE	s	s	s,+	NE	NE	NE	NE	+	NE	NE	+	+
ST4, 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