



Deepwater Horizon Natural Resource Damage Assessment

Programmatic Review

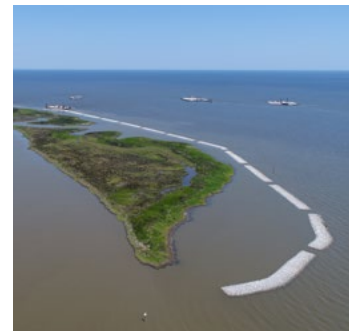
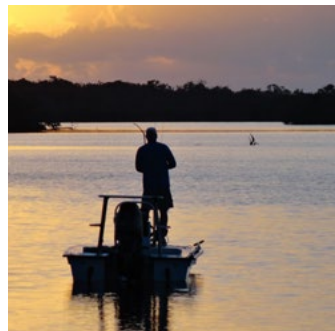
November 2021



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Cover photo credit: Jeanne Allen, EPA. Turtle and sunset fishing photo credit: Florida Fish and Wildlife Conservation Commission. Beach (second row) photo credit: Florida Department of Environmental Protection

Acronyms

BP	BP Exploration and Production	NMFS	National Marine Fisheries Service
DIVER	Data Integration Visualization Exploration and Reporting Tool	NRDA	Natural Resource Damage Assessment
DOI	U.S. Department of the Interior	OPA	Oil Pollution Act
EPA	U.S. Environmental Protection Agency	RESTORE	Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act
ESA	Endangered Species Act	SAV	Submerged Aquatic Vegetation
NEPA	National Environmental Policy Act	USDA	U.S. Department of Agriculture
NFWF	National Fish and Wildlife Foundation		
NOAA	National Oceanic and Atmospheric Administration		

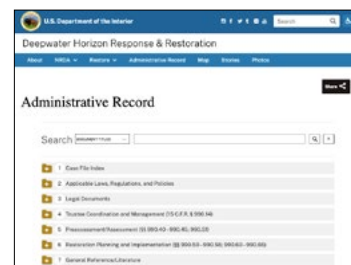
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Useful Links

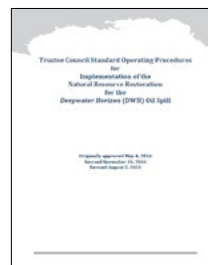
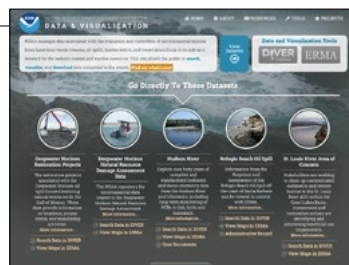
Trustees' Programmatic Restoration [Plan](#)

The *Deepwater Horizon* Natural Resource Damage Assessment Trustee Website



***Deepwater Horizon* Response & Restoration [Administrative Record](#)**

DIVER - [Restoration Project Data](#)



Monitoring and Adaptive Management [Manual](#)

Trustee Council Standard Operating [Procedures](#)

Executive Summary

The Natural Resource Damage Assessment Trustees for the *Deepwater Horizon* oil spill will periodically re-examine the restoration program to track their status towards meeting restoration goals and to identify any potential needs for program adjustments. This document serves as the Trustees' first programmatic review and provides a summary of Trustee progress through year-end 2020.

The 2010 *Deepwater Horizon* oil spill was an unprecedented event. Approximately 3.2 million barrels of oil were released into the deep ocean over nearly three months. The plume of oil moved throughout the water column, formed surface slicks that cumulatively covered an area the size of Virginia, and washed onshore to oil at least 1,300 miles of shoreline habitats. The spill and associated response actions resulted in injuries to numerous habitats and resources, species, and ecological functions. Overall, injuries affected such a broad array of natural resources and ecological services over

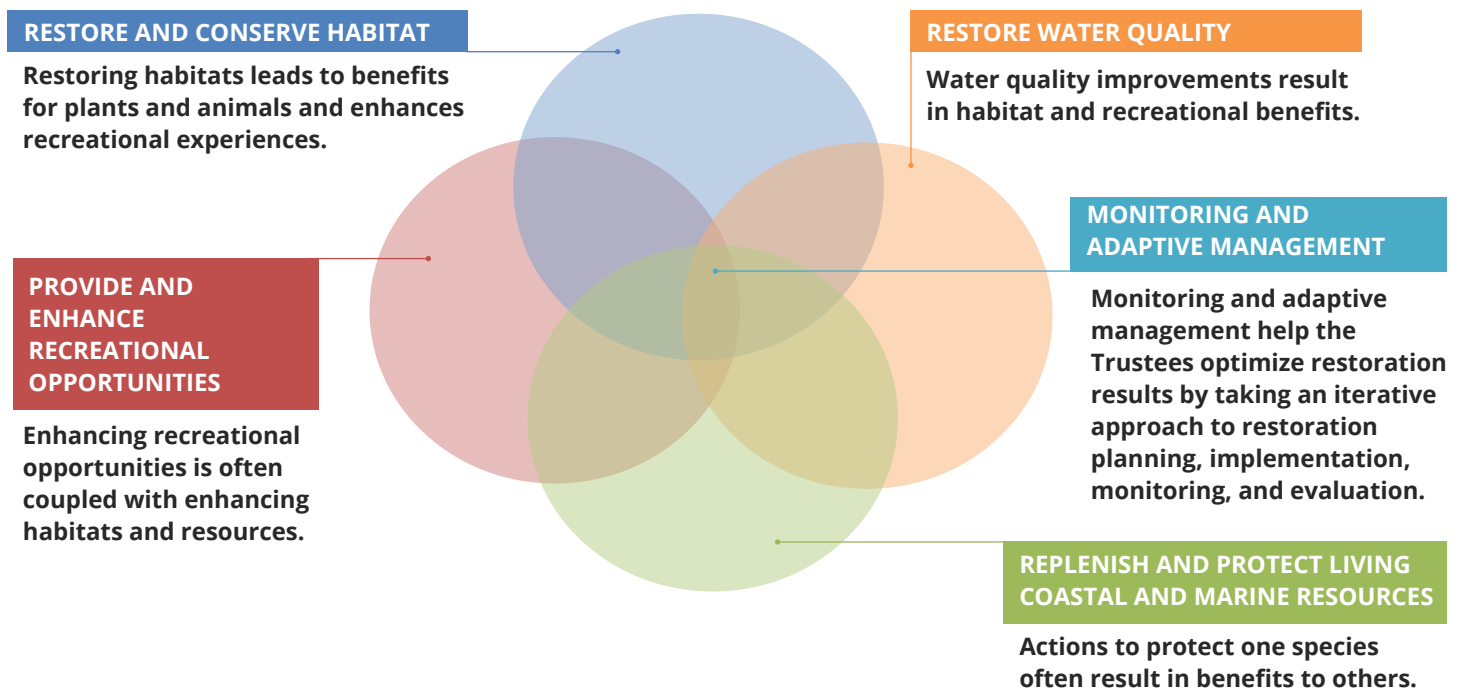
an expansive area that they are described in the Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement (Trustees' Programmatic Restoration Plan) as an ecosystem-level injury to the northern Gulf of Mexico.

In April 2016, a settlement was finalized that included up to \$8.8 billion in funding for the Trustees to address natural resource damages. The Trustees are in the initial years of a multi-decade process to plan and implement a comprehensive, integrated ecosystem restoration plan. The Trustees' Programmatic Restoration Plan includes five complementary goals and a portfolio of restoration types to address the diverse suite of spill-related injuries.

The Trustees' Programmatic Restoration Plan also establishes a governance structure through which the Trustees collaborate to administer restoration planning and implementation.

INTEGRATED RESTORATION

The five goals below guide the Trustees' restoration of the Gulf ecosystem.



These administrative functions are critically important to ensure that restoration funds are used in a coordinated manner; that regulatory compliance is conducted in a consistent, timely, and transparent manner; and, that the Trustees keep the public engaged and informed. In addition, adaptive management and monitoring provide the flexibility to adjust the program over time to respond to changing conditions or to new information.

Through 2020, the Trustees received approximately \$2.8 billion in funding from the settlement and committed approximately \$2.4 billion of that amount to the planning and implementation of more than 200 projects and activities. Funding commitments were largest for the restoration types of Wetlands, Coastal, and Nearshore Habitats (\$1.3 billion) and Provide and Enhance Recreational Opportunities (\$389 million). These funding commitments reflect the relatively large allocations to these two restoration types in the Consent Decree, as well as the Trustees' ability to use prior planning efforts to expedite the identification and evaluation of appropriate projects and activities. Funding commitments to other restoration types were notable but smaller.

RESTORATION PROJECTS BY THE NUMBERS

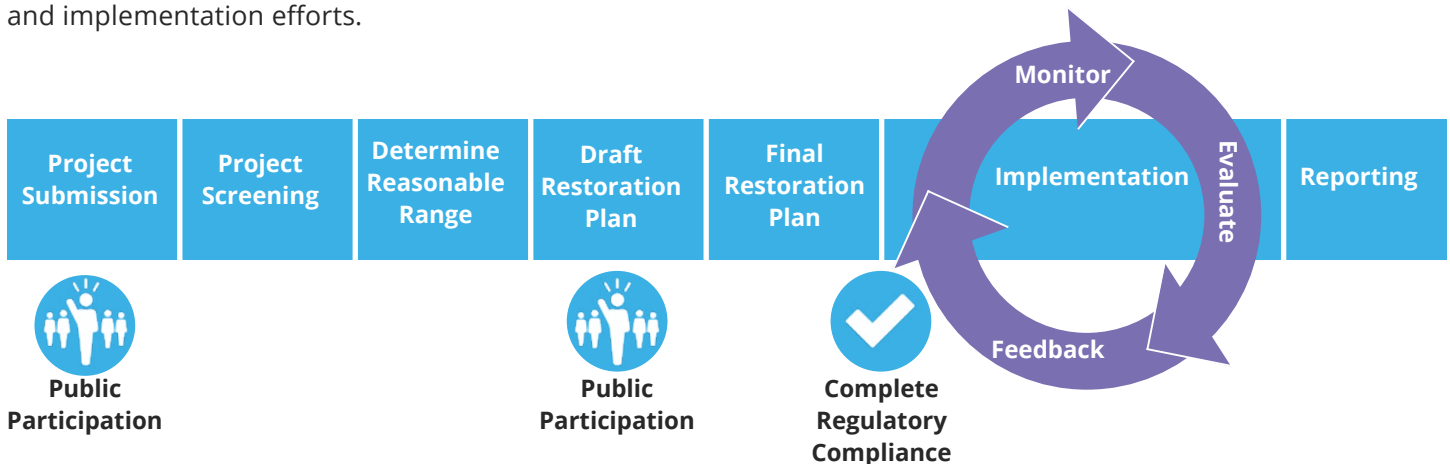
Through 2020, the Trustees have finalized **32** restoration plans and approved **200+** projects and activities.

From an administrative perspective, the Trustees have successfully implemented the governance structure described in the Trustees' Programmatic Restoration Plan. In general, the day-to-day business of the restoration program is conducted through the restoration planning and implementation process. This process has been documented in the 32 final restoration plans and more than 700 resolutions produced by the Trustees through 2020.

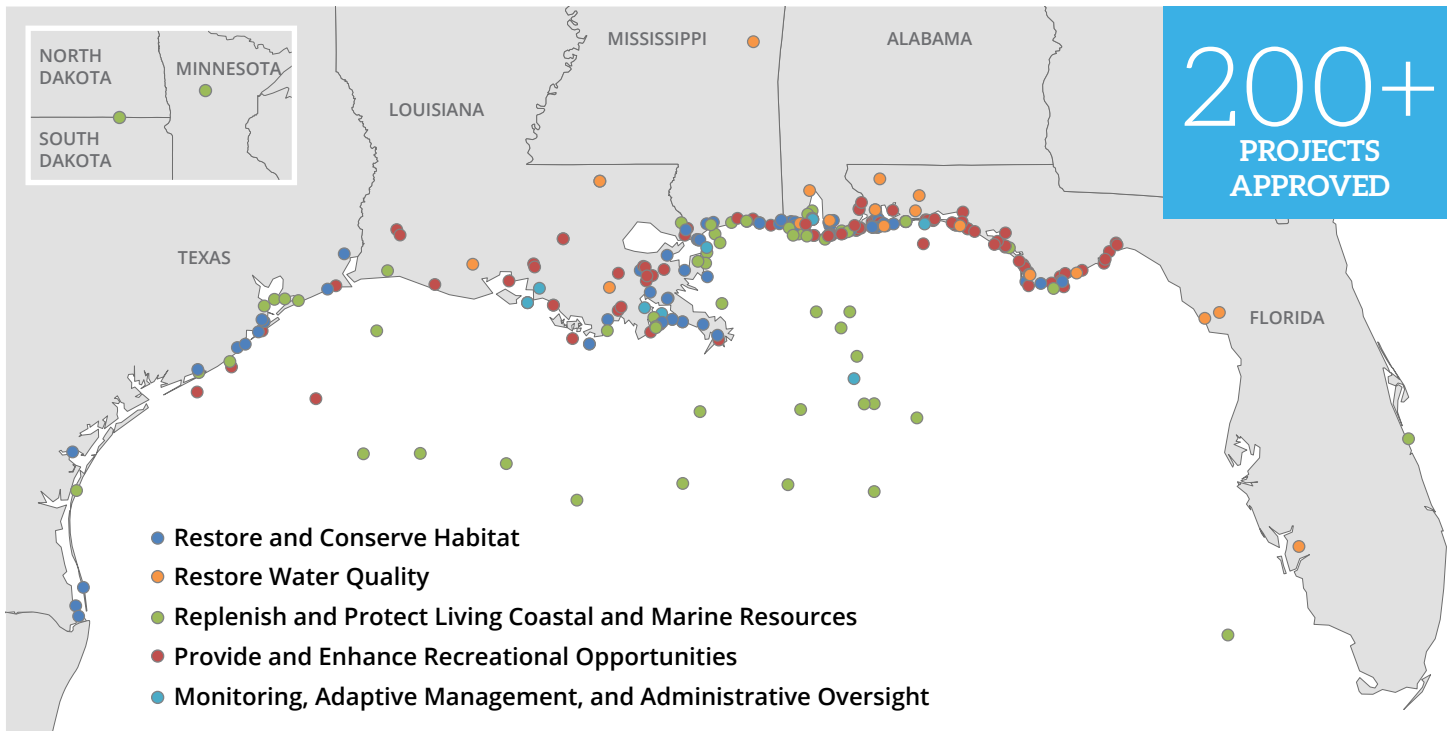
Public engagement is an essential part of the restoration program. The Trustees held 119 public meetings on restoration topics, published more than 550 web stories

RESTORATION PLANNING AND IMPLEMENTATION PROCESS OVERVIEW

The restoration planning portion of the process involves multiple steps that result in Trustee evaluation and selection of projects for implementation. It provides multiple opportunities for public participation and efficiently integrates regulatory compliance. Project implementation is characterized by an adaptive management feedback loop that incorporates robust monitoring, evaluation, and adjustments to projects underway and future planning and implementation efforts.



Implementation of Projects



on the Gulf Restoration website, added more than 11,600 documents to the Administrative Record, received more than 5,000 restoration project idea submissions, and reviewed more than 6,700 comments on draft restoration plans and made appropriate changes to project selection or design to reflect public input. Key restoration program materials have been translated to facilitate the inclusion of non-English speaking stakeholders in the restoration process. Webinars and online open houses were used more extensively in 2020 to bridge the gap when in-person meetings were not feasible due to the COVID-19 pandemic.

While restoration is off to a strong start, much remains to be done. The Trustees will continue to implement projects and activities already approved through the restoration planning process. Potential future projects will be identified, evaluated, and selected with a continuing emphasis on public outreach and involvement. The Trustees will also continue to integrate information from other Gulf restoration planning initiatives into their process and establish partnerships to support project implementation, and seek opportunities to

Financial Takeaway

By the end of 2020, the Trustees received \$2.8 billion of the \$8.8 billion settlement. They have committed \$2.4 billion (87%) of the received funds to restoration projects and planning initiatives.

leverage funding, as they have during the first several years of the *Deepwater Horizon* restoration program. Continued monitoring and assessment of restoration outcomes at project, restoration type, and programmatic scales will be important to evaluate restoration progress as more projects are fully implemented. These monitoring and assessment efforts will also enhance future restoration planning by providing information needed to adaptively manage the restoration program.

The remainder of this document provides additional detail on the *Deepwater Horizon* NRDA restoration program progress through 2020.

Selected Restoration Achievements To Date

Documented more than **93,200** sea turtle nests that facilitated the return of millions of sea turtle hatchlings to the ocean



25 watersheds with nutrient reduction projects in implementation



3,870 acres of oyster habitat enhanced or restored

Commercial fishing partnerships conserved **1 million** pounds of oceanic fish to grow and reproduce



Enhancement of stranding response capacity for marine mammals



Restored **2,120 acres** and acquired and protected **3,080 acres** of habitat important for bird breeding and foraging



2,350 acres of marsh, beach, and dune habitats created, restored, or enhanced

74 projects implemented to provide and enhance recreational opportunities in the Gulf



More than **5,600** acres of wetland, coastal, and nearshore habitat acquired and protected



Louisiana's coastal wetlands provide habitat for wildlife and opportunities for recreation.

Photo credit: State of Louisiana

Introduction

The February 2016 Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement (Trustees' Programmatic Restoration Plan) provides that the Trustees for the *Deepwater Horizon* oil spill may re-examine the restoration program approximately every five years to track progress towards meeting restoration goals and any potential needs for program adjustments. Assessing and documenting progress in a publicly available report is consistent with the *Deepwater Horizon* Trustees' commitment to adaptive management, transparency, and accountability. Reporting on progress provides a basis to evaluate the potential need for adjustments to the pace, direction, administrative processes, or other aspects of *Deepwater Horizon* Natural Resource Damage Assessment (NRDA) restoration planning and implementation. This document serves as the Trustees' first programmatic review and provides a summary of the Trustees' progress through year-end 2020.

KEY TERMS

Natural Resource Damage Assessment:

A process that is conducted by designated natural resource trustees on behalf of the public to assess injuries to natural resources and the services they provide and to restore those resources and services.

Trustees: The trustees are government entities authorized to undertake the natural resource damage assessment and related restoration activities.

The 2010 *Deepwater Horizon* oil spill was an unprecedented event. Approximately 3.2 million barrels of oil were released into the deep ocean over nearly three months. The plume of oil moved throughout the water column, formed surface slicks that cumulatively covered an area the size of Virginia, impacted more than 700 square miles of seafloor surrounding the wellhead,

The snowy egret is one of many bird species that visit the Gulf of Mexico region.



Photo credit: Florida Fish and Wildlife Conservation Commission

and washed onshore to oil at least 1,300 miles of shoreline habitats. The spill and associated response actions resulted in injuries to numerous habitats and resources, species, and ecological functions. For example, Trustee analyses indicate that among other impacts, trillions of newly hatched fish, billions of adult oysters, tens of thousands of sea turtles, and tens of thousands of birds were killed. Hundreds of miles of wetlands and sand beaches were injured by oiling and response actions. Overall, injuries affected such a broad array of natural resources and ecological services over such an expansive area that they are described in the Final Programmatic Damage Assessment and Restoration Plan and Trustees' Programmatic Restoration Plan as an ecosystem-level injury to the northern Gulf of Mexico.

In the years following the spill, the Trustees began planning for and implementing emergency and early restoration projects with funding from the primary party responsible for the spill, BP Exploration and Production (BP). Through these projects and activities, the Trustees began addressing spill impacts while conducting a massive effort to assess and comprehensively characterize injuries to natural resources and ecological services. In April 2016, a settlement with BP and other responsible parties was finalized that included up to \$8.8 billion in funding for the Trustees to address natural resource damages through a

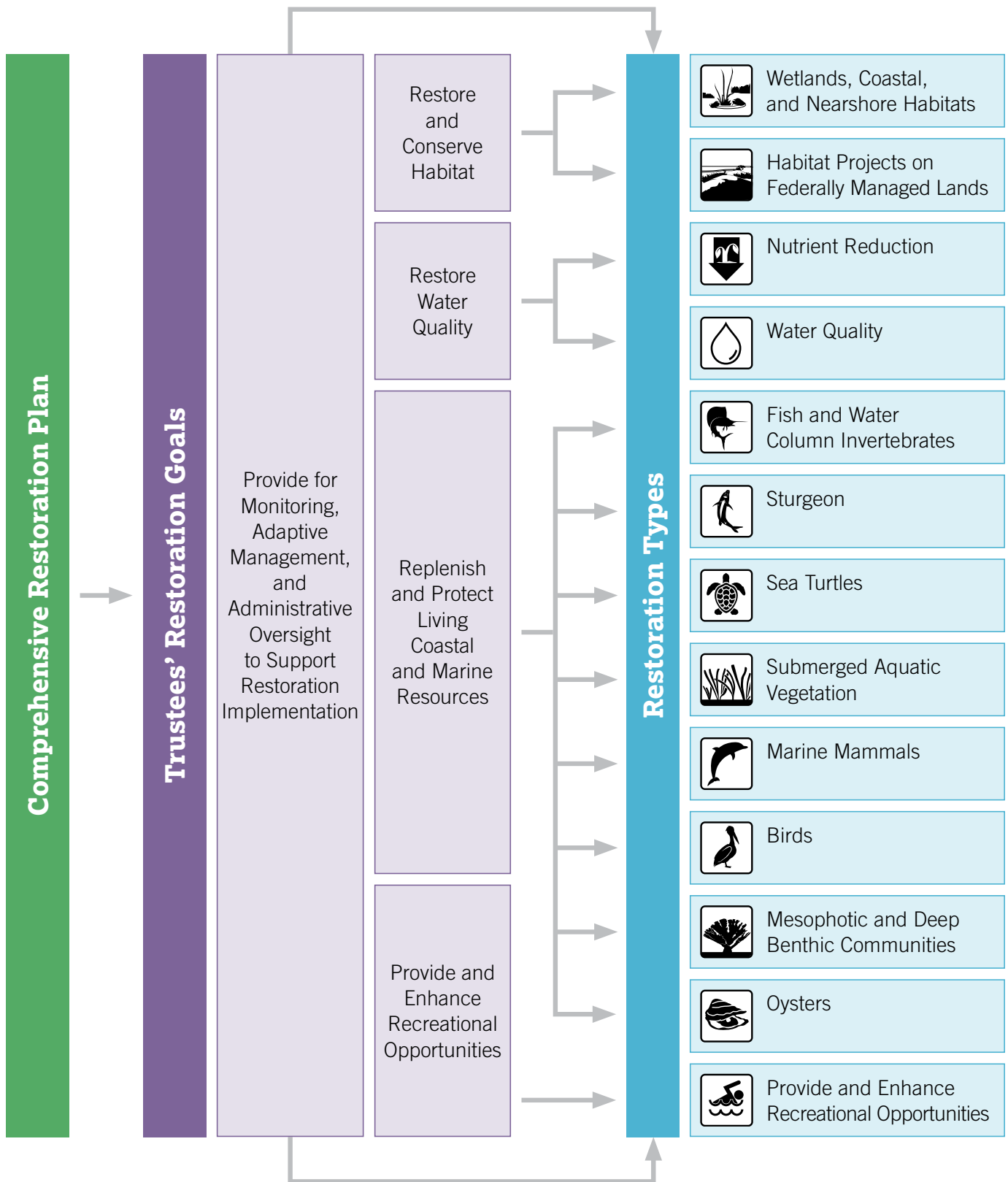
What are projects and activities?

Projects include restoration on-the-ground, in the water, or engineering and design efforts that help guide future restoration. Activities include restoration planning, monitoring and adaptive management efforts, or other actions that support restoration.

comprehensive portfolio of restoration projects and activities. Settlement payments from BP will continue annually through 2031 and may extend to 2032 for final payments related to unknown conditions and adaptive management restoration.

Just as the injuries did not happen in isolation, restoration efforts require an ecosystem approach to restoring the natural resources and ecological services injured by the *Deepwater Horizon* incident. The Trustees are in the initial years of a multi-decade process to plan and implement the Trustees' Programmatic Restoration Plan, which is a comprehensive, integrated ecosystem approach to restoration. The Trustees' Programmatic Restoration Plan includes five complementary goals and a portfolio of restoration types that address the diverse suite of regional and local scale injuries. It also describes how restoration funding is allocated across

Deepwater Horizon Trustee Restoration Goals and Restoration Types



DEEPWATER HORIZON FUNDING FOR RESTORATION

The *Deepwater Horizon* settlements provided several sources of restoration funding; three are highlighted below.

NATURAL RESOURCE DAMAGE ASSESSMENT

This document is focused only on [Natural Resource Damage Assessment](#) work.

THE RESTORE ACT

Learn more about [RESTORE Act](#) work.

NATIONAL FISH AND WILDLIFE FOUNDATION

Learn more about their work through the [Gulf Environmental Benefit Fund](#).

the 13 restoration types (as well as seven distinct restoration areas and unknown conditions). These 13 restoration types are intended to work both independently and together to address injuries to natural resources and services. The Trustees' Programmatic Restoration Plan also establishes a suite of restoration approaches and the framework for ongoing identification, evaluation, selection, and implementation of restoration projects and activities (see Chapter 3 for a description of project and activity selection process).

The Consent Decree establishes a governance structure through which the Trustees collaborate to administer restoration planning and implementation. The Trustees' Programmatic Restoration Plan further describes the governance provisions for funding allocations for administrative oversight, monitoring, and adaptive management consistent with the Consent Decree. These administrative functions are critically important to ensure that restoration funds are used in a coordinated manner and that the Trustees keep the public engaged and informed. Adaptive management and monitoring provide the flexibility to adjust the program to respond to changing conditions or new information.

In the Trustees' Programmatic Restoration Plan, the Trustees determined that comprehensive, integrated ecosystem restoration is the best approach to addressing the ecosystem-level injuries that resulted from the *Deepwater Horizon* spill and response actions. By restoring a wide range of natural resources and habitats, the Trustees will provide substantial benefits to a large variety of species and ecological services, thereby

maximizing the effects of restoration projects and activities and the likelihood of appropriately compensating the public for injuries from the spill. This document provides information on the progress made through the initial years of *Deepwater Horizon* Trustee restoration efforts.

Document Organization

The remainder of this document is organized as follows:

- **Chapter 2** – Administrative Oversight: Provides updates on Trustee governance, financial management, public engagement, and regulatory compliance.
- **Chapter 3** – Restoration Planning, Implementation Process, Monitoring and Adaptive Management Process: Summarizes the process used by the Trustees to identify and evaluate potential restoration projects, finalize project selection for implementation, and explains the role of monitoring and adaptive management.
- **Chapter 4** – Restoration Implementation Progress: Provides updates on restoration implementation progress for each of the 13 restoration types.
- **Chapter 5** – Restoration Area Updates: Presents restoration progress information by geographic area (i.e., Florida, Alabama, Mississippi, Louisiana, Texas, Open Ocean, and Regionwide).
- **Chapter 6** – Future Restoration Planning: Provides a summary of how the Trustee Council will continue to pursue restoration.

Administrative Oversight

Texas coastal marshes provide important habitat for a wide range of species.



Photo credit: Texas Parks and Wildlife Department

The Trustees' Programmatic Restoration Plan identifies five overarching goals to guide NRDA restoration efforts. One of these goals is to provide for comprehensive planning, administrative oversight, and monitoring and adaptive management of restoration implementation. The focus of this goal is to ensure that the portfolio of restoration projects implemented over decades provides long-term benefits to the resources and services injured by the spill and that the projects are implemented in an efficient and effective manner as envisioned in the Trustees' Programmatic Restoration Plan. To help meet this goal, the Trustees' Programmatic Restoration Plan identifies a governance structure created to guide the restoration process and establish transparency and public accountability for Trustee actions. Through this governance structure, the Trustees manage the various oversight responsibilities associated with the NRDA restoration program, including financial management, public engagement, and

regulatory compliance. Trustee progress in each of these areas is summarized in the following subsections of this chapter. The Trustees' progress related to comprehensive planning and monitoring and adaptive management is summarized in Chapter 3.

Governance

The Trustees have successfully implemented the governance structure described in the Trustees' Programmatic Restoration Plan and established related responsibilities, processes, and procedures in Memoranda of Understanding and Standard Operating Procedures found in the *Deepwater Horizon* Administrative Record. As evidenced throughout this document, this governance structure has allowed the Trustees to plan and implement restoration activities effectively, efficiently, and transparently. Currently, the Trustees do not anticipate substantive changes to the governance structure.

GOVERNANCE STRUCTURE

TRUSTEE COUNCIL

Alabama | Florida | Louisiana | Mississippi | Texas | DOI | EPA | NOAA | USDA

Ensures coordination, efficiency, transparency, and accountability across the Trustee Implementation Groups.

TRUSTEE IMPLEMENTATION GROUPS

Alabama | Florida | Louisiana | Mississippi | Texas | Open Ocean | Regionwide | Unknown Conditions and Adaptive Management*

Conduct planning for restoration and monitoring and adaptive management; provide oversight for implementation.
*Will be formed at a future date.

INDIVIDUAL TRUSTEE AGENCIES

More than a dozen individual state and federal agencies.
Agencies implement restoration projects and monitoring activities.

Structure

The Trustees' governance structure includes a Trustee Council, Trustee Implementation Groups, and Trustee agencies. The Trustee Council includes representatives of all five Gulf states and four federal agencies: U.S. Department of the Interior (DOI), U.S. Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration (NOAA), and U.S. Department of Agriculture (USDA). The Trustee Council is chaired and vice-chaired by a state agency representative and a federal agency representative, respectively, which rotates annually. By establishing procedures and practices to standardize or establish consistency, the Trustee Council ensures coordination, efficiency, transparency, and fiscal program accountability across the Trustee Implementation Groups.

Consistent with the Consent Decree, the Trustees have established seven Trustee Implementation Groups corresponding to the seven restoration areas: one for each of the five Gulf States, one for Open Ocean, and one for Regionwide. Each state Restoration Area Trustee Implementation Group consists of state Trustee

representative(s) and a Trustee representative from each of the four federal agencies. The Open Ocean Trustee Implementation Group consists of a Trustee representative from each of the four federal agencies. The Regionwide Trustee Implementation Group includes representatives of all five Gulf states and each federal Trustee. All decisions are made by consensus.

The Trustee Implementation Groups conduct restoration planning, implementation, and monitoring and adaptive management for restoration decisions using funding allocated to each restoration area (Chapter 3). In accordance with the Consent Decree, the Trustees also will establish an eighth Trustee Implementation Group, Unknown Conditions and Adaptive Management. In addition, the Cross-Trustee Implementation Group Monitoring and Adaptive Management Workgroup was established with membership by all Trustee agencies to collectively address monitoring and adaptive management topics relevant to multiple restoration areas.

Each agency applies its expertise and experience to inform, evaluate, and implement restoration planning

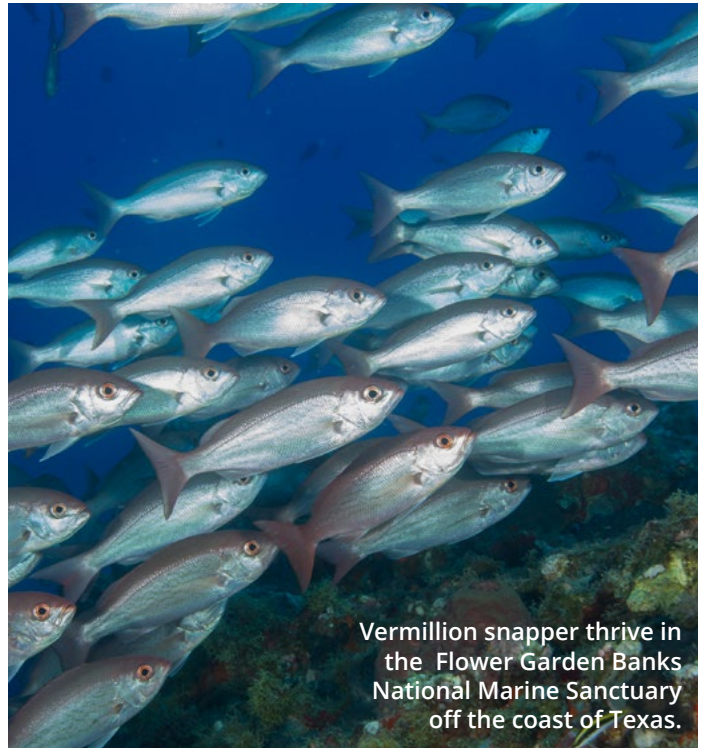
and monitoring and adaptive management decisions for the NRDA restoration program. Each project or activity in a restoration or monitoring plan is implemented by one or more Trustee agency. The Trustee agency that implements the project is responsible for preparing project-specific information, carrying out the project, tracking project-specific expenditures, and preparing the annual reporting information on behalf of the Trustee Implementation Group.

Procedures and Planning Guidance

Immediately following the 2016 Consent Decree, the Trustee Council adopted Standard Operating Procedures to address long term management and administration by the Trustees, including structure and decision-making, funding and fiscal management, administrative procedures, restoration planning and implementation, monitoring and data management, recordkeeping, and reporting.

Beyond development and implementation of Standard Operating Procedures, the Trustees have developed strategic frameworks and a Monitoring and Adaptive Management Manual. These types of documents allow Trustee Implementation Groups the flexibility to conduct restoration planning in a manner that best fulfills restoration area goals while ensuring ecosystem restoration goals are addressed. For example, while Trustee Council Standard Operating Procedures describe the process that Trustee Implementation Groups will follow for restoration planning, they do not prescribe a specific number of plans that should be produced or specify in which order restoration goals should be addressed. Strategic frameworks for birds, marine mammals, oysters, and sea turtles were developed to guide prioritization, sequencing, and the selection of projects by Trustee Implementation Groups to ensure individual projects contribute to the ecosystem goals. Further, the Monitoring and Adaptive Management Manual provides guidance on developing monitoring plans and implementing monitoring and adaptive management actions during restoration.

Trustee Council documents may be updated, on an as-needed basis. For example, Trustee Council Standard



Operating Procedures were initially approved in May 2016 and subsequently revised in November 2016 and again in 2021 to reflect the evolution of the program. As an example, the Trustee Council updated financial topics, such as the process for returning funds and other deposits, and outlined the process for project closure. All versions of the Standard Operating Procedures, Monitoring and Adaptive Management Manual, and strategic frameworks can be found in the *Deepwater Horizon* Administrative Record and on the Trustees' Gulf Spill Restoration website.

In general, day-to-day Trustee Implementation Group business is conducted through the restoration planning and implementation process (see Chapter 3) and is documented through restoration plans and resolutions. More than 700 Trustee Council and Trustee Implementation Group resolutions and 32 final restoration plans were produced through 2020 and are available in the *Deepwater Horizon* Administrative Record. The resolutions document consensus decisions regarding the funding of administrative activities, and the implementation of restoration projects and activities approved through restoration plans.

Financial Management

Distribution and Use of Funds

As of December 31, 2020, the Trustees have received approximately \$2.8 billion (32 percent) of the total settlement amount (up to \$8.8 billion) and earned approximately \$80 million in interest on received funds. Through the end of 2020, approximately \$2.4 billion (87 percent) of the funds received have been committed to the restoration planning and implementation of more than 200 projects. Trustee administrative and oversight spending have totaled less than three percent of funding received.

The Trustee Council is pleased with the rate of commitment of settlement funds to-date for several reasons. To commit funds to projects or activities, a Trustee Implementation Group completes restoration planning and produces a final restoration plan and resolution to guide how the funds are used. Additional planning processes are in place to guide the use of funds for administrative or other needs. The Trustee Implementation Groups carefully balance funding availability with the projects and activities considered for implementation during any specific period. This requires thorough analysis consistent with the complexities of ecosystem-level restoration and other important aspects of the restoration process, such as:

- Determination of whether a project or activity can be leveraged with other projects and activities or other sources of Gulf restoration funding.
- A need, in some cases, to address critical data gaps before engaging in substantive project development activities.
- The time and effort required for restoration plan development to include Oil Pollution Act (OPA) and National Environmental Policy Act (NEPA) analyses.
- Meaningful engagement with the public in restoration planning and decision-making.

While project funds were committed to 13 different restoration types, the amount of funding commitments varied among them. Overall, project funding commitments through 2020 were largest for the restoration types of Wetlands, Coastal, and Nearshore Habitats

KEY TERMS

Allocation: Funds assigned to each restoration area and type by the Consent Decree.

Payment: Settlement funds paid by BP in annual installments.

Committed: Funds approved by a final restoration plan or resolution for projects or activities.

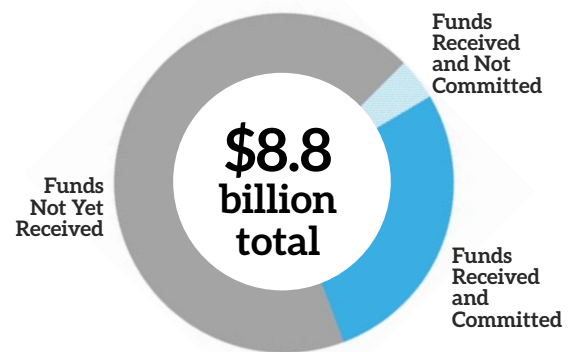
(\$1.3 billion) and Provide and Enhance Recreational Opportunities (\$389 million). These funding commitments reflect the relatively large allocations to these two restoration types in the Consent Decree, as well as the Trustees' ability to use prior planning efforts to expedite the identification and evaluation of appropriate projects. Project commitments to other restoration types were notable, but smaller. For example, before committing to specific Gulf sturgeon restoration projects, the Trustees chose to address planning data gaps (i.e., key life history and habitat data) to inform decisions about the type and location of project(s) to maximize restoration benefits. The \$2.4 million committed to the Sturgeon Restoration Type through 2020 reflects the cost of these critical data collection activities.

Once committed, the Trustees may begin spending funds consistent with approved resolutions, project plans, and budgets. Through 2020, the Trustees produced four resource-specific strategic frameworks, released 32 restoration plans, developed and amended a Monitoring and Adaptive Management Manual, and initiated more than 200 restoration projects and planning, monitoring and adaptive management activities. The Trustees spent approximately \$740 million (30 percent) of the approximately \$2.44 billion in committed funds. Spending committed funds takes time, due to complexities and effort required for:

- Coordination with other Gulf restoration programs;
- Use of competitive procurement processes to maximize cost efficiencies;

Financial Takeaway

As of the end of 2020, the Trustees received \$2.8 billion of the \$8.8 billion settlement. They have committed \$2.4 billion (87%) of the received funds to restoration projects and planning initiatives.



- Conversion of conceptual project designs into “shovel-ready” project plans;
- Completion of permitting and other regulatory requirements;
- Construction scheduling to minimize project mobilization/demobilization costs and the costs and risks associated with hurricanes and other seasonal factors;
- Time required to receive and process final invoices.

Administrative Accounting

Trustees and Trustee Implementation Groups follow the Standard Operating Procedures and document decisions regarding the use of funds via resolutions. All financial transactions are reported by Trustees annually in the Data Integration Visualization Exploration and Reporting (DIVER) online platform and are summarized into annual project reports found in the *Deepwater Horizon* Administrative Record with the associated restoration plan. The Trustee Council’s Annual Financial Summary report is made available on the Trustees’ Gulf Spill Restoration website, as well as in the *Deepwater Horizon* Administrative Record.

Consistent with the Standard Operating Procedures, individual Trustees are responsible for tracking and reporting project-level financial information throughout project implementation, including monitoring and adaptive management, until the project is completed and closed. Trustees are responsible for using appropriate accounting policies and procedures for holding and tracking funds and reviewing expenditures. Each Trustee agency submits an annual financial report that is reviewed by the Trustee Implementation Groups and

Trustee Council. Further, Trustee Implementation Groups use the Trustee Council Standard Operating Procedures for managing all funds deposited into their restoration fund accounts and follow a general framework that includes the following: distribution of funds, use of funds, administrative account processes, regular financial reviews, and use of interest earned on restoration funds. The Trustees’ review of each of these topics is summarized below.

















Financial Reviews

The Consent Decree requires each Trustee to evaluate the accuracy of financial reporting and compliance with the Standard Operating Procedures and relevant NRDA agreements no less than once every three years from the receipt of funding. All Trustees have completed their initial financial reviews, and some have completed subsequent reviews. No significant deficiencies have been found. All final reports are publicly available in the *Deepwater Horizon* Administrative Record.

Use of Interest

The Standard Operating Procedures describe the use of and reporting on earned interest, which may be earned on any settlement funds in the DOI Restoration Fund or funds held in individual Trustee accounts. Each Trustee Implementation Group may use earned interest at its discretion for any Trustee Implementation Group responsibility, such as planning, administration, project implementation, or monitoring and adaptive management. Trustee Implementation Groups report interest annually as funds received in the *Deepwater Horizon* Trustee Council Annual Financial Summary Report.

Deepwater Horizon NRDA Funding by Restoration Type Through 2020

Restoration Type	Settlement Allocation	Funds Committed Through 2020	Percent Funds	
			Committed	Remaining
 Wetlands, Coastal, and Nearshore Habitats	\$4,617,927,767	\$1,313,696,646	28%	72%
 Habitat Projects on Federally Managed Lands	\$75,000,000	\$26,208,365	35%	65%
 Nutrient Reduction	\$110,000,000	\$22,859,364	21%	79%
 Water Quality	\$300,000,000	\$17,118,747	6%	94%
 Fish and Water Column Invertebrates	\$400,000,000	\$78,681,216	20%	80%
 Sturgeon	\$15,000,000	\$2,443,466	16%	84%
 Submerged Aquatic Vegetation	\$22,000,000	\$0	0%	100%
 Oysters	\$200,046,309	\$79,379,483	40%	60%
 Sea Turtles	\$212,221,165	\$73,801,299	35%	65%
 Marine Mammals	\$144,000,000	\$30,968,016	22%	78%
 Birds	\$501,244,170	\$173,172,048	35%	65%
 Mesophotic and Deep Benthic Communities	\$273,300,000	\$126,816,161	46%	54%
 Provide and Enhance Recreational Opportunities	\$419,260,589	\$389,030,762	93%	7%
 Monitoring and Adaptive Management	\$520,000,000	\$38,926,165	7%	93%
 Administrative Oversight and Comprehensive Planning	\$289,500,000	\$73,259,311	25%	75%
 Unknown Conditions (distributed after 2026)	\$700,000,000	\$0	0%	100%



A community outreach workshop in Mississippi.

Public Engagement

As stewards of public trust resources under OPA, the Trustees engage and inform the public and maintain an open and documented process for planning and implementing restoration, monitoring, and adaptive management. The process is specified in the Trustees' Standard Operating Procedures for identifying, collecting, and maintaining documents appropriate for the Administrative Record. Each Trustee Implementation Group also develops and maintains Administrative Record material in accordance with those procedures.

In addition to the Administrative Record, the Trustee Council updates the Trustees' Gulf Spill Restoration website regularly to provide a central site for public access to restoration information and updates from the Trustee Council, Trustee Implementation Groups, and Trustee agencies (though Trustees may also post information on their respective websites). From the website, the public can access DIVER. DIVER continues to be the centralized storage location for the public to submit project ideas and obtain information regarding financial disbursements and expenditures, restoration project tracking information, data storage, regulatory compliance tracking information, monitoring and adaptive management data, and restoration project reports.

The Trustees actively engage the public through open meetings on restoration topics, requesting and reviewing project idea submissions, releasing restoration plans for public review and comment, making appropriate changes to project selection or design, and providing comment responses. The Trustee Council and each of the seven Trustee Implementation Groups hold public meetings every year, where members of the public have an opportunity to hear restoration updates. The public also has opportunities to provide comments on restoration activities during the annual Trustee Council public meetings and during public meetings that are held for each restoration plan. Key restoration program materials are translated to facilitate the inclusion of non-English speaking stakeholders in the restoration process. Webinars and online open houses were used more extensively in 2020 when in-person meetings were not feasible due to the COVID-19 pandemic.

Through these actions, the public has directly influenced the Trustees' NRDA restoration process. Project ideas proposed by various stakeholders have been selected for implementation. Among these are the Indian Point Shoreline Erosion Protection project (proposed by the Coastal Bend Bays & Estuaries Program – [DIVER ID 106](#)); Grand Bay Land Acquisition and Habitat Management

Trustee Outreach and Public Input

The Trustees' continuing commitment to public engagement is demonstrated through the varied metrics below that reflect Trustee efforts through the end of 2020.

125,000+

DIVER queries run



119

public meetings held



11,600+

documents added to the Administrative Record

Nearly **12,500** subscribers to the Trustee email distribution list



6,700+ public comments received on draft restoration plans

32

final restoration plans released



550+

restoration webstories published to the Gulf Restoration website

398,210

visits to the Gulf Restoration website

5,000+

project submissions



(proposed by the Conservation Fund – [DIVER ID 113](#)); and the Navarre Beach Park Coastal Access, Dune Restoration and Gulfside Walkover Complex projects (proposed by Santa Rosa County Board of Commissioners – [DIVER ID 39](#) and [40](#), respectively).

The Trustees have also modified some proposed projects in response to public comments received during open comment periods for restoration plans and during public meetings. Examples of projects modified based upon public comments include, but are not limited to, the Florida Pensacola Bay Living Shoreline project ([DIVER ID 26](#)), which was modified to remove the Sanders Beach component from the project and evaluate opportunities to increase the number of acres of marsh and reef habitat created at Project GreenShores Site II; an enhanced eco-friendly playground was added to the Salinas Park recreational component of the Florida Coastal Access project ([DIVER ID 65](#)); and the location of the proposed Lake Charles Science Center and Educational Complex ([DIVER ID 211](#)) was moved in response to the City of Lake Charles' request to co-locate it with the city's planned children's museum.

Trustee public engagement efforts also manifest in other ways, such as through partnerships with other organizations to support project implementation. For example:

- NOAA, on behalf of the Open Ocean Trustee Implementation Group, has partnered with the National Fish and Wildlife Foundation (NFWF) and the pelagic longline fishery in the Gulf of Mexico to restore tuna, billfish and other oceanic fish. Through this project, fishermen are voluntarily taking a break from longline fishing and using different gear types that reduce bycatch ([DIVER ID 58](#)). Along with engaging the fishery to participate, NOAA and NFWF have enhanced the project each year based on feedback from participants and stakeholders. Both on-the-water and administrative adjustments have been successful. Participants have said they are finding it rewarding to help restore fish in the Gulf and are invested in making alternative gear more effective for future generations of fishermen. Interest and participation in the project continue to be strong, furthering the benefits produced by the project and leading to a healthier Gulf of Mexico ecosystem.
- The Alabama Trustee Implementation Group, through the Alabama Department of Conservation and Natural Resources has partnered with the Town of Dauphin Island and Mobile County to facilitate the purchase and management of the 838-acre West End of Dauphin Island, to preserve a diversity of coastal habitats—sweeping dunes, salt marsh, and beach flats ([DIVER ID 242](#)). Sea turtles and several bird

species, including the federally threatened wintering piping plover, use these habitats. The beach and dune areas serve as nesting habitat for the least tern and the snowy plover. Project partners will be developing a management plan and implementing initial management actions based on recommendations in the management plan.

- The Open Ocean Trustee Implementation Group, through DOI, finalized agreements with the Universities of Florida, Georgia, and Southern Mississippi to support Gulf sturgeon data collection efforts, including a stock assessment, development of standardized data collection protocols, and evaluation of juvenile Gulf sturgeon habitat use and preference in estuaries in the northern Gulf of Mexico ([DIVER ID 203](#)).

- The Florida Trustee Implementation Group engaged the public directly in the design of the playground portion of the Lynn Haven Park and Preserve component of the Florida Coastal Access project ([DIVER ID 65](#)). With outreach assistance provided by the Trust for Public Land, children attending Deer Point Elementary School suggested the amenities they would like included in the park's playground. In recognition of the Panama City crayfish habitat preserved on the site, the students asked for and were given a climbing structure built in the shape of a crayfish.



- The Florida and Regionwide Trustee Implementation Groups engaged local schoolchildren and other members of the public in the Enhanced Management of Avian Breeding Habitat Injured in Response Activities in the Florida Panhandle, Alabama, and Mississippi ([DIVER ID 9](#)). The Alabama Trustee Implementation Group, through Bon Secour National Wildlife staff and the American Bird Conservancy, implemented the Alabama Coastal Bird Stewardship Program ([DIVER ID 241](#)). Program activities included a public information campaign that reached thousands of residents and

visitors. Volunteers were recruited to help with stewarding, surveying, and nest monitoring. A library summer reading program reached numerous elementary school children, and a photography workshop and community fairs reached hundreds more.

Regulatory Compliance

The Trustees developed a variety of processes to ensure consistent, timely, and transparent regulatory compliance for restoration undertaken through the *Deepwater Horizon* NRDA restoration program. Through 2020, the Trustees have completed more than 2,400 consultations and permitting actions for the more than 200 projects selected for implementation. These consultations and permitting actions comply with 10 key federal laws. Key aspects of the Trustees' approach to regulatory compliance are summarized below.

The Trustees have substantial experience and expertise addressing regulatory compliance needs associated with restoration projects, which helps ensure that such needs are met in an efficient and effective manner. Early consideration of potential regulatory compliance issues during the project screening and restoration plan development processes helps prevent compliance-related delays. Proposed projects that may have adverse environmental or other impacts (e.g., effects on Endangered Species Act (ESA) protected species) are often modified early in the planning process to eliminate or reduce such impacts. Trustee Implementation Groups may screen out projects for consideration if they are likely to result in unavoidable adverse impacts to resources and modifications are not feasible. As a result, projects ultimately included and evaluated in restoration plans rarely raise substantive regulatory compliance issues.

The Trustees have streamlined the compliance process for *Deepwater Horizon* NRDA restoration to facilitate the large number of required regulatory reviews in an efficient manner. For example, the Trustees initiate technical assistance reviews with regulatory agencies before initiating consultation or permit review. This allows Trustees to obtain additional, substantive compliance information useful to project design and



Sediment is pumped onto Queen Bess Island to help restore the island's bird nesting habitat, which includes vital habitat for Louisiana's pelican.

Trustee evaluation processes prior to including proposed projects in a draft plan. These technical assistance reviews identify potential effects and allow changes to be made to projects ahead of consultations and reviews that must be completed before a project selected in a final restoration plan can move to the implementation phase. For example, restoration of 37 acres of prime bird nesting habitat on Louisiana's Queen Bess Island ([DIVER ID 83](#)) hinged on efficient coordination among project partners to fit the project within tight timelines. The \$18.7 million project, approved by the Louisiana Trustee Implementation Group in March 2019, had only a six-month construction window to complete work in between nesting seasons to avoid impacts to migratory birds. As part of the streamlined processes set up for *Deepwater Horizon* projects, and through close collaboration with the U.S. Army Corps of Engineers, the Louisiana

Trustee Implementation Group was able to complete the project within required time frames.

Other examples of compliance processes used to facilitate restoration planning include, but are not limited to:

- The Trustees developed a biological evaluation form to help provide guidance and standardize project information for review under several federal laws.
- The Trustees established compliance liaisons to assist Trustee agencies with completing compliance in an efficient, consistent, and timely manner.
- The Trustees coordinate with other agencies responsible for compliance determinations, such as the U.S. Army Corps of Engineers and state and local permitting agencies, to avoid duplicative environmental reviews.

COMPLIANCE TRACKING

The Trustees' [website](#) contains detailed compliance status for 10 federal laws.

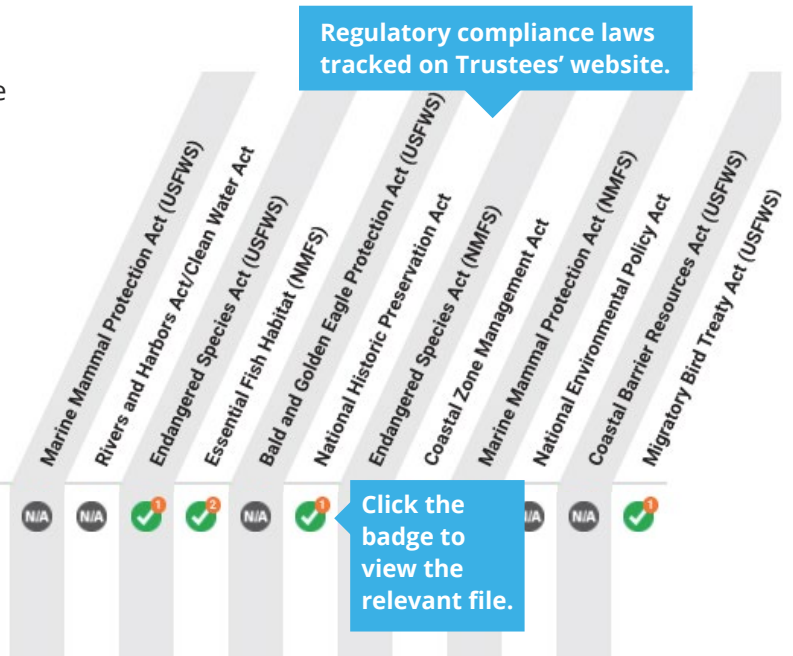
Regulatory compliance laws tracked on Trustees' website.

Icon Status of Regulatory Review/Approvals

Not Applicable In Progress Complete, click to view file

Regionwide

Trustee	Project Title
Florida; DOI	Enhanced Management of Avian Breeding Habitat Injured by Response Activities in the Florida Panhandle, Alabama, and Mississippi - Protection of shorebird/seabird nesting habitat areas in the Florida Panhandle through fencing, monitoring, surveillance, stewarding, and reducing disturbance to nesting and foraging habitat



• The Trustees have sought to use streamlined consultation processes as available and appropriate. For example, of the 30 informal ESA consultations requested from National Marine Fisheries Service (NMFS) across the Trustee Implementation Groups since 2020, nine consultations were able to use existing streamlined consultation processes that resulted in a faster response time.

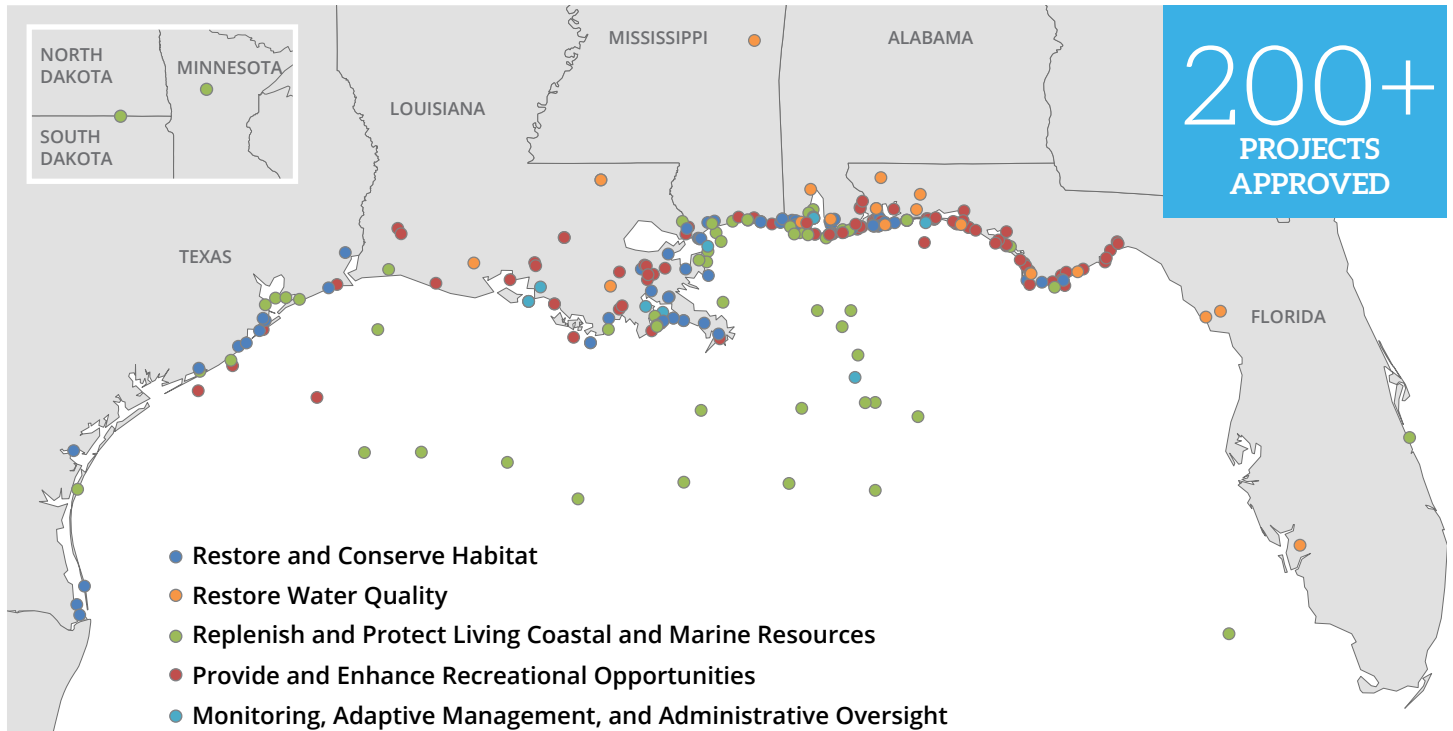
The Trustees also have streamlined processes for meeting National Environmental Policy Act (NEPA) requirements. NEPA requires federal agencies to consider the environmental and socioeconomic effects of proposed actions in their decision-making. The Trustees' Programmatic Restoration Plan includes a broad-scale, programmatic NEPA analysis, allowing subsequent restoration plans to focus on evaluating potential impacts unique to projects. In addition, the Trustees may incorporate by reference and summarize NEPA analyses conducted for similar projects in similar environments. These two processes allow the Trustees to avoid unnecessary and costly duplication of effort.

Final restoration plans identify both the best practices applicable to the implementation of each selected project, as well as any outstanding regulatory compliance needs. While it is not always feasible to complete all required compliance evaluations prior to finalizing the restoration plan, all evaluations are completed prior to project implementation. During the implementation phase, projects comply with any requirements established through the regulatory compliance process.

The status of regulatory compliance (e.g., "in progress" versus "completed") for the 10 federal laws most frequently applicable to *Deepwater Horizon* NRDA restoration projects is displayed on the Trustees' Gulf Spill Restoration website for the public, along with links to final compliance documents for more detailed information. Restoration projects may require compliance with additional relevant federal, state, and local regulations that are not highlighted on the Gulf Spill Restoration website. All compliance documentation is made available in the *Deepwater Horizon* Administrative Record.

Restoration Planning, Implementation, and Monitoring and Adaptive Management Process

Implementation of Projects



Introduction

The Trustees began restoration of natural resources and related services in April 2011, while the injury assessment was still underway. Both emergency restoration and early restoration were initiated at this early stage to minimize ongoing injury, prevent continuing injury, and accelerate restoration of injured natural resources and resource services.

Deepwater Horizon NRDA restoration is guided by the goals, objectives, and processes identified in the Trustees' Programmatic Restoration Plan, Trustee Council Standard Operating Procedures, and the Consent Decree. Important restoration considerations addressed in earlier sections of this document include the allocation of settlement funding, public engagement and transparency, and regulatory compliance. Additional considerations integrated throughout the

restoration planning and implementation process include:

- Consistency with the Trustees' Programmatic Restoration Plan and restoration type goals;
- Opportunities to leverage funding from other sources and engage external restoration partners;
- Implementation of projects providing benefits throughout the Gulf of Mexico;
- Potential for projects to benefit multiple resource types;
- Monitoring and Adaptive Management.

Consistency with the Trustees' Programmatic Restoration Plan and Restoration Type Goals

The five programmatic restoration goals and 13 restoration types that form the foundation of the *Deepwater*

Horizon NRDA restoration program are identified in Chapter 1. In addition, for each restoration type, there are restoration approaches and techniques identified in the Trustees' Programmatic Restoration Plan that can be used to achieve the restoration type goals. Ensuring consistency with the programmatic restoration goals and the restoration types is an essential part of the process used by the Trustees to develop a reasonable range of potential projects for each restoration plan. Potential projects that are not consistent with goals relevant to a particular plan or do not meet the Trustees' screening criteria are not considered for that plan. Additional information about restoration projects is provided in Chapters 4 and 5.

In addition, for the Oysters, Birds, Marine Mammals, and Sea Turtles Restoration Types, the Trustees developed strategic frameworks to guide the prioritization, sequencing, and selection of projects in future restoration plans. These strategic frameworks were adopted by the Trustee Council in June 2017. These frameworks promote information sharing and coordination across restoration areas, helping local restoration actions contribute to ecosystem-level restoration outcomes for these wide-ranging species.

Leveraging Funding and Engaging Restoration Partners

As appropriate, the Trustees may combine funding from multiple restoration types to fund projects. For example, the Louisiana Outer Coast Restoration project ([DIVER ID 35](#)), and the Grand Bay Land Acquisition and Habitat Management project ([DIVER ID 113](#)) are funded through contributions from both the Birds and the Wetlands, Coastal, and Nearshore Habitats Restoration Types.

Also, during the project screening process the Trustees may consider the potential for leveraging funding and engaging other restoration partners and have had notable successes in these areas. For example, the McFaddin Beach and Dune Restoration project ([DIVER ID 108](#)) is funded from the *Deepwater Horizon* NRDA Restoration Program, the NFWF's Gulf Environmental Benefit Fund, the RESTORE Act, the Gulf of Mexico

KEY TERMS AND CONCEPTS

Emergency restoration: Authorized by OPA regulations, actions were taken before completing the NRDA process to minimize continuing injury or prevent additional injury.

Early restoration: Consistent with an early restoration agreement reached with BP, 65 projects were approved before completing the NRDA to accelerate partial restoration of injured natural resources and their services.

Post-settlement restoration: Consistent with the Trustees' Programmatic Restoration Plan and the Consent Decree, projects are selected and implemented as part of a comprehensive, integrated ecosystem restoration program.

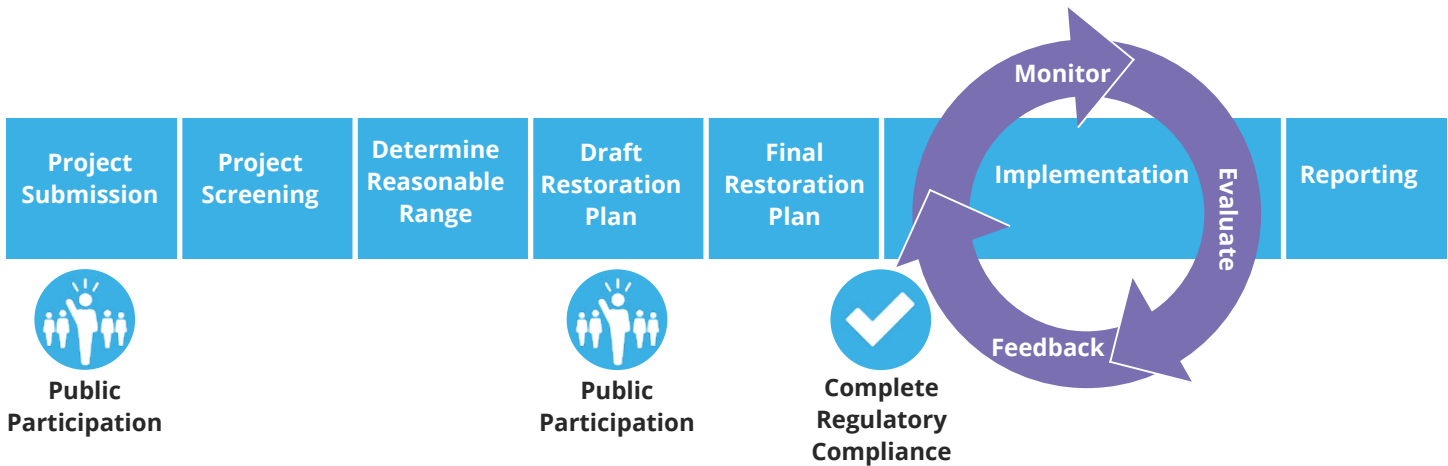
Energy Security Act, the U.S. Fish and Wildlife Service, and the State of Texas. In addition, there are several projects adjacent to McFaddin Beach funded by the Gulf Environmental Benefit Fund that are intended to restore the coastal marshes of the Salt Bayou Watershed, all of which will be protected by the McFaddin Beach and Dune Restoration project. This leveraging of funds and collaboration on project placement has increased the restoration footprint and reaps far greater environmental benefits than could be achieved by any one partner working alone.

Project Locations

Restoration projects approved by the Trustees are being implemented throughout the Gulf states, as well as in nearshore and offshore Gulf environments. Furthermore, some projects have been approved outside of the Gulf of Mexico to help restore breeding grounds or address other threats to species injured by the spill that spend part of their life cycle in other regions. The acquisition of common loon nesting habitat in Minnesota ([DIVER ID 186](#)) is an example .

RESTORATION PLANNING AND IMPLEMENTATION PROCESS OVERVIEW

The restoration planning portion of the process involves multiple steps that result in Trustee evaluation and selection of projects for implementation. It provides many opportunities for public participation and efficiently integrates regulatory compliance. Project implementation is characterized by an adaptive management feedback loop that incorporates robust monitoring, evaluation, and adjustments to projects underway and future planning and implementation efforts.



Benefits to Multiple Restoration Types

The Trustees are using an integrated and ecosystem-level approach to restoration in response to the wide array of resources that were injured in the oil spill. This integrated approach addresses the Trustees' restoration goals by maximizing potential synergies among the restoration types and approaches. As a result, the Trustees have considered and approved projects that illustrate the linkages and interactions among habitats and animals and that result in benefits to numerous resources. For example, while the Louisiana Outer Coast Restoration project ([DIVER ID 35](#)) is designed to restore beach, dune, and back-barrier marsh habitats, as well as brown pelican, tern, skimmer, and gull populations, it will also provide benefits to numerous additional aquatic, aquatic-dependent, and terrestrial species. This includes habitat benefits to commercially and recreationally important species, such as red drum and brown shrimp. Similarly, the Grand Bay Land Acquisition and Habitat Management project ([DIVER ID 113](#)) will preserve and restore a mosaic of coastal wetlands habitats, including coastal marsh, freshwater

marsh, savannas and flatwoods, and forested freshwater scrub-shrub habitat that provide benefits for numerous bird species.

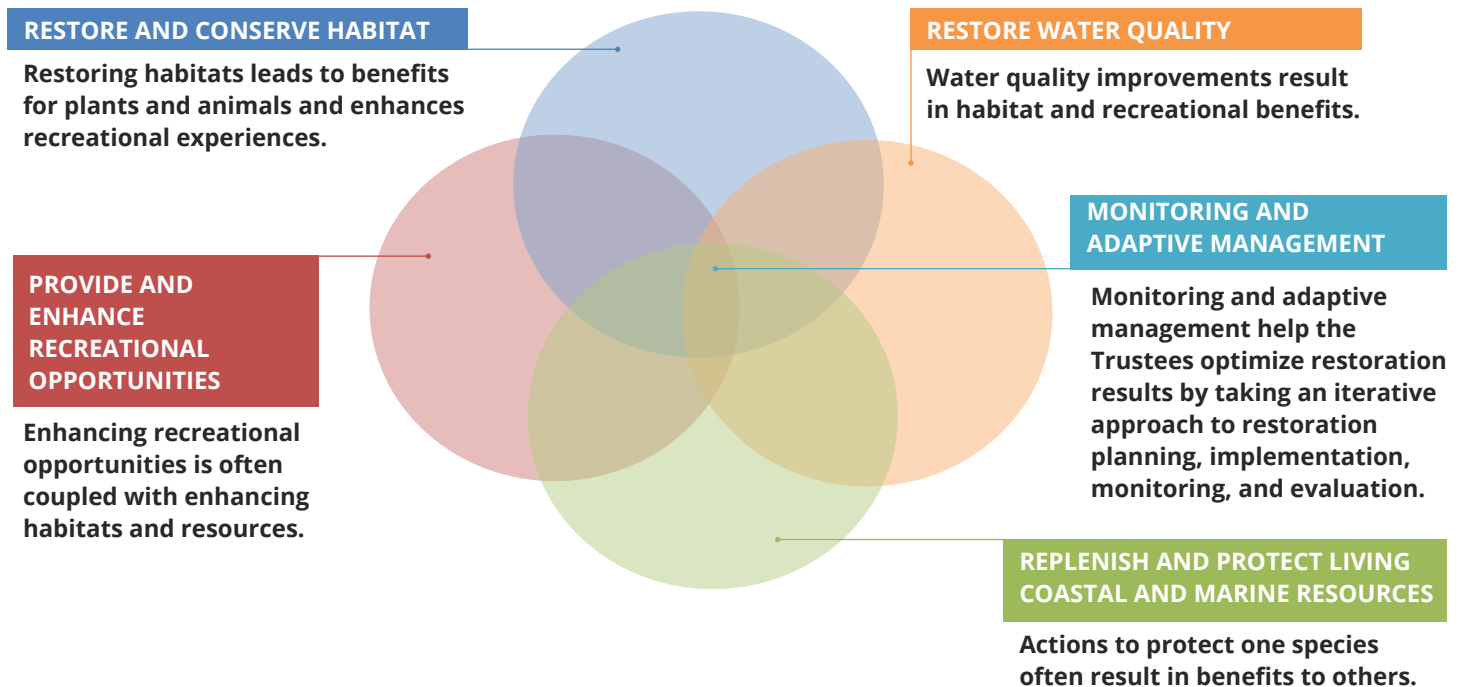
More generally, some of the ways the restoration goals work together to restore injured resources and services include:

RESTORE AND CONSERVE HABITAT

Habitat restoration includes opportunities to restore a combination of nearshore and coastal habitats that collectively can provide a variety of ecological benefits, such as improved water quality, habitat for invertebrate and fish species, and enhanced foraging opportunities for certain bird species. Habitat restoration can also improve the quality of the environment where people recreate, leading to improved recreational experiences and opportunities. This restoration goal serves as the foundation for achieving comprehensive, integrated, ecosystem restoration because of the multiple benefits that can be derived through habitat projects.

INTEGRATED RESTORATION

The five goals below guide the Trustees' restoration of the Gulf ecosystem.



RESTORE WATER QUALITY

Nutrient reduction projects and water quality improvements in coastal watersheds can improve the health and resilience of coastal and marine habitats, as well as the living coastal and marine resources that inhabit them. Improving water quality in coastal watersheds can also reduce the occurrence of chronic threats to coastal and nearshore habitats and provide improved recreational use opportunities.

REPLENISH AND PROTECT LIVING COASTAL AND MARINE RESOURCES

Resource-specific restoration actions, in combination with habitat restoration previously described, ensure that species, life stages, and/or services are comprehensively restored. These restoration efforts often benefit multiple resources. For example, projects that reduce anthropogenic light sources on sea turtle nesting beaches or conserve beach nesting habitat also improve and protect habitat used by other wildlife, such as shorebirds and beach mice. Similarly, fishing

gear changes and bycatch reduction efforts benefit fish as well as other species inhabiting the same area, such as marine mammals and sea turtles, while also reducing bird deaths from gear entanglement.

PROVIDE AND ENHANCE RECREATIONAL USE OPPORTUNITIES

There are many ways that the human community interacts with the natural environment, including fishing, beachgoing, bird watching, and countless other recreational activities. Recreational use projects seek to improve on those experiences through maintaining healthy coastal and marine habitats and resources, increasing the public access to these coastal resources, and enhancing the quality of these recreational activities.

Monitoring and Adaptive Management

The unprecedented scale of *Deepwater Horizon* NRDA restoration requires a monitoring and adaptive management framework to support restoration decisions.

The monitoring and adaptive management framework is applied at all levels of *Deepwater Horizon* NRDA restoration, from individual projects to restoration types and, ultimately, across the entire restoration program. To facilitate project monitoring and adaptive management, the Trustees developed a Monitoring and Adaptive Management Manual, released in January 2018 and updated in August 2019, to provide guidance for monitoring needed to evaluate restoration outcomes and benefits to injured resources. Trustee Implementation Groups use this guidance in the development of project-specific monitoring and adaptive management plans, which are developed as part of restoration plans. A primary purpose of monitoring and adaptive management plans is to describe the data collection and information that will be needed to determine project success, identify potential corrective actions, and inform future restoration decision-making. By using monitoring and adaptive management, project managers can identify potential project uncertainties and work towards resolving those uncertainties through targeted data collection efforts during project implementation. By encouraging consistency in project monitoring, the Monitoring and Adaptive Management Manual also allows the Trustees to assess restoration benefits across similar projects and evaluate overall restoration outcomes for each restoration type.

The Trustees are also applying the principles of monitoring and adaptive management to restoration types and the restoration program as a whole. For example, both the Open Ocean and Louisiana Trustee Implementation Groups have released monitoring and adaptive management strategy documents that describe those groups' processes for identifying and prioritizing monitoring and adaptive management activities. Similarly, the Louisiana Trustee Implementation Group released an adaptive management framework in 2019 that makes recommendations for implementing adaptive management activities in coastal Louisiana across restoration programs (e.g., NRDA, RESTORE Act, and the Coastal Wetlands Planning, Protection, and Restoration Act). Such efforts help identify and efficiently sequence the collection and evaluation of data needed to measure restoration

WHAT IS MONITORING AND ADAPTIVE MANAGEMENT?

A process for the collection and evaluation of restoration data which can be used to fine-tune restoration implementation and management over time.

Monitoring and adaptive management creates an ever-expanding base of knowledge used to gauge restoration success and improve current and future restoration decision-making.



Photo credit: Texas Parks and Wildlife Department

outcomes and to facilitate collaboration and coordination among Trustee Implementation Groups and other restoration programs in the Gulf.

Numerous monitoring and adaptive management activities have been funded by the Trustee Implementation Groups to address important data gaps and evaluate resource- and regional-level restoration outcomes through targeted data collection and analysis. For example, both the Louisiana and Regionwide Trustee Implementation Groups are conducting colonial waterbird surveys focused on nesting activity and population characteristics ([DIVER IDs 178](#) and [257](#)). The data collected during these surveys will help monitor waterbird colony locations and performance at region-wide scales, estimate population sizes, and plan future restoration projects. This population trend information will provide context for evaluating the collective benefits of restoration projects aimed at restoring colonial waterbird nesting habitat. Another example relates to Gulf sturgeon juvenile recruitment, growth, and survival patterns. This information is incomplete and is necessary to identify restoration priorities and evaluate the success of restoration efforts. The Open Ocean Trustee Implementation Group is undertaking data collection and analysis activities as part of existing restoration

projects and monitoring and adaptive management activities to inform subsequent restoration efforts, thus maximizing the likelihood of success of subsequent restoration projects.

Additional information about monitoring and adaptive management activities for specific restoration types is provided in Chapter 4.

Restoration Progress

Chapter 4 provides a summary of restoration implementation progress for each of the 13 restoration types. To develop these summaries, the Trustees compiled restoration project and monitoring information from DIVER for all of the projects that were completed or in progress through 2020. Each section focuses on the projects funded under the specific restoration type; however, some projects are funded under multiple types and may be summarized in more than one section. Monitoring and adaptive management activities related to a specific restoration type are summarized with the applicable restoration type. For example, sturgeon monitoring and adaptive management activities are summarized in the Sturgeon Restoration Type section. Restoration achievements common across projects or activities to date were aggregated to provide a summary of progress across the Trustees' restoration efforts within a given restoration type. Variability in the type, amount, and presentation of information between different restoration types reflects the varying challenges, opportunities, and differences in the amount and type of data available for this initial programmatic review. As additional projects and activities are implemented and as more and varied monitoring information is collected, the Trustees may report on achievements in more detail in future programmatic reviews.

Chapter 5 presents restoration progress information by restoration area (i.e., Alabama, Florida, Louisiana, Mississippi, Texas, Open Ocean, and Regionwide). The type, amount, and presentation of information by restoration area varies, reflecting the different types of projects and activities being conducted across the geographic areas.



Gannets are one of the bird species injured by the oil spill.

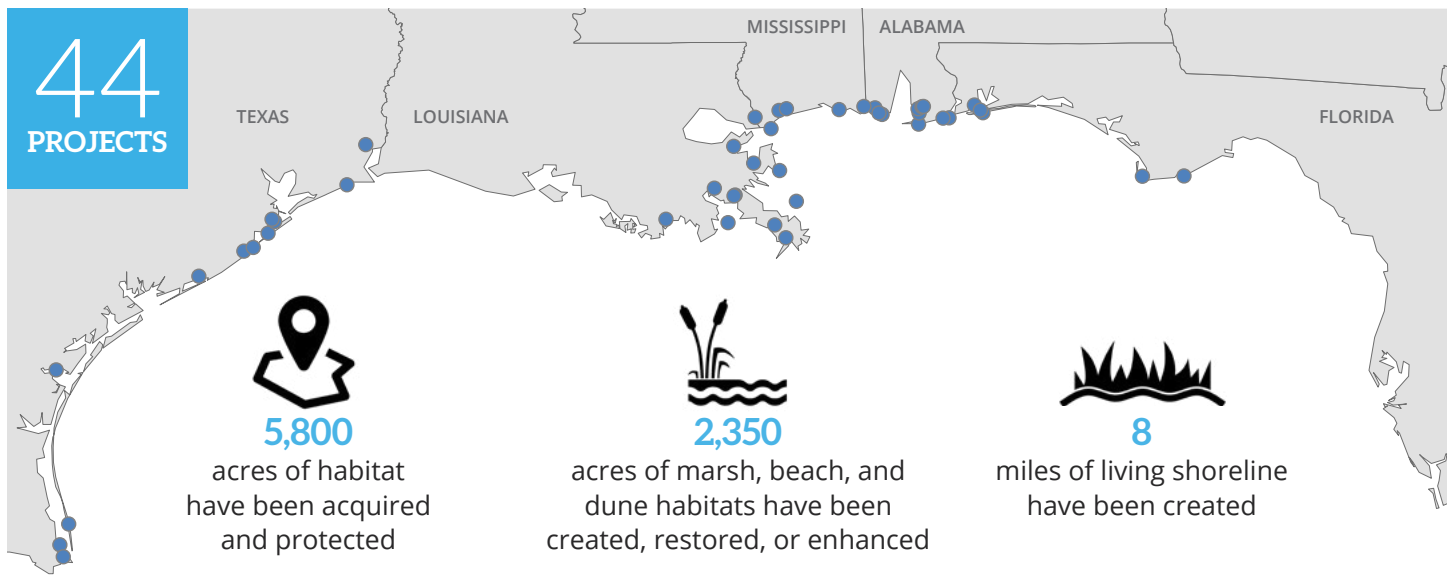
Photo credit: Carl Miller

Wetlands, Coastal, and Nearshore Habitats



Introduction

The coastal and nearshore environment of the northern Gulf of Mexico encompasses a diverse collection of habitats that stretch from Texas to Florida. These habitats include but are not limited to fresh, brackish, and salt marshes; beaches; dunes; barrier islands; mangrove-salt marsh complexes; mangroves; submerged aquatic vegetation (SAV) (e.g., seagrass); adjacent nearshore waters; mudflats; and habitat forming fauna, such as oysters. Many organisms rely on these habitats for food, shelter, and nesting, including commercially and recreationally important wildlife and fisheries resources.



Settlement Allocation

\$4,617,927,767

Funds Committed Through 2020

\$1,313,696,646

Percent Funds Remaining

72%

Coastal habitats and wetlands provide many ecological benefits and ecosystem services. They serve as buffers from storm damage and sea-level rise, protecting coastal resources, property, and infrastructure, and they minimize upland erosion. Wetlands play a role in carbon sequestration and storage by capturing carbon dioxide from the atmosphere in the vegetation of wetlands and storing it in marsh soils. Wetlands also help to improve water quality by removing pollutants, nutrients, and sediments. Coastal wetlands are important for aquatic and terrestrial food webs by supporting marsh animals (e.g., shrimp, snails, fishes, crabs, and insects) and nearby animals (e.g., birds, nearshore oysters, and transient fishes).

The *Deepwater Horizon* oil spill caused significant and widespread injury to wetlands as well as coastal and nearshore habitats. Oiling occurred across nearly 1,300 miles of shorelines within the Gulf of Mexico region. Oil was also found in or on coastal wetland soils and vegetation, sediments adjacent to beaches, SAV, and nearshore animals. Injuries occurred to plants and animals at the base of the food web, up to high-level predators. The Trustees identified a suite of restoration approaches in the Trustees' Programmatic Restoration Plan to restore injured habitats, their associated flora and fauna, and the ecological services they provide. Restoration is being implemented in all five Gulf states to provide benefits across the interconnected northern Gulf of Mexico ecosystem.

MARSH CREATION BENEFITS FISH AND INVERTEBRATE COMMUNITIES

One goal of the Wetlands, Coastal, and Nearshore Habitats Restoration Type is to restore ecological functions for the range of animals injured by the spill, such as fish and nearshore benthic invertebrate communities. Creating and restoring coastal marsh habitat increases food and shelter needed for fish and invertebrates to grow and survive.

Research indicates that salt marshes throughout the northern Gulf of Mexico can generally support substantially more fish and invertebrates compared to shallow water habitats without vegetation. The actual numbers of fish and invertebrates supported by restored marshes vary by species and depend on specific site conditions. For example, this can mean:

- 2 to 15 times more blue crab,
- 2 to 20 times more white shrimp,
- 2 to 10 times more spotted seatrout,
- 4 to 9 times more brown shrimp.



Completed coastal marsh restoration projects in Louisiana include 306 acres of salt marsh habitat behind a restored barrier island in Barataria Bay ([DIVER ID 35](#)) and another 104 acres of brackish marsh habitat in Barataria Basin ([DIVER ID 4](#)). Aerial photos

of the Barataria Basin project show tidal creeks are now providing access to ponds, marsh edges, and other habitat features important for fish and invertebrates. An additional 1,183 acres of future brackish marsh restoration, which will be monitored for habitat use by fish and invertebrates, is planned for another area in Barataria Basin, Louisiana ([DIVER ID 124](#)).

An additional 46 acres of coastal marsh have been created in Mississippi ([DIVER ID 38](#)) to complement 6 miles of living shoreline constructed to slow erosion and help preserve existing marsh that otherwise may be lost. Planning is also underway for up to 900 acres of marsh restoration in Texas ([DIVER ID 100](#)). These projects highlight just a few examples of how Wetlands, Coastal, and Nearshore Habitats projects are helping to restore fish and invertebrate communities in the Gulf of Mexico.

Trustee Achievements Through 2020

As of 2020, a total of 44 projects have been funded under the Wetlands, Coastal, and Nearshore Habitat Restoration Type. Funding commitment to date is approximately \$1.3 billion for planning, implementation, and monitoring efforts. Although many of these projects are still in progress, numerous achievements have been made using a variety of restoration techniques, including living shorelines; enhancement of beaches, dunes, barrier islands and other habitats; land acquisition; and marsh creation. Many projects include a combination of restoration approaches that work together to achieve multiple benefits to wetland, coastal, and nearshore habitats. Restoration efforts are also used in combination with protective measures that aim to reduce human disturbance to highly sensitive habitats and their associated species. Examples include

placing buoys and signage to educate and deter human disturbance to shorebird and sea turtle nests. Public outreach (e.g., creation and distribution of educational brochures) and stakeholder engagement add to these protection practices.

Marsh Restoration

Many restoration projects include components focused on restoring wetland habitats using techniques such as sediment placement, planting of marsh vegetation, and hydrologic restoration. The projects aim to restore fragmented marsh habitats that have degraded over time due to factors such as sea-level rise, high subsidence rates, diminished sediment supply, and extreme storm events. So far, projects located in Louisiana, Mississippi, and Alabama have restored nearly 670 acres of marsh habitat. In the coming years, the currently approved

restoration projects collectively will restore about an additional 10,000 acres of intermediate, brackish, and salt marshes. By restoring these habitats, the Trustees aim to create wetland habitat for a variety of plants, fish, birds, and other wildlife. Restoration of these habitats also helps to buffer storm surge and reduce the adverse impacts of coastal flooding and erosion.

Living Shorelines and Breakwaters

Living shorelines and breakwater techniques use natural or artificial materials to protect shorelines and create self-sustaining and productive habitat. By reducing wave energy, breakwaters help to reduce shoreline erosion and can increase accretion, which contributes to the creation and protection of salt marsh and estuarine habitat. Eight miles of breakwater materials have already been placed and another nine miles are planned. In addition to protecting shorelines, these breakwaters may develop into living reefs over time, supporting benthic communities such as mollusks, worms, shrimp, and crabs.

Some of the living shoreline projects also include the direct creation of subtidal and intertidal oyster reefs as well as placement of cultch material, which provides substrate to support oyster reef development. Nearly 140 acres of subtidal oyster reef have been restored or created in Mississippi and Alabama (plus more than 1,000 acres funded under other restoration types). An additional 55 acres of subtidal or intertidal reef creation is planned throughout the region. Many of these living shoreline efforts that are being planned and implemented in various locations throughout the Gulf are expected to build oyster reef habitats and protect critical SAV, coastal marshes, lagoons, and associated upland habitats.

Enhancement of Beaches, Dunes, and Barrier Islands

The Trustees have implemented multiple restoration projects to nourish beaches, increase island size, and create habitat for ground nesting shorebirds. Some projects used the placement of sand fencing and planting of dune vegetation to help retain sediment on beaches and encourage the development of healthy coastal dunes. Healthy dune systems can serve as a repository

for sand to naturally replenish neighboring beaches that have experienced erosion from coastal storms. Furthermore, the presence of a healthy and extensive root system from dune grasses and other vegetation helps maintain and stabilize dunes. To date, more than 1,680 acres of beach and dune have been created, restored, or enhanced, with an additional 370 acres planned.

Because coastal dunes can become destabilized when beachgoers walk across them to reach the water's edge, some of these projects include the construction of dune walkovers. These walkovers also protect the animals that rely on these habitats, such as endangered beach mice. Since these habitats are also important nesting areas for bird species, these projects often include placement of signage that informs the public of the goal of deterring disturbance to nesting birds.

Land Acquisition and Protection

To date, more than 5,800 acres of habitat have been acquired from willing sellers, with the ability to acquire up to 8,000 additional acres in accordance with approved restoration plans. Acquired lands include estuarine and tidal wetlands, coastal prairie, beach, bottomland hardwood wetlands, pine savanna, pine flatwoods, freshwater marsh, and cypress swamps, among others. One of the benefits of land acquisition for restoration and management is that it provides permanent protection of critical ecosystems. The protection of these lands improves the sustainability of both coastal wetlands and adjacent upland areas, secures habitat for threatened and endangered species, and has been used to enhance wildlife corridors. These acquired lands are managed to provide maximum ecological and recreational benefits in coordinated partnerships among state, federal, and private (non-governmental organizations) entities.

Submerged Aquatic Vegetation

Healthy SAV serves critical ecological functions in the Gulf of Mexico. SAV beds can be improved by minimizing further deterioration and erosion of sediment and enhancing vegetation communities. Two projects in Florida aim to enhance shallow seagrass beds damaged by boat motors, while boater outreach, buoys, and signage aim to educate the public about best practices for protecting seagrass habitats.



Overhead aerial photos of marsh creation behind a restored barrier island in Barataria Bay, Louisiana ([DIVER ID 35](#)) in 2016, prior to construction (left image) and in 2018, 1 year after completion (right image).



The Hancock County Marsh Preserve in Hancock County, Mississippi where 6 linear miles of living shoreline were built between 2017 and 2018. The living shoreline protects coastal marsh habitat from erosion and also serves as habitat for oysters and other benthic fauna ([DIVER ID 38](#)).



Louisiana Lake Hermitage Marsh Creation ([DIVER ID 4](#)) before dredge placement in 2013 (left) and post-construction in 2015 (right).

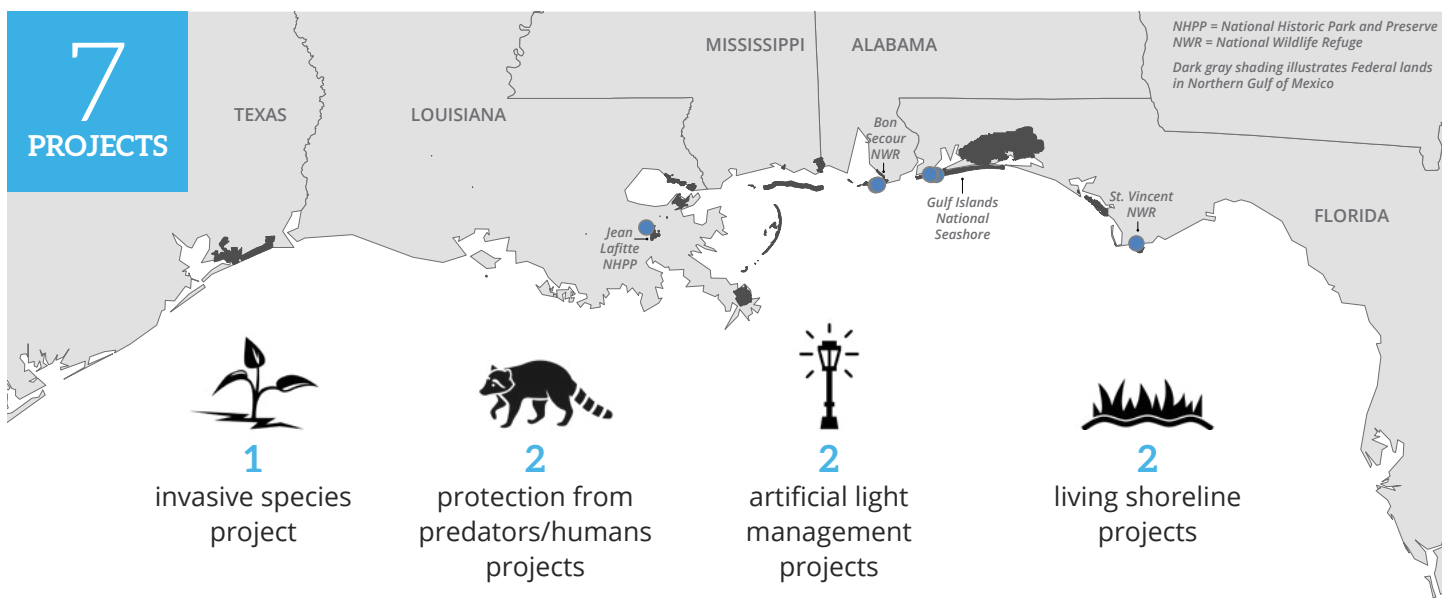
Habitat Projects on Federally Managed Lands



Introduction

Habitat projects on federally managed lands are located in national parks, seashores, and wildlife refuges, which support diverse ecosystems. These lands include such resources and habitats such as marshes, mangroves, beaches and dunes, barrier islands, SAV, oyster reefs, and shallow unvegetated areas. Federally managed lands provide food, shelter, and nursery grounds for many ecologically and economically important animals, including fish, shrimp, shellfish, sea turtles, birds, and mammals.

The Trustees documented natural resource impacts caused by *Deepwater Horizon* oiling and response actions along more than 173 miles of sand beach



Settlement Allocation

\$75,500,000

Funds Committed Through 2020

\$26,208,365

Percent Funds Remaining

65%

habitat and 21 miles of vegetated coastal habitat in 10 federally protected and managed land areas in the five Gulf states. In addition, as part of response actions, freshwater released from the Mississippi River to limit shoreline oiling harmed SAV habitat in a national park.

To address impacts caused by the oil spill and response activities on federally managed lands, the Trustees plan to:

- Restore federally managed habitats that were affected by the oil spill and response activities through an

integrated portfolio of restoration approaches across a variety of habitats.

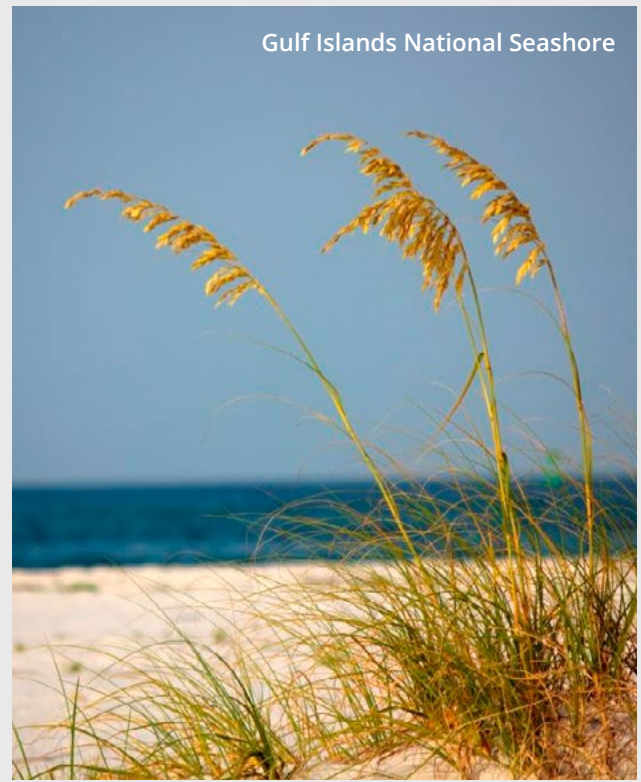
- Restore for injuries to federally managed lands by targeting restoration on federal lands where the injuries occurred, while considering approaches that provide resiliency and sustainability.
- Ensure consistency with land management plans for each designated federal land and its purpose by identifying actions that account for the ecological needs of these habitats.

Trustee Achievements Through 2020

The Trustees have committed approximately \$26 million to plan for, implement, and monitor seven projects approved under the Habitat Projects on Federally Managed Lands Restoration Type. The Trustees have also committed an additional approximately \$264,000 to one monitoring and adaptive management activity. These projects vary in approach and targeted habitats, given the diversity in habitat types impacted by the spill and location-specific needs. For example, at Bon Secour National Wildlife Refuge in Alabama, living shoreline techniques are being applied to limit further erosion and to protect marsh habitat ([DIVER ID 133](#)).

At Gulf Islands National Seashore in Florida, beach-dune habitat and associated wildlife (such as birds and sea turtles) are being protected from predators and from vehicle collisions and other human impacts. This is being accomplished through a variety of management actions ([DIVER ID 183](#)). Other actions being implemented at the National Seashore include reducing artificial lighting ([DIVER ID 202](#)) and augmenting invasive plant species management activities to help restore native plant communities ([DIVER ID 185](#)).

Predator control activities, including the removal of feral hogs and control of raccoon populations, are being undertaken to help restore habitat and ecological services to natural resources on St. Vincent National Wildlife Refuge in Florida ([DIVER ID 181](#)).



Gulf Islands National Seashore

WHAT IS FEDERALLY MANAGED LAND?

When the Trustees refer to projects on federally managed lands, they are referencing projects that are located in areas such as national parks and seashores and national wildlife refuges. Starting with the designation of Pelican Island in Florida as the first national wildlife refuge in 1903, the federal government has set aside more than 100 areas in the Gulf of Mexico region to preserve and protect these habitats and the wildlife that depend on them.

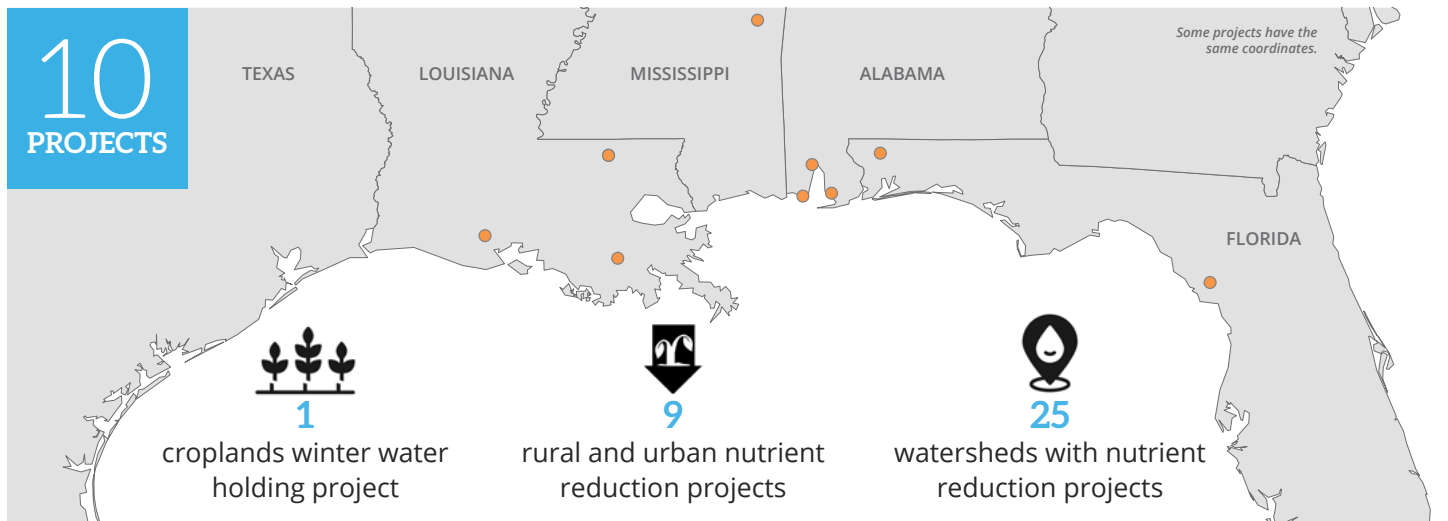
At Jean Lafitte National Historical Park and Preserve in Louisiana, a nearly continuous rock breakwater will be constructed to help protect existing SAV habitat from wave energy and create favorable conditions for reestablishment of at least 50 acres of SAV in the park ([DIVER ID 79](#)).

Nutrient Reduction



Introduction

Nutrient pollution adversely impacts water quality and poses a significant threat to many watersheds across the entire Gulf Coast. Excessive nutrient enrichment, or eutrophication, of Gulf Coast estuaries and their watersheds is a chronic threat that can lead to hypoxia, harmful algal blooms, habitat losses, altered food webs, and/or fish kills as well as other negative ecosystem impacts. Agriculture and its associated land use practices (e.g., application of fertilizer and concentrated animal farm operations) are a principal source, although not the sole source, of elevated nutrient loads along the Gulf Coast. Agriculture is a dominant land use type throughout all Gulf Coast states, and accounts for approximately 78% of land area within Texas, 29% in Louisiana, 38% in Mississippi, 28% in Alabama, and 27% in Florida. Although there are many existing local, state, regional, and federal programs across the Gulf working to address nutrient pollution, available funding is insufficient to address all the improvements needed. Through coordination with such programs, the Trustees can take advantage of their established processes and approaches to accelerate and efficiently meet restoration goals.



Settlement Allocation

\$110,000,000

Funds Committed Through 2020

\$22,859,364

Percent Funds Remaining

79%

The *Deepwater Horizon* oil spill resulted in a range of injuries to nearshore environments that affected the overall health and connectivity of those habitats to the larger Gulf ecosystem. In addition to restoration efforts funded by the *Deepwater Horizon* settlement that target specific resources impacted by the spill, such as fish and oysters, nutrient reduction approaches are also part of the restoration portfolio. Nutrient reduction approaches include conservation and forestry management practices, creation and enhancement of wetlands, and coastal and riparian conservation. These approaches help mitigate chronic and pervasive ecosystem threats caused by eutrophication of Gulf

Coast waters. Reducing nutrient inflows to the Gulf will improve water quality and benefit estuaries that provide food, shelter, and nursery grounds for many of the Gulf's ecologically and economically important species (e.g., fish and shrimp).

The goals for the Nutrient Reduction (Non-Point Source) Restoration Type are to:

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

- Co-locate nutrient load reduction projects with other restoration projects to enhance ecological services provided by other restoration approaches.
- Enhance ecosystem services of existing and restored Gulf Coast habitats.

Trustee Achievements Through 2020

The Trustees have committed \$22.8 million to plan for, implement, and monitor 10 nutrient reduction projects across the Gulf of Mexico. Projects selected for implementation in this restoration type are focused on reducing the amount of nutrients that enter and flush out of coastal watershed agricultural areas and those that incorporate forestry management, wetlands creation and enhancement, hydrologic restoration, and coastal riparian conservation as other means to reduce nutrient loads to coastal watersheds. The agricultural conservation practices applied in these projects will help to reduce nutrient flows into coastal systems that can fuel hypoxic events and harmful algal blooms, which can impact fish and other aquatic wildlife and make habitats less productive. Examples of agricultural conservation practices include nutrient management, riparian buffers, and conservation tillage. Selected projects are summarized below.

- Nutrient reduction provided by the Pensacola Bay and Perdido River ([DIVER ID 208](#)) and Lower Suwannee River ([DIVER ID 209](#)) Watersheds-Nutrient Reduction projects help to improve water quality by reducing excess nutrients and sediments to receiving waterbodies upstream of Pensacola Bay and Suwannee Sound, respectively.
- Reduced erosion and nutrient inputs to watersheds that support the estuarine and marine resources of coastal Alabama are provided by agricultural conservation practices in the Fowl River watershed ([DIVER ID 165](#)), improved land management practices in the Weeks Bay watershed ([DIVER ID 166](#)), and engineering and design to enable future structural and non-structural best management practices to address nutrient runoff in the Toulmins Spring Branch ([DIVER ID 164](#)).
- Agricultural conservation and cropland nutrient reduction projects in the Bayou Folse ([DIVER ID 169](#))

and Vermilion and Cameron Parishes ([DIVER ID 170](#)) and nutrient management on dairy farms in St. Helena and Tangipahoa Parishes ([DIVER 167](#)) and Washington Parish ([DIVER 168](#)) reduce excess nutrients and provide habitat for a variety of wetlands-dependent species in coastal Louisiana watersheds.

- The Upper Pascagoula Water Quality Enhancement project ([DIVER ID 96](#)) develops and implements conservation plans and practices to reduce nutrient and sediment runoff into coastal watersheds from the Chunky-Okatibbee watersheds. This project provides synergistic benefits associated with other restoration projects focused on improving Gulf sturgeon habitat.

These projects use conservation practices to reduce nutrient and sediment loads from agricultural land within these watersheds. More specifically, they rely on voluntary cooperation and support of public and private landowners to provide technical assistance and help implement conservation practices that improve nutrient and soil health management. Critical components of these projects include outreach and education on nutrient management, baseline, and post-implementation water quality monitoring, identifying willing landowner participants, and developing and implementing site-specific conservation and nutrient management plans.

Monitoring and Adaptive Management

The projects identified above are underway and at varying stages of implementation. Outputs will be monitored by the Trustees to evaluate project effectiveness and may include:

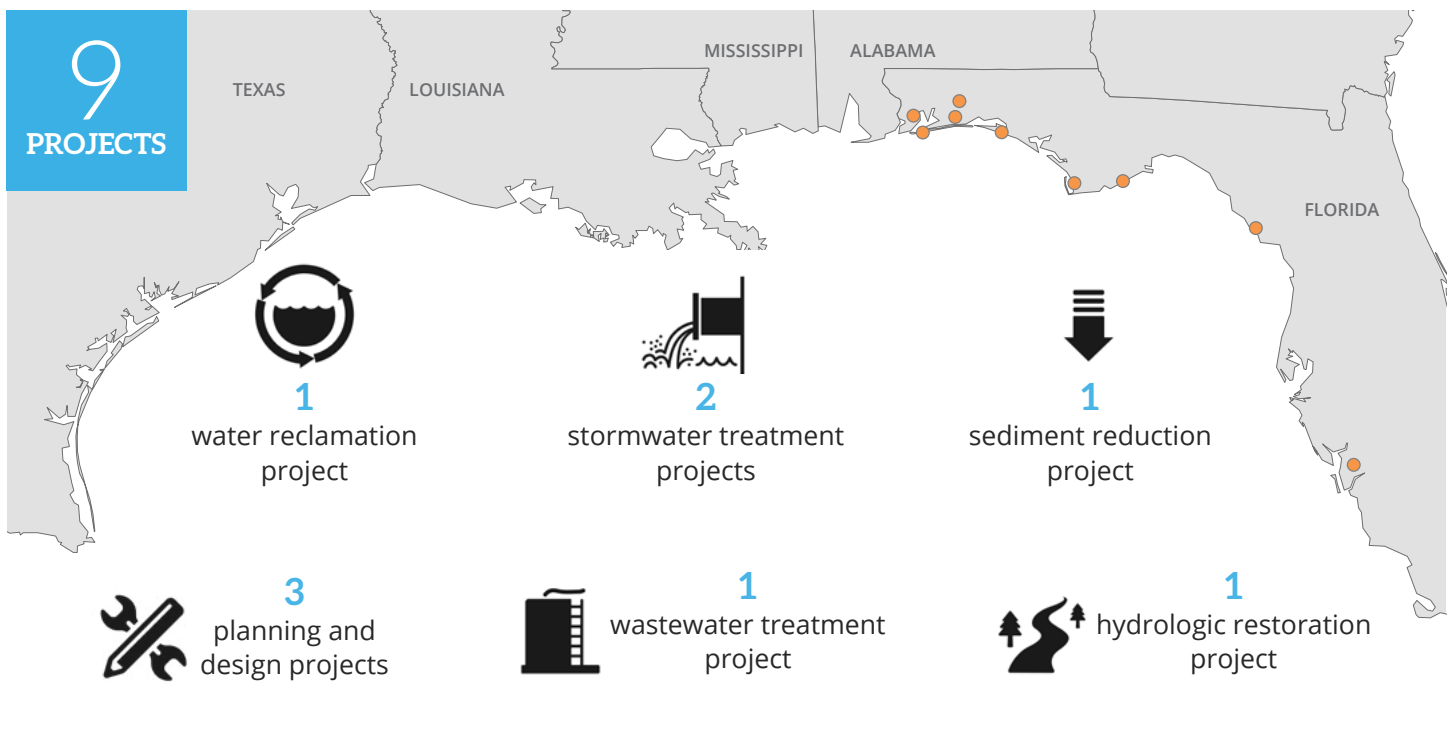
- The number of farms with site-specific conservation plans.
- The number of acres treated with conservation practices by land use.
- The number of farms implementing nutrient management plans.
- The number of conservation and restoration outreach and education efforts to landowners in prioritized watersheds.
- Baseline and post-project implementation water quality monitoring results.

Water Quality



Introduction

Pathogens and harmful algal blooms, fueled by excessive nutrients and/or alterations to freshwater flows, compromise the health of the Gulf's coastal habitats and resources. They can also affect the public's use of the Gulf Coast for swimming, fishing, and other activities. Coastal development results in land use changes and hydrologic alterations that can change the volume, timing, duration, and quality of freshwater inflows into the Gulf. Altered freshwater inflows can lead to increased flooding, salinity shifts, and discharge of pollutants, such as fecal bacteria and pathogens, to nearby coastal water bodies. These stressors contribute to beach closures, restrictions on shellfish harvesting, fish consumption advisories, and reduced aquatic habitat quality.



Settlement Allocation

\$300,000,000

Funds Committed Through 2020

\$17,118,747

Percent Funds Remaining

94%

During 2010 and 2011, Florida's coast experienced substantial recreational use losses due, in part, to poor water quality from the spill. As part of the Trustees' restoration portfolio, they are compensating for hydrologic and water quality degradation in coastal watersheds along the Florida coast. This compensation will reduce the occurrence of chronic threats to coastal and nearshore habitats and provide improved recreational use opportunities. Additionally,

water quality improvements benefit the overall health and resiliency of the Gulf ecosystem by restoring vital estuarine habitats and the resources that depend on them.

The goals for this restoration type to support a comprehensive ecosystem restoration approach and benefit water quality to promote recreational use in Florida are:

- Reduce pollutant loads entering priority watersheds along the Florida Gulf Coast (including nutrients and pathogens) that contribute to water quality degradation and can lead to chronic eutrophication, harmful algal blooms, hypoxia, habitat losses, or beach and shellfish restrictions.
- Mitigate high-volume flows and prevent dramatic shifts in salinity that threaten many coastal habitats and resources along the Gulf Coast.
- Co-locate pollutant reduction projects with other restoration projects to enhance ecological services provided by other restoration approaches.

Trustee Achievements Through 2020

The Trustees have committed approximately \$17 million to plan for, implement, and monitor nine water quality improvement projects. These projects use techniques such as stormwater control measures, agricultural conservation practices, erosion control practices (e.g., living shorelines, vegetated buffers, unpaved road stabilization), and restoration of natural hydrologic flows. Approved projects are summarized below:

- Rattlesnake Bluff Road and Riverbank Restoration project ([DIVER ID 180](#)) reduces sedimentation to the Yellow River and Pensacola Bay through road stabilization and culvert replacement at up to six priority stream crossings.
- Alligator Lake Coastal Dune Lake Hydrologic Restoration project ([DIVER ID 198](#)) helps restore tidal exchange and removes barriers to fish and wildlife movements between the north and south portions of Alligator Lake by removing deteriorating culverts and constructing a bridge.
- Carpenter Creek Headwaters Water Quality Improvements project ([DIVER ID 195](#)) includes construction of a stormwater treatment facility and restoration of a 2.6-acre wetland in a highly urbanized watershed that flows into Pensacola Bay.
- City of Carrabelle's Lighthouse Estates: Septic Tank Abatement – Part II project ([DIVER ID 200](#)) improves water quality in Apalachicola Bay and St. George Sound by connecting 110 homes near the bay currently served by septic systems to a central

wastewater treatment system and limiting the installation of additional septic systems within the area.

- City of Port St. Joe Stormwater Improvements project ([DIVER ID 199](#)) reduces pollutant loadings to St. Joseph Bay by adding stormwater treatment capacity, implementing stormwater control measures, improving the existing stormwater conveyance system, and developing a stormwater master plan for the City of Port St. Joe.
- Pensacola Beach Reclaimed Water System Expansion project ([DIVER ID 196](#)) reduces pollutant discharge into Santa Rosa Sound through greater use of reclaimed water by expanding the Emerald Coast Utilities Authority's Pensacola Beach Reclaimed Water System.
- Planning and design for three potential projects, including: (1) development of a science-based, data-driven Strategic Hydrological Planning Tool to guide restoration and management of surface waters that flow through the 15,014 acre Yucca Pens Unit of the Cecil Webb/Babcock Wildlife Management Area ([DIVER ID 201](#)); (2) identification of restoration activities to restore hydrological connections within the Lower Suwannee National Wildlife Refuge ([DIVER ID 179](#)); and, (3) assessment and identification of unpaved stream crossings contributing the largest sediment loads to the Pensacola Bay watershed and development of planning level design solutions at a minimum of 15 priority locations ([DIVER ID 197](#)).

Monitoring and Adaptive Management

The projects identified above are underway and are at varying stages of implementation. Project outputs that will be tracked by the Trustees include:

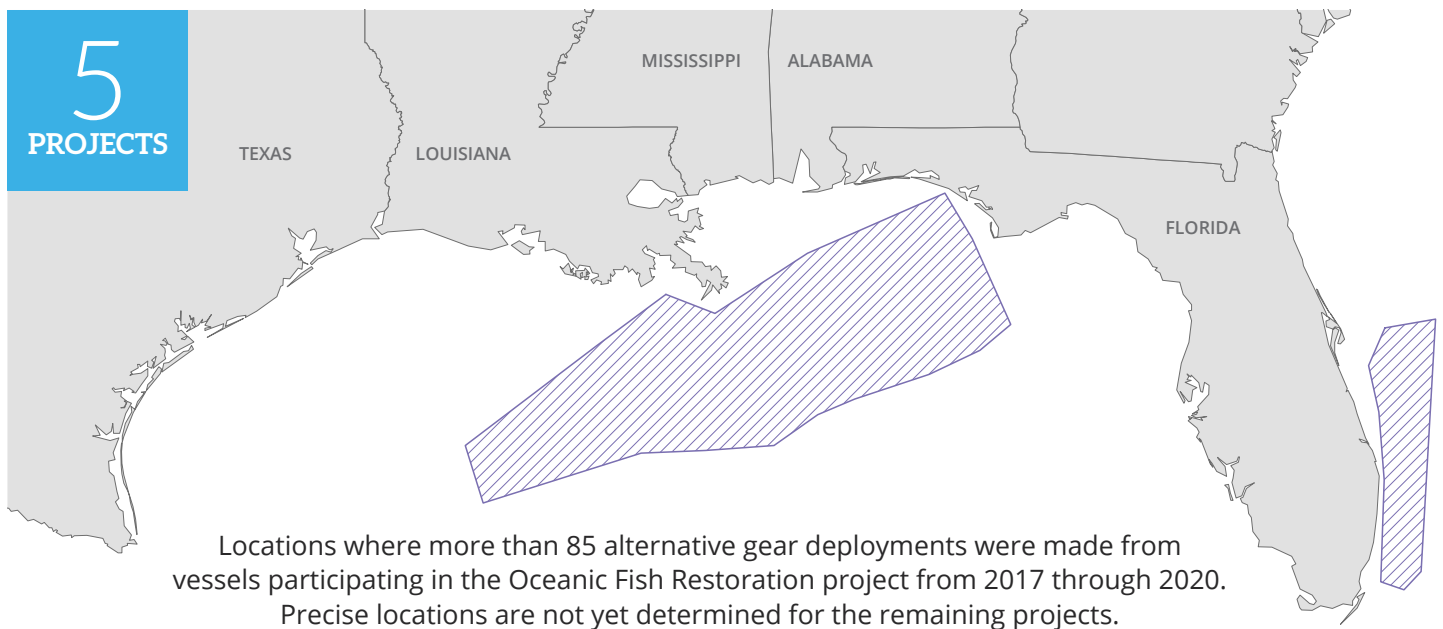
- The number of water quality improvement practices implemented.
- The number of acres of water quality improvement area.
- The number of homes converted from septic systems to central wastewater treatment.
- Baseline and post-execution water quality monitoring results.

Fish and Water Column Invertebrates



Introduction

From coastlines to the deep sea, a wide variety of organisms inhabit the Gulf of Mexico water column. These organisms include commercially and recreationally important fish and invertebrate species such as shrimp, bluefin tuna, and red snapper. These natural resources are critical to the health of the marine ecosystem and support the livelihood of seafood businesses and fishing communities across the Gulf. Furthermore, these organisms are an important part of the marine food web that includes other injured resources, such as birds, sea turtles, and marine mammals.



Settlement Allocation

\$400,000,000

Funds Committed Through 2020

\$78,681,216

Percent Funds Remaining

80%

Fish and invertebrates from all levels of the food chain were exposed to oil during and after the *Deepwater Horizon* oil spill. In particular, many fish and invertebrate eggs and larvae were injured or killed. Oil exposure resulted in the death or injury of 2–5 trillion fish larvae and 37–68 trillion invertebrates, which means that billions of fish and invertebrates never reached adulthood. In addition, the oil spill had detrimental, sublethal effects on those fish that survived the initial spill and cleanup, including reduced growth rates, impaired cardiac function, and compromised immune systems. To address the lost fish and invertebrate resources, the Trustees are restoring injured fish and

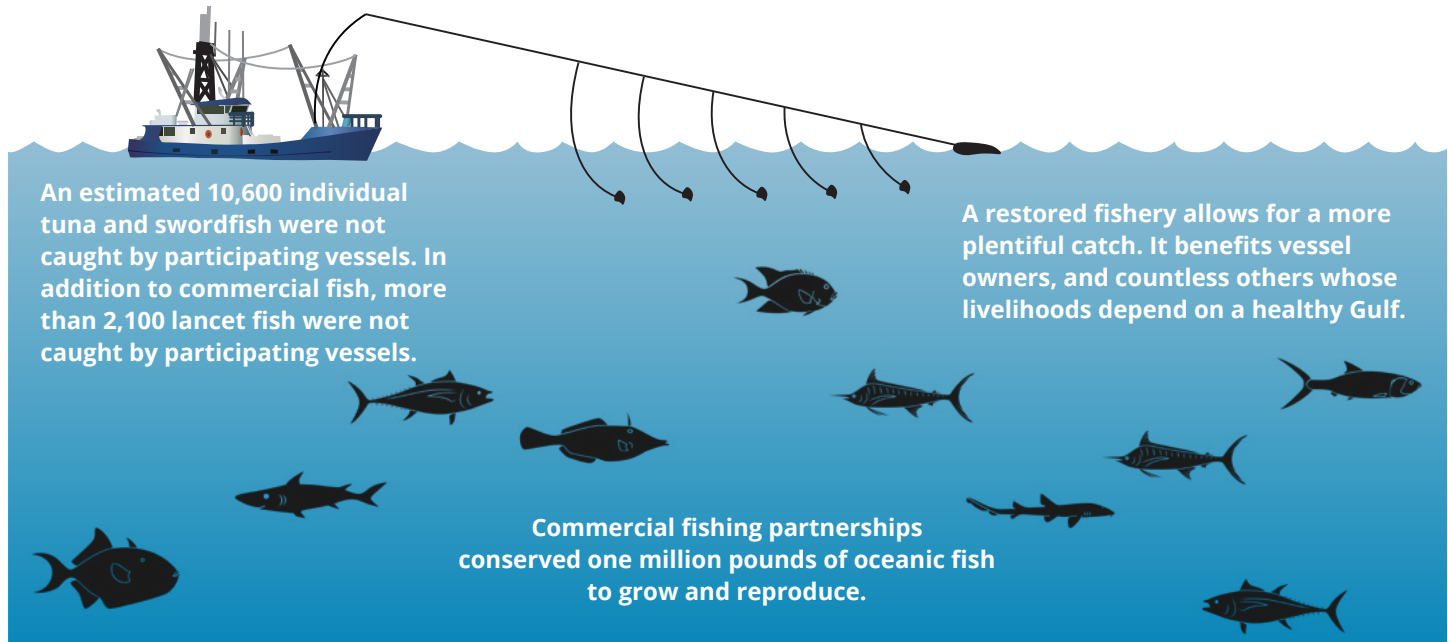
invertebrates across the range of coastal and oceanic zones by:

- Reducing direct sources of mortality, such as incidental catch (or bycatch) in commercial and recreational fisheries.
- Increasing the health of fisheries by providing fishing communities with methodologies and incentives to reduce impacts to fishery resources.

In addition to these efforts, fish and invertebrate injuries will be partially addressed through restoration of habitats used by these species, including wetlands,

Oceanic Fish Restoration Project Approach to Restoring Fish Injuries

Participants are able to harvest yellowfin tuna and swordfish during the repose using alternative fishing gear which results in reduced bycatch.



coastal, and nearshore habitats and mesophotic and deep benthic habitats.

Trustee Achievements Through 2020

The Trustees have committed \$79 million to plan for, implement, and monitor five projects approved under the Fish and Water Column Invertebrates Restoration Type. Although many of these projects are still in progress, numerous achievements have been made, as described below.

Oceanic Fish Restoration Project

The Oceanic Fish Restoration project ([DIVER ID 58](#)) is restoring a portion of the injuries to oceanic (pelagic) fish by reducing fish mortality in the Gulf pelagic longline fishery. This project launched as a pilot study in 2017, and began its first full season in 2018. Longline fishermen target pelagic fish, including yellowfin tuna and swordfish. The pelagic longline fishery is sustainably managed, yet sometimes results in bycatch of non-targeted species (e.g., sharks, marlin, bluefin tuna) that can die before they can be released. The project includes two-parts:

WHAT IS BYCATCH?

Fishermen sometimes catch and discard animals they do not want, cannot sell, or are not allowed to keep. This is collectively known as “bycatch.” Bycatch can be fish, but can also include marine mammals, sea turtles, and seabirds that become hooked or entangled in fishing gear.

- A temporary, voluntary repose period (where participants agree to refrain from fishing with pelagic longline gear for six months of the year), allowing fish to grow, survive, and reproduce. Participating vessels are compensated to offset their loss of revenue.
- During the voluntary repose, participants have the option to continue to fish using alternative gear, including buoy, deep drop rod and reel, and greenstick gears, which results in lower bycatch of non-targeted species in comparison to traditional longline gear.

About half of the pelagic longline fleet in the Gulf have chosen to participate in this project, which has reduced

fishing pressure on pelagic fish. Data collected from 2017–2019 show that goals to reduce fish mortality and help restore more than 60 species of pelagic fish in the Gulf have been met. This includes the annual goal of allowing approximately 25,000 pounds of fish per participating vessel to remain in the Gulf. The alternative gear was found to be extremely effective at reducing mortality of non-target species, with almost 90 percent of all fish discarded from alternative gear released alive. Vessel owners' participation in the repose and use of alternative gear allowed approximately one million pounds of pelagic fish, including yellowfin tuna and bluefin tuna, to remain in the Gulf during 2017–2019. This results in more fish for the Gulf of Mexico food web.

The Oceanic Fish Restoration project will continue for an additional two years, which will further restore pelagic fish in the Gulf for the benefit of the fishery and ecosystem. This will also provide an opportunity to continue building the Trustees' understanding of how

the alternative gear works in the fishery and an opportunity for fishermen to learn and improve their proficiency with these gears.

Additional Projects

The Trustees are implementing a restoration project that will restore recreationally important reef fish populations by reducing post-release mortality from barotrauma. Barotrauma occurs when fish are rapidly brought to the surface from deep water and gases in the fish's tissues and organs expand, and in some cases, cause organs to rupture. When fish suffering from barotrauma are released, they may die from the injuries or struggle to descend back into the water column, becoming easy prey to predators. The Reduction of Post-release Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries project ([DIVER ID 226](#)) will reduce barotrauma-related mortality in recreational reef fish fisheries by distributing fish descender devices to recreational anglers and providing education on how to effectively use the equipment.

ALTERNATIVE GEAR USED IN THE OCEANIC FISH RESTORATION PROJECT

Alternative gear (shown at right) is better at allowing more non-target fish to be released alive in comparison to typical longline gear because fewer number of hooks are fished and the gear is more frequently tended, increasing the likelihood that bycatch will be released alive. Data from the project indicated that almost 90 percent of fish discarded from alternative gear were released alive compared to less than half of fish discarded from longline gear. Fishermen participating in this effort have provided positive feedback about the project. According to one participant, "I am very invested in helping make alternative gear more effective for future generations of fishermen." Another participant said, "I found it very rewarding to be part of the research and experiment with the new gear, as well as to be part of something that could help restore fish in the Gulf."

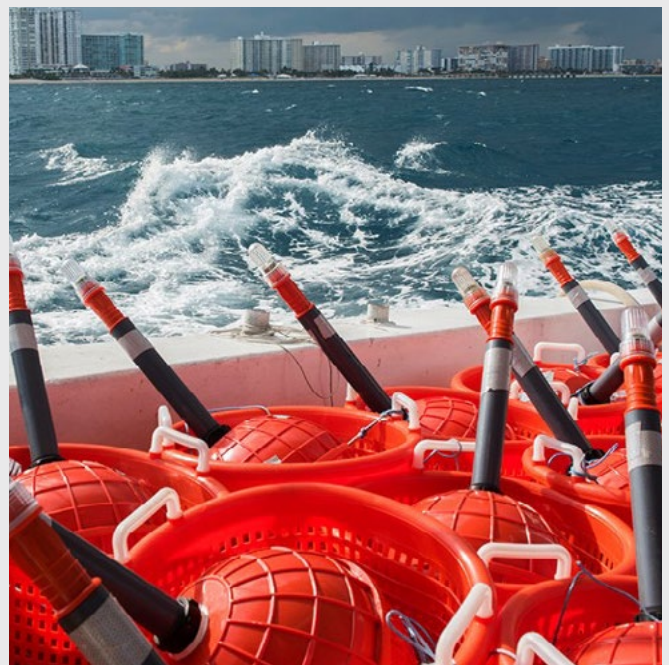


Photo credit: Jay Fleming Photography

Fish descender devices are weighted devices that help fish return to depth quickly, minimizing the negative effects from barotrauma. This project will begin with the development of best practices for fish descender devices use in the Gulf, and include surveys of public knowledge, attitudes, and opinions regarding these devices to track project success. Field research will be conducted on fish descender devices use and related post-release mortality, which will help to improve these mortality estimates and refine best practices. This project includes Gulf-wide collaboration with the Gulf States Marine Fisheries Commission, Florida Sea Grant, anglers, academics, state agencies, and other stakeholders, who together aim to harness the best available science to improve release practices.

Three additional restoration projects are being implemented that help restore fish and invertebrates by reducing bycatch in commercial fisheries. The Better Bycatch Reduction Devices for the Gulf of Mexico Shrimp Trawl Fishery project ([DIVER ID 227](#)) proposes to identify and promote the use of better bycatch reduction devices, which allow non-target fish and invertebrates to escape from shrimp trawls while retaining shrimp. To promote the use of these devices and help fishermen install and use them correctly, outreach workshops, trainings, and incentives will be provided.

Similarly, the Communication Networks and Mapping Tools to Reduce Bycatch project ([DIVER ID 225](#)) will identify areas where bycatch is high so that fishermen can redirect effort to other areas, avoid higher bycatch, and potentially improve efficiency in retaining allowable catch. Finally, the Restoring Bluefin Tuna via Fish Depth Optimization project ([DIVER ID 224](#)) will restore Western Atlantic bluefin tuna by identifying and sharing fishing practices that reduce bycatch in the pelagic longline fishery. A pilot study will be conducted to better define an optimal pelagic longline depth to reduce bluefin tuna bycatch. Anticipated benefits of identifying optimal depths in the pelagic longline fishery include positive economic benefits to fishermen from increased target catch per unit effort and benefits to bluefin tuna stocks and possibly other bycatch species by reducing fishing

mortality. Data on possible effects to other species from a deeper pelagic longline fishing depth will also be collected. This may include bycatch rates of yellowfin tuna, dolphinfish, skipjack tuna, wahoo, swordfish, sea turtles, and marine mammals.

Monitoring and Adaptive Management

Monitoring data collected by the Trustees enable evaluation of outcomes for individual projects as well as across restoration types. Some outputs monitored by the Trustees to evaluate project effectiveness included participation in the annual repose, quantity and disposition of bycatch and discards by species, and participation in alternative gear installation and use.

Several lessons learned have emerged through the implementation of the Oceanic Fish Restoration project. The project began as a pilot in 2017 to evaluate implementation, make any necessary changes, and allow further engagement with vessel owners, fish dealers, and other stakeholders before its first full season in 2018. Based on the results of the pilot project and feedback from stakeholders, two regional efforts were initiated, rather than one Gulf-wide program, to allow for broader geographic participation when identifying participants for the project.

Adaptive management changes were made to target the use of alternative gear. The types of alternative gear used for the project were expanded in 2018, with the addition of deep drop rod and reel gear. Also, the utility of the alternative gear was expanded through Exempted Fishing Permits, which were issued by NMFS to project participants to allow both tuna and swordfish to be retained on one of the alternative gear types (buoy gear) and to allow buoy gear to be retrieved using a power hauler. Finally, eligible participants were given the option to renew their participation for the next year without reapplying, giving vessel owners greater continuity in using alternative gear from year to year. Project implementers concluded the adaptive management changes were successful because participation has continued to improve each year, with more vessel owners applying, and from a broader geographic area.

Sturgeon

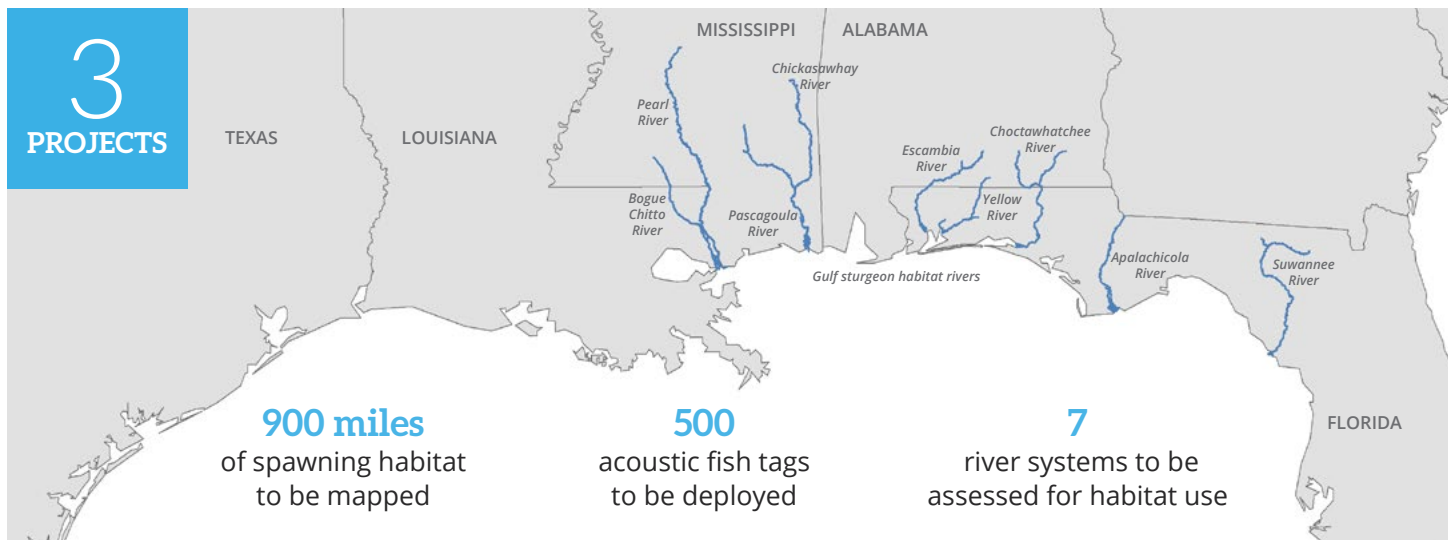


Introduction

Gulf sturgeon is a threatened species that was listed in 1991 under the federal Endangered Species Act of 1973. This anadromous fish inhabits rivers, estuaries, and coastal environments along the northern Gulf of Mexico, from Lake Pontchartrain in Louisiana to the Suwannee River in Florida. The decline of the species was caused by overexploitation and exacerbated by habitat degradation, poor water quality, reduced access to spawning habitat through dam construction, and other factors.



U.S. Fish and Wildlife Service staff gather health information from Gulf sturgeon.



Settlement Allocation

\$15,000,000

Funds Committed Through 2020

\$2,443,466

Percent Funds Remaining

84%

The Trustees estimated that the *Deepwater Horizon* oil spill potentially exposed between 1,100 and 3,600 Gulf sturgeon to oil and likely reduced food availability through spill-related impacts to benthic environments where their prey live. As a result of these injuries, the Trustees are restoring and protecting Gulf sturgeon by improving access to spawning areas and increasing the reproductive success of populations.

Key data gaps are being addressed to better inform restoration planning while Trustees continue to seek novel restoration prospects. For example, estuaries serve as important foraging habitat for juvenile Gulf

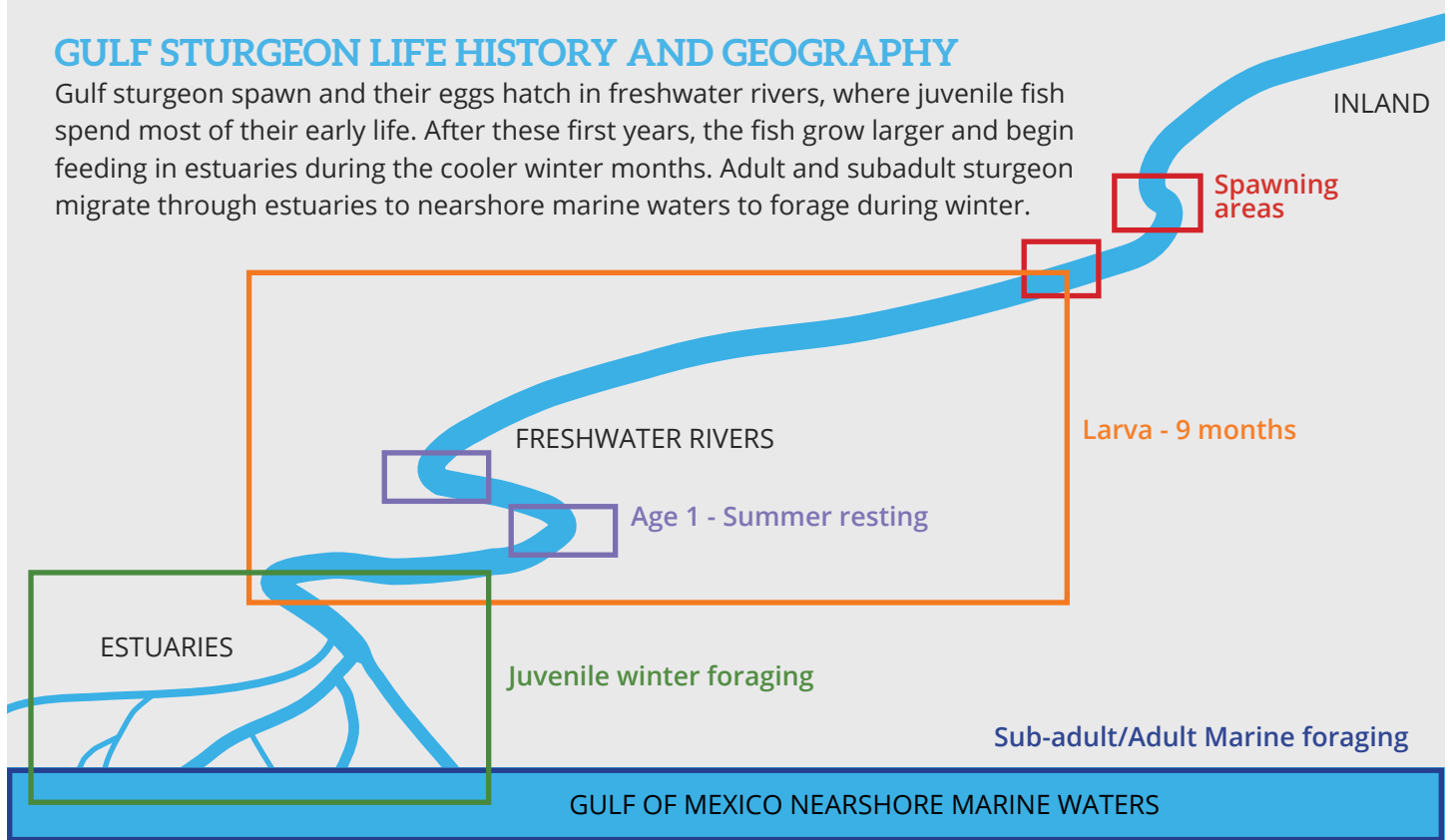
sturgeon in the winter, yet little is known about their patterns of habitat use or preference for different types of habitat such as oyster reefs, seagrass beds, or mud flats. Recruitment, growth, and survival patterns of juvenile Gulf sturgeon are poorly understood, yet this information is important for prioritizing restoration activities and evaluating the success of restoration efforts.

Trustee Achievements Through 2020

The Trustees have committed \$2.4 million to plan for and implement one restoration project. The Trustees have also committed an additional approximately

GULF STURGEON LIFE HISTORY AND GEOGRAPHY

Gulf sturgeon spawn and their eggs hatch in freshwater rivers, where juvenile fish spend most of their early life. After these first years, the fish grow larger and begin feeding in estuaries during the cooler winter months. Adult and subadult sturgeon migrate through estuaries to nearshore marine waters to forage during winter.

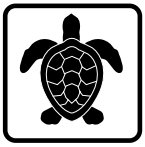


\$3 million for two monitoring and adaptive management activities for Gulf sturgeon that will begin to address restoration challenges and opportunities for this species. The three concurrent efforts are highly integrated and coordinated, and they are being implemented by a diverse set of partners from state and federal agencies, private entities, and academic institutions. In the Pearl and Pascagoula River systems, a restoration project ([DIVER ID 182](#)) is focused on the identification of spawning habitats and identification of locations where spawning is occurring successfully. Side scan sonar habitat mapping is being used to identify the location of potential hard-bottom spawning habitats throughout more than 900 stream miles accessible to Gulf sturgeon. An array of passive telemetry receivers distributed throughout both systems provides data on access, timing, and occupation of stream reaches by tagged adult fish during spawning periods. Fin spine microchemistry analysis will document the stream location origins of juvenile sturgeon produced in each system on the basis of water quality differences among reaches. Overall, the results of this project will inform

future restoration efforts aimed at improving access to, creating, or enhancing the quality of spawning habitats.

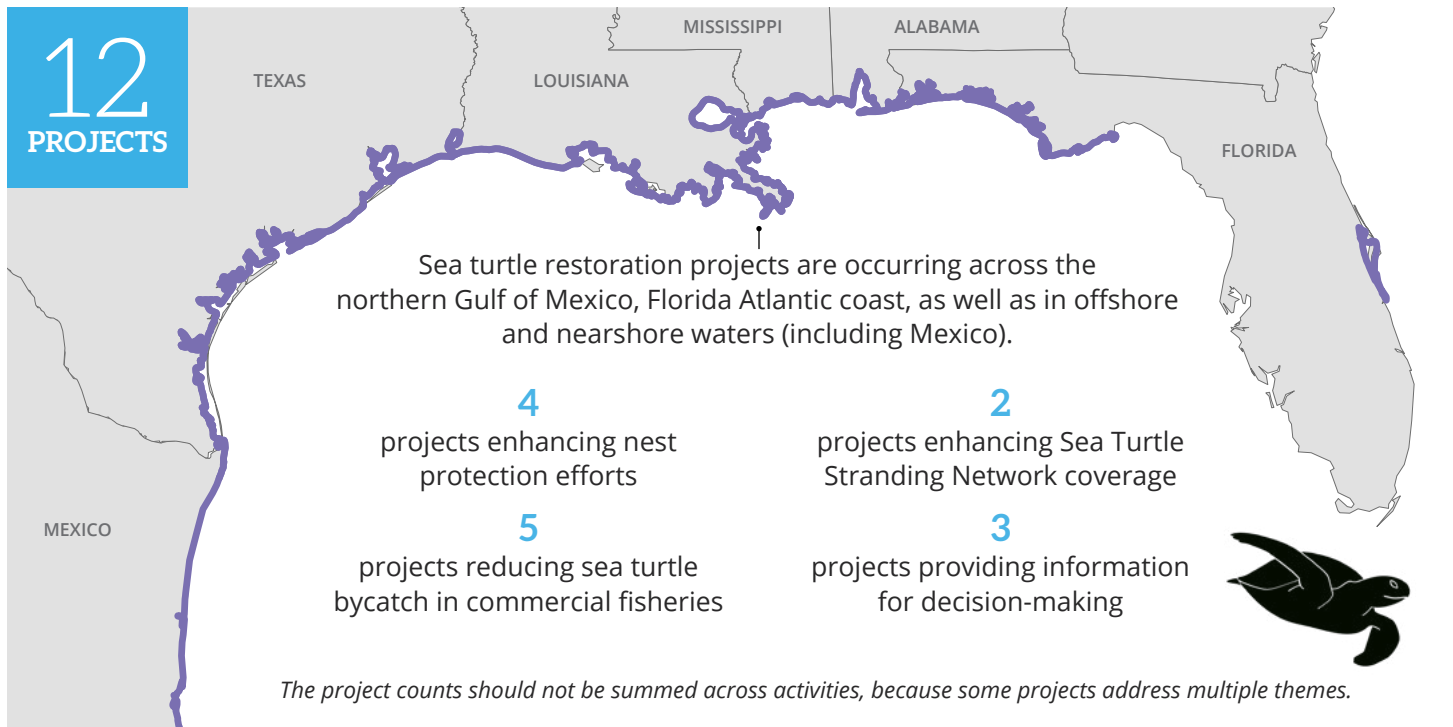
Across the Gulf sturgeon's range, from the Suwanee in Florida to the Pearl River in Louisiana and Mississippi, a monitoring and adaptive management activity ([DIVER ID 206](#)) characterizes patterns of estuarine habitat use and overwinter survival of juveniles through the use of passive telemetry receiver arrays. In addition, this activity aims to develop several metrics for recruitment, age and growth, and genetic identity that are necessary to characterize the pre-restoration status of Gulf sturgeon populations. A second activity ([DIVER ID 203](#)) will review and compile available Gulf sturgeon stock assessment data to provide pre-restoration baseline information on population sizes and trends, while also improving tools and practices that will allow more consistent data to be collected in the future. Overall, the three current efforts represent first steps toward achieving the overarching goals of improving access to spawning habitat and increasing reproductive success of Gulf sturgeon.

Sea Turtles



Introduction

Sea turtles are highly migratory, with a wide geographic range crossing state, federal, and international boundaries. They also use both terrestrial (beach) and marine (nearshore and offshore) habitats. The *Deepwater Horizon* oil spill injured or killed an estimated 100,000 to 200,000 sea turtles in the Gulf of Mexico. Species affected by the spill face many threats from both human and natural causes. The Trustees' integrated restoration portfolio focuses on restoring sea turtle populations by addressing all sea turtle life stages (hatchling, juvenile, and adult). Restoration approaches address primary threats (e.g., bycatch and loss or degradation of nesting habitat) and provide resources to enhance existing conservation efforts and programs (e.g., stranding networks).



Settlement Allocation

\$212,221,165

Funds Committed Through 2020

\$73,801,298

Percent Funds Remaining

65%

Trustee Achievements Through 2020

To help guide restoration planning, the Trustees developed a [Strategic Framework for Sea Turtle Restoration Activities](#) to promote continued coordination across the Restoration Areas, which ensures that key threats to sea turtles are addressed. One example of the Trustees' initial collaboration efforts is the Sea Turtle Early Restoration project ([DIVER ID 62](#)), a 10-year, multi-faceted project being implemented by the Regionwide and Texas Trustee Implementation Groups.

Additionally, the Trustees have planned and implemented a range of sea turtle restoration projects across the Gulf states and in Mexico. Through 2020, the Trustees committed more than \$73 million in Sea Turtles Restoration Type funds to plan for, implement, and monitor 12 projects. These projects focus on four main themes: 1) nest protection, 2) sea turtle stranding response and rehabilitation, 3) bycatch reduction, and 4) filling data gaps and developing tools to support future restoration planning and decision-making.



Sea turtles arrive at beaches in large numbers to lay their eggs.

Sea turtle restoration project achievements to date are summarized below according to four restoration categories.

Nest Protection

In the Gulf of Mexico, sea turtles primarily nest in Florida, Alabama, Texas, and Mexico, with occasional nesting in Mississippi and Louisiana. Restoration has been focused on protection of sea turtle nesting to create opportunities to improve reproductive success on nesting beaches. Restoration techniques address threats (such as coastal development) that can disrupt nesting and reduce embryo and hatchling survival. Through 2020, the Trustees have worked to reduce the impacts of coastal development on sea turtles by reducing beachfront lighting and educating beach users about sea turtle-friendly practices. The Trustees retrofitted more than 3,100 lights with sea turtle-friendly lighting along Alabama and Florida Panhandle beaches. In addition, on behalf of the Alabama Trustee Implementation Group, the Alabama Department of Conservation and Natural Resources, on behalf of the Alabama Trustee Implementation Group, also participated in more than 25 outreach events in 2019 to educate beach users and homeowners about sea turtle-friendly practices. Projects that reduce artificial light sources on nesting beaches or conserve sea turtle

nesting habitat also improve and protect habitat used by other wildlife, such as beach mice and shorebirds.

The Trustees have also enhanced existing nest monitoring and protection efforts in Alabama, Texas, and Mexico. Nest monitoring and protection (such as placing protective screening over nests or relocating nests determined to be at high risk from flooding or predation) have successfully increased the number of nests producing hatchlings. From 2016 through 2020, Trustee-supported sea turtle conservation programs conducted daily surveys of potential nesting beaches during nesting season. These patrols logged a cumulative length of more than 1.7 million miles in Alabama, Texas, and Mexico. This represented an average of more than 200,000 miles of surveys per year in Texas, which was more than a 33 percent increase from the average length patrolled in the 5 years prior to project implementation. In 2019, Texas patrols monitored the greatest cumulative mileage (218,479 miles) since monitoring began in Texas in the late 1980s. The patrols across Alabama, Texas, and Mexico documented more than 93,200 sea turtle nests that resulted in more than 4.3 million sea turtle hatchlings returning to the ocean.

Over the next few years, the Trustees will continue existing nest monitoring and protection projects in

Alabama, Texas, and Mexico and will expand their nest protection efforts through a land acquisition project that would protect sea turtle nesting beaches in Florida's Archie Carr National Wildlife Refuge ([DIVER ID 236](#)).

Sea Turtle Stranding and Salvage Network and Rehabilitation

Sea turtle stranding response activities increase the likelihood that live, stranded sea turtles are found, rehabilitated, and released. Additionally, a critical component of sea turtle stranding response is the documentation and necropsy of dead sea turtles to identify causes of mortality, which can help identify in-water threats that can be addressed. The Trustees are improving sea turtle stranding response by enhancing the Sea Turtle Stranding and Salvage Network's program capacity Gulf-wide, providing additional and improved training and education and enhancing data management and diagnostic tools.

The Trustees are enhancing sea turtle stranding program capacity through the implementation of two projects. The Enhancement of the Sea Turtle Stranding and Salvage Network and Development of an Emergency Response Program component of the Sea Turtle Early Restoration project ([DIVER ID 62](#)) includes improvements to communication and coordination across the five Gulf state stranding networks, develop-

ing a formal emergency response program to increase the survival of sea turtles during cold stun and other mass stranding events; and expanding and improving existing sea turtle response capacity. For example, eight new positions were added, including a project coordinator, data coordinator, mortality investigator, and one position in each Gulf state, to support the work of State Coordinators. The Trustees also acquired or provided funding for vehicles, equipment, and supplies for the State Coordinators and the Texas stranding network participants. Additionally, the Louisiana stranding network expanded stranding surveys into western Louisiana to improve stranding documentation and response in remote areas.

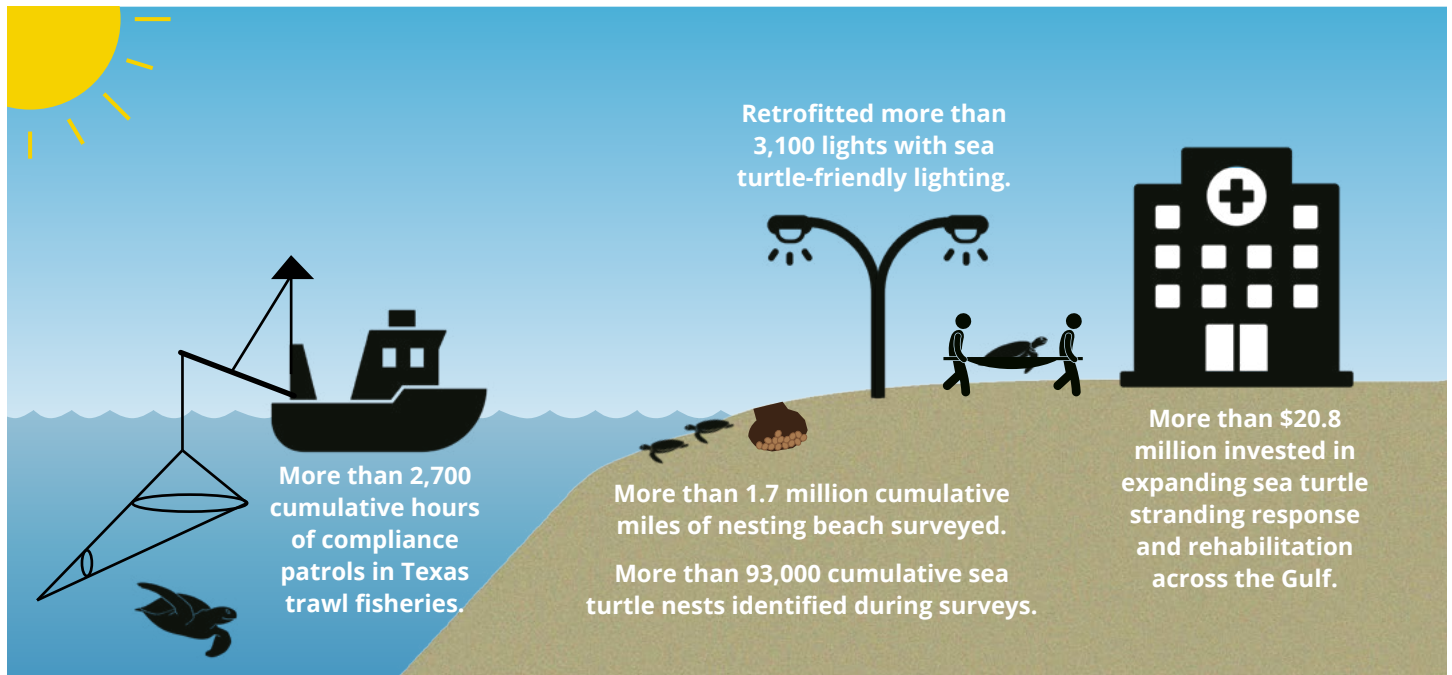
State stranding networks often bring live, stranded sea turtles to rehabilitation centers to treat their injuries and illnesses in an effort to increase the chances of the sea turtles surviving when released back into the Gulf of Mexico. The Texas Trustees continue to provide funding for equipment, supplies, and personnel at partnered rehabilitation facilities, enhancing capacity at these centers. Finally, the Coastal Alabama Sea Turtle (CAST) Triage project ([DIVER ID 142](#)) was initiated in 2018 and is in the early stages of constructing a new, appropriately equipped facility for the initial triage, treatment, release, or transfer of injured or ill sea turtles, the first of its kind in Alabama.

ENHANCING BI-NATIONAL PARTNERSHIPS

The Mexican State of Tamaulipas supports the largest nesting population of Kemp's ridley sea turtles in the world. Through the Kemp's Ridley Sea Turtle Nest Detection and Enhancement component of the Sea Turtle Early Restoration project ([DIVER ID 62](#)), the Texas Trustee Implementation Group continues to foster bi-national cooperative relationships to restore this species. This project includes providing additional staff, training, equipment, and supplies over a 10-year period in both Texas and Mexico to enhance nest detection and protection activities.



Ongoing Sea Turtle Restoration Efforts



The Trustees' restoration efforts have also focused on enhancing training and education. For example, from 2017 to 2020, 157 workshops were held across the Gulf states. The workshops included training for stranding responders in the use of standardized data collection techniques, reporting methods, and sea turtle handling protocols. Additionally, post-mortem examinations were conducted on approximately 1,960 sea turtles across the Gulf states from 2017 to 2020, using improved necropsy protocols and associated trainings.

Lastly, the Trustees are enhancing data management and diagnostic tools to improve understanding of the causes and locations of sea turtle mortality, thereby increasing understanding of threats in the marine environment. Data collected is used to identify the severity, quantity, and geographic and temporal aspects of threats. To improve data quality and ensure timely access to data, the Trustees are improving the stranding network database to provide a more stable system with comprehensive data entry and standard quality assurance procedures. The first iteration of the database was released in 2018; improvements are ongoing. Improvements to mortality investigations and determinations of cause of death include the develop-

ment of stranding probability and mapping models, sediment fingerprinting analyses to inform locations of turtle mortality, and the development of video necropsy training modules.

Bycatch Reduction (Commercial)

Bycatch in commercial fisheries is a primary threat to sea turtles in the marine environment, and reducing sea turtle bycatch is a restoration priority. Bycatch occurs when non-target animals such as fish, invertebrates, sea birds, marine mammals, or sea turtles, are unintentionally hooked, entangled, or caught in fishing gear. The Trustees are addressing sea turtle mortality from commercial fishery bycatch using a variety of techniques, including:

- Increasing compliance with existing sea turtle friendly fishing gear requirements through enhanced capacity for enforcement and voluntary gear inspections.
- Increasing fisheries observers (number and coverage) to better characterize bycatch.
- Using observer data (or improving data collection practices) to identify opportunities for conservation measures.
- Developing and/or testing new gear configurations.

Bycatch reduction projects implemented to date have targeted sea turtles in all five Gulf states. One way the Trustees are reducing bycatch is through enhancing law enforcement patrols intended to improve compliance with existing turtle excluder device regulations and voluntary inspection of commercial fishing vessels. The Trustees enhanced the capacity of bycatch enforcement through increasing the number of personnel and the amount of time dedicated to vessel inspections and patrols. In Texas, law enforcement patrol hours increased from 31 hours to more than 300 hours in 2017, and close to 800 hours in 2018, 700 hours in 2019, and 1,000 hours in 2020. As a result, Texas law enforcement officers inspected approximately 40 vessels annually from 2017 to 2020.

The Trustees have also conducted outreach events, workshops, and trainings. A workshop held in 2017 had more than 350 attendees as part of the Shrimp Trawl Bycatch Reduction component of the Sea Turtle Early Restoration project. The workshop focused on educating fishermen on the impacts of sea turtle bycatch and the proper use of turtle excluder devices, ultimately encouraging compliance with sea turtle-friendly requirements.

The Trustees will continue commercial fishery bycatch reduction efforts over the coming years, implementing recently approved projects that target bycatch reduction, such as enhancing fishing gear to more efficiently reduce bycatch; and furthering understanding of the factors contributing to sea turtle bycatch to inform future restoration.

Data Collection and Decision Support Tools

As described in the Trustees' Programmatic Restoration Plan and Strategic Framework for Sea Turtle Restoration Activities, data gathering activities can help the Trustees better understand what, where, and when specific restoration actions are appropriate. Data collection and decision support tools can also help determine which restoration actions are most likely to be successful.

The Trustees have implemented several projects aimed at improving understanding of sea turtle habitat use in the nearshore environment, as well as improving the standardization of in-water sea turtle data collection. For example, through the Gulf of Mexico Sea Turtle Atlas project ([DIVER ID 223](#)), the Trustees aim to create a comprehensive, user-friendly tool to link various sea turtle data sources and repositories to assist in restoration decision-making.

TURTLE EXCLUDER DEVICES (TEDs)

A TED is a metal grid that fits into the end of the trawl, with a top or bottom escape opening covered with a flap. Sea turtles encounter the TED grid when they pass through the trawl net and are able to escape through the adjacent opening. In the picture at right, a member of the NOAA Gear Monitoring Team performs a voluntary inspection of a TED to ensure it complies with applicable laws and regulations ([DIVER ID 62](#)). Between 2017 and 2019, NOAA's Gear Monitoring Team conducted more than 500 courtesy vessel inspections. These inspections are still ongoing; but in 2020, only a few inspections were conducted due to the COVID-19 pandemic.



Submerged Aquatic Vegetation



Introduction

SAV beds serve many important functions within the nearshore environment, including but not limited to contributing to primary productivity; serving as the base of near-shore food webs; providing habitat and shelter for many species of fish and invertebrates; and trapping sediments, which improves water clarity and stabilizes the sea bottom. As described in the Trustees' Programmatic Restoration Plan, SAV in the Chandeleur Islands, Louisiana, was injured because of the spill, and the spatial distribution of seagrasses decreased. The primary goals of the SAV Restoration Type are to provide resiliency and sustainability to this habitat and restore ecological functions of SAV beds in the Chandeleur Islands. SAV in other parts of the northern Gulf of Mexico, such as in Florida, were also impacted by the oil spill response activities and those injuries were restored through pre-settlement emergency restoration projects.

SAV Restoration Type funds are allocated specifically to the Louisiana Trustee Implementation Group. This group has not obligated any of these funds to date.

Trustee Achievements Through 2020

To maximize restoration benefits, the Trustees are taking a strategic and comprehensive approach to planning and restoring the Chandeleur Islands' habitats, that take into account existing and ongoing restoration projects in the area. Future SAV restoration activities will benefit from the ongoing development of a monitoring and adaptive management framework and programmatic plan ([DIVER ID 121](#)). These plans ensure the Trustees iteratively incorporate new information into each step of the decision-making process and reduce uncertainty, improve decision-making and future restoration activities, and track progress towards restoration goals.

In addition to SAV restoration that will be conducted in Louisiana under this Restoration Type, the Trustees identified "restore and enhance submerged aquatic

Submerged aquatic vegetation (SAV) contributes to primary productivity of the Gulf of Mexico.



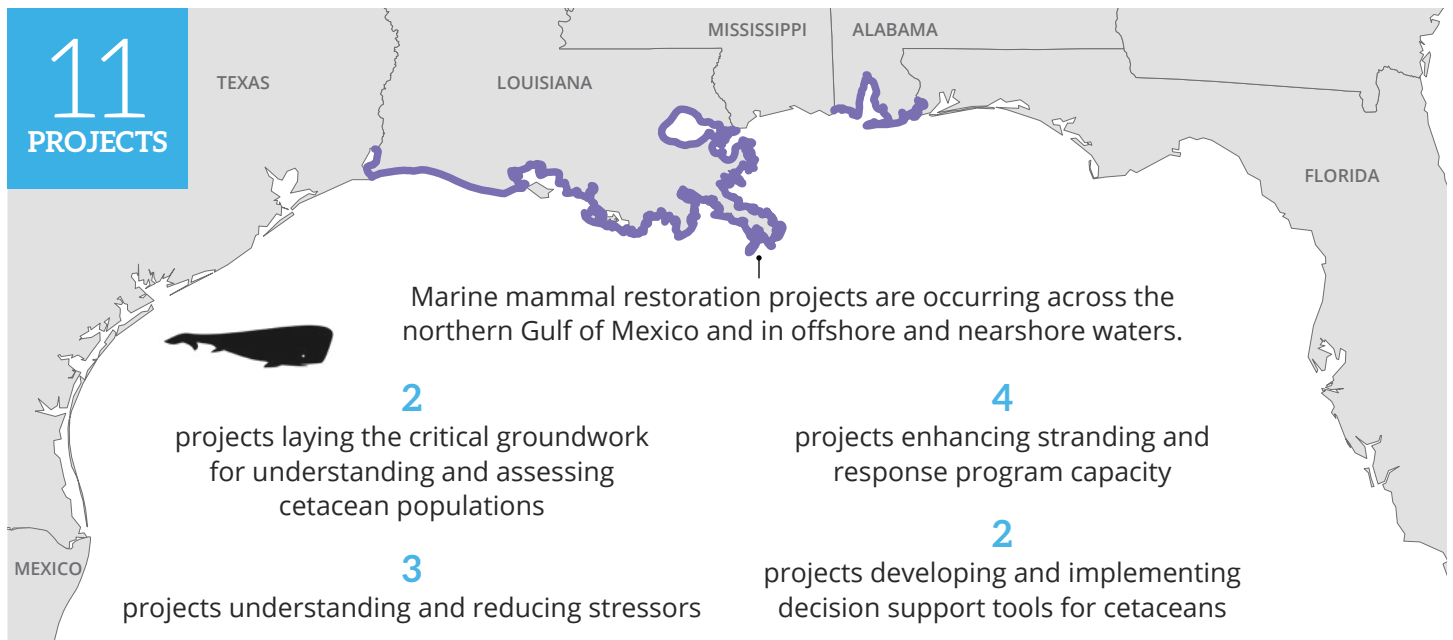
vegetation" as a restoration approach under the Wetlands, Coastal, and Nearshore Habitats and Habitat Projects on Federally Managed Lands Restoration Types. The Florida Trustee Implementation Group's Seagrass Recovery project ([DIVER ID 27](#)) is an example of a Wetlands, Coastal, and Nearshore Habitats project that provides SAV benefits. The project addresses boat damage to shallow seagrass beds in the Florida Panhandle by restoring scars in turtle grass and other SAV species. The Louisiana Trustee Implementation Group's Shoreline Protection at Jean Lafitte National Historic Park and Preserve project ([DIVER ID 179](#)), is another example. It includes re-establishing seagrass beds in the Barataria Preserve unit of Jean Lafitte National Historical Park and Preserve that experienced SAV losses due to freshwater releases during the oil spill.

Marine Mammals



Introduction

The Gulf of Mexico provides habitat for 21 species of cetaceans (dolphins and whales). Their habitats range from coastal bays, sounds, and estuaries to the open ocean. Dolphins and whales are federally protected under the Marine Mammal Protection Act of 1972. Both sperm whales and Gulf of Mexico Rice’s whales (formerly known as Gulf of Mexico Bryde’s whales) have additional protection under the Endangered Species Act of 1973. Cetaceans are long-lived, slow to reproduce, produce only one calf at a time, inhabit a broad geographic range and diverse habitats, and may be impacted by multiple stressors throughout the water column. All cetacean species come to the surface to breathe, therefore surface threats are also important. In the Gulf, some of these additional stressors include noise, interactions with commercial and recreational fishing gear, other human interactions (such as illegal feeding, harassment, and gunshots), vessel strikes, habitat loss and habitat degradation, and pollution.



Settlement Allocation

\$144,000,000

Funds Committed Through 2020

\$30,968,016

Percent Funds Remaining

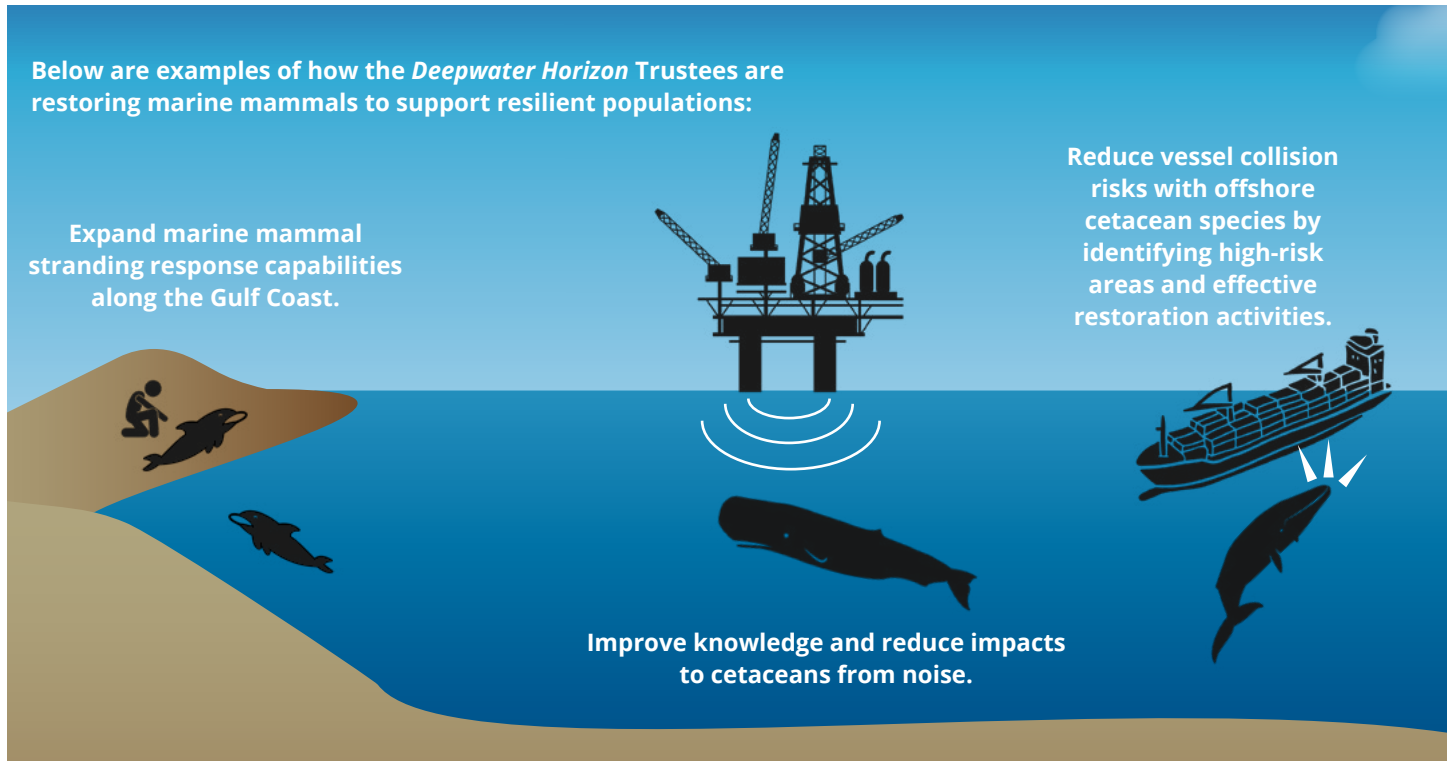
78%

The *Deepwater Horizon* oil spill exposed all 21 of the Gulf cetacean species to chemical contaminants across a wide geographic range. Oil and dispersants contaminated estuarine and marine habitats in a large portion of the northern Gulf of Mexico and cetaceans were exposed to these contaminants through skin contact, as well as inhalation, ingestion, and aspiration. This exposure caused significant health impacts that resulted in increased mortality, reduced survival, and reduced reproductive success. The oil spill also damaged

habitats and prey species, thus reducing habitat quality and food availability, further worsening the physical and toxic effects on cetacean species.

Based on biological characteristics and potential effects from stressors, the Trustees developed a [Strategic Framework for Marine Mammal Restoration Activities](#), including a portfolio of restoration approaches. Guided by these restoration approaches, the Trustees designed projects to restore injured cetaceans, support resilient

Marine Mammal Restoration Efforts



cetacean populations, reduce impacts from further stressors or threats, and complement existing management priorities.

Trustee Achievements Through 2020

Through 2020, the Trustees committed approximately \$31 million to plan for, implement, and monitor eight projects. The Trustees have also committed an additional approximately \$7.4 million for three marine mammal monitoring and adaptive management activities.

Groundwork Activities for Understanding Cetaceans

In the initial years of the *Deepwater Horizon* NRDA restoration program, the Trustees conducted work aimed at laying critical groundwork for understanding and assessing cetacean populations and their current health in the Gulf. Two monitoring and adaptive management activities were implemented to assess bay, sound, and estuary dolphin populations in Alabama and Louisiana through photo identification and other scientific methods that provide information

on dolphin distribution, density, habitat use, behavior, body condition, and other health parameters. The Assessment of Alabama Estuarine Bottlenose Dolphin Populations and Health project ([DIVER ID 147](#)) provides valuable resource-level monitoring for dolphin stocks in Alabama waters, which are largely unstudied, and will inform pre-restoration baselines, restoration planning, and implementation. The Louisiana Marine Mammal Abundance, Distribution, and Density project ([DIVER ID 127](#)) provided baseline information on the abundance, distribution, and density of bottlenose dolphins in Barataria Bay. Results from this project will guide the establishment of metrics for restoration monitoring and adaptive management decision making.

Enhancing Stranding and Response Program Capacity

In addition to data collection, the Trustees are investing in enhancements of marine mammal stranding and response program capacity. The Trustees funded the Reducing Impacts to Cetaceans During Disasters By



Gulf of Mexico Rice's whale,
MMPA/ESA Permit # 21938

Improving Response Activities project ([DIVER ID 230](#)) which is aimed at improving and enhancing response and assessment activities Gulf-wide for cetaceans facing threats from human-caused and natural disasters. Together, the Trustees, with state and federal partners, are developing situation-specific disaster response plans for marine mammals. The Trustees also funded projects to enhance capacity for stranding network programs in Alabama ([DIVER ID 144](#)) and Louisiana ([DIVER ID 256](#)) through increased personnel, equipment, training, diagnostic support, and supplies. Despite modified response protocols enacted during the COVID-19 pandemic, the Alabama Marine Mammal Stranding Network performed full or partial necropsies on 90 percent of cetacean carcasses in 2020. The network also collected and stored tissue samples wherever possible. In 2020, they collected approximately 6,000 biological samples and submitted sample inventories for stranded cetaceans to the Gulf of Mexico Marine Mammal Health Monitoring and Analysis Platform. These activities facilitate ongoing data collection to determine causes of illness and death and better understand marine mammal-human interactions, diet, disease, and causes of strandings.

Enhancing Understanding of and Reducing Stressors on Cetaceans

The Trustees are also conducting restoration projects aimed at understanding and reducing stressors, such as noise and vessel strikes. For example, through the Reduce Impacts of Anthropogenic Noise on Cetaceans project ([DIVER ID 229](#)), the Trustees will assess the specific types of noise sources that impact marine mammal populations in order to target activities to reduce the most harmful sources of noise in the Gulf. The acoustic environment in the Gulf includes a spectrum of human-made noise sources that can be harmful to cetaceans, including noise from seismic surveys, oil extraction, and vessel traffic. This project will rely heavily on partnerships to identify and advance the appropriate noise reduction techniques and technologies for testing and implementation.

Developing and Implementing Decision Support Tools for Cetaceans

Through the Evaluating the Cumulative Impact of Multiple Stressors on Cetaceans project ([DIVER ID 217](#)), the Trustees are developing and implementing a modeling framework to evaluate the cumulative

impacts of multiple stressors (e.g., noise, shipping traffic, prey availability) and quantify the relative benefit of efforts to reduce those impacts, focusing on sperm whales and oceanic dolphins. This project will integrate information gathered from a variety of sources into a framework to simulate the impact of potential restoration projects and quantify their likely effectiveness at improving survival and reproduction of target species.

Finally, the Compilation of Environmental Threats and Animal Data for Cetacean Population Health Analyses (CETACEAN) project ([DIVER ID 231](#)) will develop a data platform to provide user-friendly access to datasets for assessing the health of cetaceans and the stressors that threaten them. The CETACEAN data platform will assist Trustees, restoration planners, stranding responders, and conservation managers in assessing the health of, and threats to, cetaceans in the Gulf. The project will

provide an integrated information platform that will be used to inform the development of restoration activities and the assessment of restoration effectiveness.

Future data collection and analysis of results from ongoing projects will improve our understanding of dolphin and whale populations, their health, habitats, and stressors, and the relationships among them. This CETACEAN project will be increasingly important to providing a clear path forward in understanding effective restoration of cetaceans in the rapidly changing Gulf. The current and future work will continue to inform and support the Evaluating the Cumulative Impact of Multiple Stressors on Cetaceans and CETACEAN projects. It will also guide effective restoration planning, implementation, and monitoring and adaptive management for the duration of the *Deepwater Horizon* NRDA restoration and for future damage assessments.

PHOTO-ID SURVEYS AND CATALOGING

Photo-ID surveys provide information used to identify and follow individual animals over time, including information on movements, ranges, behaviors, reproductive success, survival, and potential injuries (e.g., vessel strikes or entanglements). Individual dolphins can be identified by the shape and markings on their dorsal fins, particularly differences in accumulated scars, notches, and nicks. The Trustees are using photo-ID surveys to investigate dolphin communities across Mobile Bay, Perdido Bay, and nearshore Alabama waters, and the seasonal (summer/winter) abundance, distribution, and habitat use of dolphins along the Alabama coast. Since the project began, the Trustees have conducted 81 boat surveys covering approximately 1,800 miles. From all surveys combined (photo-ID, biopsy, and training surveys), 2,950 photographs were cataloged and a total of 1,011 distinctive dolphins were identified. In Louisiana, the Trustees conducted photo-ID surveys for abundance, distribution, density, and survival of marine mammals to



support the understanding of baseline population conditions in Barataria Bay 9 years after the spill. The Trustees conducted bay-wide surveys in the Barataria Bay, covering approximately 2,606 miles. Through these surveys the Trustees collected a total of 27,365 photographs and identified a total of 1,977 distinctive dolphins.

Birds



Introduction

The Gulf of Mexico region provides summer breeding habitat for nearly 300 bird species. It also intersects with three of the four major North American migration flyways (Atlantic, Mississippi, and Central Flyways), providing essential stopover habitats during the spring and fall migration periods. An estimated 56,000 to 102,000 birds from at least 93 species were killed by the *Deepwater Horizon* oil spill, including resident and migratory species from all five Gulf Coast states. Given the spill's broad geographic extent, and the variety of species and large number of individuals impacted, a diverse set of restoration approaches is needed.

A combination of species-specific and habitat-focused restoration projects are underway. This collection of projects will address the differing habitat requirements for individual species and life stages as well as ongoing threats that can limit restoration effectiveness. These projects are benefiting numerous bird species through protection, creation, and enhancement of nesting and foraging habitat; reestablishment of breeding colonies; management of bird predators; and prevention of incidental bird mortality from human activities. Each restoration area is in the process of implementing bird restoration projects to provide benefits across the interconnected northern Gulf of Mexico ecosystem and beyond.

Trustee Achievements Through 2020

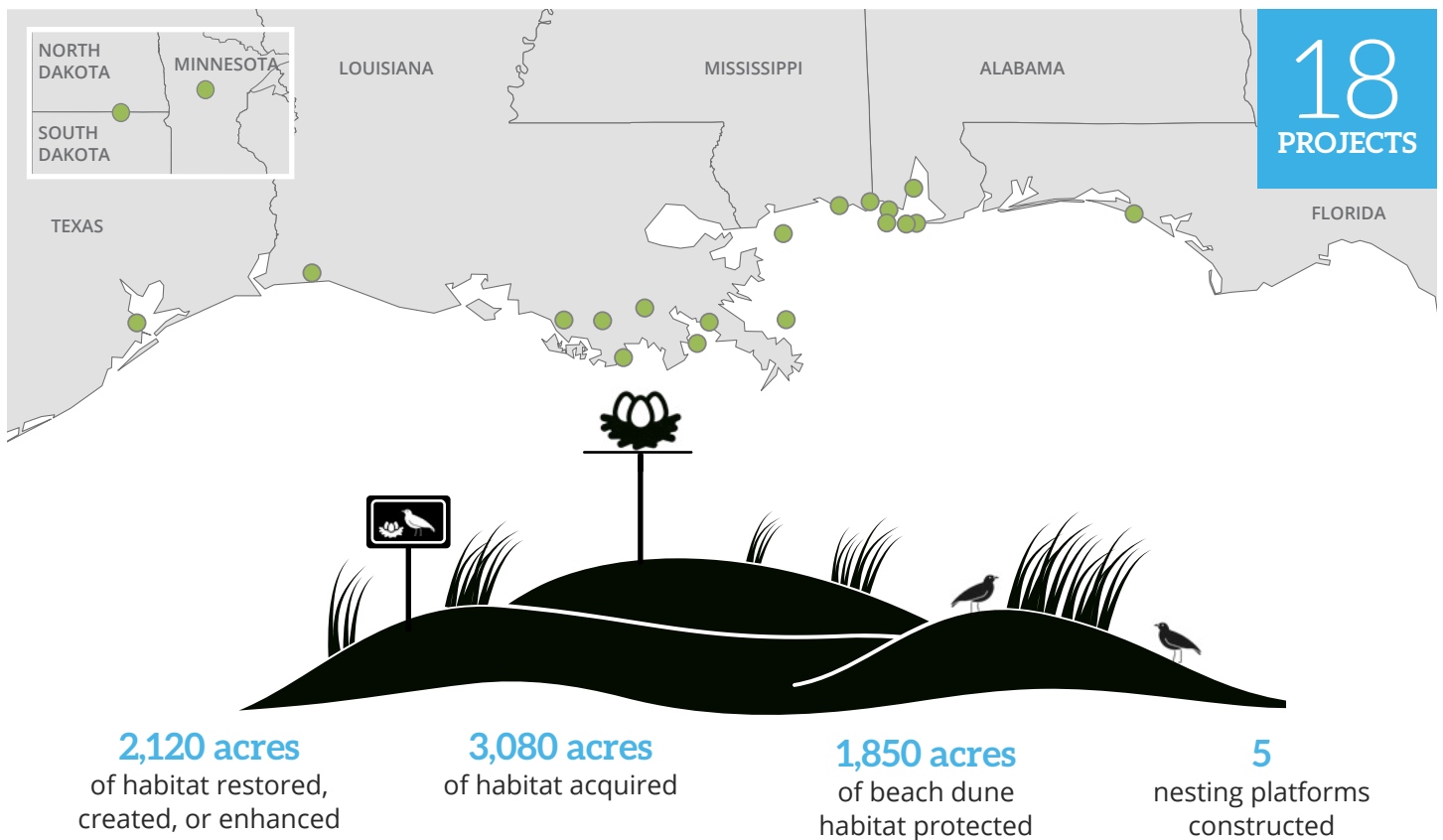
The Trustees began implementing bird projects during early restoration, with an emphasis on reducing disturbances to beach-nesting birds and enhancing nesting and foraging habitat for colonial waterbirds. Building on the lessons learned in early restoration, the Trustees developed the [Strategic Framework for Bird Restoration Activities](#) to promote information sharing and coordination among Trustees and across Restoration Areas. The Trustees have committed approximately \$173 million to plan for, implement, and monitor 16 projects. The Trustees have also committed an additional approximately \$2.9 million for two bird monitoring and adaptive management activities.

Barrier islands provide important nesting, migratory, and overwintering bird habitat and thus have been the focus of several restoration projects. Techniques to create or enhance barrier island habitats include increasing beach and dune elevations, installing sand



Nesting plovers are found at many restoration project sites.

fencing along with planting vegetation to promote sand retention and dune formation, and placing shell or limestone to provide nesting substrate. Land acquisition, including conservation easements, are also used to protect important breeding and foraging habitat for birds. Although these barrier island and land acquisition projects are just getting underway, they have thus far resulted in the restoration of 2,120 acres of habitat and the acquisition of 3,080 acres of habitat that are important for bird breeding and foraging. Other techniques used by the Trustees include non-native and invasive vegetation management as well as the construction and placement of platforms that serve as nesting locations.



Settlement Allocation

\$501,244,170

Funds Committed Through 2020

\$173,172,048

Percent Funds Remaining

65%

Complementary to these actions, protective measures incorporated into some projects aim to reduce human disturbance and manage predators in order to reduce bird mortality and enhance reproductive success. For example, 1,850 acres of nesting habitat for beach-nesting birds have been protected using symbolic fencing (e.g., wooden posts, string, flagging) and informative signage to reduce potential human disturbance. Informative signage is used to educate the public about nesting in the area. To restore common loons at their nesting grounds, project funding will be used to facilitate public outreach and engagement with lake associations and anglers to protect nesting habitat and reduce the use of lead tackle which can be fatal to loons if ingested ([DIVER ID 186](#)). These efforts are anticipated to result in the removal of more than 1,000 pounds of lead tackle annually near common loon nesting grounds.

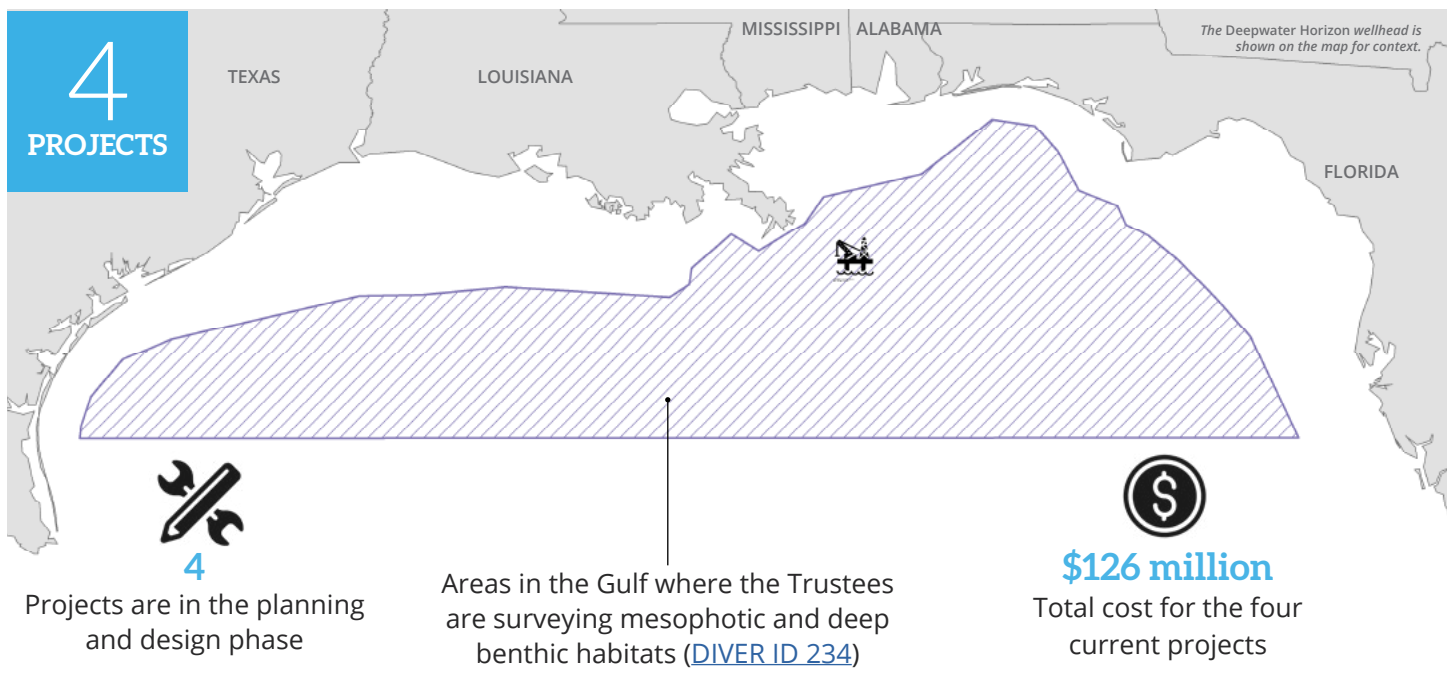
In addition to these restoration activities, the Trustees have identified critical information gaps that will be addressed through specific data collection activities to facilitate future restoration planning efforts. For example, colonial waterbirds will be surveyed by plane along the northern Gulf Coast from South Texas to the Big Bend region of Florida ([DIVER ID 257](#)). These surveys will identify colony locations, estimate population sizes, and identify important habitat characteristics critical for restoration planning. Recent surveys will be compared to similar surveys conducted from 2010 to 2015 to enable the Trustees to evaluate bird restoration success. Furthermore, in Louisiana, the Trustees are refining their monitoring protocols and developing a guidance document ([DIVER ID 248](#)) that will address knowledge gaps in the engineering, design, and monitoring of coastal habitats for bird restoration.

Mesophotic and Deep Benthic Communities



Introduction

Mesophotic and deep benthic communities include hard- and soft- bottom habitats and associated fish and invertebrates. Soft substrates (e.g., mud, sand, fine grain sediments) are most common in benthic habitats of the Gulf of Mexico, accounting for approximately 96 percent of the ocean floor. Hard-bottom habitats (e.g., areas of rock, coral, and sponge) account for the remaining 4 percent. Mesophotic benthic communities and habitats are located at water depths where light levels are low. Deep benthic communities and habitats exist at water depths at which no light can penetrate. Mesophotic and deep benthic habitats support many species of corals and associated animals, including fish, anemones, sponges, sea stars, sea cucumbers, and crabs.



Settlement Allocation

\$273,300,000

Funds Committed Through 2020

\$126,816,161

Percent Funds Remaining

54%

More than 770 square miles of deep benthic habitat surrounding the *Deepwater Horizon* wellhead and four square miles of the Pinnacles mesophotic reef complex, located at the edge of the continental shelf, were injured by the oil spill.

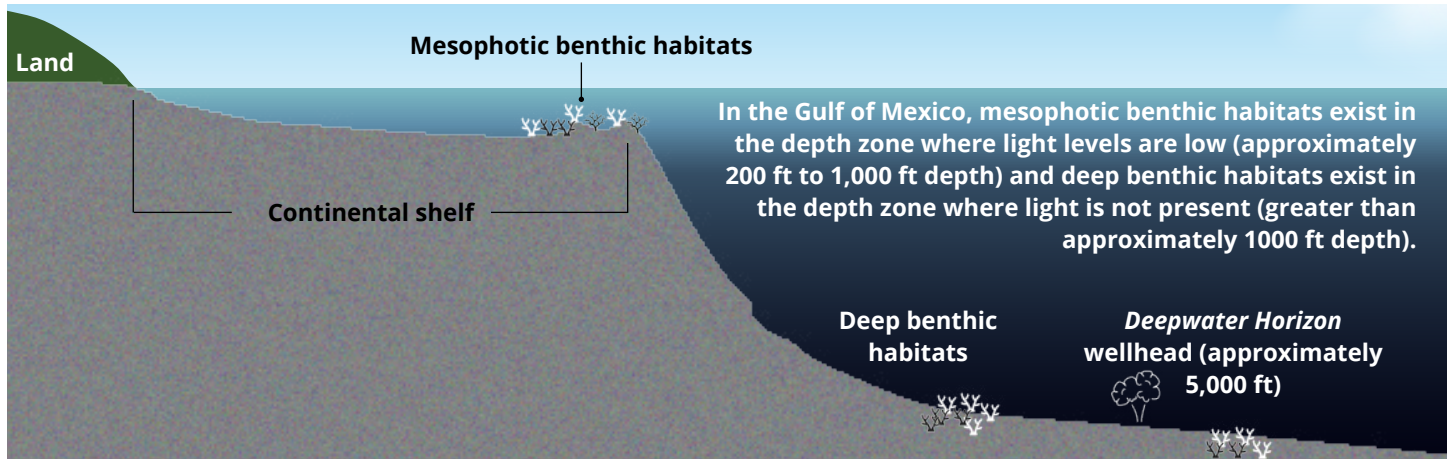
Restoration for these resources is complicated by a limited scientific understanding of these communities, limited experience with restoration at the depths at which these communities occur, and remote locations that limit accessibility and make studying or working in

them difficult. A phased approach to restoration will allow for data collection to address critical uncertainties.

Trustee Achievements Through 2020

The Trustees have committed more than \$126 million to plan for, implement, and monitor four projects focused on addressing these restoration challenges and opportunities. The Mapping, Ground-truthing and Predictive Habitat Modeling project ([DIVER ID 234](#)) will map and verify where these communities occur to assess their abundance and distribution and refine

Benthic Habitats in the Gulf of Mexico



predictive models to improve the effectiveness and cost efficiency of restoration and future mapping efforts. Information gathered through this project will be used to guide activities planned for the other three projects described below.

The Habitat Assessment and Evaluation project ([DIVER ID 232](#)) will involve field surveys and laboratory-based analyses of community composition and food-web dynamics. These surveys will also examine individual mesophotic and deep benthic species, including their life histories, genetic diversity, and population structures. The ages, growth rates, reproductive potential, and health and condition of mesophotic and deep-sea corals will be assessed, as will invertebrate and fish assemblages. Finally, environmental conditions will be evaluated to establish baseline conditions and associated temporal variability in and around these environments. The information provided by the project will maximize the effectiveness of approaches to manage, protect, and restore mesophotic and deep benthic communities throughout the northern Gulf.

Techniques for coral propagation and transplantation remain poorly developed and relatively untested in species living at mesophotic or deeper depths. The Coral Propagation Technique Development project ([DIVER ID 235](#)) will involve field and lab work to test a variety of methods and different substrates to enhance coral propagation, recruitment, and growth. Additional work will be concentrated on developing coral transplant

techniques that can be implemented at larger scales.

Despite the depth at which these communities occur, their health and resiliency can be impacted by threats. The Active Management and Protection project ([DIVER ID 223](#)) will help address such threats through: direct action (e.g., removing marine debris and derelict fishing gear, installing mooring buoys to reduce damage from boat anchoring, assessing and remediating risks associated with leaking and abandoned oil and gas infrastructure, and targeted removal of invasive species); education and outreach for resource users and the general public; engagement and collaboration with stakeholders and managers; and development of socioeconomic analyses to evaluate potential impacts of management or protection.

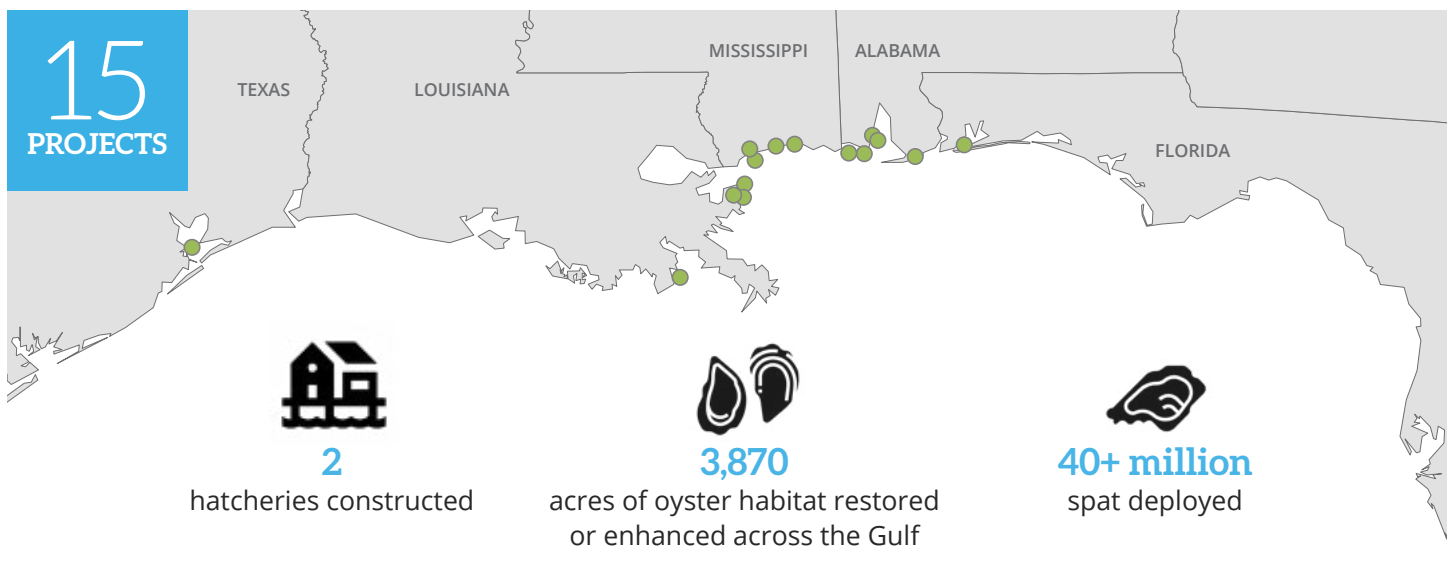
The four restoration projects fit together to form a cohesive whole. For example, knowing—or being able to reliably predict—where these communities exist is critical to prioritizing locations to target protection and management or other restoration activities. Sampling and data collection efforts will yield information on the distribution, composition, and connectivity among the different populations that comprise these communities, as well as their life-histories, growth, and reproductive potential. Initiation of actions to reduce ongoing threats to these communities will provide near-term benefits and enhance the effectiveness of longer-term restoration efforts.

Oysters



Introduction

The eastern oyster is an ecological keystone species that is widely distributed in the estuarine waters of all five Gulf of Mexico states and contributes to the integrity and health of estuarine ecosystems. Oyster reefs provide a variety of ecosystem services, including, but not limited to, water quality improvement; shoreline stabilization; habitat for fish, invertebrates, and epibenthic fauna (organisms that live on or just above bottom sediments); diversification of the ecosystem landscape; and oyster production for harvest. Long-term environmental changes and localized stressors can impact oysters by increasing turbidity; impacting physiological status; and altering the distribution of contaminants, disease, and predators.



Settlement Allocation

\$200,046,309

Funds Committed Through 2020

\$79,379,483

Percent Funds Remaining

60%

The *Deepwater Horizon* oil spill and response actions resulted in the loss of tens of millions of adult oysters in the nearshore environment and more than four billion adult oysters in the subtidal environment due to direct mortality and the associated lack of reproduction over subsequent generations.

To address the large scale of this impact, restoration actions target maintaining or enhancing productive and well-connected networks of oyster reefs. Connectivity among restored and existing oyster reefs enhances oyster population resiliency in the face of environmental changes and stressors. The Trustees are implementing oyster projects in all five Gulf states that are expect-

ed to benefit oyster populations across the northern Gulf of Mexico ecosystem.

Trustee Achievements Through 2020

The Trustees have planned, implemented, and began monitoring for several oyster projects during early restoration, with an emphasis on subtidal reefs and living shorelines in the Florida, Alabama, Mississippi, and Louisiana restoration areas. Building on the lessons learned in early restoration, the Trustees developed the [Strategic Framework for Oyster Restoration Activities](#) to promote information sharing and coordination across geographic areas to guide future oyster restoration efforts. Subsequent planning resulted in the approval of



Right photo credit: Dr. Earl Melancon, Nicholls State University

Left: Oyster cultch deployment in Mississippi. Right: Oyster larvae are transported by currents and tides and settle onto existing oyster shells to grow into “spat.” This picture from Barataria Bay, Louisiana, shows 49 live, 1- to 2-month-old oyster spat on one shell.

ten additional oyster restoration projects. To date, the Trustees have committed more than \$79 million to restore oysters in the Gulf of Mexico.

Oyster projects include the restoration or creation of oyster reefs through placement of cultch in nearshore and subtidal areas. Cultch material consists of crushed shells, limestone rock, or other similar materials that provide substrate on which oyster larvae can attach and grow to create oyster reef habitat. Other projects include enhancing oyster reef productivity by placing additional juvenile oysters at existing or restored oyster reefs to increase abundance at the reefs.

Currently available data indicate that the Trustees have restored nearly 3,870 acres of oyster reef habitat across the Gulf. In addition, restoration also includes the construction of new hatchery facilities, and support to existing ones, to produce additional larvae and seed oysters and encourage oyster production. Thus far, one hatchery has been completed in Louisiana ([DIVER ID 5](#)) and has produced 40 million spat-on-shell oysters that were deployed to restoration sites in Louisiana. The Louisiana hatchery project also produced an

estimated one million seed oysters for restoration, sales, and research. An existing hatchery facility in Louisiana ([DIVER ID 254](#)) is continuing to produce oysters for placement in public oyster areas. A new hatchery project is underway in Alabama ([DIVER ID 137](#)) as part of a long-term plan to yield sustainable and resilient oyster populations in the region.

Monitoring and Adaptive Management

Monitoring data collected by the Trustees enable evaluation of outcomes for individual projects as well as across restoration types. Oyster restoration projects have resulted in an average of approximately 4 adult oysters per square foot one year after restoration, with some individual projects having densities as high as approximately 12 adult oysters per square foot. The differences in densities among sites is not unexpected as oyster densities are known to vary substantially from location to location and over time. In Alabama, additional monitoring is being conducted ([DIVER ID 138](#)) to identify water bottoms that are capable of supporting oyster cultch. This information will allow the Trustees to target priority areas for future oyster reef restoration.

Provide and Enhance Recreational Opportunities



The new trail at the Bon Secour National Wildlife Refuge.



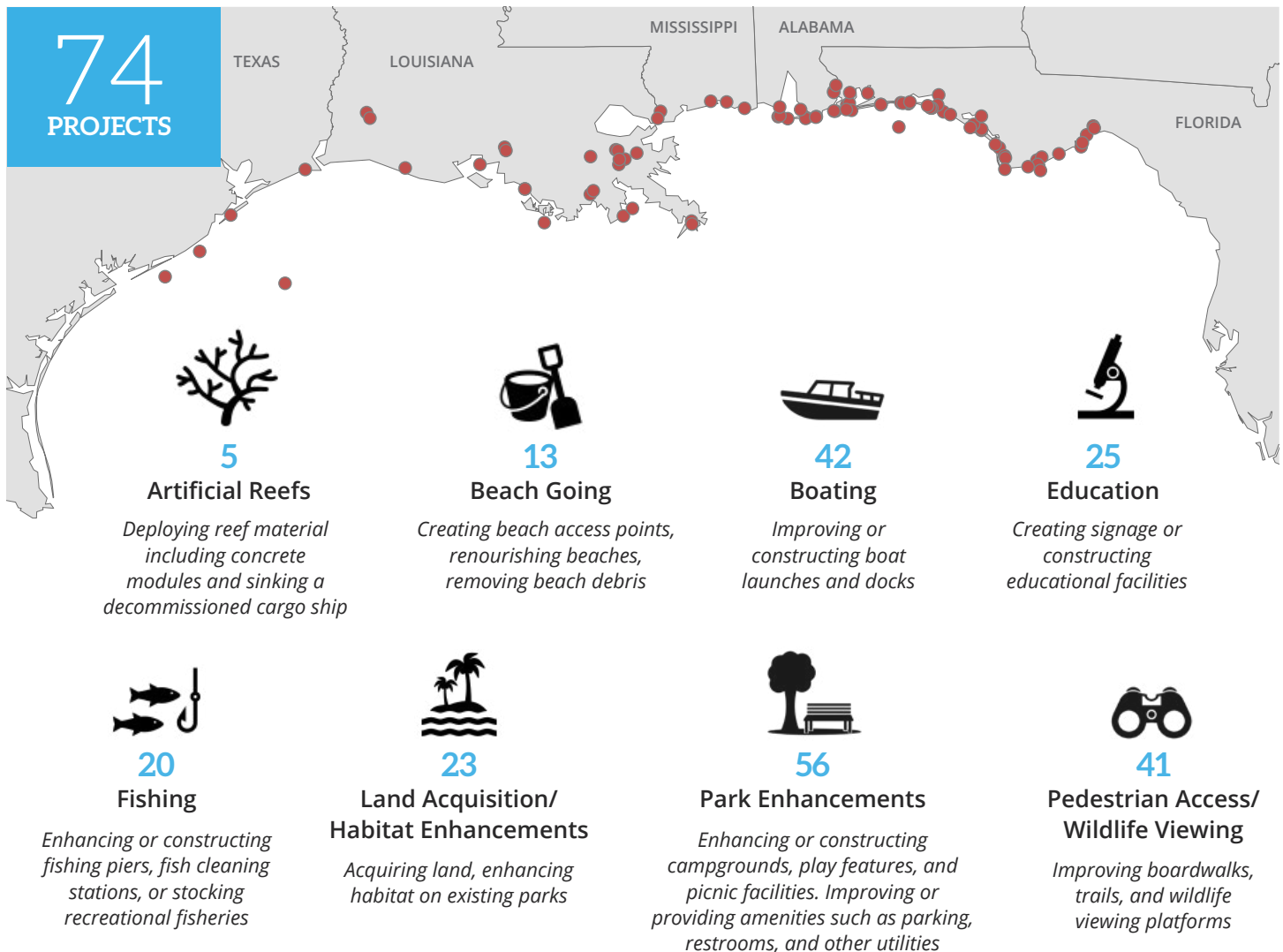
Introduction

Many recreational activities across the Gulf of Mexico directly connect to natural resources and are dependent on a healthy and productive environment. As described in the Trustees' Programmatic Restoration Plan, a range of recreational uses were impacted during and after the *Deepwater Horizon* oil spill. To address the lost recreational uses, the Trustees created the Provide and Enhance Recreational Opportunities Restoration Type. The primary goals of this restoration type are:

- Restoring and creating recreational infrastructure.
- Increasing recreational access and use opportunities.
- Providing education and outreach that engage communities in natural resource restoration and stewardship.
- Restoring natural resources.

Trustees Achievements Through 2020

The Trustees committed \$389 million in restoration funds to plan for, implement, and monitor 74 restoration projects with more than 90 unique project components, under the Provide and Enhance Recreational Opportunities Restoration Type. These projects have included a wide range of activities to compensate the public for lost recreational uses and have been implemented in all five Gulf states. Projects are providing new recreation access to natural resources, enhancing recreational experiences through existing access points or new or improved amenities, and providing or enhancing natural resource-related education. Some project activities also provide benefits to natural resources, such as wildlife and habitat restoration and water quality improvements. Education programs and construction of educational facilities promote conservation and environmental stewardship and improve the



The Trustees have enhanced a wide variety of recreational activities across the Gulf. This map provides the number of components that enhanced each recreational activity. Note that some components enhanced multiple activities, so achievements should not be summed across activities.

Settlement Allocation

\$419,260,589

Funds Committed Through 2020

\$389,030,762

Percent Funds Remaining

7%

public's connection to the resources injured by the spill. Using performance monitoring, the Trustees ensure any planned recreational amenities are constructed or implemented as designed and provide the intended public access.

The Trustees relied on numerous restoration approaches, such as acquiring and conserving land, creating

artificial reefs, providing recreational infrastructure, enhancing fishing opportunities through aquaculture, and creating and enhancing natural resource-related education programs and facilities. Across the projects initiated through 2020, 28 new access points for recreational opportunities were created and 66 existing recreational sites were enhanced. The Trustees acquired more than 250 acres of coastal land and plan to



Photo credits: Florida Fish and Wildlife Conservation Commission

SCALLOP RESTORATION IS A COMMUNITY EFFORT

In Florida, recreational scalloping has a long cultural heritage that encourages multigenerational family interaction. However, harvest has been closed in the western Florida Panhandle (Bay County through Escambia County) since 2002, due to population declines from changing environmental conditions. As part of early restoration, the Trustees funded the Scallop Enhancement for Increased Recreational Fishing Opportunity in the Florida Panhandle ([DIVER ID 49](#)) project to enhance local populations of scallops in Escambia, Santa Rosa, Okaloosa, Bay, Gulf, and Franklin Counties to either support a potential future recreational harvest or maintain an existing one.

At the end of 2017, the project began a “Scallop Sitter” program in which community members maintained restoration cages with scallops in St. Andrew and St. Joseph Bays. Additionally, the public participated in “Scallop Rodeos” to collect wild scallops to place in protective restoration cages. In 2018 and 2019, about 300 volunteers collected more than 9,000 wild scallops for restoration. Unfortunately, the COVID-19 pandemic halted these two programs in 2020, but these community-led activities resumed in the summer of 2021.

acquire more than 1,300 additional acres to provide access to natural resources for recreational use. The Trustees also enhanced a wide variety of recreational activities across the Gulf, such as beach going, boating, fishing, and wildlife viewing. The range of recreational enhancements are summarized in the infographic.

The Trustees have seven percent of the settlement allocation remaining to dedicate to this restoration type. As of the end of 2020, the Open Ocean, Florida, and Mississippi Restoration Areas have funds remaining.

Restoration Area Updates

Introduction

The Consent Decree allocated restoration funds to eight restoration areas: one for each of the five Gulf states, Open Ocean, Regionwide, and Unknown Conditions and Adaptive Management. Consistent with the Consent Decree, the Trustees established seven Trustee Implementation Groups corresponding to seven of the restoration areas: one for each of the five Gulf States, one for Open Ocean, and one for Regionwide. In accordance with the Consent Decree, the Trustees will also establish an eighth Trustee Implementation Group for the Unknown Conditions and Adaptive Management Restoration Area.

Each Restoration Area Trustee Implementation Group consists of state Trustee representative(s) and a Trustee representative from each of the four federal agencies. Each Trustee Implementation Group is responsible for restoring resources within the geographic scope of its Restoration Area, as described below.

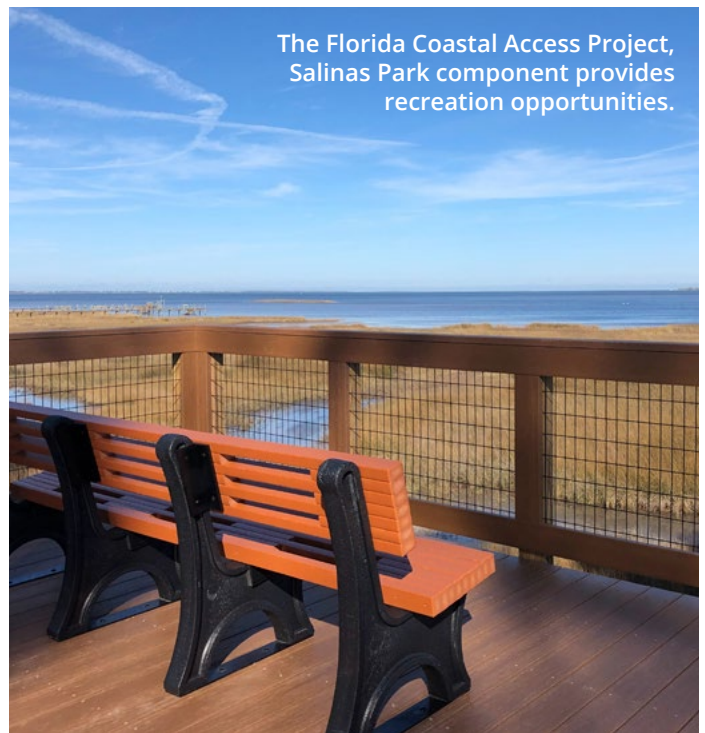


Photo credit: Florida Department of Environmental Protection

Alabama Restoration Area

The Alabama Trustee Implementation Group is responsible for restoring resources within the geographic jurisdiction of the State of Alabama. The Implementation Group consists of the Alabama Trustees and the four federal Trustees:



- **Natural Resource Trustees for the State of Alabama:** Alabama Department of Conservation and Natural Resources, Geological Survey of Alabama
- **Federal Trustees:** DOI, NOAA, USDA, EPA

Florida Restoration Area

The Florida Trustee Implementation Group is responsible for restoring resources within the geographic jurisdiction of the State of Florida. The Implementation Group consists of the Florida Trustees and the four federal Trustees:



- **Natural Resource Trustees for the State of Florida:** Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation Commission
- **Federal Trustees:** DOI, NOAA, USDA, EPA

Louisiana Restoration Area

The Louisiana Trustee Implementation Group is responsible for restoring resources within the geographic jurisdiction of the State of Louisiana. The Implementation Group consists of the Louisiana Trustees and the four federal Trustees:



- **Natural Resource Trustees for the State of Louisiana:** Louisiana Coastal Protection and Restoration Authority, Louisiana Oil Spill Coordinator's Office, Louisiana Department of Environmental Quality, Louisiana Department of Wildlife and Fisheries, Louisiana Department of Natural Resources
- **Federal Trustees:** DOI, NOAA, USDA, EPA



Brown pelicans are making a comeback in Louisiana.

Photo credit: Jeanne Allen, EPA

Mississippi Restoration Area

The Mississippi Trustee Implementation Group is responsible for restoring resources within the geographic jurisdiction of the State of Mississippi. The Implementation Group consists of the Mississippi Trustee and the four federal Trustees:



- **Natural Resource Trustees for the State of Mississippi:** Mississippi Department of Environmental Quality
- **Federal Trustees:** DOI, NOAA, USDA, EPA

Texas Restoration Area

The Texas Trustee Implementation Group is responsible for restoring resources within the geographic jurisdiction of the State of Texas. The Implementation Group consists of the Texas Trustees and the four federal Trustees:



- **Natural Resource Trustees for the State of Texas:** Texas Commission on Environmental Quality, Texas General Land Office, Texas Parks and Wildlife Department
- **Federal Trustees:** DOI, NOAA, USDA, EPA

Open Ocean Restoration Area

The Open Ocean Trustee Implementation Group is responsible for restoring wide-ranging and migratory living coastal and marine resources throughout its geographic range, including some areas outside the Gulf of Mexico. The Implementation Group consists of the four federal Trustees:



- **Federal Trustees:** DOI, NOAA, USDA, EPA

Regionwide Restoration Area

The Regionwide Trustee Implementation Group is responsible for restoring resources across the Gulf, particularly wide-ranging living coastal and marine resources. The Implementation Group consists of all nine state and federal Trustees previously identified.



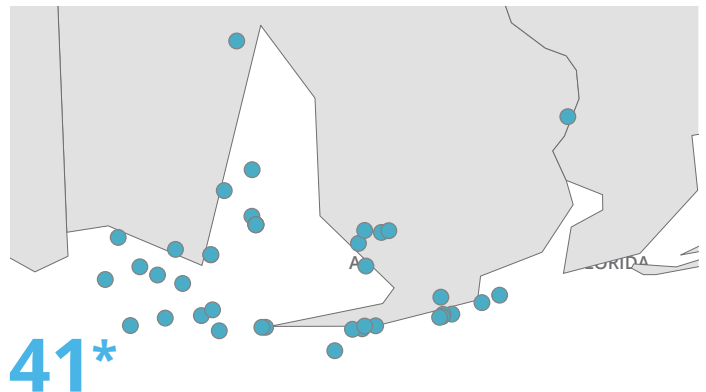
Alabama Restoration Area

Introduction

The Alabama Trustee Implementation Group includes Trustees from the Alabama Department of Conservation and Natural Resources, the Geological Survey of Alabama, and the four federal agencies. This group is responsible for restoring natural resources and the services they provide that were injured by the *Deepwater Horizon* oil spill and response activities within the Alabama Restoration Area.

The Alabama Gulf Coast includes numerous riverine estuaries and associated bays, tidal marshes and creeks, and barrier islands. These habitats are important for nesting, feeding, and migration for a variety of commercial and recreational fish species, crustaceans, shellfish, marine mammals, sea turtles, and birds. The larger Alabama Gulf region offers opportunities for various forms of recreation, including boating, fishing, and bird watching. More than 90 miles of shoreline in Alabama were oiled during the *Deepwater Horizon* oil spill, and more than 80 miles were subject to response activities. A variety of marshes, wetlands, beaches and barrier islands, and oyster reefs were injured, including habitats on federally managed lands such as National Wildlife Refuges and Bureau of Land Management properties. Oiling of oyster reefs led to reduced oyster cover, resulting in accelerated shoreline erosion. Alabama's sea turtles, marine mammals, and birds had a variety of health impacts, including mortality, from the oiling and response activities. Finally, beach and recreational fisheries closures resulted in lost recreational use during the spill.

The *Deepwater Horizon* settlement allocates approximately \$295 million for NRDA restoration in Alabama. This includes approximately \$111 million to provide and enhance recreational opportunities. The remaining funds will support projects that restore habitats (including habitats on federally managed lands); restore water quality through nutrient reduction; and replenish and protect wildlife, including sea turtles, marine mammals, birds, and oysters. Funds will also



RESTORATION PROJECTS IN ALABAMA

- 9 Wetlands, Coastal, and Nearshore Habitats
 - 2 Habitat Projects on Federally Managed Lands
 - 3 Nutrient Reduction
 - 5 Sea Turtles
 - 2 Marine Mammals
 - 5 Oysters
 - 6 Birds
 - 10 Provide and Enhance Recreational Opportunities
 - 2 Monitoring and Adaptive Management
- * Some projects are funded under multiple restoration types











support administrative oversight and monitoring and adaptive management in the Alabama Restoration Area.

Trustee Achievements in the Alabama Restoration Area Through 2020

More than \$184 million in restoration funds has been committed through 2020 for the planning, implementation, monitoring, and administration of 39 restoration projects and two monitoring and adaptive management activities through 2020 in the Alabama Restoration Area. This accounts for approximately 62 percent of Alabama's total settlement allocation.

During early restoration, the Trustees approved nine projects in Alabama that primarily focused on habitat restoration, specifically oyster and living shoreline restoration. Since the 2016 settlement, the Alabama Trustee Implementation Group has released three additional restoration plans that have focused on providing and enhancing recreational opportunities

Alabama Restoration Area Funding Overview

Restoration Type	Settlement Allocation	Funds Committed Through 2020	Percent Funds	
			Committed	Remaining
 Wetlands, Coastal, and Nearshore Habitats	\$93,110,000	\$34,636,998	37%	63%
 Habitat Projects on Federally Managed Lands	\$3,000,000	\$484,001	16%	84%
 Nutrient Reduction	\$5,000,000	\$3,479,090	70%	30%
 Oysters	\$13,329,000	\$7,760,818	58%	42%
 Sea Turtles	\$5,500,000	\$4,096,546	74%	26%
 Marine Mammals	\$5,000,000	\$3,118,763	62%	38%
 Birds	\$30,145,000	\$12,561,456	42%	58%
 Provide and Enhance Recreational Opportunities	\$110,505,305	\$112,295,461*	102%	0%
 Monitoring and Adaptive Management	\$10,000,000	\$3,508,766	35%	65%
 Administrative Oversight and Comprehensive Planning	\$20,000,000	\$2,242,311	11%	89%
Total	\$295,589,305	\$184,184,210	62%	38%

* Interest used

and restoring wetlands, coastal, and nearshore habitats (including some habitats on federally managed lands), water quality, and living coastal and marine resources (including sea turtles, marine mammals, birds, and oysters).

Restoration Planning Beyond 2020

In early 2021, the Alabama Trustee Implementation Group released an addendum to their third post-settlement restoration plan, using earned interest to

fund two projects to enhance recreational use. In the coming years, the Alabama Trustee Implementation Group will continue implementing the projects approved in their restoration plans. In addition, they may begin to plan for program-level monitoring and adaptive management. As these projects are being implemented, the Alabama Trustee Implementation Group will discuss developing new restoration plans and implementing projects under the restoration types with funds remaining, as appropriate.

Project Highlight: Protecting the Bird Habitat of Dauphin Island

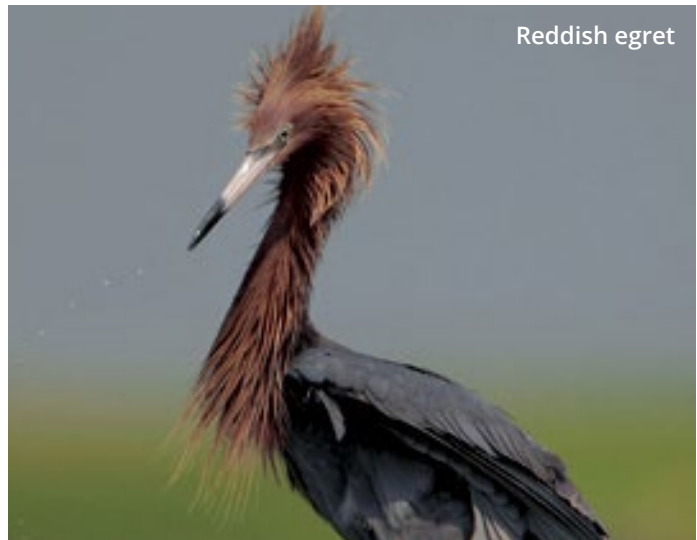
Dauphin Island, located near the mouth of Mobile Bay, is a 15-mile-long barrier island containing some of the Southeast's most important bird habitat. In December 2019, the Dauphin Island West End Acquisition project ([DIVER ID 242](#)) was approved with an estimated cost of \$8 million as part of the Alabama Restoration Plan III and Environmental Assessment. In October 2020, the Alabama Trustee Implementation Group acquired 838 acres of coastal habitat on the west end of the island.

The acquisition conserves habitat for coastal bird populations that are dependent on the area for nesting, foraging, and migration stopover. It contains dune, marsh, and beach habitat. Neotropical migratory birds use the area as a prime resting spot during migrations. Alabama Audubon has observed the presence of seven priority bird species (which includes species that were impacted by the *Deepwater Horizon* oil spill and species of federal or state conservation concern) on the west end during the 2020 survey season. Sea turtles also use these beaches for nesting.

The piping plover is one of the bird species present at the west end of Dauphin Island. Piping plovers are a threatened species within their Alabama range, and are protected under the federal Endangered Species Act. Conserving this parcel of land will ensure that the sensitive coastal habitat is protected for years to come.

"Acquisition of the west end of Dauphin Island provides much needed protections for threatened piping plover habitat," said Erin Plitsch, Restoration Biologist, U.S. Fish and Wildlife Service. "Alabama's coastal habitat is a favorite for bird watchers and wildlife habitat enthusiasts alike, and this project will add to the continuing effort to restore these vulnerable areas."

In partnership with DOI and the Alabama Department of Conservation and Natural Resources, Mobile County and the Town of Dauphin Island are developing a bird conservation and management plan that will guide future implementation of management activities on the



Reddish egret



Red knot

parcel. These activities are designed to support healthy bird populations and will likely include improvements to the habitat, temporary protective closures immediately surrounding nests, education and outreach activities, and protections from predators.

"Public ownership of the west end of Dauphin Island will allow for the protection and management of its habitats," said Chris Blankenship, Commissioner of the Alabama Department of Conservation and Natural Resources. "Through the collaborative work of the Alabama Trustee Implementation Group, and the local stakeholders, the acquisition of this land will have a tremendous benefit for coastal and water birds injured by the *Deepwater Horizon* oil spill."

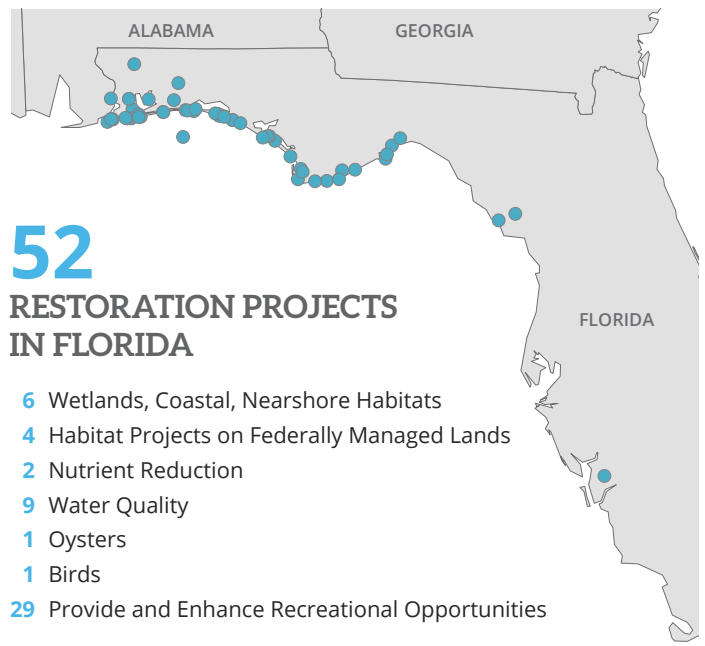
Florida Restoration Area

Introduction

The Florida Trustee Implementation Group includes Trustees from the Florida Fish and Wildlife Conservation Commission, the Florida Department of Environmental Protection, and the four federal agencies. This group is responsible for restoring natural resources and the services they provide that were injured by the *Deepwater Horizon* oil spill and response activities within the Florida Restoration Area.

The State of Florida has an extensive coastline along the Atlantic Ocean and the Gulf of Mexico. This coastline consists of an array of ecologically valuable wetland and upland habitats, including tidal marshes/mudflats, swamps, pine savanna, maritime forests, beaches, and dunes. It also includes aquatic habitats such as bays, estuaries, bayous, mangroves, submerged aquatic vegetation, and the open waters within the state boundary. These habitats support an abundance of wildlife, including marine mammals, sea turtles, birds, fish, and oysters. Florida's abundant coastline and associated wildlife also provide high recreational value to residents and visitors for beach-going, fishing, swimming, birding, boating, and other water sports. These animals and habitats were exposed to *Deepwater Horizon* oil and response activities as the oil made landfall. More than 175 miles of Florida's coastline were oiled, including critical beach and dune habitats that serve as important sea turtle and bird nesting areas. In Florida, the oil spill and response activities also impacted residents and visitors' recreational use of natural resources through beach and fishery closures.

The *Deepwater Horizon* Consent Decree allocates \$680 million for NRDA restoration in Florida. This includes approximately \$184 million to provide and enhance recreational opportunities. The remaining funds will support projects to restore habitats and water quality; restore habitats on federally managed lands; replenish and protect wildlife, including sea turtles, marine mammals, birds, oysters. Funds will also support administrative oversight and monitoring and adaptive management in the Florida Restoration Area.














Trustee Achievements in the Florida Restoration Area Through 2020

More than \$207 million in restoration funds has been committed for the planning, implementation, monitoring, and administration of 52 restoration projects through 2020 in the Florida Restoration Area, which accounts for approximately 31 percent of Florida's total settlement allocation.

During early restoration, the Trustees approved 33 projects in the Florida Restoration Area across four early restoration plans that primarily focused on providing and enhancing recreational opportunities. In 2019, the Florida Trustee Implementation Group released its first restoration plan since the 2016 Consent Decree. This plan approved 23 projects to provide and enhance recreational opportunities, reduce nutrients in watersheds and enhance coastal water quality, and enhance habitats on federally managed lands.

Most of the committed funds to date have focused on recreation. Approximately \$155 million has been invested in 33 restoration projects that have provided and enhanced recreational opportunities and experiences by building artificial reefs, improving

Florida Restoration Area Funding Overview

Restoration Type	Settlement Allocation	Funds Committed Through 2020	Percent Funds	
			Committed	Remaining
 Wetlands, Coastal, and Nearshore Habitats	\$20,629,367	\$15,844,567	77%	23%
 Habitat Projects on Federally Managed Lands	\$17,500,000	\$2,896,066	17%	83%
 Nutrient Reduction	\$35,000,000	\$5,302,441	15%	85%
 Water Quality	\$300,000,000	\$17,118,747	6%	94%
 Oysters	\$25,370,596	\$5,370,596	21%	79%
 Sea Turtles	\$20,000,000	\$358,401	2%	98%
 Marine Mammals	\$5,000,000	\$39,315	1%	99%
 Birds	\$42,835,000	\$2,201,384	5%	95%
 Provide and Enhance Recreational Opportunities	\$183,817,680	\$156,706,522	85%	15%
 Monitoring and Adaptive Management	\$10,000,000	\$0	0%	100%
 Administrative Oversight and Comprehensive Planning	\$20,000,000	\$2,105,000	11%	89%
Total	\$680,152,643	\$207,943,039	31%	69%

public access to waterways for boating and fishing, and acquiring land, among other restoration actions. For example, more than 3,500 reef structures have been deployed across the Florida Panhandle. Once all projects approved through 2020 are implemented, more than 30 existing recreational sites will have been enhanced and more than 15 new sites created.

The Florida Trustee Implementation Group has also implemented projects that are enhancing beach and

dune habitat, which supports a variety of wildlife such as beach mice, shorebirds and seabirds, and sea turtles. More than 13 miles of dunes were restored along Perdido Key and Pensacola Beach through planting of native vegetation and installation of sand fencing. These techniques passively trapped sand, increasing dune stabilization and reducing erosion. More than 1,600 acres of beach habitat across the Panhandle were protected for shorebirds and seabirds through habitat stewardship; and an additional

3,900 acres of beach habitat on federally managed lands are being protected through predator control, habitat stewardship, and invasive plant removal. Finally, more than 3,000 beach-facing lights were replaced across the Panhandle, helping restore darker night sky conditions on beaches to improve nesting conditions for sea turtles.

Restoration Planning Beyond 2020

In mid-2021, the Florida Trustee Implementation Group released their second post-settlement restoration plan, which approved 18 restoration projects for implementation under the Habitat Projects on Federally Managed Lands, Sea Turtles, Marine Mammals, Birds, and Provide and Enhance Recreational Opportunities Restoration Types. Many of these projects leverage funding, and implementation may be coordinated with other restoration partners such as the Regionwide Trustee Implementation Group and NFWF. Many of the projects also build on previous restoration conducted by the Trustees in Florida and across other Restoration Areas. For example, two projects approved under the Birds Restoration Type will support predator management and habitat stewardship, building on similar work that was successfully implemented as part of early restoration. Other projects include restoration approaches or techniques not yet implemented by the Trustees. For example, projects approved under the Sea Turtle Restoration Type will address threats from marine debris, bycatch in recreational fisheries, and vessel strikes.

As these projects are being implemented, the Florida Trustee Implementation Group will discuss developing new restoration plans and implementing projects under the restoration types with funds remaining, as appropriate.

Project Highlight: Florida Coastal Access Project

The Florida Coastal Access Project ([DIVER ID 65](#)) enhances recreational use at six locations across the Panhandle by acquiring coastal lands and constructing recreational infrastructure. More than 110 acres of land were acquired with project funds and donated to local governments for use as public parks. This includes

Florida Coastal Access Project

110 acres acquired

\$45 million committed to enhancing recreational access and use



Photo credits: Florida Department of Environmental Protection

More than 4.5 acres were acquired as part of the Navarre Beach Marine Park Inholding component (top) of the Florida Coastal Access Project. After lands were acquired, recreational amenities were built at some of the locations, such as this boardwalk constructed at Salinas Park (above).

more than 90 acres acquired for the Lynn Haven Preserve and Park in Bay County. At five locations, project funds were used to construct new or enhance existing recreational infrastructure, such as boardwalks and wildlife viewing areas, paddle-craft docks, picnic pavilions, playgrounds, and informational and educational amenities. While the Florida Trustee Implementation Group evaluated many potential acquisition sites for this project, the final locations were chosen based on public support for the park locations.

The Florida Coastal Access Project expands public access to coastal recreational areas in perpetuity. This and other similar projects seek to increase opportunities for access to natural resources by returning privately-owned coastal areas from willing land owners to the public trust. Finally, in addition to providing and enhancing recreational opportunities, the Florida Coastal Access Project's protection of coastal areas also helps conserve habitat for living coastal resources.

Adaptive Management Highlight: Predator Control at St. Vincent National Wildlife Refuge

Located off Apalachicola, Florida, St. Vincent Island is one of the last undeveloped barrier islands in Florida. The U.S. Fish and Wildlife Service manages the island as part of the St. Vincent National Wildlife Refuge. The barrier island refuge is an important safe haven for at-risk species, including gopher tortoises, Florida red-bellied turtles, and many species of marshbirds, shorebirds, and seabirds. It is also an important stop-over point for neotropical migratory birds, which breed in North America but spend winters in Mexico, Central America, South America, or the Caribbean islands.

Human-caused disturbances such as the introduction of feral hogs and raccoons have long affected nesting shorebirds, seabirds, and sea turtles on St. Vincent National Wildlife Refuge. In its 2012 management plan, the refuge prioritized expanding shorebird monitoring and predator management through a partnership with USDA. Also, to verify the source of shorebird breeding disturbances at several state and federally managed sites, including the refuge, the Trustees funded an early restoration project that enhanced management at bird nesting sites throughout the eastern Gulf of Mexico through stewardship practices ([DIVER ID 9](#)).

The project provided resources to increase shorebird surveys at the refuge starting in 2013 and enhanced monitoring efforts to document signs of predators at nesting sites. The improved monitoring techniques helped the Trustees and the refuge determine that raccoons were one of the primary causes of least tern



A mother and chick snowy plover walk along the beach at St. Vincent Island.

colony failure on the refuge. The refuge then implemented trapping efforts in 2017, resulting in a noticeable reduction in predator presence around shorebird nesting colonies.

The Florida Trustee Implementation Group used lessons learned from the bird stewardship project to inform and fund the St. Vincent National Wildlife Refuge Predator Control project ([DIVER ID 181](#)) in its first post-settlement restoration plan. This project began in 2020, and aims to mitigate the negative impacts of feral hogs and raccoons on shorebirds and other wildlife habitat managed by the refuge.

Monitoring data suggests that the Trustees' efforts, through partnerships with the USDA, have successfully extirpated feral hogs from the island, and the raccoon population has been reduced to manageable levels. In total, these projects are enhancing more than 12,000 acres of barrier island habitat for a variety of wildlife, including seven miles of nesting beach for birds and sea turtles.

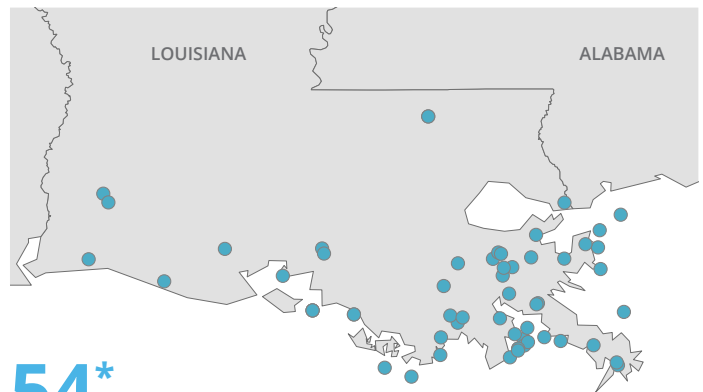
Louisiana Restoration Area

Introduction

The Louisiana Trustee Implementation Group includes Trustees from five state agencies, the Louisiana Coastal Protection and Restoration Authority, the Louisiana Oil Spill Coordinator’s Office, the Louisiana Department of Environmental Quality, the Louisiana Department of Wildlife and Fisheries, and the Louisiana Department of Natural Resources, in addition to the four federal agencies. This group is responsible for restoring, within the Louisiana Restoration Area, natural resources and the services they provide that were injured by the *Deepwater Horizon* oil spill and response activities.

The northern Gulf of Mexico is recognized for its vast coastal tidal wetlands, which are estimated to represent half of the total saltwater intertidal wetland habitat in the lower 48 states. Louisiana alone contains nearly 40 percent of coastal wetlands in the continental United States. Louisiana’s and Gulf salt marshes are highly productive. Marsh edge habitat provides spawning, nursery, and feeding grounds for juvenile fish and invertebrates of ecological and commercial importance. Marshes are also important habitats for terrestrial animals, including amphibians, reptiles, and mammals; and they support extraordinary bird species diversity. In addition to marshes, Louisiana’s coast also contains sensitive mangrove, SAV, and oyster habitat. This abundance of ecological diversity supports a vibrant outdoor recreation and tourism industry, giving Louisiana its nickname of the “Sportsman’s Paradise.”

All aspects of Louisiana’s coastal ecosystem were harmed during the *Deepwater Horizon* oil spill. Louisiana experienced 95 percent of the shoreline oiling, with the heaviest oiling occurring in the Barataria Basin. Extensive oiling and loss of marsh vegetation in the Barataria Basin accelerated the pace of land loss that was occurring in Louisiana, resulting in the permanent loss of coastal wetlands over large portions of the Basin. The negative effects of oiling on plants and lower levels of the nearshore food web (e.g., amphipods, shrimp, snails) caused a cascade of impacts through higher level species (e.g., birds, mammals).














54* RESTORATION PROJECTS IN LOUISIANA

- 11 Wetlands, Coastal, Nearshore Habitats
 - 1 Habitat Projects on Federally Managed Lands
 - 4 Nutrient Reduction
 - 2 Marine Mammals
 - 4 Oysters
 - 5 Birds
- 23 Provide and Enhance Recreational Opportunities
 - * Two projects are funded under multiple restoration types

Additionally, bottlenose dolphins in Barataria Bay and the Mississippi Sound were some of the most severely injured, experiencing a 52 percent and 62 percent maximum reduction in their population sizes, respectively. Finally, the loss of oyster reef habitat contributed to a lack of recruitment and recovery for oysters and to shoreline erosion and wetland loss.

The *Deepwater Horizon* settlement allocates \$5 billion for restoration in Louisiana. This includes approximately \$4 billion to restore wetlands, coastal, and nearshore habitats. The remaining funds will support projects to restore habitats on federally managed lands; restore SAV; restore water quality through nutrient reduction; replenish and protect wildlife, including sea turtles, marine mammals, birds, and oysters; and provide and enhance recreational opportunities. Funds will also support administrative oversight and monitoring and adaptive management in the Louisiana Restoration Area.

Louisiana Restoration Area Funding Overview

Restoration Type	Settlement Allocation	Funds Committed Through 2020	Percent Funds	
			Committed	Remaining
 Wetlands, Coastal, and Nearshore Habitats	\$4,268,688,400	\$1,110,520,610	26%	74%
 Habitat Projects on Federally Managed Lands	\$50,000,000	\$22,828,298	46%	54%
 Nutrient Reduction	\$20,000,000	\$9,724,333	49%	51%
 Oysters	\$40,874,300	\$40,874,300	100%	0%
 Sea Turtles	\$10,000,000	\$0	0%	100%
 SAV	\$22,000,000	\$0	0%	100%
 Marine Mammals	\$50,000,000	\$3,572,490	7%	93%
 Birds	\$220,437,300	\$115,550,172	52%	48%
 Provide and Enhance Recreational Opportunities	\$60,000,000	\$60,100,100*	100%	0%
 Monitoring and Adaptive Management	\$225,000,000	\$22,187,397	10%	90%
 Administrative Oversight and Comprehensive Planning	\$33,000,000	\$9,016,904	27%	73%
Total	\$5,000,000,000	\$1,394,374,604	28%	72%

*Committed budgets are estimates and reconciliation of final expenditures will ensure that this restoration type allocation is not exceeded.

Trustee Achievements in the Louisiana Restoration Area Through 2020

More than \$1.3 billion has been committed for the planning, implementation, monitoring, and administration of 48 restoration projects and six monitoring and adaptive management activities in the Louisiana Restoration Area through 2020. This accounts for approximately 28 percent of Louisiana’s total settlement allocation.

During early restoration, the Trustees approved three projects in Louisiana that focused on oysters, birds, wetlands, coastal, and nearshore habitats. Since the Consent Decree, the Louisiana Trustee Implementation Group has released 12 restoration plans that have focused on providing and enhancing recreational opportunities and restoring wetlands, coastal, and nearshore habitats (including some habitats on federally managed lands), nutrient reduction, and



Caillou Lake Headlands (Whiskey Island) before restoration (inset) and after.

living coastal and marine resources (including marine mammals, birds, and oysters).

Using the state's Comprehensive Master Plan as a guiding document, the Louisiana Trustee Implementation Group, has achieved significant milestones. Undertaking proven restoration techniques that have for decades been staples in the fight to save Louisiana's disappearing coastline, the commitment by the Trustees is evident. Accomplishments range from the 23 individual recreational use projects either completed or under way to two of the most successful bird restoration projects in the state's history. In addition, projects planned and approved through the Louisiana Trustee Implementation Group have set the stage for one of the largest habitat restoration efforts in the state's history, where more than 50 million cubic yards of material will be moved to create and restore marsh, beach, and dune habitats on numerous barrier islands.

Restoration Planning Beyond 2020

In March 2021, the Louisiana Trustee Implementation Group released a draft restoration plan for the Mid-Barataria Sediment Diversion project. The plan

focuses on restoring natural riverine processes to the Barataria Basin, the portion of the Louisiana coast that experienced the highest rates of oiling. This project leverages planning, engineering, and design funding from NFWF's Gulf Environmental Benefit Fund. In June 2021, the Louisiana Trustee Implementation Group initiated its eighth post-settlement restoration plan focused on restoring wetlands, coastal, and nearshore habitats. Finally, in July, the Trustee Implementation Group approved a seventh monitoring and adaptive management activity to inventory and assess lower trophic levels (i.e., animals at the base of the marine food web) in Barataria Bay. In August 2021, it completed its Monitoring and Adaptive Management Strategy, which identifies specific restoration objectives and monitoring and adaptive management needs for the Louisiana Restoration Area.

As these projects are being implemented, the Louisiana Trustee Implementation Group will discuss developing new restoration plans and implementing projects under the restoration types with funds remaining, as appropriate.



Shell Island before restoration (above left) and after (above right).

Project Highlight: Louisiana Outer Coast Restoration Project

The Louisiana Outer Coast Restoration project ([DIVER ID 35](#)) is the largest restoration project approved by the Louisiana Trustee Implementation Group to date. As of 2020, the project has restored beach, dune, and back-barrier marsh habitats at three barrier island locations - Caillou Lake Headlands (also known as Whiskey Island), Chenier Ronquille, and Shell Island (West Lobe and portions of East Lobe). Restoration of a fourth island, North Breton Island, is currently underway. The total estimated cost to implement the Louisiana Outer Coast Restoration project is approximately \$320 million.

Caillou Lake Headlands (Whiskey Island) is a barrier island in the Isle Dernieres reach of the Terrebonne Basin barrier system. This project restored approximately 4.5 miles of beach and dune habitat while simultaneously creating approximately 6,700 linear feet of marsh platform. A total of 954 acres of habitat were created using 10.4 million cubic yards of sand pumped in from an offshore borrow area. Louisiana, working cooperatively with NOAA and DOI, led the design and construction of this project. The work was completed in April 2018.

“Whiskey Island is more than just restoration of a barrier island serving as the first line of defense for the coastal area of Terrebonne Parish,” said Louisiana Coastal Protection and Restoration Authority Board

Chairman Chip Kline. “It represents the new era the Louisiana Coastal Protection and Restoration Authority is embarking on, bringing to construction bigger, more-substantial protection and restoration projects all along our coast.”

Chenier Ronquille is located along the Plaquemines/Barataria Bay barrier shoreline, 47 miles southeast of New Orleans and 8 miles east of Grand Isle. Portions of Chenier Ronquille experienced heavy oiling during the *Deepwater Horizon* oil spill. Mechanical and manual methods of cleanup exposed the beaches to months of disturbance. NOAA led the implementation of this project on behalf of the Trustee Implementation Group, which restored 518 acres of beach, dune, and back-barrier marsh habitats. The project was completed in March 2017.

“We were so grateful for the opportunity to restore Chenier Ronquille,” said Mel Landry, Louisiana Restoration Area Lead for NOAA. “Our barrier islands are a home to iconic fish and wildlife species. They also provide the first line of defense from damage caused by tropical storms and hurricanes.”

Shell Island is located approximately 49 miles south-southeast of New Orleans, along the southern margin of the Barataria Basin in Plaquemines Parish. The project restored beach, dune, and back-barrier marsh habitats on Shell Island West and the western portion of Shell Island East. Restoration work included



Aerial view of North Breton Island before (inset) and during restoration.

repairing breaches in the shoreline, reestablishing a primary dune along the length of the shoreline, and construction of a back-barrier marsh. These actions resulted in the restoration of 320 acres of beach and 299 acres of wetlands. Louisiana, working cooperatively with NOAA and DOI, led the design and construction of this project. Construction was completed in December 2016.

“Shell Island West was the first barrier island restoration in Louisiana to use NRDA funding,” said Louisiana Coastal Protection and Restoration Authority Executive Director Bren Haase. “It is a vital link in the chain of barrier island projects spanning all the way west in Terrebonne Parish. Shell Island serves as a mile marker on our path to a more sustainable future for coastal Louisiana.”

North Breton Island is part of the Breton National Wildlife Refuge established in 1904 by Theodore Roosevelt. This restoration project enhances habitat for nesting brown pelicans, terns, skimmers, and gulls. The work includes pumping approximately 8.2 million

cubic yards of soil from a nearby borrow site. The restored island will include more than 400 acres of constructed barrier island habitat, including beaches, dunes, and back-barrier marsh. Using funds leveraged from another NRDA, mangroves will be planted to facilitate development of nesting habitat. DOI is leading the implementation of this project.

“Breton is a special place, and vital to water and nesting birds, especially the brown pelican,” said Jimmy Laurent, Breton Island National Wildlife Refuge Manager. “If the island disappears, crucial bird habitat will be lost for generations to come. With this project, we aren’t letting that happen.”

Working together, the Louisiana Trustee Implementation Group is successfully restoring the Louisiana coast’s first line of defense and vital wildlife habitat. “After years of silently guarding us, Louisiana’s barrier island sentinels needed our help. Fully restored, they can once again serve our environment and our people,” said Mel Landry.

Mississippi Restoration Area

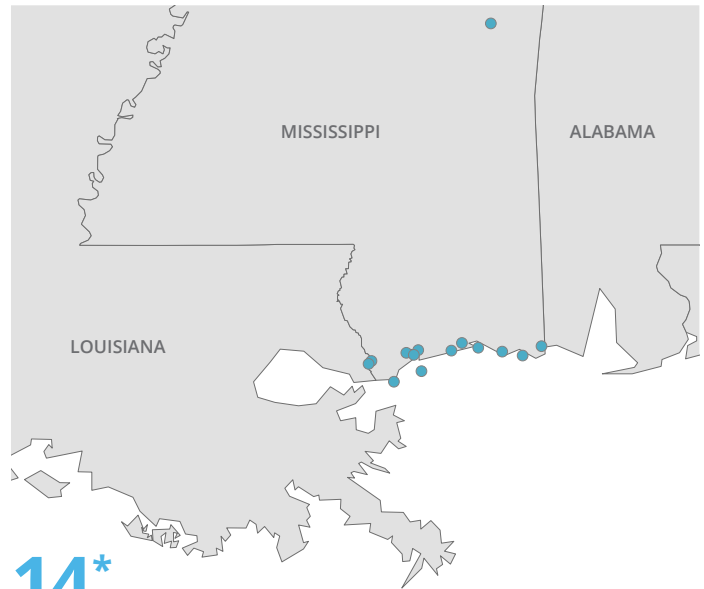
Introduction

The Mississippi Trustee Implementation Group includes Trustees from the Mississippi Department of Environmental Quality and the four federal agencies. This group is responsible for restoring natural resources and the services they provide that were injured by the *Deepwater Horizon* oil spill and response activities. Restoration activities occur within the Mississippi Restoration Area.

The Mississippi Restoration Area contains numerous coastal wetlands and habitats, including swamps, tidal flats, brackish and salt-water marshes, barrier and coastal islands, pine savannas, and bayous. Expansive salt marsh systems are found in the bays and along rivers adjacent to the Mississippi Sound. Primary resources in the Mississippi Restoration Area include Grand Bay, Graveline Bay, and the Pascagoula River and Pearl River marsh systems. These marshes are rich in wildlife resources and provide nesting grounds and important stopovers for waterfowl and migratory birds, as well as spawning areas and valuable habitats for commercial and recreational fisheries. This mix of fresh and salt water within Mississippi Sound provides a suitable habitat for oysters, shrimp, and other fisheries.

Mississippi barrier and coastal islands include Petit Bois, Horn, Ship, Cat, Deer and Round Islands. Portions of the Mississippi barrier islands are managed for the public by Gulf Islands National Seashore and include more than 62 miles of beach and shoreline, much of which was directly impacted by the *Deepwater Horizon* oil spill and response activities. These islands are critically important areas for shorebirds, sea turtles, beach invertebrates, functioning coastal habitat, and recreational use.

During the *Deepwater Horizon* oil spill, physical and biological injuries to beach, wetland, and nearshore habitats resulted from oiling and response activities in Mississippi. In particular, the spill severely affected oyster reproduction in the Mississippi Sound, resulting in reduced larval production; spat settlement; and spat



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RESTORATION PROJECTS IN MISSISSIPPI

- 6 Wetlands, Coastal, Nearshore Habitats
 - 1 Nutrient Reduction
 - 4 Oysters
 - 2 Birds
 - 3 Provide and Enhance Recreational Opportunities
- * Two projects are funded under multiple restoration types

substrate availability that compromised the long-term sustainability of oyster reefs and further contributed to shoreline erosion. In addition, Mississippi's injury was extensive, with thousands of birds impacted including several species of shorebirds (colonial and solitary nesters), wading birds, and marsh birds. Mississippi Sound bottlenose dolphins were one of the most severely injured dolphin populations. In addition, the *Deepwater Horizon* oil spill injured or killed an estimated 100,000 to 200,000 sea turtles in the Gulf of Mexico. These injured sea turtle species use habitats in Mississippi for various life stages.

The *Deepwater Horizon* settlement allocates approximately \$295 million for NRDA restoration in Mississippi. These funds will support projects to restore wetlands, coastal, and nearshore habitats, including those on federally managed lands; to improve water quality

Mississippi Restoration Area Financial Overview

Restoration Type	Settlement Allocation	Funds Committed Through 2020	Percent Funds	
			Committed	Remaining
 Wetlands, Coastal, and Nearshore Habitats	\$135,500,000	\$107,137,500	79%	21%
 Habitat Projects on Federally Managed Lands	\$5,000,000	\$0	0%	100%
 Nutrient Reduction	\$27,500,000	\$4,000,000	15%	85%
 Oysters	\$33,600,000	\$24,100,000	72%	28%
 Sea Turtles	\$5,000,000	\$0	0%	100%
 Marine Mammals	\$10,000,000	\$0	0%	100%
 Birds	\$25,000,000	\$5,250,000	21%	79%
 Provide and Enhance Recreational Opportunities	\$23,957,000	\$18,957,000	79%	21%
 Monitoring and Adaptive Management	\$7,500,000	\$0	0%	100%
 Administrative Oversight and Comprehensive Planning	\$22,500,000	\$6,700,000	30%	70%
Total	\$295,557,000	\$166,144,500	56%	44%

through nutrient reduction; and to replenish marine resources, including sea turtles, marine mammals, birds, and oysters. In addition, funds will provide and enhance recreational opportunities and support administrative oversight and monitoring and adaptive management in the Mississippi Restoration Area.

Trustee Achievements in the Mississippi Restoration Area Through 2020

More than \$166 million has been committed for the planning, implementation, monitoring, and administration of 14 restoration projects through 2020 in

the Mississippi Restoration Area. This accounts for approximately 56 percent of Mississippi’s total settlement allocation.

During early restoration, the Trustees approved seven projects in Mississippi to partially restore losses to secondary benthic productivity, focusing on oysters and recreational uses. Reef secondary benthic productivity includes bivalve mollusks such as oysters, annelid worms, shrimp, crabs and other organisms associated with reefs. Some of those projects are completed, while others are in the implementation and project



monitoring phases. Since the Consent Decree, the Mississippi Trustee Implementation Group finalized two restoration plans, as well as a supplemental plan, that focus on restoring wetlands, coastal, and near-shore habitats; water quality through nutrient reduction; and, living coastal and marine resources (including birds and oysters).

Restoration Planning Beyond 2020

The Mississippi Trustee Implementation Group began planning for its third post-settlement restoration plan by publishing a call for project ideas. This third draft plan, scheduled for publication in 2021, may include restoration projects targeting living coastal and marine resources (including sea turtles, marine mammals, and birds), habitats on federally managed lands, and recreational opportunities. In the coming years, the Mississippi Trustee Implementation Group will continue implementing the projects approved in restoration plans. As these projects are being implemented, the Mississippi Trustee Implementation Group will develop

new restoration plans and implement projects under the restoration types with remaining funds, as appropriate, to help address the impacts from the *Deepwater Horizon* oil spill and restore what was injured.

Project Highlight: Hancock County Marsh Living Shoreline Protects One of Mississippi's Largest Salt Marshes

The Hancock County Marsh Living Shoreline Project ([DIVER ID 38](#)) is located within the 20,909-acre Hancock County Marsh Preserve between Bayou Caddy and the mouth of the East Pearl River. High erosion rates recorded over decades, particularly at St. Joseph's Point, make this area a priority for protection. This \$50 million project was part of the third phase of early restoration and also leveraged \$6 million from RESTORE Act funding. Mississippi Department of Environmental Quality and NOAA are Implementing Trustees. Mississippi Department of Environmental Quality led engineering and construction, and NOAA is leading the monitoring for this project.



Living Shoreline Component

Living shorelines use natural materials such as plants, rocks, and oysters to help stabilize shorelines and slow erosion while also creating habitat for wildlife. The living shoreline was constructed in phases starting in 2016 and continuing through 2018. This component included construction of approximately 6 miles of breakwaters that are providing wave reduction and marsh protection functions. Pre-construction erosion rates varied from 6 to 10 feet each year in the project area. Erosion rates and resulting marsh loss would continue without the project. The project is reducing shoreline loss by an average of approximately 89 percent across the project site compared with pre-construction shoreline erosion rates.

The living shoreline was designed to develop into a living reef that supports benthic secondary productivity in the Mississippi Sound. Recent monitoring data demonstrates that the project is exceeding performance targets for average bivalve density by more than 30 times and for productivity by more than 1.5 times, indicating a healthier reef system. In addition, local citizens report that fishing in the vicinity of the living reef is outstanding.

Subtidal Reef Habitat Component

Historically, there were extensive, prolific reefs of the American oyster in the shore zone and nearshore

areas of lower Hancock County that provided natural protection from shoreline erosion, as well as habitat that could be colonized by shellfish and other benthic organisms. Oyster reefs were injured by the spill. In 2016, approximately 46 acres of cultch was deployed in Heron Bay to support benthic secondary productivity, including oysters. Monitoring began in 2017 and will extend through 2023. Recent monitoring data demonstrates that the project is exceeding performance targets for average bivalve density by approximately 40 times and for productivity by three times.

Marsh Creation Component

This component includes creation of approximately 46 acres of salt marsh habitat landward of the breakwaters and living reef areas that have previously experienced erosion. Engineering design was completed in 2017 and construction of the marsh was completed in 2021. Monitoring to evaluate marsh elevation, plant species composition of the marsh, and the percentage of coverage by those species will extend over 5 years through 2026.

The Hancock County Living Shoreline Project is providing many important benefits to the area. While targeting marsh protection and secondary productivity, the project also provides foraging habitat for fish, loafing and feeding habitat for birds (e.g., pelicans, shorebirds, wading birds), and recreational opportunities for anglers.

Texas Restoration Area

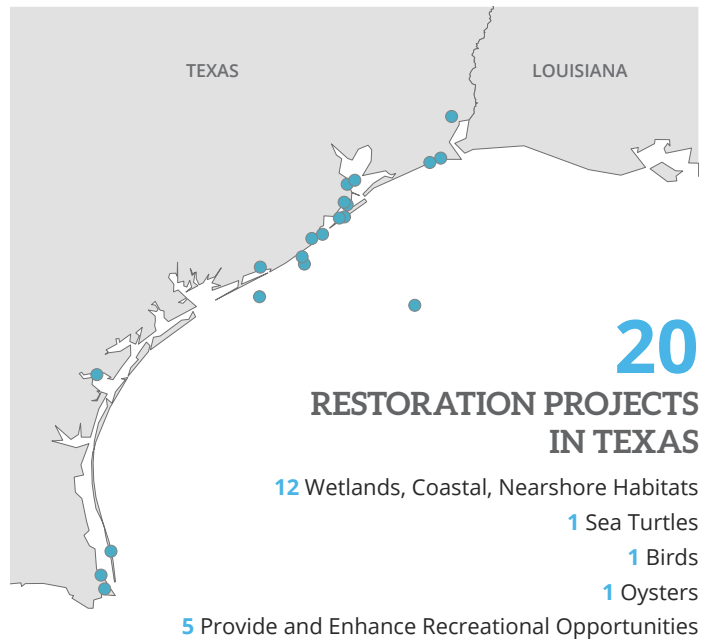
Introduction

The Texas Trustee Implementation Group is responsible for restoring natural resources and their services within the Texas Restoration Area that were injured by the *Deepwater Horizon* oil spill and response activities. This group includes Trustees from the Texas Parks and Wildlife Department, the Texas General Land Office, the Texas Commission on Environmental Quality, and the four federal agencies.

The Texas Gulf Coast stretches along the Gulf of Mexico for 367 miles, from the Louisiana border south to the Texas-Mexico border. Owing to the substantial variation in rainfall and hydrology across the coast, this coastal area includes a wide variety of habitats, such as barrier islands, estuarine to brackish tidal marshes surrounding bays and estuaries, shallow intertidal waters, and tidal flats. These habitats and the surrounding Gulf waters are home to a vast array of fish, shellfish, birds, and other animals, all of which depend on the coast's diverse habitats for food and shelter.

During the spill, oil was found along the Texas coast, primarily in beach and dune habitat. Additionally, the Trustees determined that the *Deepwater Horizon* oil spill resulted in an ecosystem-level injury to the Gulf of Mexico that required a comprehensive ecosystem approach to restoration, including to injured natural resources in Texas. For example, the Trustees concluded that sea turtles in offshore areas, continental shelf areas, and on nesting beaches suffered adverse effects from oil exposure and response activities. One effective way to restore these sea turtles is to protect nesting Kemp's ridley sea turtles, which primarily nest in Texas and Mexico.

The *Deepwater Horizon* settlement allocates approximately \$238 million for NRDA restoration in Texas. This includes approximately \$100 million to restore wetlands, coastal, and nearshore habitats. The remaining funds will support projects to restore water quality through nutrient reduction; replenish wildlife, including sea turtles, birds, oysters; and provide and enhance











recreational use. Funds will also support administrative oversight and monitoring and adaptive management in the Texas Restoration Area.

Trustee Achievements in the Texas Restoration Area Through 2020

More than \$107 million has been committed for the planning, implementation, monitoring, and administration of 20 restoration projects through 2020 in the Texas Restoration Area. This accounts for approximately 45 percent of Texas's total settlement allocation. These include projects to restore sea turtles, birds, oysters, wetlands, coastal, and nearshore habitats.

During the early restoration process, the Trustees approved seven projects in Texas that primarily focused on restoring living coastal and marine resources (specifically sea turtles and birds) and enhancing recreational use quality and opportunities. Since the 2016 settlement, the Texas Trustee Implementation Group released one restoration plan in 2017 focused on restoring wetlands, coastal, and nearshore habitats and oysters.

Texas Restoration Area Financial Overview

Restoration Type	Settlement Allocation	Funds Committed Through 2020	Percent Funds	
			Committed	Remaining
 Wetlands, Coastal, and Nearshore Habitats	\$100,000,000	\$45,556,971	46%	54%
 Nutrient Reduction	\$22,500,000	\$353,500	2%	98%
 Oysters	\$22,500,000	\$413,000	2%	98%
 Sea Turtles	\$27,465,000	\$20,069,000	73%	27%
 Birds	\$40,603,770	\$20,707,770	51%	49%
 Provide and Enhance Recreational Opportunities	\$18,582,688	\$18,582,688	100%	0%
 Monitoring and Adaptive Management	\$2,500,000	\$0	0%	100%
 Administrative Oversight and Comprehensive Planning	\$4,000,000	\$1,504,346	38%	62%
Total	\$238,151,458	\$107,187,275	45%	55%

Restoration Planning Beyond 2020

In 2022, the Texas Trustee Implementation Group plans to release their second post-settlement restoration plan, which will propose funding projects to restore wetlands, coastal, or nearshore habitats; water quality through nutrient reduction; and living coastal and marine resources (specifically, oysters, sea turtles, and birds). In the coming years, the Texas Trustee Implementation Group will continue implementing the projects approved in their restoration plans. As these projects are being implemented, the Texas Trustee Implementation Group will discuss developing new restoration plans and implementing projects under the restoration types with funds remaining, as appropriate.

Project Highlight: Early Restoration Artificial Reef Projects in Texas

The *Deepwater Horizon* oil spill and response activities caused the loss of recreational uses across the Gulf of Mexico, which is a national and international destination for recreational boaters, anglers, and deep-sea divers. Offshore reefs can provide excellent opportunities for these activities. The Texas Trustees implemented three artificial reef projects approved in 2016 to restore a portion of that lost recreational use.

Mid-Upper Texas Coast Artificial Reef

In January 2017, the Texas Parks and Wildlife Department created an artificial reef site about 67 miles south-southeast of Galveston by sinking a 371-foot-long



Photo credits: TPWD Artificial Reef Program

Scenes after the sinking of the *Kraken* and placement of structures to create an artificial reef.

ship named *Kraken*. The ship is located within an 80-acre permitted reef site in waters that are approximately 135 feet deep. The *Kraken's* proximity to the Flower Garden Banks National Marine Sanctuary also makes it a premiere dive location in the Gulf of Mexico. Before the sinking, the ship was cleaned of hazardous substances and passed all required federal and state inspections. Additional funds from donations to the Texas Parks and Wildlife Department, Texas Artificial Reef Program, were also used to implement this project ([DIVER ID 37](#)).

Matagorda Artificial Reef Project

This project ([DIVER ID 36](#)) created a new artificial reef site within Texas state waters approximately 10 miles offshore of Matagorda County. The artificial reef was created within a 160-acre permitted area through deployment of 1,605 concrete pyramids onto sandy substrate at a water depth of 60 feet.

Freeport Artificial Reef Project

This project ([DIVER ID 28](#)) increased the amount of reef material in a currently permitted artificial reef site

known as the George Vancouver (Liberty Ship) Artificial Reef, located within Texas state waters 6 miles from Freeport. The project placed 801 concrete pyramids onto sandy substrate at a water depth of 55 feet in the remaining portions of the 160-acre permitted area.

Each of these projects is successfully enhancing recreational fishing and diving opportunities, as fish, coral, and other invertebrates populate them and anglers and divers visit.

"The deployment of the 371-foot *MV Kraken* created new angler and dive opportunities in the offshore waters of Texas," said Dr. Brooke Shipley of Texas Parks and Wildlife Department's Artificial Reef Program. "Additionally, the enhancement of the materials at the Freeport reef site and the creation of the Matagorda reef site developed and created more recreational fishing opportunities for anglers in Texas state waters. At these popular fishing locations, we have reports of increased catch rates of key recreationally sought species."

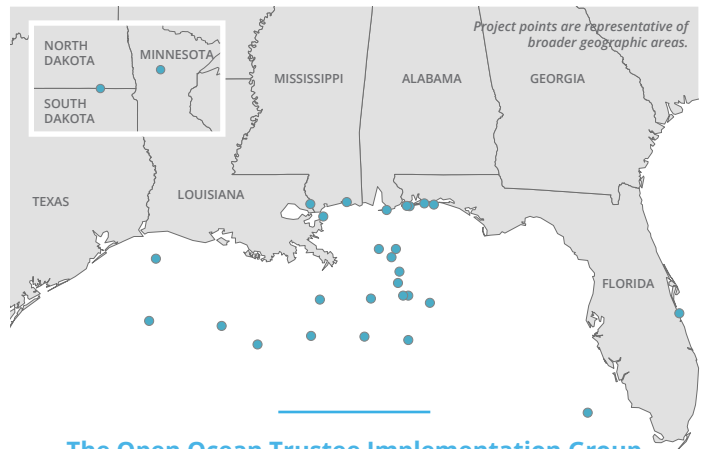
Open Ocean Restoration Area

Introduction

The Open Ocean Trustee Implementation Group is responsible for restoring natural resources and their services within the Open Ocean Restoration Area that were injured by the *Deepwater Horizon* oil spill and response activities. This group includes Trustees from the four federal agencies (DOI, NOAA, USDA, and EPA).

The northern Gulf of Mexico comprises an interconnected regional ecosystem, including coastline habitats, bays and estuaries, expansive continental shelf, and vast open ocean and deep sea. The northern Gulf of Mexico ecosystem contains some of the nation's most diverse and productive natural resources. A vast quantity of water and resources across the northern Gulf of Mexico were exposed to oil during the *Deepwater Horizon* oil spill. The surface slick covered a cumulative area of at least 43,300 square miles. Water column resources injured by the spill include species from all levels of the food chain, from phytoplankton, through small invertebrates, such as shrimp, to large predatory fish. Injured predatory fish included species such as bluefin tuna that can migrate from the Gulf of Mexico into the Atlantic Ocean and as far as the Mediterranean Sea. The Trustees also documented a footprint of more than 770 square miles of injury to deep-sea benthic habitat, including long-lived deep-sea corals surrounding the wellhead and extending up the continental slope (depths greater than 1000 feet). Hundreds of marine species, including threatened and endangered species, were also injured in the open Gulf waters, including thousands of sea turtles; seabirds; Gulf sturgeon; dolphins; and whales, such as the endangered Rice's whale (formerly known as Gulf of Mexico Bryde's whale).

The *Deepwater Horizon* settlement allocates approximately \$1.2 billion for NRDA restoration in the Open Ocean Restoration Area. This includes approximately \$868 million to replenish and protect living coastal and marine resources, including birds, sturgeon, fish and invertebrates, sea turtles, marine mammals, and deep-sea coral communities. It also includes approxi-



The Open Ocean Trustee Implementation Group restores wide-ranging and migratory species that were injured by the spill throughout their geographic range, including some areas outside the Gulf of Mexico.

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RESTORATION PROJECTS IN THE OPEN OCEAN RESTORATION AREA

- 5 Fish and Water Column Invertebrates
- 1 Sturgeon
- 6 Sea turtles
- 4 Marine Mammals
- 2 Birds
- 4 Mesophotic and Deep Benthic Communities
- 4 Provide and Enhance Recreational Opportunities
- 3 Monitoring and Adaptive Management










mately \$22 million to enhance recreational opportunities lost due to the spill. The settlement also provided approximately \$350 million for monitoring, adaptive management, and administrative oversight.

Trustee Achievements in the Open Ocean Restoration Area Through 2020

More than \$335 million has been committed for the planning, implementation, monitoring, and administration of 26 restoration projects and three monitoring and adaptive management activities through 2020. This accounts for approximately 27 percent of Open Ocean's total settlement allocation.

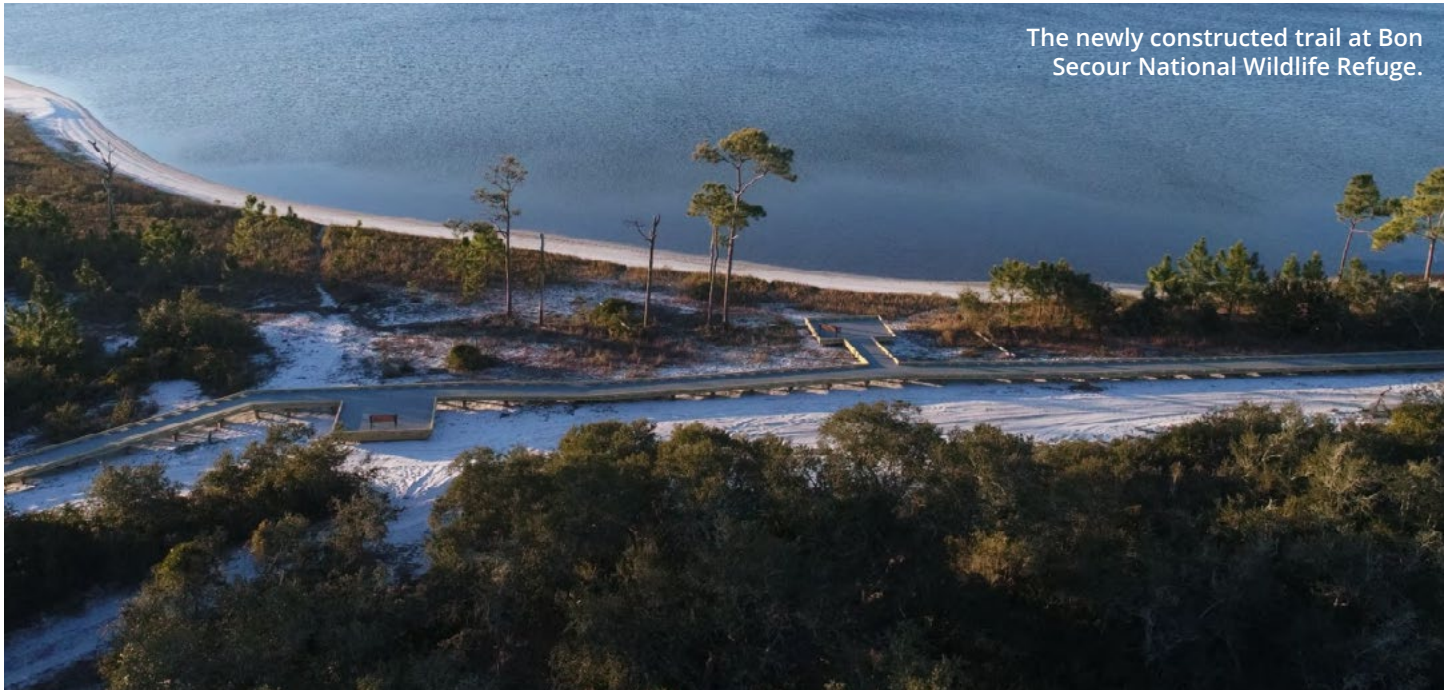
Restoration Area Updates - Open Ocean Restoration Area

Open Ocean Restoration Area Funding Overview

Restoration Type	Settlement Allocation	Funds Committed Through 2020	Percent Funds	
			Committed	Remaining
 Fish and Water Column Invertebrates	\$400,000,000	\$78,681,216	20%	80%
 Sturgeon	\$15,000,000	\$2,443,466	16%	84%
 Sea Turtles	\$55,000,000	\$19,462,853	35%	65%
 Marine Mammals	\$55,000,000	\$23,501,256	43%	57%
 Birds	70,000,000	\$14,374,206	21%	79%
 Mesophotic and Deep Benthic Communities	\$273,300,000	\$126,816,161	46%	54%
 Provide and Enhance Recreational Opportunities	\$22,397,916	\$22,388,991	100%	0%
 Monitoring and Adaptive Management	\$200,000,000	\$7,317,540	4%	96%
 Administrative Oversight and Comprehensive Planning	\$150,000,000	\$40,650,257	27%	73%
Total	\$1,240,697,916	\$335,635,946	27%	73%

During early restoration, the Trustees approved four projects focused on providing and enhancing recreational opportunities and increasing visitor satisfaction. Through 2020, the Trustees enhanced approximately 570 acres of beach and 10 acres of nearshore tidal wetlands by removing nearly 20,000 tons of asphalt and road base material across Fort Pickens, Santa Rosa, and Perdido Key areas of Gulf Islands National Seashore in Florida ([DIVER ID 15](#)). Through the Bon Secour National Wildlife Refuge Trail Enhancement Project ([DIVER ID 56](#)), the Trustees repaired and enhanced the Jeff Friend Trail and boardwalk, constructed an observation platform, and widened two parking spaces. The Trustees also partnered with the City of

Pensacola and Escambia County to fund the construction of two ferries for visitors to travel between the City of Pensacola, Pensacola Beach, and the Fort Pickens area of Gulf Islands National Seashore in Florida ([DIVER ID 32](#)). The two ferries, named Pelican Perch and Turtle Runner by local schoolchildren, have been in operation for the past four summers. The Trustees also began engineering and design work to enhance bike and pedestrian access in the Davis Bayou area of coastal Mississippi on National Park Service lands through construction of multiple-use trails ([DIVER ID 55](#)). The project plans to widen about 2 miles of the existing road surface on Park Road to accommodate multiple-use, bicycle-pedestrian trails.



The newly constructed trail at Bon Secour National Wildlife Refuge.

During early restoration, the Trustees also approved the Oceanic Fish Restoration Project ([DIVER ID 58](#)), a 5-year project to restore oceanic fish populations in cooperation with the Gulf of Mexico pelagic longline fishery. This project has successfully reduced fishing pressure on pelagic fish species by working with pelagic longline vessel owners to conduct voluntary 6-month repose periods and use alternative gear to reduce bycatch and restore pelagic fish populations. (See the *Fish and Water Column Invertebrates* section of this document for more information on this project.)

Since the Consent Decree, the Open Ocean Trustee Implementation Group has finalized two restoration plans that approved 21 restoration projects. Through these projects, the Open Ocean Trustees are collaboratively implementing restoration to reduce fish mortality, bycatch, and fishing interactions with protected sea turtles; and to reduce environmental stressors and enhance disaster response for whales and oceanic dolphins. Funds will also be used to protect critical beach nesting areas for sea turtles, restore and conserve breeding and nesting bird habitat, identify Gulf sturgeon spawning habitat, and enhance protection and management for mesophotic and deep sea coral communities.

Additionally, the Open Ocean Trustee Implementation Group approved three monitoring and adaptive management activities to address critical data gaps and needs for the restoration of Gulf sturgeon and marine mammals. For example, the Trustees will develop models of the effects of multiple stressors on sperm whales and oceanic dolphins ([DIVER ID 217](#)). These models will be used to prioritize potential restoration activities and evaluate their effectiveness.

The Trustees are also building the foundation for restoration of Gulf sturgeon through mapping and monitoring juvenile sturgeon habitat use in seven river systems across the Gulf where sturgeon occur. Through the use of sonar mapping, acoustic telemetry, and other data analysis, the Trustees seek to identify potential Gulf sturgeon spawning habitat, habitat use and origins of juvenile sturgeon ([DIVER ID 182](#)). The monitoring activities focus on examining population dynamics and habitat use of juvenile sturgeon ([DIVER ID 206](#)), and characterizing sturgeon population status and trends across the species range ([DIVER ID 203](#)). Collectively, this sturgeon work will provide information needed to effectively prioritize restoration activities, protect important habitat, and provide a suite of baseline metrics to evaluate restoration success.

In 2020, the Trustees incorporated more than 30 years of mark recapture data into the Gulf sturgeon databases, rolled out the database to partners, and developed standardized data entry forms and software for field data entry on tablets. Efforts to capture, tag, and monitor juvenile sturgeon commenced in all seven sturgeon river systems, as teams worked around delays and setbacks associated with the COVID-19 pandemic.

Restoration Planning Beyond 2020

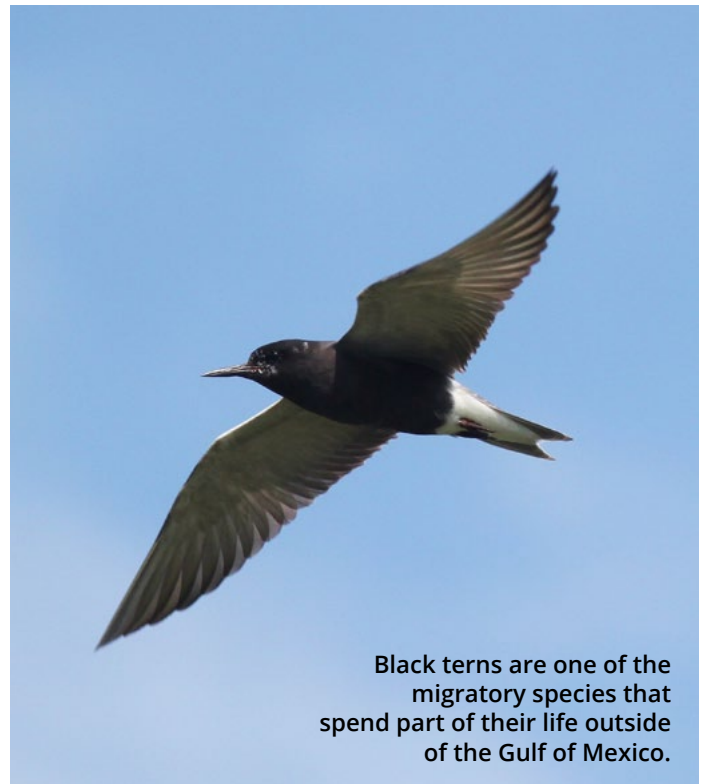
In March 2021, the Open Ocean Trustee Implementation Group began planning for their third post-settlement restoration plan by requesting project ideas from the public. This third plan may include projects targeting bird and sturgeon restoration. The Open Ocean Trustees also started to address priorities identified in their updated Monitoring and Adaptive Management Strategy ([DIVER ID 125](#)), which was released in June 2020. Work includes developing restoration objectives and indicators to assess restoration progress for Open Ocean resources. Also in 2021, the Open Ocean Trustees sought the public's input on priorities for a restoration strategy for fish and water column invertebrates. The Open Ocean Trustees will also continue to implement activities to fill critical information gaps and projects to restore living marine resources and their services injured by the spill.

Project Highlights: The Long Reach of Restoration - Helping Migratory Birds

The Open Ocean Trustees conduct restoration that provides important benefits for injured migratory bird species that spend part of their life outside of the Gulf region. For this reason, the Open Ocean Trustees looked to restoration opportunities in the Upper Midwest region, where they are implementing projects to benefit black terns and common loons.

Black Terns

Each year, black terns make a long journey from their nesting areas in the northern United States and southern Canada to their wintering habitat along the tropical coasts of Central and South America. On their way back and forth from their breeding and non-breeding habitats, they stop over in the Gulf of Mexico region. It



Black terns are one of the migratory species that spend part of their life outside of the Gulf of Mexico.

was during their migration in 2010 that the birds were injured by oil from the *Deepwater Horizon* spill.

The Restoration of Black Terns in North and South Dakota Project ([DIVER ID 188](#)) is a \$6.25 million project that will use conservation easements in partnership with willing landowners to protect 2,000 wetland acres and 1,000 grassland acres that provide important nesting and foraging habitats.

In the Dakotas, the U.S. Fish and Wildlife Service has estimated that more than 1,200 private landowners are on waiting lists to have their property evaluated for wetland and grassland conservation easements. Working through the U.S. Fish and Wildlife Service's Dakota Grassland Conservation Area's Land Protection Plan and using its inventory of suitable habitat, willing landowners and the habitat on their land helped to achieve some early successes for this project. As of December 2020, the Trustees and their partners had acquired five wetland easements totaling 985 acres of black tern nesting and foraging habitat from willing landowners.



Left, lead-free tackle was distributed as part of a project to restore common loons in Minnesota. Right, common loon.

Common Loons

A large portion of the North American common loon population that winters in the Gulf of Mexico region also nests each spring around Minnesota's freshwater lakes. In 2019, the Open Ocean Trustees approved a 3-year, \$7.52 million project called Restoration of Common Loons in Minnesota ([DIVER ID 186](#)) with a goal of increasing reproductive success and reducing mortality. Project activities include acquiring loon breeding habitat, providing nesting platforms, and engaging lake associations in maintaining and monitoring habitat use. The project also uses education and outreach to reduce loon exposure to lead-based fishing tackle, which is poisonous if ingested by loons.

During the first half of 2020, project partners U.S. Geological Survey, Upper Midwest Environmental Sciences Center, and Minnesota Department of Natural Resources worked together to analyze historic baseline data to guide identification of priority lakes and locations for artificial nest platforms. They also worked to identify lake associations to participate in a "Loon-friendly Lake Association" registry program dedicated to loon conservation and monitoring. A key

part of this program entails developing a survey data collection tool and training lake association volunteers in its use.

Another partner, Minnesota Pollution Control Agency, adopted a "Get the Lead Out" slogan for the lead reduction portion of this project. The Get the Lead Out Team also set lofty goals pertaining to collection of lead tackle, distributing educational information, and engaging with anglers and tackle manufacturers. In early 2020, team members attended sports shows and conducted surveys that collected data on tackle use, along with opinions about lead tackle and potential wildlife impacts. The team also distributed approximately 3,500 sample packs of lead-free tackle.

The Open Ocean Trustees will continue to invest restoration funds to restore species injured by the oil spill. As an integral component of our work, the Open Ocean Trustee Implementation Group will seek additional opportunities to restore important habitats and species within the Gulf of Mexico region and beyond to have the greatest benefit to the resources injured by the oil spill.

Regionwide Restoration Area

Introduction

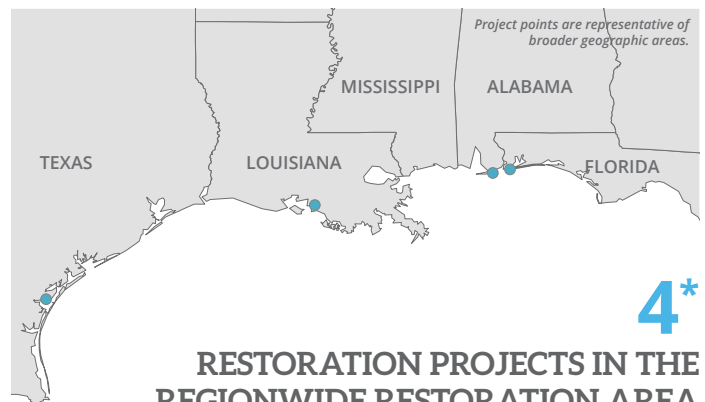
The Regionwide Trustee Implementation Group encompasses Trustees from the five Gulf states and the four federal agencies. This group is charged with restoring living coastal and marine resources (i.e., birds, sea turtles, marine mammals, and oysters) that were injured by the *Deepwater Horizon* oil spill and response activities within the Regionwide Restoration Area. The Regionwide Trustee Implementation Group has developed strategic frameworks to guide living coastal and marine resources restoration planning. The Group also supports the Trustees' monitoring and adaptive management planning through the Monitoring and Adaptive Management Work Group.

This restoration area encompasses a broad range of habitats, from inland, tidally-influenced freshwater ecosystems to approximately 600-foot-deep water off the coast. This includes a variety of wetland and upland habitats, including tidal marshes, salt and brackish marshes, tidal mudflats, swamps, pine savanna, maritime forests, dunes, and beaches. It also includes aquatic habitats such as estuaries, bayous, bays, mangroves, SAV, and the open waters of the continental shelf. These coastal areas and nearshore waters are important for nesting, feeding, and migration for a variety of fish, crustaceans, shellfish, marine mammals, sea turtles, and birds. These animals and habitats were injured by the *Deepwater Horizon* oil and/or response activities in open ocean, nearshore, and shoreline environments.

The *Deepwater Horizon* settlement allocates approximately \$350 million to the Regionwide Trustee Implementation Group. This includes approximately \$245 million to restore living coastal and marine resources, specifically sea turtles, marine mammals, birds, and oysters. The remaining funds will support monitoring and adaptive management and administrative oversight.

Trustee Achievements in the Regionwide Restoration Area Through 2020

The Regionwide Trustee Implementation Group has committed more than \$50 million to the planning, implementation, monitoring, and administration of three restoration projects and one monitoring and adaptive management activity through 2020. This accounts for approximately 15 percent of the Regionwide Restoration Area's total settlement allocation.



2 Sea turtles







2 Birds

1 Monitoring and Adaptive Management

* Two projects are funded under multiple restoration types

During early restoration, the Trustees approved three projects in the Regionwide Restoration Area that focused on restoring birds and sea turtles. These included efforts to: enhance avian breeding habitat injured by response activities in the northern Gulf coast ([DIVER ID 9](#)); enhance sea turtle nesting by reducing light impacts ([DIVER ID 10](#)); restore sea turtles through enhanced outreach to the shrimp fishery ([DIVER ID 62](#)); and enhance the Sea Turtle Stranding and Salvage Network ([DIVER ID 62](#)). Since the 2016 Consent Decree, the Regionwide Trustee Implementation Group has also been planning for restoration: the Trustees released [strategic frameworks](#) to guide bird, sea turtle, oyster, and marine mammal NRDA restoration efforts. Additionally, a large-scale monitoring activity to inform future restoration of colonial waterbirds is underway ([DIVER ID 257](#)).

Regionwide Restoration Area Funding Overview

Restoration Type	Settlement Allocation	Funds Committed Through 2020	Percent Funds	
			Committed	Remaining
 Sea Turtles	\$89,256,165	\$29,814,498	33%	67%
 Marine Mammals	\$19,000,000	\$736,192	4%	96%
 Birds	\$72,223,100	\$2,527,060	3%	97%
 Oysters	\$64,372,413	\$860,769	1%	99%
 Monitoring and Adaptive Management	\$65,000,000	\$5,912,462	9%	91%
 Administrative Oversight and Comprehensive Planning	\$40,000,000	\$11,040,493	28%	72%
Total	\$349,851,678	\$50,891,474	15%	85%

Restoration Planning Beyond 2020

Finally, the Regionwide Trustee Implementation Group’s expenditures also include the efforts of the [Cross-TIG Monitoring and Adaptive Management group](#), which includes representatives with technical experience from each Trustee. The work group serves as a forum for the Trustees to collectively address relevant monitoring and adaptive management topics. The work group also assists with developing monitoring guidance and processes applicable across all Trustee Implementation Groups, as appropriate. This group released the [Monitoring and Adaptive Management Manual](#) in late 2017, and an [update to the Manual](#) in August 2019. Finally, the work group assisted the Trustees with the evaluation of monitoring data and project information across projects implemented through 2020 to summarize progress by restoration type and restoration area presented in this programmatic review.

In September 2021, the Regionwide Trustee Implementation Group released their first post-settlement restoration plan. This plan includes 11 restoration

projects focused on sea turtles, marine mammals, oysters, and birds. The projects will be implemented across the five Gulf states, including select locations in Mexico and on the Atlantic Coast of Florida. As these projects are being implemented, the Regionwide Trustee Implementation Group will discuss developing new restoration plans and implementing additional projects under the restoration types with funds remaining, as appropriate.

Project Highlight: Regionwide Flyovers Document Colonial Waterbird Numbers, Nesting Sites

Colonial waterbirds experienced significant injuries in association with the *Deepwater Horizon* oil spill, including direct and indirect exposure, loss of future generations, and degradation of their historic preferential nesting and foraging habitats. The Trustees documented these injuries by multiple means during the assessment, including aerial nests surveys from fixed-wing aircraft (2010-13 and 2015) and associated nest dotting (counting) analyses.



Scenes from the flights to document colonial waterbird nesting sites.

In October of 2020, the Regionwide Trustee Implementation Group approved a colonial waterbird Monitoring and Adaptive Management Activity Implementation Plan ([DIVER ID 257](#)), which prioritized the collection and analysis of data on colonial waterbird breeding population performance across the northern Gulf of Mexico. Specifically, assessment survey data collected between 2010 and 2018 will be compared with new data collected in 2021. These data encompass a broad geographic expanse (southern Texas to Florida's Big Bend) within the northern Gulf of Mexico. Surveyors documented species present as well as breeding status of colonial waterbird species at historic and newly restored colony locations. Representative species documented in these surveys include brown pelicans, royal terns, sandwich terns,

Caspian terns, gull-billed terns, black skimmers, reddish egrets, little blue herons, tricolored herons, roseate spoonbills, great blue herons, black-crowned night herons, laughing gulls, and Forster's terns – all species significantly impacted by the *Deepwater Horizon* oil spill.

Trustees assert that implementation of a region-wide monitoring approach (large-scale and ecosystem-wide) is critical to their ability to assess the status of *Deepwater Horizon*-impacted bird species; assist in future bird restoration project engineering, design and construction; and evaluate progress of restorative efforts in a way that can be clearly conveyed to and easily understood by the Gulf region's resource stakeholders and public.

Future Restoration Planning



Sunrise at South Padre Island, Texas.

Photo credit: TPWD

The Trustees are in the initial years of a multi-decade process to implement a comprehensive, integrated ecosystem restoration plan that allocates \$8.8 billion in funding to be paid to the Trustees in annual installments through 2032. Through 2020, the Trustees have received approximately \$2.8 billion of settlement funding and allocated approximately \$2.4 billion to projects and activities. While restoration is off to a strong start, much remains to be done. Looking forward, the Trustees will continue to identify, evaluate, and implement projects and activities consistent with the five complementary goals and portfolio of restoration types described in the Trustees' Programmatic Restoration Plan.

In the near term, the Trustees will continue to implement projects and activities already approved through the restoration planning process. Potential future projects will be identified, evaluated, and selected, with a continuing emphasis on public outreach and involvement. Oysters, birds, marine mammals, and sea turtles

restoration will be guided by publicly available strategic frameworks developed by the Trustees for the prioritization, sequencing, and selection of projects in future restoration plans. These frameworks promote information sharing and coordination across restoration areas, helping local restoration actions contribute to ecosystem-level restoration outcomes for these wide-ranging species. Additional strategic planning documents may be developed, as circumstances warrant.

The Trustees will continue to integrate information from other Gulf restoration planning initiatives into their processes, including but not limited to: the Texas Coastal Resiliency Master Plan, Louisiana's Coastal Master Plan, Mississippi's Gulf Coast Restoration Plan, Alabama's Coastal Comprehensive Plan, and Florida's Gulf Environmental Benefit Fund Restoration Strategy Plan.

The Trustees anticipate continuing existing and establishing new partnerships to support project

Isle au Pitre off the coast of Louisiana.



implementation, and seeking opportunities to leverage funding, as they have during the first several years of the *Deepwater Horizon* NRDA restoration program. Such collaboration increases the magnitude of restoration and provides far greater ecosystem benefits than could be achieved by any one partner working alone.

Monitoring and adaptive management are expected to play an increasingly important role over time as more projects are fully implemented and the Trustees collect additional monitoring data. The Trustees recognize that the best available science to use for planning restoration activities evolves as the body of science originating from this program, as well as other science, monitoring, and restoration programs in the Gulf of Mexico, continues to grow. Such efforts will facilitate ongoing identification and use of best practices as well as thoughtful response to restoration challenges, needs, and opportunities that arise as conditions in the

Gulf environment change. Continued monitoring and assessment of restoration outcomes at project, restoration type, and ecosystem scales will be important to evaluate restoration progress as more projects are approved and implemented. These monitoring and assessment efforts will also enhance future restoration planning by providing information needed to adaptively manage the restoration program over time.

In addition, variability in restoration data and/or information from other restoration and science programs that may signal the existence of emerging unknown conditions may need to be considered in future restoration planning and decision-making. Decisions on using funds for the Unknown Conditions and Adaptive Management restoration will be informed by monitoring data gathered across Restoration Areas and by review of any available scientific and supporting information that documents unforeseen conditions.

Interactive Story Map

Check out the accompanying [interactive story map](#).



Juvenile green turtle eating a jellyfish. Credit: Florida Fish and Wildlife Conservation Commission, John Starrett.