

# OUR FUTURE GULF

2.0 RECOMMENDATIONS FOR  
**RESTORATION AND CONSERVATION**  
OF THE GULF OF MEXICO | 2021-2024

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# Executive Summary

This report presents The Nature Conservancy's recommendations for the continuing restoration of the Gulf of Mexico.

The Nature Conservancy is a nonprofit conservation organization with chapters in all five Gulf states. We have worked in the Gulf of Mexico region for more than 40 years and expanded our activities there after the Deepwater Horizon oil spill in 2010. We do conservation science, advocate for public restoration projects and policies, and implement restoration actions on the ground and in the water.

Our experience across the Gulf over the last 10 years tells us that governments, nonprofit organizations, private enterprise, and other stakeholders are, overall, working together in a constructive way to shape a future Gulf that is healthier and more resilient than it is today. We particularly commend local, state, and federal officials for the tangible progress they are making on Gulf restoration. The task, however, is daunting. There is a legacy of past damage to the Gulf's natural systems, and since we released the previous version of *Our Future Gulf* in 2016, we have seen changing and often increasing threats to the Gulf region:

- ➔ **The impacts of climate change** and sea-level rise have become more evident.
  - Hurricanes have increased in frequency and strength.
  - There are more intense rainfall events across the region, which have flooded estuaries with nutrient-laden freshwater.
  - There is more freshwater flowing down the Mississippi River, including during major flood periods.
  - Coastal erosion and marsh loss continue, particularly in Louisiana, where revised projections forecast additional relative sea-level rise and land loss.
- ➔ **Natural hazards in the region** affect low-income and minority populations disproportionately.
- ➔ **Oysters and oyster reefs** continue to steeply decline across the Gulf, due to multiple causes.

- ➔ **Nutrients, mostly from agricultural sources**, still flow down the Mississippi and cause a “dead zone” that extends westward from the river's mouth.
- ➔ **The coastal population** of the Gulf region is growing, which is putting more people and property in harm's way from natural hazards.
- ➔ **The COVID-19 pandemic** has damaged the Gulf's economy, particularly the tourism and seafood industries.

Our recommendations in this report address these trends. Our proposals are based on years of science and study by many institutions in the Gulf region.

## THE NATURE CONSERVANCY SUPPORTS THE FOLLOWING MAJOR STRATEGIES

for implementation by the Gulf's government agencies, nonprofit organizations, and private enterprises over the next three to five years:

- ➔ **Continue to use an estuary/watershed approach** to Gulf restoration.
- ➔ **Implement the Louisiana Coastal Master Plan**, including evaluating the options for adjusting river flows through the Mississippi River Delta to make better use of the Old River Control Structure and the Atchafalaya River Basin to balance high-water impacts across the delta.
- ➔ **Restore and conserve floodplain and upland forests** upstream on Gulf rivers, including the Mississippi, to moderate floods, retain water in times of drought, remove nutrients, and provide fish and wildlife habitat.
- ➔ **Restore oysters and oyster reefs** at a large scale for both their ecological and economic values, following the Oyster Framework Plan produced by the Gulf Natural Resource Damage Trustees.
- ➔ **Acquire additional public land inland** of existing protected wetland areas, to allow those wetlands to migrate upslope as sea level rises.
- ➔ **Restore, reinforce, and protect natural features** (use nature-based solutions) to buffer communities from the impacts of storms and sea-level rise.
- ➔ **Continue to support existing programs** like National and State Estuary Programs, National Estuarine Research Reserves, National Seashores, and National Marine Sanctuaries as anchors to long-term Gulf restoration.
- ➔ **Ensure that young people, people of color, and disadvantaged communities are engaged in and benefit from Gulf restoration.** Continue the GulfCorps Program to put young people to work doing meaningful Gulf restoration.
- ➔ **Enhance intergovernmental communication and coordination** to facilitate the planning, permitting, and execution of Gulf restoration projects.

These proposals are spelled out in more detail in this report.

# Introduction

The Gulf of Mexico is a very large, biologically rich, and highly productive marine and estuarine ecosystem bounded by the United States, Cuba, and Mexico. The communities surrounding the Gulf have a rich and diverse history and range from large metropolitan areas like Houston, Tampa, and New Orleans to smaller working-waterfront settlements like Cedar Key, Florida, and Bayou La Batre, Alabama. However, despite all its assets, the Gulf of Mexico region faces many challenges.

The Nature Conservancy is a nonprofit conservation organization whose mission is “to conserve the lands and waters on which all life depends.” Our vision is “a world where the diversity of life thrives, and people act to conserve nature for nature’s sake and its ability to fulfill our needs and enrich our lives.” To achieve this vision, we develop and apply the best available science to solve conservation problems and collaborate with a wide range of people and organizations to use that science to guide practical conservation actions.

While the Conservancy has a global reach, we have been working at a local scale in the Gulf of Mexico region for more than 40 years. During that time, we have been on the ground and in the water conserving and restoring the Gulf’s natural resources, and we have observed first-hand the problems that the region’s coastal ecosystems face. In recent years, despite the often-heroic efforts of government officials, nonprofit organizations, businesses, and engaged individuals, we have seen the condition of the Gulf and many of its bays, estuaries, and tributary rivers continue to decline, jeopardizing the values that the Gulf of Mexico provides to coastal communities and to the country as a whole.

An acute example of that decline was the Deepwater Horizon oil spill in 2010, which took human lives and caused unprecedented damage to the environment. Passage of the RESTORE Act in 2012

and settlement in 2016 of the fines and damages resulting from the spill have created several funding sources and new institutions that, together with the ongoing work of state, federal, and local agencies, offer a unique opportunity to respond to the impacts of the spill itself and to address the Gulf’s long-term problems.

## PURPOSE OF THIS DOCUMENT

We do not know of another instance in which so much money has been guaranteed over the long term (15+ years) for the restoration of a major ecosystem. The Nature Conservancy believes that, while we cannot return the Gulf ecosystem to the way it once was, by investing the settlement money wisely and using it to leverage other public and private funds to restore the natural systems and features of the Gulf of Mexico, we can produce immense returns for the larger Gulf, and we can make the region’s communities and economies more resilient to ongoing stresses, such as storms and sea-level rise intensified by climate change.

In 2016, The Nature Conservancy published *Our Future Gulf*, our recommendations for what we believed were the most important principles, policies, strategies, and locations for Gulf restoration. Now that the Deepwater Horizon settlement has been in place for several years and the agencies involved are implementing Gulf restoration, we have updated and broadened our recommendations for restoring and conserving the Gulf’s natural resources. In this report, *Our Future Gulf 2.0*, we focus on the actions across the region and within specific watersheds that we believe will:

- **Contribute to restoring the health of the Gulf** as a whole.
- **Provide benefits to the diversity of people** who live in the Gulf region.
- **Take into account the growing body of science** on the condition of the Gulf, including the projected impacts of climate change.
- **Reflect the experience** and build on the accomplishments of early restoration projects.
- **Encourage cooperation** across state and agency boundaries.
- **Create the foundation** for long-term Gulf restoration.
- **Produce** tangible and measurable results.

We are grateful to the public officials, private foundations, businesses, and engaged citizens who have advanced Gulf restoration so far. We hope the ideas set out here will help to inspire the cooperative design, funding, and implementation of additional projects that will work in concert to restore the overall Gulf ecosystem that provides many benefits to people and nature.



# THE MULTIPLE VALUES OF THE GULF OF MEXICO

The Gulf of Mexico, including its bays, estuaries, shorelines, and deep and open water habitats, is one of the most productive and biologically diverse large marine systems on Earth. It harbors over 15,000 marine species, including more than 130 federally protected species (USFWS, 2013). The Gulf is globally important for marine and avian species migration. More than 40% of all North American migrating waterfowl and shorebirds use the Mississippi Flyway through the Gulf region (USFWS, 2013). Much of the Gulf Coast region lies within the North American Coastal Plain Biodiversity Hot Spot (Noss, 2016). The Gulf's tributary rivers have the greatest number of freshwater fish, mussel, crawfish, and snail species in North America. The Gulf is not only diverse, it is highly productive. Approximately 16% of U.S. seafood landings are from the Gulf, with a commercial harvest of 1.4 billion pounds, valued at \$661 million.

The Gulf of Mexico region is also home to 16 million people. The Gulf adds \$32 billion to the region's gross state product, supports millions of jobs, and is nationally significant for oil and gas production, shipping, military preparedness, and its seafood and tourism industries. The character of the Gulf's communities is closely tied to the natural environment; the region has a rich culture of music, art, cooking, and outdoor recreation and a distinct sense of history and place.

A brown pelican in flight in Bayou La Batre (above left). Kemp's Ridley sea turtles, the most endangered of sea turtle species living in the Gulf of Mexico, are raised from eggs in a hatchery and then released on the beaches of Padre Island National Seashore in Texas, where they will eventually return to nest.

PHOTOS BY HUNTER NICHOLS/TNC AND CARLTON WARD JR.





## THE PEOPLE OF THE GULF HAVE NOT SHARED EQUALLY IN ITS BENEFITS

Despite the ecological and economic values of the Gulf, the people living along its shores have benefited unevenly from its resources. The Gulf region is home to both extremely wealthy and very poor communities, and it continues to grapple with a history of racial and ethnic inequality. The decline of the seafood industry from the impacts of the Deepwater Horizon spill, overfishing, foreign competition, and other factors has reduced the incomes of people, some of who were already impoverished. The oil spill, and now the COVID-19 pandemic, have been particularly hard on the many Gulf residents employed in the seafood, restaurant, tourism, and hospitality industries. During the first six months of the pandemic, landing revenues in

the fisheries industry along were down 23% compared with the same time period the year before. In addition, 48% of affected seafood dealers and processors closed their businesses for some period of time during those months.



PHOTOS BY AUDRA MELTON/TNC





## THE VALUES OF THE GULF HAVE BEEN DAMAGED OVER TIME AND CONTINUE TO BE THREATENED

The ecological values of the Gulf have eroded over time and continue to be threatened by rapid environmental and socioeconomic changes, adding to the legacy of past stresses. The Gulf's ecological decline has resulted in significant adverse social and economic impacts. There are multiple ongoing threats to the Gulf environment.

- Alteration of the Mississippi River due to flood control and navigation projects deprive the Mississippi River Delta of freshwater and sediment and contribute to the loss of thousands of acres of marshland each year.
- When the Mississippi is in flood, these alterations can result in too much nutrient-laden freshwater entering Mississippi Sound; other river floods similarly affect Mississippi Sound and other Gulf estuaries.
- Nutrients, primarily nitrogen and phosphorus from upstream sources in the Mississippi basin, produce a dead zone with very low oxygen surrounding the mouth of the river that extends westward into the Gulf.
- Point and nonpoint discharges of polluted water into most of the Gulf's rivers, bays, and estuaries diminish water quality over a wide area and can impact the health of people living in and visiting those coastal communities.
- The withdrawal of water for urban and agricultural uses and the loss of forests, floodplains, and other wetlands upstream have caused changes in freshwater flows into many of the Gulf's estuaries and coastal streams. In some cases, the addition of too

An aerial view of the flooded areas along the Atchafalaya River outside Baton Rouge, Louisiana (left). The Old River Control Structure and Morganza Spillway have been opened to release water into the Atchafalaya Basin to prevent flooding further downstream in cities including Baton Rouge and New Orleans. The flooded overflow banks from the Mississippi River in St. Francisville, Louisiana (above).

PHOTOS BY  
DAVID Y. LEE



The Nature Conservancy is working closely with the city of Punta Gorda and regional partners, developing projects to improve coastal resilience, including oyster reef planting and restoration and protection of mangrove habitat.

PHOTO BY CARLTON WARD JR.

much (often polluted) freshwater running into the estuaries has damaged the natural resources in those estuaries, as in the case of Lake Okeechobee flushing into the Caloosahatchee River in southwest Florida. In other cases, water withdrawal has affected the hydrology of tidal and nontidal streams and groundwater flowing into the Gulf. This has changed salinity regimes, increased turbidity, and severed aquatic habitat connectivity, as in the case of the rivers of Texas that are tributary to the Gulf.

➔ Alteration of Gulf shorelines through bulkheading, dredging, filling, dune removal, and the destruction of coastal habitats, including oyster and coral reefs, mangroves, seagrass beds, and coastal marshes, have damaged or fragmented these and other critical habitats. Such changes have reduced the ability of the coastlines to recover from further harm or to protect the land from storms.

➔ The cumulative impacts of previous energy exploration and development practices have negatively affected some coastal and offshore habitats and species.

➔ Overfishing, bycatch mortality, and habitat damage associated with unsustainable fishing practices continue to reduce fish and shellfish stocks and impact protected species.

### THE DEEPWATER HORIZON SETTLEMENT AGREEMENT IS A UNIQUE OPPORTUNITY TO ACCELERATE GULF RESTORATION

The Deepwater Horizon settlement agreement, which was accepted by the Federal District Court in 2016, continues to be an unprecedented opportunity to address the problems of the

Gulf. Substantial on-the-ground restoration and conservation progress has already been made using this money. Overall, the primary Deepwater Horizon funding mechanisms are doing a good job of investing in sound restoration projects; federal, state, and local governments should be commended for their work on the Gulf. During the next 12 years, these programs will make an additional \$12 billion available for Gulf restoration. While this is not enough money to fix all that is wrong, it is enough, if invested well, to develop science-based and publicly supported conservation and restoration plans, to accelerate restoration activities, to leverage other funds, and to create a solid foundation and direction for long-term progress. An explanation of the allocation of Deepwater Horizon funding is found in Appendix I to this document.

There is potential to leverage the Deepwater Horizon funds with other state and federal funding to support projects of greater scale and impact. Examples of such other funding include the recently expanded Land and Water Conservation Fund, Gulf of Mexico Energy Security Act, the new Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure Communities Program, Community Development Block Grants resulting from disasters, other National Fish and Wildlife Foundation funds, and several programs administered by the Natural Resources Conservation Service.

A brown pelican covered in oil rests on a rock in Barataria Bay, south of New Orleans.

PHOTOS BY BRIDGET BESAW



South Padre PHOTO BY KENNY BRAUN



# PROGRESS HAS BEEN MADE IN THE GULF

**SINCE THE PUBLICATION OF *OUR FUTURE GULF* IN 2016, SUBSTANTIAL PROGRESS HAS BEEN MADE IN GULF RESTORATION.**

State and local governments and federal agencies have invested in planning for restoration, with input from a variety of stakeholders. This planning has included processes for selecting projects for funding from the various Deepwater Horizon sources:

- ➔ In 2019, Texas completed a second version of its Coastal Resiliency Master Plan, which includes specific restoration and coastal resilience projects across the Texas coast. Technical advisory groups are refining detailed aspects of this plan.
- ➔ Louisiana is currently implementing the 2017 Coastal Master Plan and is in the process of developing the 2023 Coastal Master Plan.
- ➔ In 2017, the State of Mississippi Department of Environmental Quality completed an update of its Mississippi Gulf Coast Restoration Plan.
- ➔ Alabama has updated its Mobile Bay Estuary Comprehensive Conservation and Management Plan, including detailed restoration plans for several tributaries to the Bay.
- ➔ Florida completed a Gulf Environmental Benefit Fund Restoration Strategy Plan for the Panhandle/Big Bend regions and established estuary planning and management programs in three large panhandle watersheds.



American oystercatcher at Coffee Island in Mobile Bay, Alabama. The site of oyster reef restoration led by The Nature Conservancy creates important habitat for shorebirds.

PHOTOS BY CARLTON WARD JR.

- The RESTORE Council has adopted a planning framework for grantmaking.
- The Trustee Implementation Groups (TIGs) for individual states, for the Open Ocean TIG, and for the Regionwide TIG have released plans and frameworks to guide specific restoration actions.
- Tens of thousands of acres of environmentally important land have been acquired for conservation purposes.
- Coastal restoration and resilience projects are underway in all Gulf states, including, for example, large-scale barrier island construction at Queen Bess Island and the Caminada Headland in Louisiana, Round Island in Mississippi, and Lightning Point in Bayou La Batre, Alabama.
- Water quality improvement projects have been funded in most states, including upgrades to wastewater treatment plants. Homes that were served by failing septic systems have been connected to sewers.
- Projects as the Tate's Hell State Forest restoration project in Florida have recognized the importance of forest management to water quality and quantity.
- At dozens of sites across the Gulf region, new boat ramps, trails, and boardwalks have been installed to improve access to the shore.
- GulfCorps has employed hundreds of young adults across all five Gulf states to improve the coastal environment by planting native vegetation, removing invasive exotic species, preparing sites for prescribed fire, installing boardwalks, and responding to natural disasters.

- Offshore, red snapper stocks are being rebuilt through science-based fisheries management. As a result, red snappers are no longer considered to be an overfished species.

GulfCorps crew members remove storm debris.

PHOTO BY MICHAEL DUMAS

## BUT LONG-TERM CHALLENGES TO THE HEALTH OF THE GULF REMAIN

Events, trends, and scientific studies over the last four years have illustrated the gravity of the threats.

- Extreme weather events, at least in part attributable to climate change, have revealed the increased vulnerability of the Gulf's natural and human communities.
- Revised projections of sea-level rise and its impact on Louisiana by 2050 have estimated that more land will be lost than earlier estimates indicated, even with restoration measures.
- The decline of oysters has accelerated across the Gulf, with wild oyster harvests dwindling to unprecedented low levels in Florida, Alabama, Mississippi, and Texas. The causes of this decline include too much or too little freshwater, overharvest-



This bridge in Empire, Louisiana, remained closed due to congestion almost 60 days after Hurricane Katrina blew through the area.

PHOTO BY ROBERT KAUFMANN/FEMA



Researchers study a coastal stream in Mississippi.

PHOTO BY AUDRA MELTON/TNC

ing, sedimentation from storms, and lost substrate for settlement.

- Forests in Gulf watersheds have been damaged by storms and are threatened by conversion to other land uses, including urban expansion and intensive agriculture.
- Urban areas around the Gulf have continued to grow, putting pressure on freshwater and coastal resources and increasing the need for protection from storms.
- The COVID-19 pandemic damaged the Gulf's economy by reducing the market for seafood (much of which had been consumed in restaurants) and by shutting down segments of the tourism industry. COVID has, however, stimulated interest in outdoor activities and enhanced people's enjoyment of nature.

## SCIENCE IS INFORMING STRATEGIES FOR GULF RESTORATION

Progress on and monitoring of restoration projects, as well as new research and science, including that funded by the Gulf National Academies of Science Gulf Program and the NOAA Gulf Research Program, are informing our approach to restore the Gulf. Here are some examples of restoration strategies from The Nature Conservancy's own research:

- Natural features, such as mangroves, do mitigate the impacts of storm surge. A study revealed that mangroves in Florida prevented \$1.5 billion in direct flood damages and protected over half a million people during Hurricane Irma in 2017, reducing damages by nearly 25% in counties that had mangroves.
- Buyouts of repetitively flooded properties can reduce loss payments and at the same time create restored natural areas that can mitigate storm damage downstream.
- Properly designed natural and hybrid infrastructure can withstand at least moderate storms and protect adjacent properties from storm damage.
- The beneficial use of dredged materials, if timed and coordinated appropriately, can reduce the cost and speed up the completion of coastal restoration projects.
- Restored oyster reefs can produce multiple benefits. Half Moon Reef in Matagorda Bay, Texas, restored by the Conservancy and partners, has helped to generate an additional \$1.27 million in annual economic activity for the state of Texas through tourism, fishing guide excursions, and recreational fishing.
- A report on migratory marine and avian species revealed the importance of migratory corridors and hot spots across the Gulf.
- When trained and effectively led, young adults organized through conservation corps can accomplish meaningful conservation work.

Oyster reef restoration on a Texas barge.

PHOTO BY JEROD FOSTER



# THE NATURE CONSERVANCY'S PROPOSED OVERALL GOAL FOR GULF OF MEXICO RESTORATION

WE PROPOSE THAT AN OVERALL GOAL FOR  
GULF OF MEXICO RESTORATION SHOULD BE ...

To restore and sustain the natural systems within the Gulf of Mexico and that affect the Gulf to enable those systems to provide habitat for the full range of native plant and animal species in Gulf lands and waters; ensure that people who depend on the Gulf benefit economically, ecologically, and socially from Gulf restoration; and make human and natural communities more resilient to change.

The Nature Conservancy staff and partners plant Sea Oats along the shore of Round Island, a few miles off the shore of Pascagoula, Mississippi. These plantings are to help ensure from future erosion of the island itself, as well as help nature take back this island from the sea. PHOTO BY MATTHEW BÖROWICK



# Recommendations

## PRINCIPLES FOR GULF RESTORATION

We suggest several overall principles to guide Gulf restoration, regardless of the program or funding source:

- **Base restoration on the best available science**, engineering, monitoring, and adaptive management. The majority of scientific research being done in the Gulf should be designed to inform practical resource restoration and management decision-making.
- **Reach out to, listen to, and respect** affected stakeholders at every stage of the restoration process.
- **Support an integrated approach** to project planning and implementation, with an emphasis on large-scale restoration projects, to maximize the environmental benefits and outcomes. Where needed, work across state and local boundaries and initiate pilot projects if the restoration is a new concept.
- **Previous plans and studies** for the restoration of the Gulf and its estuaries contain much good science and community input. Consider these plans when developing new ones.
- **Take a long-term view.** Short-term plans and projects should create the foundation for ongoing and long-term restoration strategies for the Gulf as a whole.
- **Benefit all communities** throughout the Gulf through the restoration process, with a focus on those with low-income and underserved populations.
- **Make the Gulf region more resilient** to the impacts of climate change, ocean acidification, and sea-level rise. In the last four years, the immediate impacts of climate change in the form of sea-level rise and more intense storms and rainfall events, and the projections of future impacts on Gulf communities, have become even clearer.

## CROSS-CUTTING STRATEGY AND POLICY RECOMMENDATIONS

Specific actions to advance each of the areas of restoration recommended by The Nature Conservancy are explained below, but several strategies cross program and geographic lines:

- Continue to advance restoration and conservation planning on an estuary/watershed basis. Much restoration in the Gulf is already structured in this way, including the revised RESTORE Council's Comprehensive Plan and individual National Estuary Program (NEP) and National Estuarine Research Reserve (NERR) plans. (Louisiana has begun the process to add another NERR to the Gulf.) Establishment of three Estuary Programs in Florida's panhandle region is an important step forward. Citizens and local elected officials identify with their bays and estuaries and provide long-term support for their restoration. State-of-the-art conservation planning, including threat and situational analysis, can readily take place on an estuary/watershed basis. The estuary/watershed approach, such as that used by NEPs in the Gulf, can coordinate restoration and management and increase collaboration across local, state, and federal agencies.
- Coordinate and leverage the expenditures of Deepwater Horizon spill-related funds at the federal, state, and local levels among each other and with other sources of public and private investment to accomplish watershed and Gulf-wide projects at scale. It can be difficult to use multiple sources of funds for individual projects, given federal administrative processes, so procedures should be changed to allow pooled funding.
- Involve under-resourced, socially vulnerable, and low-wealth communities and people in every aspect of Gulf restoration.
- Use disaster response funds strategically to contribute to long-term resilience to storms and floods, while responding to immediate human needs.
- Seek private investment in Gulf restoration and management by partnering with companies on restoration that benefits the private sector and by exploring the use of private capital to accelerate restoration activities.
- Employ nature-based solutions, such as restoring oyster and coral reefs, seagrass beds, mangroves, sand dunes, marshes, coastal forests, coastal prairies, and barrier islands, and the ecological and physical processes that maintain these systems, to increase the resilience of natural and human communities.
- Develop new permitting strategies to reduce the time required to review Gulf restoration projects, to expedite and streamline restoration actions without compromising the function and intent of laws and regulations that protect the environment. These strategies can include issuing General Permits, forming multi-agency permitting teams, and permitting on a watershed basis.
- Share state-of-the-art restoration information freely and promptly across the Gulf to reduce duplication of effort and move new restoration science into on-the-ground action.
- Connect nearshore restoration with upland and offshore economic and ecological health, recognizing that many species are dependent on estuaries during their life history, and many human communities are dependent on activities occurring on land and in the Gulf's offshore waters.
- Utilize the Strategic Conservation Assessment decision support tool developed by the U.S. Fish and Wildlife Service to identify and evaluate land conservation priorities.



## ACTIONS TO MEET THE GOALS OF OUR FUTURE GULF 2.0

A floodlight illuminates the Atchafalaya Conservation Center in Bayou Sorrel, Louisiana. The Nature Conservancy Louisiana works with community members in the Atchafalaya River Basin on efforts to conserve the region and provide economic stability. September, 2020.

PHOTO BY RORY DOYLE

The Nature Conservancy's review of the science and status of Gulf of Mexico restoration and lessons learned over the past four years suggests four areas of action for further successful restoration over the next 3 to 5 years.

**FRESHWATER SYSTEMS** | It is clearer than ever that what happens upstream impacts the health of the Gulf's estuaries and that the health of those estuaries affects the condition of the whole Gulf. Actions associated with freshwater systems address the quality, quantity and timing of water flowing to the Gulf.

**COASTAL SYSTEMS** | These actions address threats to the coast itself, including the impacts of climate change and sea-level rise.

**OFFSHORE SYSTEMS** | These actions improve the condition of offshore habitats and far-ranging species.

**PEOPLE** | Gulf restoration should benefit all people living in the Gulf region.

Here are the strategies and actions we suggest ...

### ACTIONS RELATING TO FRESHWATER SYSTEMS

**1. Work upstream with private landowners** to protect, restore, and maintain floodplains and other forested lands in a healthy and, where appropriate, natural condition.

- a. Continue the use of Natural Resources Conservation Service programs to restore agricultural lands that are unsuitable for farming to bottomland hardwood forests and other wetland types to reduce flooding and improve water quality.
- b. Identify carbon credit sales and other market mechanisms that will make it profitable for landowners to restore the wettest and most flood-prone agricultural lands to natural land cover types, such as floodplain forests.
- c. Implement the RESTORE project sponsored by the State Foresters in Florida, Alabama, and Mississippi to provide technical assistance to private forest landowners in priority watersheds.
- d. Use funding from Deepwater Horizon, the recently expanded Land and Water Conservation Fund, the North American Wetlands Conservation Act, and state sources to acquire outright and through conservation easements large and strategic tracts of forest land in Gulf watersheds.
- e. Support the Grassland Restoration Initiative Program in Texas, which provides funding for technical assistance and habitat delivery for restoration in priority coastal prairies and watersheds.
- f. Also in Texas, state agencies should continue to promote sustainable land management practices (invasive species control, prescribed fire regimes, and rotational grazing) and document how these practices influence coastal health.

**2. Seek and implement funding** from Deepwater Horizon, the Land and Water Conservation Fund, the North American Wetlands Conservation Act, FEMA, and state sources to acquire outright tracts of land with high conservation value in Gulf watersheds.

- a. Focus on acquiring lands that contribute to biodiversity protection, provide ecosystem services, and are contiguous with existing protected land.
- b. Where feasible, buy out other properties that have been exposed to repetitive flooding or natural hazard losses. These properties should become greenspace, offering multiple uses and benefits.

**3. Manage water and public lands** to restore or optimize their conservation values while protecting human communities from flood damage.

- a. In conjunction with the U.S. Army Corps of Engineers and other stakeholders, identify options for management of Lower Mississippi River flows to reduce flood risk to vulnerable communities and reduce impacts on riverine and marine ecosystems.
- b. Work with the U.S. Army Corps of Engineers and multiple stakeholders to evaluate the options for restoring fish passage on rivers that are tributaries to the Gulf.

- c. Connect side channels on the Mississippi River and advocate for aquatic connectivity on other Gulf tributary rivers and streams through culvert design and replacement.
- d. Develop environmental water transactions to restore riverine systems, hydrologic connectivity, and freshwater inflows for nearshore wetland and estuarine habitats.
- e. Support the restoration and environmental management of public lands, such as through stewardship contracting on National Forests, and through projects to restore hydrology on public lands, such as the Apalachicola Regional Stewardship Project.
- f. Expand state water use planning and policy, including flow standards.

**4. Advocate for improved research, modeling, and monitoring** to optimize freshwater flows in Gulf estuaries.

- a. The U.S. Geological Survey should establish a more comprehensive salinity monitoring program across the Gulf.
- b. Measure the relationship of changing freshwater flows to the restoration and management of oysters across the Gulf.

**5. Expand incentives** to reduce nutrient flows into the Mississippi Basin. The larger Mississippi Basin contributes nutrients, mostly from agricultural runoff to the Mississippi, which produce the dead zone at the mouth of the river. While managing nutrient runoff lies outside the scope of Deepwater Horizon investment, measures are needed to reduce nutrient runoff in fields and on their edges and through floodplain restoration. These should build on existing Natural Resources Conservation Service Programs and include ideas such as supply chain goals.



**ACTIONS RELATING TO COASTAL SYSTEMS**

**1. Protect wetland migration corridors** and other strategic coastal lands.

- a. Incorporate climate change scenarios and future habitat predictions into land acquisition, wetlands protection and restoration decisions, including identification of the most important wetland migration corridors in the Gulf region. Wetland migration corridors are areas that will become wetter as sea level continues to rise; they should be protected from development to allow valuable wetland functions to survive.
- b. The U.S. Fish and Wildlife Service and state agencies should identify specific areas and funding sources to acquire land in fee or easement to be protected to maintain the function of coastal wildlife refuges and other protected areas. This may require expansion of refuge and other public land boundaries.

**2. Use nature-based solutions** to make coastal communities more resilient to storms and floods.

- a. Continue to evaluate the effectiveness, design, and distribution of these systems, including monitoring projects following storm events.



- b. State/local government should develop policy options and incentives for encouraging, planning, and implementing these systems for risk reduction and adaptation.
- c. Use areas adversely affected by hurricanes, such as the area damaged by Hurricane Michael, including Tyndall Air Force Base in Florida, to explore effective nature-based systems investment planning.
- d. Continue to review the effectiveness of living shorelines and encourage more living shoreline construction projects based on the best current science and engineering.
- e. Encourage private landowners, particularly industrial companies, to adopt nature-based systems to protect their properties.
- f. Communities should participate in FEMA’s Community Rating System to identify opportunities to protect open space and increase coastal resilience while reducing flood insurance rates for their residents.

**3. Restore and sustain oyster reefs** across the Gulf.

- a. Develop comprehensive and integrated oyster management and/or restoration and recovery plans for important estuaries.
- b. Adopt appropriate oyster stock enhancement, maintenance, and management methods that help maintain oyster populations

Pelicans take flight in the Sabine National Wildlife Refuge.

PHOTO BY AUDRA MELTON/TNC



A fishing boat off the Mississippi coast.

PHOTOS BY AUDRA MELTON/TNC

for their multiple benefits.

c. Implement the Deepwater Horizon Natural Resource Damage Oyster Framework, including creation of a system of oyster spawning sanctuary reefs across the Gulf.

d. Construct strategically located and appropriately designed oyster reefs to implement oyster recovery plans and demonstrate construction and management techniques.

e. Encourage oyster aquaculture to diversify fishing opportunities and to provide some ecosystem services.

**4. Conserve, restore, or enhance** depleted coastal and/or nearshore ecosystems to maintain biodiversity and ecosystem services.

a. Continue to develop, distribute more widely, and use decision-support tools to define restoration goals and identify sites for implementation.

b. Explore the utility of mangroves to provide ecosystem and coastal resilience benefits. Where appropriate, research the potential for mangrove expansion as a coastal resilience strategy in the northern Gulf.

c. Use the latest science-based techniques to restore coral reefs in the Florida Keys.

d. Support the work of national and state estuary programs, National Estuarine Research Reserves, and other planning and coastal management organizations that are stakeholders. These long-standing entities can play a significant role in Gulf restoration.

e. Quantify and document the value of the ecosystem services provided by natural coastal features as a tool for securing investment in natural systems.

f. Address sediment loss in coastal systems and work with local and regional beneficial use programs to influence where and how nourishment projects are conducted.

## ACTIONS RELATING TO OFFSHORE SYSTEMS

**1. Increase mapping, data collection, and resource protection** in offshore areas.

a. Evaluate options for expansion and enhanced management of the Flower Garden Banks and the Florida Keys National Marine Sanctuaries.

b. Continue offshore habitat mapping and evaluation of restoration activities.

c. Expand research on the migratory pathways of marine and avian species through the Gulf as a step toward further protection of migratory corridors.

**2. Continue the careful management of Gulf fisheries** for their economic and ecological values.

a. Further involve user groups in decisions about fisheries management.

b. Accelerate effort to reduce bycatch and overharvest, including initiatives to reduce snapper/grouper barotrauma.



GulfCorps crew members restoring habitat in coastal Louisiana.

PHOTO BY JEFF DEQUATTRO/TNC

## ACTIONS RELATING TO THE PEOPLE OF THE GULF REGION

**1. Continue, expand, and broaden GulfCorps**, a project that hires young adults to restore coastal habitats.

- Renew GulfCorps with RESTORE funding.
- Coordinate GulfCorps with any new infrastructure/economic stimulus programs.
- Increase training and mentoring of GulfCorps members to prepare them for productive careers in conservation and related fields.

**2. Proactively engage a wide array of partner and stakeholder organizations** in planning Gulf restoration activities. Collaborate with stakeholders who are impacted by conservation strategies and implement projects that will benefit at-risk communities.

**3. Engage with resource-dependent communities** (e.g., fish and shellfish harvesters) to improve resource stocks and to improve access to and increase confidence in data used for management decisions. Engagement should involve connecting people to nature, providing direct interaction with stakeholders, and supporting sustainability in working waterfronts and fishing communities.

# Restoration Opportunities

The Nature Conservancy supports an estuary/watershed approach to Gulf restoration to connect terrestrial, freshwater, and coastal systems. Appendix II highlights estuaries where there are opportunities to implement and/or support our specific proposed conservation strategies. We believe the following locations represent many of the most immediate opportunities to bring benefits to natural systems and human communities:

## ALABAMA

Mississippi Sound  
Mobile Bay  
Perdido Bay

## MISSISSIPPI

Mississippi Sound

## FLORIDA

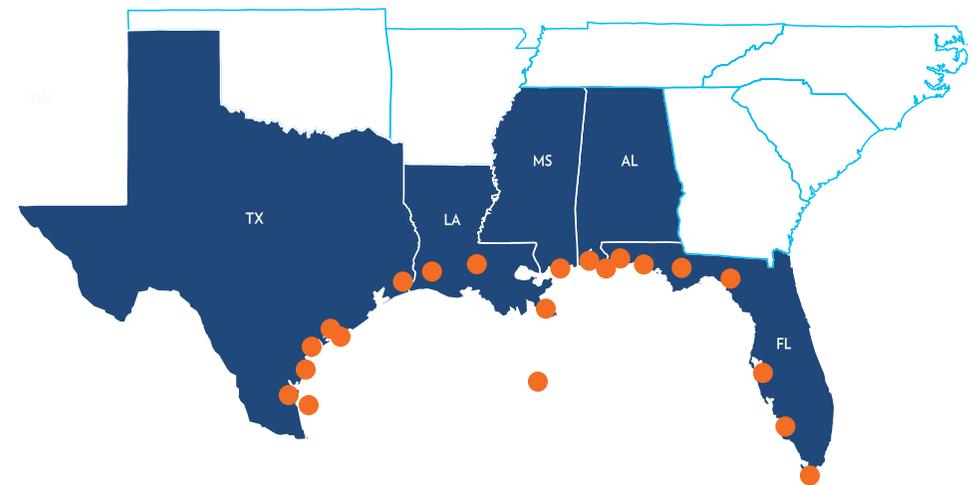
Apalachicola Watershed  
Florida Keys and Dry Tortugas  
Florida Panhandle Bays  
Suwannee/Big Bend Watershed  
Tampa Bay to Charlotte Harbor Estuaries

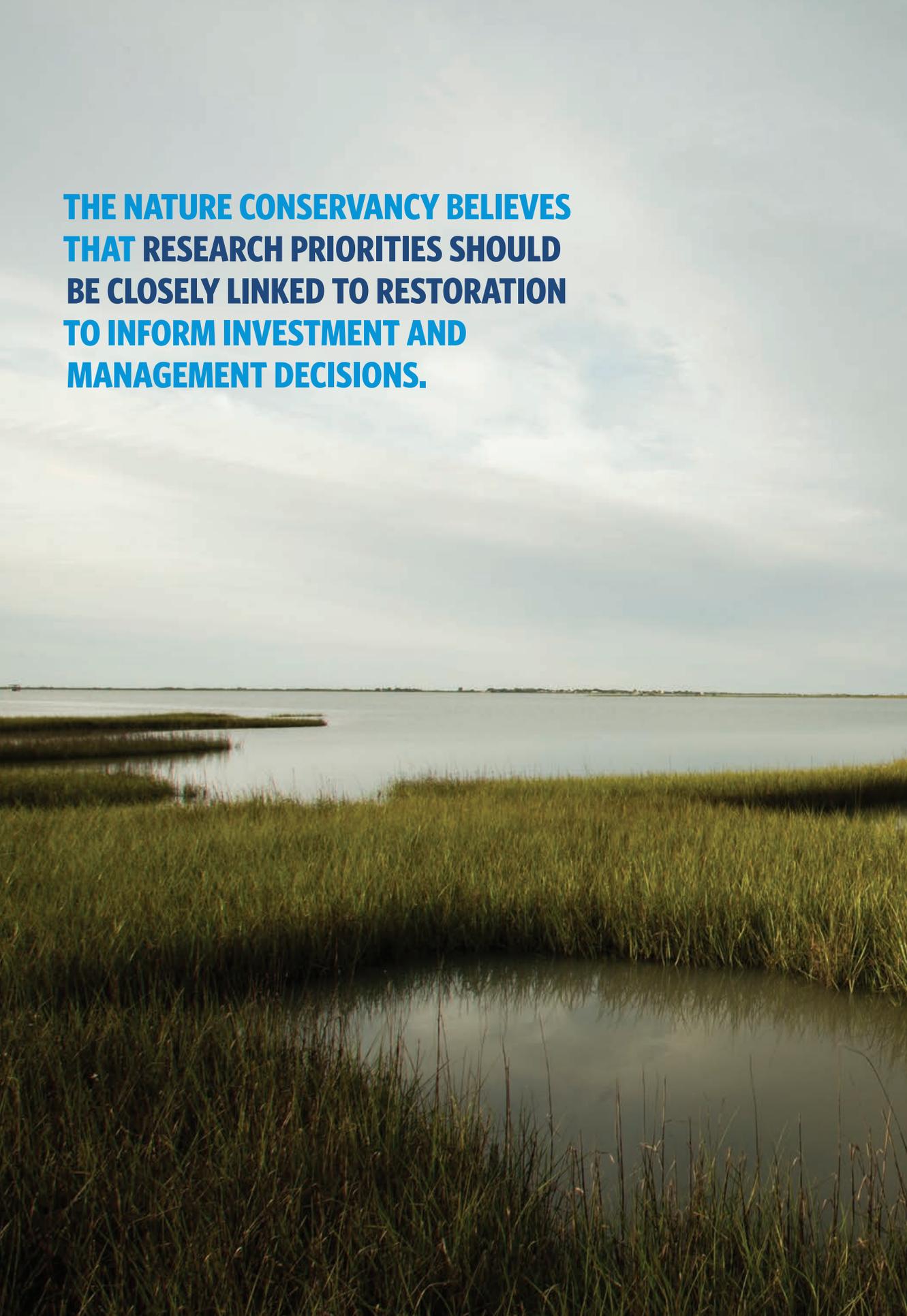
## TEXAS

Aransas Bay  
Corpus Christi Bay  
Galveston Bay  
Laguna Madre  
Matagorda Bay  
Sabine Lake  
San Antonio Bay

## LOUISIANA

Atchafalaya Basin  
Calcasieu River and Lake  
Mississippi River Delta





**THE NATURE CONSERVANCY BELIEVES  
THAT RESEARCH PRIORITIES SHOULD  
BE CLOSELY LINKED TO RESTORATION  
TO INFORM INVESTMENT AND  
MANAGEMENT DECISIONS.**

## Research Priorities

- 1. Improve projections of future environmental conditions**, including the impacts of sea-level rise and other climate factors on habitat migration.
- 2. Further evaluate the effectiveness of natural infrastructure** in reducing coastal erosion and risk from storms and riverine flooding.
- 3. Build on our recent study** of how open space conservation can reduce the impacts of coastal and riverine flooding.
- 4. Improve mapping and understanding** of open Gulf habitats and migratory marine species pathways, potential shifts with climate change, and other threats to migratory processes.
- 5. Estimate the historical impact** of anadromous fish on the Gulf ecosystem and the impacts of restoring spawning runs of these fish.
- 6. Continue to evaluate** the extent of ecosystem benefits and services provided by oyster habitat, fisheries, and aquaculture to inform reef restoration and management of oyster fisheries.
- 7. Evaluate the impact** of coastal and estuarine habitat restoration on fish populations and fisheries health, recognizing the link between coastal and offshore habitats.
- 8. Continue to research and document** impacts to coral reef systems (e.g., disease, bleaching), and design and test existing and new restoration techniques to reverse the decline of the Gulf's coral reef systems.
- 9. Conduct more comprehensive studies** on the impact of freshwater flows and nutrients in tributary rivers on estuarine health.

The 17,351-acre Powderhorn Ranch in Calhoun County, one of the few remaining large tracts of intact native coastal prairie and wetlands on the Texas coast, will become a state park and wildlife management in the wake of a cooperative effort between the Conservancy, The Conservation Fund, and the Texas Parks and Wildlife Foundation. The National Fish and Wildlife Foundation funded a significant portion of this at-scale conservation project using settlement fees from the 2010 Deepwater Horizon explosion and resulting oil spill. PHOTO BY JEROD FOSTER



## Summary and Conclusion

The Nature Conservancy believes that good progress is being made toward Gulf of Mexico restoration and that the further implementation of the Deepwater Horizon settlement can increase and accelerate that progress. In this report, we have listed the actions we recommend to achieve a healthy and sustainable Gulf. It is vital to establish clear long-term goals and to ensure that agencies, organizations, businesses, and other stakeholders cooperate to achieve those goals.

But even with science-based goal setting and unprecedented levels of cooperation, **the Gulf cannot be put back the way it once was—a vast wilderness, teeming with fish and wildlife and shaped by the dynamic forces of floods, hurricanes, and wildfires. We can, however, work together to create a vibrant future Gulf, using the principles of nature to adapt and restoring natural features and natural functions.**

This future Gulf will sustain a diversity of plant and animal species and the long-term economic and social vitality of its human communities. Its creation will require all of us to envision the region's future while respecting its past, to engineer restoration projects that work with rather than against natural forces, to conserve critical habitat and places for recreation, and to forge a regional economy that protects and invests in our natural assets. Above all, it will require the continuing involvement of the full range of people and communities in the region and the governments that represent them in every stage of the restoration process.

Oystermen tonging in Apalachicola Bay, Florida (above left).

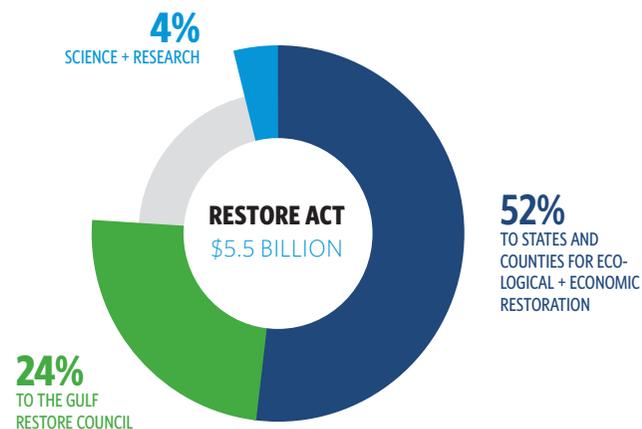
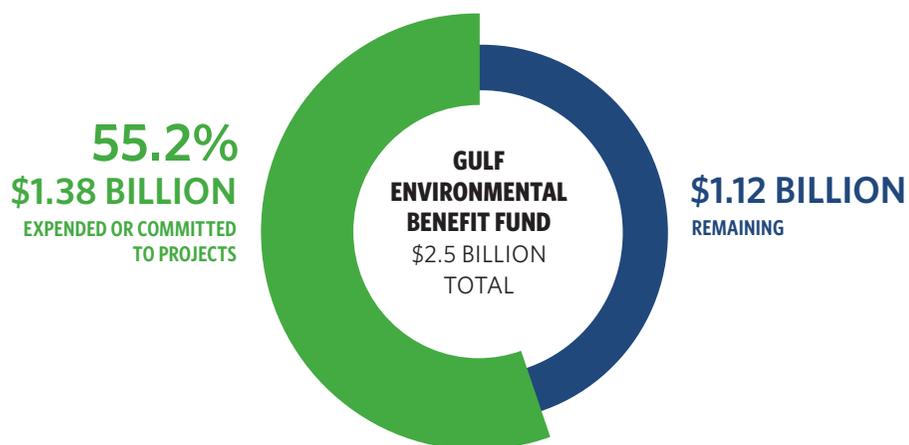
An aerial view of the Lightning Point restoration project in Bayou La Batre, Alabama (below left).

PHOTOS BY RICHARD BICKEL AND MOFFATT & NICHOL

## Appendix I SOURCES OF FUNDING

There are four major sources of Gulf restoration funding (and several additional sources for science and research) as a result of the Deepwater Horizon oil spill. Substantial funding has already been expended in some categories.

➤ Settlement of the criminal cases relating to the spill allocated \$2.5 billion to the National Fish and Wildlife Foundation in 2013 to create a Gulf Environmental Benefit Fund. The states submit projects seeking funding to the foundation and its board approves them, in accordance with the terms of the settlement agreement establishing the fund. Of this amount, \$1.38 billion has already been expended or is committed to projects.

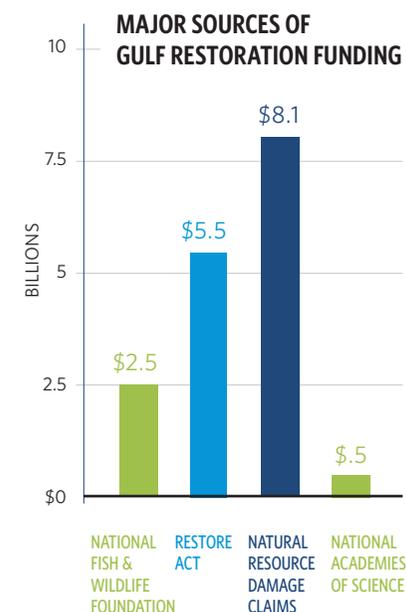


➤ The RESTORE Act makes \$5.5 billion of Clean Water Act civil penalties available over 15 years. These funds are divided into different categories, each of which follows a different decision-making process.

- \$1.32 billion goes to the Gulf RESTORE Council to support environmental restoration projects across the Gulf.
- \$2.86 billion goes to states and counties for ecological and economic restoration. County restoration projects must be consistent with the RESTORE Comprehensive Restoration Plan.
- \$220 million goes to NOAA and Centers of Excellence for science and research on the Gulf.

➤ \$8.1 billion is provided to satisfy Natural Resource Damage claims. These funds are allocated to the five states, region-wide, and to open ocean projects in accordance with the natural resource damage assessment. Funding decisions are made by each state's Trustee Implementation Groups (TIGs), by a region-wide TIG that includes both state and federal officials, and by an Open Ocean TIG composed of federal agencies.

➤ \$500 million has been given to the National Academies of Sciences for Gulf-related science research and for a community-based restoration plan.



# Appendix II

## CONNECTING STRATEGIES TO PLACE

DRAFT STRATEGIES | JULY 2020

	LAGUNA MADRE	CORPUS CHRISTI (NUECES) BAY	ARANSAS (COPANO) BAY	SAN ANTONIO BAY	MATAGORDA BAY	GALVESTON BAY	SABINE LAKE	CALCASIEU RIVER & LAKE	ATCHAFALAYA BASIN	MS RIVER AND DELTA	PEARL RIVER	MS SOUND / MS	MS SOUND / AL	MOBILE BAY	PERDIDO BAY	FL PANHANDLE BAYS	APALACHICOLA WATERSHED	SUWANNEE / BIG BEND	TAMPA BAY / CHARLOTTE HARBOR	FLORIDA KEYS	OFFSHORE
<b>FRESHWATER ECOSYSTEMS</b>																					
Work with private landowners upstream to restore floodplains and maintain forested lands																					
Seek and implement federal and state funding to acquire strategic tracts of land within Gulf watersheds																					
Manage public lands and waters to restore/optimize conservation values while protecting human communities from flood damage																					
Advocate for improved research, modeling, and monitoring to optimize freshwater flows in Gulf estuaries																					
Expand incentives for nutrient reduction in the Mississippi River basin																					
<b>COASTAL ECOSYSTEMS</b>																					
Protect wetland migration corridors and other strategic coastal lands																					
Use nature-based solutions to make coastal communities more resilient to storms and floods																					
Restore and sustain oyster reefs across the Gulf																					
Conserve, restore, or enhance depleted coastal and/or nearshore ecosystems to maintain biodiversity and ecosystem services																					
<b>OFFSHORE ECOSYSTEMS</b>																					
Increase mapping, data collection, and resource protection in offshore areas																					
Continue careful management of Gulf fisheries																					
<b>PEOPLE</b>																					
Continue to expand and broaden GulfCorps																					
Proactively engage a wide array of partners, collaborate with stakeholders impacted and implement projects in locations that will benefit at-risk communities.																					
Engage and assist resource-dependent communities																					
Connect people to the Gulf																					



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The Nature  
Conservancy



Gulf of Mexico

[nature.org/gulf](https://www.nature.org/gulf)